The Sizewell C Project

6.3 Volume 2 Main Development Site
Chapter 14 Terrestrial Ecology and Ornithology
Appendix 14A4 Invertebrates

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SIZEWELL C DEVELOPMENT – MAIN DEVELOPMENT SITE: VOLUME 2, CHAPTER 14:

APPENDIX 14A4 – INVERTEBRATES

Documents included within this Appendix are as follows:

APPENDIX 14A4 INVERTEBRATES

ANNEX 14A4.1 FIGURES (provided separately)

ANNEX 14A4.2 DESK STUDY

ANNEX 14A4.3 SECONDARY DATA

- Annex 14A4.3 Amec 2007 Invertebrate Report
- Annex 14A4.3 Amec 2009 Invertebrate Report
- Annex 14A4.3 Amec 2010 Invertebrate Report
- Annex 14A4.3 Amec 2007-2010 Invertebrate Report

ANNEX 14A4.4 PRIMARY DATA

- Annex 14A4.4 Invertebrate and NVC Surveys of SSSI: Review of previous studies and methodology for further work
- Annex 14A4.4 Sizewell C Invertebrate Surveys 2014
- Annex 14A4.4 Sizewell C Invertebrate Surveys 2016

NOTE:

Please note that the red line boundary used in figures within this document may have since been amended, and therefore does not reflect the boundaries in respect of which development consent has been sought in this application. However, the amendment to the red line boundary does not have any impact on the findings set out in this document and all other information remains correct.

VOLUME 2, CHAPTER 14: APPENDIX 14A4 – INVERTEBRATES

Contents

Tables

Plates

None provided.

Figures

Executive Summary

This appendix describes the baseline conditions for terrestrial and aquatic invertebrates which have been assessed within the Zone of Influence (ZOI) of the Sizewell C power station at the main development site (hereafter referred to as the "proposed development").

Desk-study data identified two statutory designated sites that have invertebrates cited as qualifying features of interest; these are: Minsmere to Walberswick Heaths and Marshes Ramsar site and Site of Specific Scientific Interest (SSSI), and Sizewell Marshes SSSI. Desk-study records revealed records of Norfolk hawker (*Anaciaeschna isosceles*), a species protected under Schedule 5 of the Wildlife and Countryside Act (Ref. 1.1) as well as a number of Nationally Scarce and Red Data Book (RDB) species.

Results were combined from field surveys undertaken of the proposed development site (hereafter referred to as the "site") and wider area, and are presented within 15 distinct Assessment Compartments, shown on **Figure 14A4.3**, **Annex 14A4.1 – Figures**, encompassing the site and the wider study area. The invertebrate species recorded within the Assessment Compartments considered to be directly impacted by the proposed development through habitat loss were subjected to analysis with the Invertebrate Species-habitat Information System (ISIS, now called Pantheon). This recognises invertebrate assemblage types in species lists, labels them in terms that relate to their favoured habitats and provides an indication of conservation value.

In total, 2,068 species of invertebrates have been identified. This included one protected species, Norfolk hawker dragonfly, and at least 22 RDB species recorded within the study area, along with 120 that are considered Nationally Scarce. A number of other invertebrates that are priority species in the Suffolk Biodiversity Action Plan (BAP) (Ref. 1.2) and/or are species of principal importance for the conservation of biodiversity under the Natural Environment and Rural Communities (NERC) Act (Ref. 1.3) are also present, including the rare antlion species *Euroleon nostras*.

ISIS analysis indicated that the site supports invertebrate assemblages of national importance or of high conservation value. The nationally important "reed-fen and pools" along with the broader "permanent wet mire" and "mineral marsh and open water" assemblages highlight the importance of the wetland habitats contained within Assessment Compartments that lie within and adjacent to Sizewell Marshes SSSI. The "unshaded early successional mosaic" assemblage, with the specific nested "bare sand and chalk" and "open short sward" assemblages, were well represented across the site. Assessment Compartments 4 to 6 and 13, in particular, supported nationally important assemblages of this type.

To ensure a robust Ecological Impact Assessment (EcIA) process, the invertebrate assemblage within each Assessment Compartment has been assessed to determine whether it would qualify as an Important Ecological Feature (IEF) as defined in

Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines on EcIA (Ref. 1.4). In addition, the invertebrate assemblages have been assessed in accordance with the standard Environmental Impact Assessment (EIA) methodology used within the **Environmental Statement** (**ES**) (Doc Ref. Book 6).

Based on these criteria, the invertebrate assemblages in the following Assessment Compartments are being taken forward as IEFs:

- The invertebrate assemblage associated with Assessment Compartments 6 and 6a would be classified as an IEF at the international level under the CIEEM guidelines and of high importance following the EIA-specific assessment methodology;
- The invertebrate assemblages associated with Assessment Compartments 1, 2, 3, 4, 4a, 5, 8, 9, 10, 11, 12 and 13 would be classified as IEFs at the national level under the CIEEM guidelines and of high importance following the EIA-specific assessment methodology; and
- The invertebrate assemblage associated with Assessment Compartment 15 would be classified as an IEF at the county level under the CIEEM guidelines and of medium importance following the EIA-specific assessment methodology.

1. Invertebrates

1.1 Introduction

a) Purpose of this appendix

1.1.1 This is an appendix to the power station at the main development site (referred to throughout this volume as the "proposed development") **ES Volume 2, Chapter 14**. This appendix presents the invertebrates baseline of the proposed development site (hereafter referred to as the "site") (and adjacent areas). It describes the methodologies employed in carrying out the desk-studies and detailed surveys, provides the results of this work, and evaluates the invertebrate features that could potentially be affected.

b) Establishing zone of Influence, study area and survey area

1.1.2 The study area for invertebrates is 2km from the site boundary. In establishing an appropriate Zone of Influence (ZOI) for invertebrates, it is necessary to understand that most species are very closely connected to the habitat, or mosaic of habitats, in which they are found. Therefore, the ZOI and the survey area for invertebrates is the site boundary and habitats within the wider area that potentially support valuable invertebrate fauna that could be affected by the proposed development.

c) Structure of this appendix

1.1.3 This appendix has been set out as follows:

- **Section 2** sets out the approach and methodology used for obtaining the desk-study data as well as the results of this data acquisition. The detail of the desk-study information acquired is presented in **Annex 14A4.2**.
- **Section 3** sets out the approach and methodology for the collection of secondary and primary data. The detailed secondary and primary data underpinning these results are presented in **Annex 14A4.3** and **14A4.4** respectively. **Section 3.3** outlines the approach and methodology taken for reporting the survey results and their assessment to establish the baseline condition.
- Finally, **section 4** brings together the survey results and all the information into a detailed consideration of the baseline conditions for invertebrates within the ZOI of the proposed development and identifies those IEFs to be taken forward to be considered and assessed with the EcIA.

1.1.4 Figures summarising the secondary and primary survey areas and Assessment Compartments are presented in **Annex 14A4.1 – Figures**.

d) Desk-Study

i. Approach and methodology

1.1.5 Records for invertebrates were requested from Suffolk Biodiversity Information Service (SBIS) in 2014 and were updated in 2018 for protected species or species with recognised conservation status within 2km of the site boundary.

1.1.6 The citations of all designated sites (statutory and non-statutory) within 2km of the site were reviewed to ascertain if invertebrates were included as qualifying features of interest of these sites.

1.1.7 The Suffolk BAP, Suffolk's Priority Species and Habitats list (Ref. 1.5), and the habitats and species of principal importance included on the Section 41 list of the National Environment and Rural Communities (NERC) Act, were also reviewed with reference to the habitats and species present, or likely to be present, within the site and the wider study area.

1.1.8 The desk-study also resulted in the acquisition of detailed invertebrate information for other locations and habitats within the ZOI of the proposed development from the Sizewell Land Management Reports between 1996 to the present (Ref. 1.6).

1.1.9 The Stage 3 Consultation in 2018 provided butterfly species records from Butterfly Conservation (Ref. 1.7).

ii. Results

1.1.10 The following statutory designated sites mention invertebrates within their citations, are summarised in **Table 1.1**. Full details of the interest features of these sites are provided in **Appendix 14A2 – Designated Sites**.

Table 1.1: Statutory designated sites with an invertebrate qualifying feature.

Designated Site.	Designated Interest Feature.
Minsmere to Walberswick Ramsar site.	The site fulfils the following Ramsar criteria as justification for its selection: Ramsar Criterion 2 (Ref. 1.8): "*This site supports nine Nationally Scarce plants and at least 26 Red Data Book (RDB)*[1] *invertebrates. Supports a population of the mollusc Vertigo*

[1] Pre 1994 list of rare and endangered species within the UK

Designated Site.	Designated Interest Feature.
	angustior (Habitats Directive Annex II; RDB1 (Endangered)[2]), recently discovered on the Blyth estuary river walls". The following invertebrate species are those listed in the Ramsar citation: the moth species (*Ethmia bipunctella)*, silver barred (*Deltote bankiana*), White-mantled Wainscot (*Archanara neurica*), marbled clover (*Heliothis viriplaca*), dotted footman (*Pelosia muscerda*), fenn's wainscot (*Photedes brevilinea*), flame wainscot (*Senta flammea*), shaded fan-foot (*Herminea tarsicrinalis*), *Eucosma catroptana*, *E.maritima*, *Melissoblaptes zelleri*, and *Pima boisduvaliella*; the beetle species *Gymnancycla canella*, *Aleochara inconspicua* and *Philonthus dimidiatipennis*; the fly species *Erioptera bivittata*, *E. meijerei*, the long-horned cleg (*Haematopota grandis*), *Tipula marginata*, *Cephalops perspicuus*, *Telmaturus tumidulus*, *Acartophthalmus bicolor* and *Limonia danica*; the freshwater bivalve *Pisidium pseudosphaerium*; the mud wasp *Podalonia affinis*; and the wolf spider *Arctosa fulvolineata*.
Minsmere to Walberswick Heaths and Marshes Site of Specific Scientific Interest (SSSI).	The citation for the Minsmere to Walberswick Heaths and Marshes SSSI includes the following text within its "Description and Reasons for Notification": "*The marshes have a rich insect fauna, particularly moths, which includes a number of rare species, notably white-mantled wainscot, Photedes brevilinea and Senta flammea. Many Nationally Rare[3] and scarce[4] invertebrates such as the soldier fly Odontomyia ornata are found [in the grazing marsh] east of Eastbridge*" (Ref. 1.9).
Sizewell Marshes SSSI.	The SSSI citation for Sizewell Marshes (Ref. 1.10) includes the following text within its "Description and Reasons for Notification": "*Sizewell Marshes are important for their large area of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates. The variety of ditch depths and widths, together with their fringing vegetation provide an important contribution to the site's habitat value for invertebrates and birdlife. Sizewell Marshes are of exceptional interest for their invertebrate fauna, supporting a wide range of taxa and many nationally rare or scarce species. These include terrestrial and aquatic beetles (Coleoptera), flies (Diptera), moths (Lepidoptera), dragonflies (Odonata) and spiders (Araneae).*"

1.1.11 The following non-statutory designated site mentions invertebrates within its citation, summarised in **Table 1.2**. Full details of this site are provided in **Appendix 14A2 – Designated Sites**.

[2] Pre 1994 Endangered Status: Species in danger of extinction and whose survival is unlikely if causal factors continue to operate. Endangered species either (a) occur as only a single population within one 10-km square, or (b) only occur in especially vulnerable habitats, or (c) have been declining rapidly or continuously for twenty years or more to the point where they occur in five or fewer 10-km squares, or (d) may already have become extinct

[3] Post 1994 Great Britain (GB) Rarity Status: Native species which have not been recorded from more than 15 British hectads in recent decades and where there is reasonable confidence that exhaustive recording would not find them in more

[4] Post 1994 GB Rarity Status: Native species which are not regarded as Nationally Rare AND which have not been recorded from more than 100 British hectads in recent decades and where there is reasonable confidence that exhaustive recording would not find them in more

Table 1.2: Non-statutory designated sites with an invertebrate interest.

Designated Site.	Designated Interest Feature.
Suffolk Shingle Beaches County Wildlife Site (CWS)	Citation notes that "*There are rare invertebrate species found in these coastal sites.*" (Ref. 1.11).

1.1.12 The full results of the desk-study are presented in **Annex 14A4.2** and are summarised below. The desk-study revealed that the site is surrounded by a wide variety of habitats of value to both aquatic and terrestrial invertebrates, including: fen meadow; lowland ditches; wet woodland; reedbed; acid grassland; heathland; coastal grassland; sand dune; and shingle habitats.

1.1.13 A total of 165 invertebrate species of some nature conservation value were revealed by the desk-study within 2km of the site and consisted of the following:

- thirty-two *Coleoptera* (beetles). Of these, there was one RDB2[5] species, one RDB3[6] species, two International Union for Conservation of Nature (IUCN) Near Threatened[7] species, one species listed under Section 41 of the NERC Act and 27 species considered Nationally Scarce;
- thirty-three *Diptera* (true flies). Of these, there were four RDB2, one RDB3 and one RDBK[8] species, one species listed under Section 41 of the NERC Act, three IUCN Near Threatened species, and 24 species considered Nationally Scarce;
- thirteen *Hymenoptera* (bees, wasps, ants and sawflies). Of these, there was one RDB1 species, one RDB2 species and 11 species considered Nationally Scarce; and
- eighty-six *Lepidoptera* (butterflies and moths). This comprised:
  - ten butterfly species, three of which are protected under Schedule 5 of the Wildlife and Countryside Act (W&CA) (purple emperor (*Apatura iris*), silver-studded blue (*Plebejus argus*) and white-letter

[5] Pre 1994 Vulnerable Status: Species which are likely to move into the Endangered category in the near future if causal factors continue to operate. Vulnerable species are declining throughout their range or occupy vulnerable habitats.
[6] Pre 1994 Rare Status: Species which occur in small populations and although not currently either Endangered or Vulnerable are at risk. Rare species exist in 15 or fewer 10-km squares, or are more widespread than this but dependent on small areas of especially vulnerable habitat.
[7] Post 1994 Threat Criteria: A species that does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
[8] Pre 1994 Status: Species suspected to merit either Endangered, Vulnerable, Rare or Indeterminate status but lacking enough information.

hairstreak (*Satyrium w-album*), three IUCN Vulnerable[9] species, three IUCN Near Threatened species and one species considered Nationally Scarce. Eight of the ten butterfly species are listed under Section 41 of the NERC Act;

– seventy-seven moth species. Of these, there were two RDB2 species, nine RDB3 species, 48 species listed under Section 41 of the NERC Act and 18 species considered Nationally Scarce; and

– three *Odonata* (dragonflies and damselflies). Of these, one species (Norfolk hawker (*Aeshna isoceles*)) is protected under Schedule 5 of the W&CA, one IUCN Near Threatened species and one species considered Nationally Scarce.

1.1.14 These desk-study records came from 22 locations with the majority of these records (69.4%) from the Royal Society for the Protection of Birds (RSPB) Minsmere Reserve area within Minsmere to Walberswick Heaths and Marshes SSSI, north of the site. The next highest aggregation of records (9.1%) came from the wider EDF Energy Estate.

1.1.15 The following is a summary of the key invertebrate findings from a review of the NGL Sizewell Land Management Annual Reports (Ref. 1.6):

- Norfolk hawker has been seen in good numbers within Sizewell Marshes SSSI from 2011 to 2018;
- Banded demoiselle (*Calopteryx splendens*) and "*emerald dragonfly*" (presumably the downy emerald (*Cordulia aenea*)) have been seen in small numbers on Goose Hill marshes along the Leiston Drain. Willow emerald damselfly (*Chalcolestes viridis*) was recorded for the first time in 2013;
- a very rare migrant species of butterfly, yellow-legged tortoiseshell (*Nymphalis xanthomelas*), has been recorded;
- three Notable (Nb)[10] species were recorded at Upper Abbey Farm during a moth survey: cream-bordered green pea (*Earias clorana)*, dotted border wave (*Idaea sylvestraria)* and reed dagger (*Simyra albovenosa*);

[9] Post 1994 Threat Criteria: A species which the best available evidence indicates that it is facing a high risk of extinction.

[10] Pre 1994 Status: Taxa that do not fall within RDB categories but are nonetheless uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or for less-well recorded groups between eight and twenty vice-counties.

- white admiral butterflies (*Limenitis camilla*) were recorded at six locations on the outer edges of Kenton Hills and Goose Hill in 2013; and
- up to 1,100 antlion (*Euroleon nostras*) pits have been recorded at Walk Barn.

1.1.16 Records from the Suffolk branch of Butterfly Conservation documents 32 butterfly species which were recorded between 2013 and 2017 including seven species with recognised conservation status. Alongside purple emperor, silver-studded blue, white admiral and white letter hairstreak mentioned above, this includes the IUCN Vulnerable grayling (*Hipparchia Semele*), and IUCN Near Threatened wall (*Lasiommata megera*) and small heath (*Coenonympha pamphilus*) butterflies. Butterfly Conservation also notes the presence of two moth species listed under Section 41 of the NERC Act the RBD3 white-mantled wainscot and the lunar yellow underwing (*Noctua orbona*).

e) Field surveys

i. Secondary data – approach and methodology

1.1.17 Wood Group (formerly Entec and Amec Foster Wheeler) undertook invertebrate surveys in 2007, 2009 and 2010. The detailed methodologies for these surveys are described in the following Wood Group reports (provided in **Annex 14A4.3**):

- Wood Group (2014) Sizewell 2007 Invertebrate Report (Ref. 1.12);
- Wood Group (2014) Sizewell 2009 Invertebrate Report (Ref. 1.13);
- Wood Group (2014) Sizewell 2010 Invertebrate Report (Ref. 1.14); and
- Wood Group (2014) Sizewell C New Nuclear Power Station. Terrestrial and Freshwater Ecology, and Ornithology. 2007–10 Invertebrate Survey Report (Ref. 1.15).

1.1.18 The following paragraphs summarise the survey approach and methodology for each survey year. The survey areas, sites and transect routes for all survey years are shown on **Figure 14A4.1**.

2007

1.1.19 The 2007 surveys comprised sampling for terrestrial invertebrates in a total of 11 locations (Sites A to K), and a further ten locations along the coastal strip to the east (Sites La to Lj). Invertebrates were collected using pitfall traps, Malaise traps[11], water traps, sweep netting and vacuum sampling.

1.1.20 In addition, transect surveys for white admiral butterflies were also walked in Goose Hill, Kenton Hills and Nursery Covert in July and August 2007.

2009

1.1.21 Aquatic invertebrate sampling was carried out in a total of 33 ditches and other waterbodies within Sizewell Marshes SSSI in September 2009. These features were sampled with a standard pond net for a three-minute period by passing the net along the banks and over the beds of the shallower ditches. Large freshwater invertebrates were identified and returned to the water, with the rest of the sample preserved for later examination.

1.1.22 Larval surveys for white admiral butterflies were also carried out in August 2009, in Goose Hill, Kenton Hills and Nursery Covert (as a follow up to the 2007 adult surveys).

2010

1.1.23 In 2010, ditches were selected within Sizewell Marshes SSSI for terrestrial invertebrate sampling (i.e. surveying the bankside vegetation rather than the water column) in 13 areas. These were sampled in groups in June 2010 with a sweep net attached to an angling pole.

1.1.24 In addition to the sweep sampling, invertebrates of the reedbed habitat within the north-eastern corner of the Sizewell Marshes SSSI were sampled by means of two Malaise traps. These were erected in early and late June 2010 at two separate locations (indicated on **Figure 14A4.1**). Finally, Norfolk hawker dragonflies were also recorded by locating adults using binoculars.

ii. Primary data – approach and methodology

1.1.25 Following on from the work undertaken by Wood Group, Arcadis Consulting (UK) Limited (formerly Hyder Consulting, and hereafter referred to as Arcadis) carried out further invertebrate surveys between 2014 and 2016. This survey work was designed to update the surveys undertaken by Wood Group.

[11] A tent-like structure used for collecting flying insects. Insects fly into a screen and are funnelled upwards into a collection chamber.

1.1.26 The following studies carried out by Arcadis have been used to inform this baseline (three of these are presented in **Annex 14A4.4**, the other is presented in **Appendix 14C2**):

- Arcadis (2014). Invertebrate and National Vegetation Classification (NVC) Surveys of Sizewell Marshes SSSI: Review of previous studies and methodology for further work (Ref. 1.16);
- Arcadis (2014). Sizewell C Invertebrate Surveys 2014 (Ref. 1.17);
- Arcadis (2020). **Reptile Mitigation Strategy**, presented in **Appendix 14C2A** (Ref. 1.18); and
- Arcadis (2016). Sizewell Invertebrate Species-habitat Information System (ISIS) analysis 2016 (Ref. 1.19).

1.1.27 Further details of the approach within the above studies have been provided in the subsequent sections.

2014

1.1.28 In 2014, following a review of the Wood Group 2007-10 invertebrate survey work, it was determined that the baseline evaluation would benefit from a more systematic assessment of those invertebrate communities that could be affected directly or indirectly by the proposals. Survey effort was therefore targeted specifically to include a more detailed survey of the reedbed, lowland ditches, wet woodland, fen meadow and dune grassland habitats, as well as more detailed mapping of invertebrate habitats. The aim was to survey a representative sample of each habitat, so that detailed species lists could be compiled.

1.1.29 A total of ten "Survey Areas" were assessed during the 2014 surveys (illustrated on **Figure 14A4.2)**. These areas were selected both on the basis that they constituted discrete areas of habitat likely to be of some value to invertebrates and to reflect the sampling locations surveyed in the previous Wood Group studies. Six of the survey areas, Survey Area 1 to 6, were assessed in detail as these were considered most likely to be directly affected by the proposed development. In addition, a further four areas in the wider survey area, Survey Areas 7 to 10, were assessed for their invertebrate habitats to provide context to the assessment.

Invertebrate habitat survey

1.1.30 All 2014 survey areas were subjected to a habitat survey. Broad habitats within the various sampling sites were mapped and plant communities recorded with sufficient resolution to characterise each individual sampling zone in terms of habitat type, structure and condition, with particular reference to the invertebrate assemblages that habitat types present were likely to support.

Aquatic invertebrate survey

1.1.31 Waterbodies within 2014 Survey Areas 1, 2, 3, 4 and 6a were subjected to an aquatic invertebrate survey. Two sampling events occurred, June and August 2014.

1.1.32 Each aquatic invertebrate sample was collected in accordance with the Murray Bligh (Ref. 1.20) 3-minute sweep method (as used by the Environment Agency) the details of which are provided in **Annex 14A4.4 (ii)**.

1.1.33 Where appropriate, samples were identified to species level for the requirements of Community Conservation Indices methodology (Ref. 1.21). Where necessary, specimens were identified using appropriate, current taxonomic keys.

Terrestrial invertebrate sampling

1.1.34 2014 Survey Areas 1 to 6 were subjected to terrestrial invertebrate surveys. In accordance with Drake *et al.* (Ref. 1.22) sampling was undertaken using a combination of standard capture methods recommended for Common Standards Monitoring (Ref. 1.23) of different habitat types. In accordance with Common Standards Monitoring protocol, data was collected using repeatable techniques enabling subsequent analysis using the Invertebrate Species-habitat Information System (ISIS; now called Pantheon), allowing data to be comparable between sampling sites. Sampling was undertaken in suitably dry, sunny weather, over three discrete visits (early June, July and August 2014).

1.1.35 The precise approach to sampling varied according to habitat, with a combination of the following sampling methods used: sweep-nets, beating trays, suction samplers, direct search, water traps, and mercury vapour moth traps. The details of these methods are provided in **Annex 14A4.4 (ii)**.

Identification

1.1.36 Where practical, species were identified on site without undue disturbance; however, many species could not be adequately identified in the field, so it was necessary for samples to be taken for *ex situ* identification using a binocular microscope and appropriate taxonomic keys, as required. As necessary, specialist verification of rare or uncommon species was sought from the appropriate county recorder or expert in the relevant species group.

2015

1.1.37 Further invertebrate survey work was carried out in 2015. The main focus of this work was to investigate reptile invertebrate prey availability in both the donor and receptor sites proposed as part of the **Reptile Mitigation Strategy** (i.e. locations from which reptiles will be removed from, or moved to, respectively, as part of the proposed development; see **Appendix 14C2A** for details). However, the invertebrate samples collected as part of this exercise were also identified to species level to determine whether any rare or scarce species were present in the habitats surveyed. The locations surveyed are indicated by 2015 Survey Areas 1 to 9 on **Figure 14A4.2.**

1.1.38 Surveys in 2015 consisted of one survey visit to each site. Sampling consisted of pitfall traps and pan traps placed within different microhabitats. Detailed information on methodology and the different microhabitats surveyed can be found in **Reptile Mitigation Strategy** (see **Appendix 14C2A** for details).

1.1.39 With the exception of the 2015 Survey Area 9, which was not available at the time of the survey, invertebrates were collected from all sites at the start of May 2015 and stored within industrial methylated spirit. Traps were then set at 2015 Survey Area 9 at the end of May 2015, with samples being collected in early June 2015.

2016

Assessment compartments

1.1.40 Following detailed analysis of the data from the Arcadis 2014 report, and in consultation with Natural England (Ref. 1.24), the ZOI of the proposed development with regard to invertebrates was consolidated into a final set of 15 'Assessment Compartments'. These are illustrated on **Figure 14A4.3** and are listed in **Table 14A4.3** in **section 3.3**. Assessment Compartments were identified as an appropriate division of features for the invertebrate assessment on the basis of their distinct constituent habitats and their position within the landscape relative to the site.

Invertebrate sampling

1.1.41 Six of these Assessment Compartments were surveyed in 2016: 1, 3, 4, 4a, 13 and 15. The aim of the surveys was to fill any gaps in the data acquisition from the previous survey work, including carrying out additional surveys in 2014 Survey Areas 1 and 3 where late season surveys in 2014 had not been possible.

1.1.42 Assessment Compartments 13 and 15 both lie within the site, and sampling within these compartments followed on from sampling undertaken in 2015.

1.1.43 Fieldwork was undertaken using an identical range of sampling methods as used during the Arcadis 2014 survey (detailed in **Annex 14A4.4 (ii)**). These comprised terrestrial sampling methods including timed sweeping, vacuum sampling and beating along with two aquatic samples collected from field drains in Assessment Compartment 3.

1.1.44 As in 2014, water traps were also deployed at most survey sites. The exception was Assessment Compartment 13, where flight interception traps were deployed instead of deploying water traps and undertaking beat sampling. Flight interception traps were suspended from tree branches to catch flying insects, which dropped into a catch pot below and were preserved in an ethylene glycol (antifreeze) solution. Traps were run for approximately two weeks on each of three sampling events. Collected flight interception traps samples were strained and preserved in industrial methylated spirit.

1.1.45 Besides the general sampling and habitat recording undertaken, searches for larval evidence of antlions, in the form of burrows, were undertaken. The searches focused on rides within Assessment Compartment 13 as far north as Walk Barn, on the compartment's northern boundary, and were undertaken during all three surveys (May, June and July 2016).

iii. Reporting and assessment approach

1.1.46 **Section 4** sets out the combined results of all surveys undertaken within each of the 15 Assessment Compartments, shown on **Figure 14A4.3**. Suitable invertebrate habitat is highlighted and a table of species with recognised conservation status is given for each Assessment Compartment and discussed. The habitat and resource requirements for each species with recognised conservation status is also listed. A viable population of individual species within an assemblage, recorded within an Assessment Compartment, is assumed to be present where habitat requirements are met. **Table 1.3** shows the field survey data sources used to inform the assessment for each Assessment Compartment.

Table 1.3: Field survey data sources used to assess each Assessment Compartment.

Assessment Compartment.	Data Source.					
	Arcadis			Wood Group.		
	2016	2015	2014	2010	2009	2007
1	Assessment Compartment 1 sampling.	-	Survey Area 1.	Malaise traps x1 and x2.	Sites 13, 14, 15 and 23.	Site J.
2	-	-	Survey Area 2.	-	Site 12.	-

Assessment Compartment.	Data Source.					
	Arcadis			Wood Group.		
	2016	2015	2014	2010	2009	2007
3	Assessment Compartment 3 sampling.	-	Survey Area 3.	Site M.	Site 29.	-
4	Assessment Compartment 4 sampling.	Sites 7 and 8	-	-	-	Sites A, B, C, D and I.
4a	Assessment Compartment 4°.	-	Survey Area 4.	-	-	-
5	-	-	Survey Area 5.	-	-	Sites La – Ld and Lf – Lj.
6/6a	-	-	Survey Area 6.	-	-	Sites K and Le.
7	-	-	Survey Areas 7 and 7°.	-	-	-
8	-	-	Survey Area 8.	-	Site 22.	-
9	-	-	Survey Area 9.	Sites A, B and C.	Sites 16 – 21.	Site G.
10	-	-	Survey Area 10.	-	-	-
11	-	-	-	Sites D, E and F.	Sites 1 –10.	-
12	-	-	-	-	Sites 11, 24 – 28 and 30 – 33.	-
13	Assessment Compartment 13.	Sites 2, 3 and 4	-	-	White admiral larval search areas 1 – 6.	Sites E and F, east half of white admiral transect.
14	-	Site 5	-	-	White admiral larval search areas 7 – 20.	Site H, west half of white admiral transect.
15	Assessment Compartment 15.	Site 1	-	-	-	-

ISIS analysis

1.1.47 Aquatic and terrestrial invertebrate survey data was analysed using ISIS, an analytical package developed by Natural England as a standard method for the conservation evaluation of British invertebrate communities.

1.1.48 ISIS recognises invertebrate assemblage types in species lists collected at scales ranging from management compartment to landscape character areas. The assemblage types are labelled in terms that relate to the constituent species' favoured habitats. Two levels were recognised in the classification:

- Broad Assemblage Types (BATs) – a comprehensive series of assemblage types that are characterised by more widespread species; and
- Specific Assemblage Types (SATs) – characterised by ecologically restricted species that are generally only expressed in lists from sites with conservation value. SATs are designed to be used as identified features of interest on SSSIs.

1.1.49 The ISIS output gives an indication of the conservation status of analysed invertebrate assemblages. The ISIS output allows for the invertebrate assemblages to be compared against the Favourable Condition Target (FCT) which is the level that denotes the SSSI habitat quality.

1.1.50 ISIS analysis was undertaken on the results of the combined secondary and primary datasets within Assessment Compartments 1, 3, 4/4a, 13, 14 and 15, areas within the site which were considered to be directly impacted by the proposed development, where surveys were undertaken in 2015 and 2016. ISIS analysis results described within **section 4** in Assessment Compartments 2, 5 and 6/6a are based on the 2014 results only, as no 2015 or 2016 surveys were undertaken within these compartments.

iv. Assessment methodology

1.1.51 The invertebrate assemblage within each Assessment Compartment has been evaluated on the basis of the following criteria:

- those designated sites with invertebrates on their selection that are present within and adjacent to each Assessment Compartment;
- where each Assessment Compartment is situated in context to surrounding ecologically valuable contiguous habitat,
- the presence of protected and or notable invertebrate species within each Assessment Compartment; and

- the importance of the habitat specific invertebrate assemblage(s) (BATs and SATs) supported within the habitats present in each Assessment Compartment.

1.1.52 Furthermore, the assemblages are assessed as to whether they qualify as IEFs.

1.1.53 **Section 4** describes the invertebrate baseline for each Assessment Compartment and assigns an ecological value to the Assessment Compartment. This evaluation has then been used, in conjunction with a description of the extent and magnitude of the predicted impacts of the scheme, to carry out the detailed EcIA presented in **ES Volume 2, Chapter 14**.Table 1.17 within this document details the Assessment Compartments which will be carried forward into the detailed assessment. This decision looks at the conservation value of the invertebrate assemblage present against the predicted habitat loss in each compartment, based on the development proposals. This is a measure of the impact due to the loss of resources available to the supported invertebrate assemblage.

1.2 Baseline Conditions – invertebrate features and their importance

1.2.1 This section describes the baseline conditions within each Assessment Compartment using results from the field surveys and ISIS analysis (where undertaken). The invertebrate assemblage supported within each compartment is then assessed for importance, and a consideration as to whether it qualifies as an IEF is provided. Assessment Compartments are shown on **Figure 14A4.3**.

1.2.2 To comply with both the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for EcIA and with the standard EIA methodology used elsewhere within the **ES**, both methodologies have been used to assess the invertebrate assemblage supported within each compartment. Full details of both assessment methodologies are presented in **Volume 1, Chapter 6** and **Appendix 14A1 – Introduction to the Ecological Baseline**.

b) Description and assessment of ecological features

i. Assessment compartment 1

Description

1.2.3 Assessment Compartment 1 lies fully within Sizewell Marshes SSSI and contains a number of habitats that form part of the designation.

1.2.4 This large tract of habitat comprises extensive areas of Common Reed (*Phragmites australis*) reed-swamp, with Alder (*Alnus glutinosa*) and Willow (*Salix* sp.) carr and both secondary and more mature wet woodland. There is also an area of open water within the central part of the reed-swamp, with some more floristically diverse swamp communities present around the margins. A number of wet ditches border and traverse Assessment Compartment 1. These ditches vary in terms of macrophyte diversity and structure and the more open ditches typically support a greater macrophyte diversity and structural range. Aquatic plants characteristic of ditch networks of higher conservation value were recorded, including Frogbit (*Hydrocharis morsus-ranae*) and Soft Hornwort (*Ceratophyllum submersum*), the presence of which provides habitat for potentially important aquatic invertebrate assemblages. Alongside the aquatic habitat, the juxtaposition of reed-swamp and carr habitat, and the presence of open silt areas and water-logged decayed wood, provide niches for more specialised invertebrate species. At a landscape scale, Assessment Compartment 1 provides a connection between wetland habitats within the greater Sizewell Marshes SSSI and those within Minsmere to Walberswick Heaths and Marshes Ramar site and SSSI.

1.2.5 Within this compartment, 769 species were recorded, 32 of which have a recognised conservation status. **Table 1.4** outlines the status of each species and highlights their habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.4: Assessment compartment 1 invertebrate species with a conservation status.

Species Name.	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Norfolk hawker.	*Odonata: Aeshnidae.*	Legal Protection; IUCN Endangered[12] (GB); Section 41 NERC Act; Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond. SAT: W314 – reed-fen and pools.
Rhagio strigosus.	*Diptera: Rhagionidae.*	IUCN Vulnerable; Nationally Rare.	Habitats: shaded woodland floor, tall sward & scrub. Resources: base rich soils; broadleaved woodland; sward/field layer; dry soil humidity; woodland undergrowth.

[12] Post 1994 Threat Criteria: A species which the best available evidence indicates that it is facing a very high risk of extinction in the wild.

Species Name.	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
			SAT: F001 – scrub edge.
Anticheta brevipennis.	*Diptera: Sciomyzidae.*	RDB2	Habitats: peatland Resources: well vegetated shallow freshwater pond; wetland vegetation SAT: W314 – reed-fen and pools.
Prionocera subserricornis.	*Diptera: Tipulidae.*	RDB2	Habitats: peatland; shaded woodland floor; wet woodland. Resources: broadleaved woodland; wet humidity; heavy shade; sphagnum/moss lawn; wet/damp peat. SAT: W314 – reed-fen and pools.
White-mantled wainscot.	*Lepidoptera: Noctuidae.*	RDB3; Section 41 NERC Act.	Habitat: peatland. Resource: wetland vegetation. SAT: W314 – reed-fen and pools.
Subclytia rotundiventris.	*Diptera: Tachinidae.*	RDB3	No information on habitat/habitat requirements.
Buff ermine *Spilosoma lutea.*	*Lepidoptera: Erebidae.*	Section 41 NERC Act – research only.	No specific habitat requirements.
Polydrusus (Chrysophis) formosus.	*Coleoptera: Curculionidae.*	Notable a[13]	Habitat: arboreal. Resources: woodland canopy, broadleaved woodland; leaves and/or stems; terrestrial aspect – larvae root feeders.
Crossocerus (Cuphopterus) binotatus.	*Hymenoptera: Crabronidae.*	Notable b.	Habitat: decaying wood Resource: dead trunks and branches. SAT: A212, F001.
Curculio betulae.	*Coleoptera: Curculionidae.*	Notable b.	Habitat: arboreal. Resources: broadleaved woodland; flowers, buds and shoots; terrestrial aspect – larvae ground active/pupate in soil.
Notaris scirpi.	*Coleoptera: Erirhinidae.*	Notable b.	Habitat: marshland. Resource: wetland vegetation.
Paralimnus phragmitis.	*Hemiptera: Cicadellidae.*	Notable b.	Resource: wetland vegetation.

[13] Pre 1994 GB Status: Species which do not fall within Red Data Book categories, but which are nonetheless uncommon in Great Britain and thought to occur in 30 or fewer (typically between 16 and 30) hectads. Equivalent to post 1994 Nationally Scarce.

Species Name.	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Diogma glabrata.	*Diptera: Cylindrotomidae*	Notable[14]	Habitat: shaded woodland floor. Resources: broadleaved woodland; damp humidity; light shade; woodland litter.
Dicranomyia lucida.	*Diptera: Limoniidae.*	Notable	Habitats: running water; shaded woodland floor; wet woodland. Resources: broadleaved woodland; mud/shallow litter; slow flow; wet humidity; base rich seepage, shaded seepage; heavy shade; woodland stream.
Pherbellia dorsata.	*Diptera: Sciomyzidae.*	Notable	Habitats: marshland; peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation. SAT: W314 – reed-fen and pools.
Pherbellia griseola.	*Diptera: Sciomyzidae.*	Notable	Habitat: peatland Resource: well vegetated shallow freshwater pond; wetland vegetation.
Phaonia falleni.	*Diptera: Muscidae.*	Notable	Habitat: shaded woodland floor, wet woodland. Resource: broadleaved woodland; wet humidity.
Thrypticus divisus.	*Diptera: Dolichopodidae.*	Nationally Scarce.	Habitat: peatland. Resource: deep litter; wetland vegetation.
Thrypticus nigricauda.	*Diptera: Dolichopodidae.*	Nationally Scarce.	Habitat: peatland. Resource: deep litter; wetland vegetation.
Anaspis (Anaspis) thoracica.	*Coleoptera: Scraptiidae.*	Nationally Scarce.	Habitat: decaying wood. Resource: broadleaved woodland; decaying wood – red rot; flowers (adult). SAT; A211 – heartwood decay.
Bembidion (Diplocampa) fumigatum.	*Coleoptera: Carabidae.*	Nationally Scarce.	Habitat: marshland. Resource: mud/shallow litter.
Dolichopus linearis.	*Diptera: Dolichopodidae.*	Nationally Scarce.	Habitat: peatland. Resource: wet/damp peat.
Lesser cockroach	*Dictyoptera: Blattellidae.*	Nationally Scarce.	No available details.

[14] Pre 1994 GB Status: Species which do not fall within Red Data Book categories, but which are nonetheless uncommon in Great Britain and thought to occur in 15 – 100 hectads. Equivalent to post 1994 Nationally Scarce.

Species Name.	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Ectobius panzeri.			
Hybomitra ciureai.	*Diptera: Tabanidae.*	Nationally Scarce.	Habitat: peatland. Resource: wet/damp peat; wetland vegetation. SAT: W314 – reed-fen and pools.
Lithobius (Monotarsobius) curtipes	*Lithobiomorpha : Lithobiidae.*	Nationally Scarce.	Habitat: shaded woodland floor Resource: broadleaved woodland.
Odontomyia ornata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond. SAT: W314 – reed-fen and pools.
Saldula pilosella.	*Hemiptera: Saldidae.*	Nationally Scarce.	Habitats: brackish pools and ditches; saltmarsh. Resource: pond/seepage edge; saline silt. SAT: M311 – saltmarsh.
Tabanus maculicornis.	*Diptera: Tabanidae.*	Nationally Scarce.	Habitats: running water; shaded woodland floor; wet woodland. Resource: broadleaved woodland; wet humidity; heavy shade; woodland stream.
Viviparus contectus.	*[unassigned] Caenogastropoda: Viviparidae.*	Nationally Scarce.	Habitat: marshland. Resource: base soil; sparsely vegetated shallow freshwater pond. SAT: W211 – open water on disturbed mineral sediments.
Elachiptera austriaca.	*Diptera: Chloropidae.*	Potentially Nationally Scarce[15].	Habitat: peatland. Resource: wetland vegetation.
Piezura graminicola.	*Diptera: Fanniidae.*	Potentially Nationally Scarce.	Habitat: decaying wood; shaded woodland floor. Resource: broadleaved woodland; fungal fruiting bodies; damp humidity; fungal fruiting bodies.
Stenomicra delicata.	*Diptera: Periscelididae.*	Potentially Nationally Scarce.	Habitat: peatland. Resource: wetland vegetation. SAT: W314 – reed-fen and pools.

[15] Could be deemed Nationally Scarce but more information is needed.

1.2.6 Ten BATs were recognised in the ISIS analysis. Eight of these comprised a sufficient number of species to be considered robust[16]. Of these, one BAT, the "permanent wet mire" assemblage, achieved a rarity score[17] of 242 which easily exceeds the FCT (the level that denotes SSSI quality) of 180 specified within ISIS for this assemblage. This indicates that Assessment Compartment 1 supports a permanent wet mire assemblage of national importance.

1.2.7 Over a third of the species (37.5%) listed in **Table 1.4** are associated with permanent wet mire (peatland) habitat. This includes the legally protected Norfolk Hawker dragonfly, which requires well vegetated aquatic habitat to breed, especially unspoilt grazing marsh dyke systems with clean, non-saline water and rushy margins (Ref. 1.25). One adult individual was recorded from a Malaise trap in 2010 in the north-east corner of Assessment Compartment 1.

1.2.8 The "flowing water" BAT obtained a rarity score of 150, despite being represented by relatively few (46) species. This equals, but does not exceed, the FCT of 150 specified by ISIS. This assemblage contained two species with recognised conservation status (species associated with running water habitat, **Table 1.4**). The "flowing water" assemblage of Assessment Compartment 1 can therefore be said to be nationally important.

1.2.9 The remaining wetland BAT, "mineral marsh and open water", scored a rarity score of 130, falling short of the FCT of 150. This does not indicate national significance but is relatively close to the threshold so can be said to be of some conservation value.

1.2.10 The other BATs all achieved rarity scores below their respective FCTs; however, two BATs, "grassland and scrub matrix" and "wood decay" assemblages, came relatively close to their FCT thresholds suggesting associated habitats for these assemblages within Assessment Compartment 1 has some conservation value.

1.2.11 The "litter-rich fluctuating wetland" BAT, an assemblage found in wet woodlands, was not represented in the ISIS output of the combined dataset. Despite this, there were 46 species that are associated in part with wet woodland including three species with recognised conservation status, highlighted in **Table 1.4**. Two of these, the RDB2 *Prionocera subserricornis* and the Notable *Dicranomyia lucida,* are Tipulids (craneflies) with complex

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[16] Over fifteen species must be used in the calculation to produce a robust BAT rarity score. A score based on a smaller number of species runs the risk of being unduly influenced by the presence of just one rare species.

[17] An average score derived from scoring individual species within an assemblage based on their designated conservation status

resource requirements reflecting the importance of the mosaic of habitats within Assessment Compartment 1.

1.2.12 Fourteen SATs were recognised from the Assessment Compartment 1 combined dataset. One of these, the "W314 – reed-fen and pools" SAT, achieved a 'Number of Species Score' (species score)[18] of 23 which is over double the FCT set by ISIS of ten for this SAT. This reflects the score registered by the parent "permanent wet mire" BAT and indicates that the W314 assemblage is of national importance. Within this specific assemblage are three RDB and four Nationally Scarce species along with Norfolk hawker, highlighted in **Table 1.4**.

1.2.13 Two other SATs, the "F001 – scrub edge" and "A212 – bark and sapwood decay" assemblages, had species scores close to their respective FCT thresholds which illustrates the importance of woodland edge habitat within Assessment Compartment 1. One species, part of the F001 assemblage, is the snipe fly *Rhagio strigosus,* a Nationally Rare species listed as IUCN Vulnerable; this is associated with the shaded woodland floor habitat within Assessment Compartment 1. Another species, the Notable b crabronid wasp *Crossocerus binotatus*, is associated with both these SATs and relies on the presence of a dead wood resource for nesting. These SATs should be considered in combination with the "arboreal canopy" BAT which was identified in Assessment Compartment 1, and although not considered of high conservation value, further highlights the importance of the mosaic of habitats within this compartment.

Assessment

1.2.14 Given that:

- this compartment is directly within the footprint of the site and Sizewell Marshes SSSI;
- the detailed analysis of the extensive invertebrate survey data for this compartment has shown that at least one protected (Norfolk hawker), four RDB, one IUCN Vulnerable/Nationally rare, two NERC Act, 25 Nationally Scarce, and 3 potentially Nationally Scarce species are present;
- this compartment supports specific reed-fen, pools and broader permanent wet mire assemblages of national importance, and ditch, marsh and woodland assemblages of some conservation value; and

[18] A term within ISIS for the total number of species

- the area is part of a much larger ecological area designated as a SSSI partly for its invertebrate fauna;

then the invertebrate assemblage within Assessment Compartment 1 would:

- be an IEF at the national level under the CIEEM guidelines; and
- be of high importance, following the EIA-specific assessment methodology.

ii. Assessment compartment 2

Description

1.2.15 Assessment Compartment 2 lies within Sizewell Marshes SSSI and comprises extensive areas of reed-swamp, and wet woodland comprising Alder and Willow carr. The reedbed here is typically very dense with a deep litter layer and few associated species other than Common Nettle (*Urtica dioica*) and Bramble (*Rubus fruticosus* agg). More diverse swamp communities are present within the marginal carr, with Water-pepper (*Persicaria hydropiper*), Water Mint (*Mentha aquatica*), Branched Bur-reed (*Sparganium erectum*) and Water Forget-me-not (*Myosotis scorpioides*). Two parallel drains run the entire length of the compartment's north-west border. These ditches support a macrophyte fauna typical of the Sizewell Marshes SSSI as a whole, with the more open stretches supporting a reasonably diverse flora including species such as Frogbit and Soft Hornwort, which are often associated with ditches supporting diverse aquatic invertebrate assemblages.

1.2.16 Within this Assessment Compartment, 360 species were recorded, 19 of which have a recognised conservation status. **Table 1.5** outlines the status of each species and highlights their habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.5: Assessment compartment 2 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Passaloecus clypealis.	*Hymenoptera: Crabronidae.*	RDB3	Habitat: peatland. SAT: W314 – reed-fen and pools.
Variable damselfly *Coenagrion pulchellum.*	*Odonata: Coernagrionidae*.	IUCN Near Threatened.	Habitat: marshland. Resource: well vegetated shallow freshwater pond.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Achalcus thalhammeri.	*Diptera: Dolichopodidae.*	Nationally Rare.	Habitat: peatland. Resource: wet/damp peat.
Gnophomyia viridipennis.	*Diptera: Limoniidae*	Notable	Habitat: decaying wood. Resources: cambial layer; broadleaved woodland. SAT: A212 – bark and sapwood decay.
Psacadina verbekei.	*Diptera: Sciomyzidae.*	Notable	Habitat: peatland. Resources: well vegetated shallow freshwater pond; wetland vegetation.
Polydrusus (Chrysophis) formosus.	*Coleoptera: Curculionidae.*	Notable a.	Habitat: arboreal. Resources: broadleaved woodland; leaves and/or stems, terrestrial aspect – larvae root feeders.
Curculio betulae.	*Coleoptera: Curculionidae.*	Notable b.	Habitat: arboreal. Resources: canopy; broadleaved woodland; inflorescence – flowers, buds and shoots; terrestrial aspect – larvae ground active/pupate in soil.
Notaris scirpi.	*Coleoptera: Erirhinidae.*	Notable b.	Habitat: marshland. Resource: wetland vegetation.
Stenus (Hemistenus) palustris.	Coleoptera: Staphylinidae.	Notable b.	Habitat: peatland. Resource: sphagnum/moss lawn; wet/damp peat. SAT: W313 – moss and tussock fen.
Agonum (Agonum) nigrum.	Coleoptera: Carabidae.	Nationally Scarce.	Habitat: peatland. Resource: deep litter. SAT: W314 – reed-fen and pools.
Campsicnemus pusillus.	*Diptera: Dolichopodidae.*	Nationally Scarce.	Habitat: peatland. Resource: wet/damp peat.
Dolichopus notatus.	*Diptera: Dolichopodidae.*	Nationally Scarce.	Habitat: brackish pools & ditches; running water; sandy beach. Resource: brackish dune slacks; drawdown zone – mud/shallow litter; freshwater seepages; seepages.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Gyraulus (Torquis) laevis.	*Hygrophila: Planorbidae.*	Nationally Scarce.	Habitat: marshland. Resource: well vegetated shallow freshwater pond. SAT: W211– open water on disturbed mineral sediments.
Hybomitra ciureai.	*Diptera: Tabanidae.*	Nationally Scarce.	Habitat: peatland. Resource: wet/damp peat; wetland vegetation. SAT: W314 – reed-fen and pools.
Hydaticus seminiger.	*Coleoptera: Dytiscidae.*	Nationally Scarce.	Habitat: peatland; shaded woodland floor; wet woodland. Resource: broadleaved woodland; wet humidity; heavy shade; well vegetated shallow freshwater pond. SAT: W313 – moss and tussock fen.
Lonchoptera scutellata.	*Diptera: Lonchopteridae.*	Nationally Scarce.	Habitat: peatland. Resource: deep litter; shallow freshwater pond; wetland vegetation. SAT: W314 – reed-fen and pools.
Odontomyia ornata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond. SAT: W314– reed-fen and pools.
Peltodytes caesus.	*Coleoptera: Haliplidae.*	Nationally Scarce.	Habitat: marshland. Resource: sparsely vegetated shallow freshwater pond. SAT: W211– open water on disturbed mineral sediments.
Thrypticus pollinosus.	*Diptera: Dolichopodidae.*	Nationally Scarce.	Habitat: peatland. Resource: deep litter; wetland vegetation.

1.2.17 The species in **Table 1.5** are dominated by those that require peatland and marshland habitats, including the RDB3 crabronid wasp species *Passaloecus clypealis* which is found only in *Phragmites* reedbeds. This is reflected in the ISIS analysis undertaken on the 2014 survey results, which indicates that Assessment Compartment 2 supports “permanent wet mire” and “mineral marsh and open water”, both BATs of national importance.

1.2.18 None of the SATs recorded from the ISIS output for this Assessment Compartment exceeded the required FCT thresholds. However, the closely allied “W314 – reed-fen and pools” and “W211 – open water on disturbed mineral sediments” assemblages were well represented and close to their respective thresholds, as was the “A212 – bark and sapwood decay” assemblage. These three SATs contained species with recognised conservation status, highlighted in **Table 1.5**. The “W221 – litter-rich fluctuating marsh” SAT, which is found in wet woodland, was also well represented and close to its respective threshold, although no species with recognised conservation status associated with it were recorded. Although the FCT of these SATs were not reached, they are still considered to be of high conservation value.

1.2.19 The Community Conservation Indices analysis undertaken on the 2014 aquatic survey results indicated that, while Community Conservation Indices “Favourable Condition” status was not reached, the collective rarity and overall diversity of the fauna was of “very high conservation value”. This classification is interpreted by Chadd and Extence as “sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness”. Such sites are potentially of national significance.

1.2.20 Of the habitats recorded, the ditch network, reedbed and wet woodland all contribute to the overall very high conservation value of Assessment Compartment 2, as do the close proximities to other compartments within the Sizewell Marshes SSSI including, amongst others, Assessment Compartments 1 and 3. Whilst there are more extensive areas of similar reedbed habitat elsewhere within the Sizewell Marshes SSSI, it appears that because this area comprises former fen meadow that is developing into reedbed, this may have elevated the importance of the area for invertebrates.

Assessment

1.2.21 Given that:

- the detailed analysis of the extensive invertebrate survey data for this compartment has shown that at least one RDB3, one IUCN Near Threatened, one Nationally Rare and 17 Nationally Scarce species present;
- this compartment supports “permanent wet mire” and “mineral marsh and open water” assemblages of National importance;
- the rarity and overall diversity of the fauna was of very high conservation value;
- the area is part of a much larger ecological area designated as a SSSI partly for its invertebrate fauna; and

- the compartment will be directly affected by the proposed development due to the realignment of the Sizewell Drain;

then the invertebrate assemblage within Assessment Compartment 2 would:

- be an IEF at the national level under the CIEEM guidelines; and
- be of high importance, following the EIA-specific assessment methodology.

iii. Assessment compartment 3

Description

1.2.22 This compartment is situated within Sizewell Marshes SSSI, and the habitat comprises the *Iris pseudacorus* sub-community of the M22d NVC community *Juncus subnodulosus-Cirsium palustre* fen meadow. On a landscape scale, the fen meadow forms part of a network of floristically similar, cattle-grazed meadows, and the associated network of field drains and ditches have the potential to support aquatic and terrestrial invertebrate assemblages of conservation interest.

1.2.23 Within the compartment, 272 species were recorded, ten of which have recognised conservation status. **Table 1.6** outlines the status of each species and highlights their habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.6: Assessment compartment 3 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Syntormon mikii.	*Diptera: Dolichopodidae.*	Nationally Rare.	Habitat: peatland. Resource: wet/damp peat.
Great silver water beetle *Hydrophilus piceus.*	*Coleoptera: Hydrophilidae.*	IUCN Near Threatened; Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond. SAT: W314 – reed-fen and pools.
Scarce chaser Libellula fulva.	*Odonata: Libellulidae.*	IUCN Near Threatened.	Habitat: running water. Resource: slow flow; wetland vegetation. SAT: W125 – slow-flowing rivers.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Psacadina verbekei.	*Diptera: Sciomyzidae.*	Notable	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation.
Odontomyia argentata.	*Diptera: Statiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: base soils, well vegetated shallow freshwater pond. SAT: W314 – reed-fen and pools.
Odontomyia ornata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Oodes helopioides.	*Coleoptera: Carabidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond. SAT: W314 – reed-fen and pools.
Rhamphomyia caliginosa.	*Diptera: Empididae.*	Nationally Scarce.	Habitat: shaded woodland floor, wet woodland. Resource: broadleaved woodland; wet humidity; heavy shade.
Viviparus contectus.	*[unassigned] Caenogastropoda* *Viviparidae.*	Nationally Scarce.	Habitat: marshland. Resource: base soil; sparsely vegetated shallow freshwater pond. SAT: W211 – open water on disturbed mineral sediments.
Criomorphus williamsi.	*Hemiptera: Delphacidae.*	Notable b.	Habitat: tall sward and scrub. Resource: sward/field layer: damp soil humidity.

1.2.24 The ISIS analysis recognised nine BATs. Of these, three comprised a sufficient number of species to be considered robust. The two most well represented BATs were the closely allied, “permanent wet mire” and “mineral marsh and open water” wetland assemblages.

1.2.25 The “permanent wet mire” BAT achieved a rarity score of 212 which exceeds the FCT of 180 specified within ISIS. There were six species within this BAT with recognised conservation status recorded in this compartment (associated with peatland habitat, see **Table 1.6**), including the Nationally Rare long-legged fly *Syntormon mikii* and the IUCN Near Threated great silver water beetle. This indicates that Assessment Compartment 3 supports a “permanent wet mire” assemblage of national importance.

1.2.26 The “mineral marsh and open water” BAT rarity score did not reach the FCT threshold. This suggests the species in this assemblage were comprised of primarily common species with few rarities, except for *Viviparus contectus,* a Nationally Scarce freshwater snail.

1.2.27 The grassland habitat of the fen meadow supported a range of typical wet grassland invertebrates. Grasshoppers and crickets were well represented, with local species including the great green bush-cricket (*Tettigonia viridissima*), short-winged conehead (*Conocephalus dorsalis*) and lesser marsh grasshopper (*Chorthippus albomarginatus*) occurring alongside the formerly rare long-winged conehead (*Conocephalus fuscus*) and Roesel’s bush-cricket (*Metrioptera roeselii*), both species now being ubiquitous across much of the southern-half of the UK. This was reflected in the ISIS analysis, with the rarity score for the “grassland and scrub matrix” BAT being 140 compared to the FCT of 160. This does still indicate, nevertheless, that the “grassland and scrub matrix” assemblage is of some conservation value.

1.2.28 None of the 11 SATs recognised from the ISIS analysis provided species scores exceeding their respective FCTs. However, the species score for the “W314 – reed-fen and pools” SAT was equal to the FCT (i.e. ten). Furthermore, three of the species attributed to this assemblage have recognised conservation status (see **Table 1.6**) which indicates the W314 assemblage is of national importance.

1.2.29 Few other SATs recognised within this compartment achieved species scores close to the FCTs, although the “W125 – slow-flowing rivers” SAT had a species score of two compared with the FCT threshold of three (the low threshold accounting for the small species-pool attributed to the assemblage in ISIS). This included the larval stage of the scarce chaser dragonfly, which is considered IUCN Near Threatened. The presence of larvae confirms the breeding presence of this species.

1.2.30 The Community Conservation Indices analysis of aquatic sampling undertaken in 2014 indicated that the ditch habitat here was of “very high conservation value”. This may at least partly reflect the high diversity within a relatively small dataset, as well as the presence of the IUCN Neat Threatened and Nationally Scarce great silver water beetle.

1.2.31 Both the ditch network and the botanically-diverse fen meadow contributed to the overall conservation value of Assessment Compartment 3. The ditches sampled were floristically diverse, with abundant Frogbit, which is typical of great silver water beetle habitat.

1.2.32 Norfolk hawker, whilst not recorded in this compartment, was recorded in adjacent habitat within Assessment Compartment 12. Being well vegetated and open, the ditches within Assessment Compartment 3 were considered to have some potential to support breeding Norfolk Hawker.

Assessment

1.2.33 Given that:

- the detailed analysis of the extensive invertebrate survey data for this compartment has shown that at least two Near Threatened, one Nationally Rare and seven Nationally Scarce species are present;
- this compartment supports "permanent wet mire" and specialised "reed-fen and pools" assemblages of national importance;
- the rarity and overall diversity of the fauna, as indicated by the Community Conservation Indices score, was of "very high conservation value";
- the area is part of a much larger ecological area designated as a SSSI partly for its invertebrate fauna; and
- this area is directly adjacent to the site and may be directly and/or indirectly impacted;

then the invertebrate assemblage within Assessment Compartment 3 would:

- be an IEF at the national level under the CIEEM guidelines; and
- be of high importance, following the EIA-specific assessment methodology.

iv. Assessment compartment 4/4a

Description

1.2.34 Assessment Compartment 4/4a is within the site boundary and is split into two parts due to differences in the habitats contained in each. Assessment Compartment 4 comprises an L-shaped bund planted with trees and shrubs, open deer-grazed species-poor grassland with patches of bare ground and two belts of riparian woodland. These are man-made habitats created at the time of the construction of the Sizewell B power station. This habitat complex contains features similar to the "open mosaic habitat on previously developed land" habitat of principal importance and provides a continuation of the dry sandy habitats found within Assessment Compartments 5 and 6, described in paragraphs 4.2.44 and 4.2.52, respectively.

1.2.35 In contrast, Assessment Compartment 4a consists of a narrow strip of secondary wet woodland which screens Sizewell Marshes SSSI from habitats in Assessment Compartment 4. The habitat immediately adjacent to Assessment Compartment 4 comprises grassland planted with a range of predominantly native trees and shrubs together with species of Pine (*Pinus* spp.) and Evergreen Oak (*Quercus ilex*). Towards the bottom of the slope a more natural, albeit secondary, wet woodland habitat has developed, with middle-aged stands of Alder, Grey Willow (*Salix cinerea*) and Downy Birch (*Betula pubescens*). At the base of the slope, heavily silted and shaded ditches lead into an inundated carr woodland containing scattered swamp/wet woodland ground flora, especially at the interface with the adjacent Sizewell Marshes SSSI fen meadow and the reed-swamp habitat of Assessment Compartments 2 and 3. Whilst the exposed silt habitats and water-logged wood- decay habitat provide some potential interest, with some fallen birches with loose bark and superficial rot habitat, the habitat is too heavily shaded to support certain wet woodland invertebrate assemblages. The juxtaposition of the woodland strip in relation to the fen meadow and reed-swamp increases the potential value of this habitat for invertebrates.

1.2.36 From the combined dataset in Assessment Compartments 4 and 4a, 624 species were recorded. **Table 1.7** lists the 23 species with recognised conservation status recorded within this compartment highlighting their status, habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.7: Assessment compartment 4/4a invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Grayling	*Lepidoptera: Nymphalidae.*	IUCN Vulnerable; Section 41 NERC Act.	Habitat: short sward & bare ground. SAT: F111 – bare sand and chalk.
White-mantled wainscot moth.	*Lepidoptera: Noctuidae.*	RDB3 Section 41 NERC Act.	Habitat: peatland. Resource: wetland vegetation. SAT: W314 – reed-fen and pools.
Dolichovespula media.	*Hymenoptera: Vespidae.*	Notable a.	Habitat: arboreal. Resource: broadleaved woodland; flowers (adult); foliage, honeydew and sap runs (adult). SAT: F001 – scrub edge.
Polydrusus (Chrysophis) formosus.	*Coleoptera; Circulionidae.*	Notable a.	Habitat: arboreal. Resource: broadleaved woodland; leaves and/or stems; terrestrial aspect – larvae root feeders.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Glocianus punctiger.	*Coleoptera: Circulionidae.*	Notable b; Section 41 NERC Act.	Habitat: tall sward and scrub. Resource: sward/field layer; dry soil humidity.
Catapion pubescens.	*Coleoptera: Apionidae.*	Notable b.	Habitat: tall sward and scrub. Resource: sward/field layer, dry soil humidity.
Hypera (Antidonus) dauci.	*Coleoptera: Circulionidae.*	Notable b.	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT: F111– bare sand and chalk.
Nysson dimidiatus.	*Hymenoptera: Crabronidae.*	Notable b.	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand.
Sitona waterhousei.	*Coleoptera: Circulionidae.*	Notable b.	Habitat: short sward and bare ground. Resource: sward/field layer; dry soil humidity. SAT: F112 – open short sward.
Stenus (Stenus) carbonarius.	*Coleoptera: Staphylinidae.*	Notable b.	Habitat: peatland; shaded woodland floor; wet woodland. Resource: broadleaved woodland; deep litter; wet humidity; heavy shade. SAT: W314 – reed-fen and pools.
Trichosirocalus barnevillei.	*Coleoptera: Circulionidae.*	Notable b.	Habitat: short sward and bare ground. Resource: sward/field layer; dry soil humidity. SAT: F111 – bare sand and chalk.
Limonia trivittata.	*Diptera: Limoniidae.*	Notable	Habitat: running water; shaded woodland floor; wet woodland. Resource: base conditions; broadleaved woodland; mud/shallow litter; wet humidity; heavy shade; wetland vegetation; woodland stream.
Lomechusa emarginata.	*Coleoptera: Staphylinidae.*	Notable	Habitat: tall sward and scrub. Resource: litter and ground layer; variable soil humidity.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Pherbellia griseola.	*Diptera: Sciomyzidae.*	Notable	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation.
Rhamphomyia caliginosa.	*Diptera: Empididae.*	IUCN Lower Risk Nationally Scarce.	Habitat: shaded woodland floor; wet woodland. Resource: broadleaved woodland; wet humidity; heavy shade.
Amara lucida.	*Coleoptera: Carabidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT; F111– bare sand and chalk.
Bathysolen nubilus.	*Hemiptera: Coreidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: base conditions; sward/field layer, dry soil humidity. SAT: F112– open short sward.
Cheilosia mutabilis.	*Diptera: Syrphidae.*	Nationally Scarce	Habitat: tall sward and scrub. Resource: acidic conditions; sward/field layer, dry soil humidity.
Crypticus quisquilius.	*Coleoptera: Tenebrionidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: exposed sand, variable soil humidity; sand.
Dolichopus acuticornis.	*Diptera: Dolichopodidae.*	Nationally Scarce.	Habitat: marshland; running water. Resource: drawdown zone: mud/shallow litter.
Odontomyia argentata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: base conditions, well vegetated shallow freshwater pond. SAT: W314 – reed-fen and pools.
Pterostichus (Bothriopterus) quadrifoveolatus .	*Coleoptera: Carabidae.*	Nationally Scarce.	SAT: F003 – scrub-heath and moorland.
Lispe uliginosa.	*Diptera: Muscidae.*	Potentially Nationally Scarce.	Habitat: peatland. Resource: wet/damp peat.

1.2.37 Of the nine BATs recognised within this Assessment Compartment, seven comprised a sufficient number of species to be considered robust.

1.2.38 Two of the BATs, the “unshaded early successional mosaic” (the second most species rich BAT recognised) and “permanent wet mire” assemblages, achieved rarity scores that were just exceeding the corresponding FCT within ISIS. This indicates that these assemblages are of national importance.

1.2.39 The “unshaded early successional mosaic” BAT is likely to reflect most strongly the data collected from the sandy grassland habitat in Assessment Compartment 4. This area is connected to the sandy, dune grassland within Assessment Compartment 5 (**Figure 14A4.3**), which is considered to be of national importance (paragraph 4.2.47). Elements of this assemblage are also likely to be expressed from samples collected from the upper grassland and scrub buffer surveyed on the border of Assessment Compartments 4 and 4a. Eight species with recognised conservation status were attributed to this assemblage (requiring short sward and bare ground habitat, see **Table 1.7**). This includes the IUCN Vulnerable grayling butterfly, a specialist of dry, well-drained soils with plenty of bare ground (Ref. 1.26). Arguably the most significant species associated with this BAT was the Notable b *Sitona waterhousei*, a species of pea weevil. *S. waterhousei* has, according to records, not previously been recorded from Suffolk and, according to Hyman and Parsons (Ref. 1.27), is “*not recorded in East Anglia*”.

1.2.40 The “permanent wet mire” BAT almost certainly reflects the data collected from the wet woodland understorey, especially adjacent to the more open carr habitat towards Assessment Compartment 3. Five species with conservation significance were attributed to this assemblage, being specialists of peatland habitat (see **Table 1.7**). This includes the RDB white-mantled wainscot moth which has a very restricted range in the UK, being known only from coastal reedbeds between Southwold and Thorpeness. However, as it was recorded from a mercury vapour moth-trap, it is possible that the insect was attracted in from habitats within an adjacent compartment (although likely still from within Sizewell Marshes SSSI). This species is a specialist of dead reed stems and is thought to be sensitive to over-management of reedbeds (Ref. 1.28).

1.2.41 Despite being the most species-rich BAT, the rarity score of 130 attributed to the “grassland and scrub matrix” assemblage fell short of the FCT ISIS threshold and this was also the case for the remaining BATs.

1.2.42 Ten SATs were recognised within Assessment Compartment 4. Of these, two SATs, “F111 – bare sand and chalk” and “F001 – scrub edge”, both achieved species scores (26 and 11 respectively) exceeding their corresponding FCT ISIS thresholds of 25 and 10. This indicates that the F111 and F001 assemblages within Assessment Compartment 4 and 4a are of national importance.

1.2.43 The high score achieved by the F111 SAT can largely be attributed to species recorded from the dry, disturbed habitats within Assessment Compartment 4, within close proximity to the high quality and herb-rich habitats of Assessment Compartment 5, as mentioned above. Four species of conservation significance identified on site are attributed to the F111 assemblage, alongside the parent "unshaded early successional mosaic" BAT. The other SAT represented in the sample was F112 – open short sward, which is nested in the "unshaded early successional mosaic" BAT. This did not achieve its FCT ISIS threshold of 12, but with a species score of eight it was reasonably well represented and can be considered of high conservation value.

1.2.44 Of the resource-based SATs (other than the Favourable F001) represented within the Assessment Compartment 4 and 4a combined dataset, the "F003 – scrub-heath and moorland" SAT was closest to achieving its FCT, with a species score of seven compared to its FCT ISIS threshold of eight. In contrast, the "F002 – Rich flower resource" SAT scored ten compared to its FCT ISIS threshold of 14. These SATs reasonably reflect the more diffuse conditions present, particularly in and around Assessment Compartment 4.

Assessment

1.2.45 Given that:

- the detailed analysis of the extensive invertebrate survey data for this compartment has shown that at least one IUCN Vulnerable, one RDB species, 20 Nationally Scarce and one potentially Nationally Scarce species are present;
- the wet woodland on the western edge (Assessment Compartment 4a) supports a "permanent wet mire" assemblage type of national importance;
- the open mosaic habitat (Assessment Compartment 4) supports a specific "bare sand and chalk" and a broader "unshaded and early successional mosaic" assemblage of national importance and a specific "open short sward" assemblage of conservation value; and
- Compartment 4 and 4a will be directly impacted by the proposed development, resulting in the loss of suitable habitat;

then the invertebrate assemblages within Assessment Compartment 4 and 4a would:

- be an IEF at the national level under the CIEEM guidelines; and
- be of high importance, following the EIA-specific assessment methodology.

v. Assessment compartment 5

Description

1.2.46 Assessment Compartment 5 lies within Suffolk Shingle Beaches CWS (**Table 1.8**). This strip of habitat, on the seaward side of Assessment Compartment 4, comprises coastal shingle, vegetated shingle, vegetated sand dune and dune grassland. Inland of the dune system is a sheltered area of dune grassland which supports a diverse range of typical sandy grassland plant species, providing a flower-rich resource for invertebrates. Bare sand patches and localised shingle exposures provided additional features beneficial to invertebrates typical of coastal zone habitats. This compartment lies within the site boundary and will be impacted by the Sizewell C Project.

1.2.47 Within this compartment, 232 species were recorded. **Table 1.8** lists the 22 species with recognised conservation status recorded within this compartment highlighting their status, habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.8: Assessment compartment 5 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Evagetes pectinipes.	*Hymenoptera: Pompilidae.*	RDB1	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT: F111 – bare sand and chalk.
Grayling	*Lepidoptera: Nymphalidae.*	IUCN Vulnerable; Section 41 NERC Act.	Habitat: short sward and bare ground. SAT: F111– bare sand and chalk.
Tricimba brachyptera.	*Diptera: Chloropidae.*	RDB3	Habitat: tall sward and scrub. Resource: litter and ground layer; dry soil humidity; sand.
Apion rubiginosum.	*Coleoptera: Apionidae.*	RDB3	SAT: F003 – scrub-heath and moorland.
Small heath.	*Lepidoptera: Nymphalidae.*	IUCN Near Threatened; Section 41 NERC Act.	Habitat: short sward and bare ground. Resource: sward/field layer; dry soil humidity. SAT: F112 – open short sward.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Cinnabar moth *Tyria jacobaeae.*	*Lepidoptera: Erebidae.*	Section 41 NERC Act – research only.	Habitat: tall sward and scrub. Resource: sward/field layer; dry soil humidity.
Hippodamia (Adonia) variegata.	*Coleoptera: Coccinellidae.*	Notable b.	Habitat: tall sward and scrub. Resource: sward/field layer.
Orthochaetes setiger.	*Coleoptera: Curculionidae.*	Notable b.	Habitat: tall sward and scrub. Resource: sward/field layer.
Protapion difforme.	*Coleoptera: Apionidae.*	Notable b.	Habitat: tall sward and scrub. Resource: sward/field layer; dry soil humidity.
Protapion dissimile.	*Coleoptera: Apionidae.*	Notable b.	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT: F111– bare sand and chalk.
Pherbellia brunnipes.	*Diptera: Sciomyzidae.*	Notable	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation. SAT: W314 – reed-fen and pools.
Platypalpus niveiseta.	*Diptera: Hybotidae.*	Nationally Scarce.	No available details.
Alydus calcaratus.	*Hemiptera: Alydidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: exposed sand; dry soil humidity; sand. SAT: F111 – bare sand and chalk.
Aphanisticus pusillus.	*Coleoptera: Buprestidae.*	Nationally Scarce.	Habitat; short sward and bare ground. Resource; sward/field layer; damp soil humidity. SAT; F112 – open short sward.
Crypticus quisquilius.	*Coleoptera: Tenebrionidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: exposed sand; variable soil humidity; sand.
Lesser cockroach.	*Dictyoptera: Blattellidae.*	Nationally Scarce.	No available details.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Legnotus picipes.	*Hemiptera: Cydnidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: exposed sand; dry soil humidity; sand. SAT: F111– bare sand and chalk.
Grey bush-cricket *Platycleis albopunctata.*	*Orthoptera: Tettigoniidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: sward/field layer; dry soil humidity. SAT: F001 – scrub edge, F111 – bare sand and chalk.
Silometopus ambiguus.	*Araneae: Linyphiidae.*	Nationally Scarce.	No available details.
Villa modesta.	*Diptera: Bombyliidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: exposed sand; sward/ field layer; dry soil humidity; sand. SAT: F111 – bare sand and chalk.
Opomyza punctella.	*Diptera: Opomyzidae.*	IUCN potentially Near Threatened; Potentially Nationally Scarce	Habitat: tall sward and scrub. Resource: soil and roots; sward/field layer; dry soil humidity.
Dicraeus raptus.	*Diptera: Chloropidae.*	Potentially Nationally Scarce.	Habitat: tall sward and scrub. Resource: sward/field layer; dry soil humidity. SAT: F001 – scrub edge.

1.2.48 The dune habitat and grassland strip supported an extensive Orthopteran fauna, with approximately half of the native British species recorded in this area, including the Nationally Scarce grey bush-cricket and lesser cockroach. Three Lepidoptera listed under Section 41 of the NERC Act were also recorded here, the grayling butterfly, the small heath butterfly and the cinnabar moth (see **Table 1.8**). The flower-rich habitat combined with the extent of exposed sand provides potential for a high diversity of ground-nesting aculeate Hymenoptera, as well as a range of other specialist and generalist species.

1.2.49 BAT scores from the 2014 ISIS analysis indicate that the coastal strip supports an “unshaded early successional mosaic” assemblage of national importance, the assemblage being represented by slightly fewer species than the “grassland and scrub matrix” assemblage, which itself achieved a rarity score approaching the FCT threshold. From the SAT analysis, the

"F112 – open short sward" SAT also achieved a score above the FCT threshold, whilst "F111 – bare sand and chalk" was also well represented.

1.2.50 One species recorded from the dune habitat, the spider-hunting wasp *Evagetes pectinipes*, is classed as Nationally Endangered (RDB1). This species has rarely been recorded outside of its stronghold in Kent and represents the most significant record from the dataset. As **Table 1.8** shows, *E. pectinipes* is considered part of the "F111 – bare sand and chalk" SAT and while this SAT did not reach the FCT threshold, the presence of this species alone suggests this SAT is of very high conservation value. In addition, 14 Nationally Scarce species were also recorded from Assessment Compartment, at least half of which (together with some of the local and common species recorded) are associated with short sward and bare ground habitats.

1.2.51 The "Favourable Condition" status recorded for the broader "unshaded early successional mosaic" and specific "F112 – open short sward" indicate that this site supports invertebrate assemblages above the required threshold to be considered of national importance.

Assessment

1.2.52 Given that:

- the detailed analysis of the extensive invertebrate survey data for this compartment has shown that at least three RDB (including the RDB1 spider-hunting wasp *Evagetes pectinipes*), one IUCN Vulnerable, one IUCN Near Threatened, one Section 41 species and 14 Nationally Scarce species are present;
- this compartment supports an "unshaded early successional mosaic" assemblage of national importance as well as an "open short sward" assemblage at Favourable Condition status;
- this compartment can be considered to be of SSSI quality for its invertebrate assemblages, thus exceeding its current CWS status; and
- this area will be directly impacted by the proposed development, resulting in the loss of suitable habitat.

Then the invertebrate assemblage within Assessment Compartment 5 would:

- be an IEF at the national level under the CIEEM guidelines; and
- be of high importance, following the EIA-specific assessment methodology.

vi. Assessment compartment 6/6a

Description

1.2.53 Assessment Compartment 6, and part of Assessment Compartment 6a, lie within Minsmere to Walberswick Heaths and Marshes Ramsar site which, as described in **Table 1.1**, supports at least 26 RDB invertebrates. Both Assessment Compartments also lie within Minsmere to Walberswick Heaths and Marshes SSSI, also described in **Table 1.1**, noted for its invertebrate fauna. Assessment Compartments 6 and 6a are adjacent to the site boundary.

1.2.54 The succession of habitats in Assessment Compartment 6 from the upper shore to the vegetated dune habitat, the flatter sandy grassland/heathland habitat and its interface with the scrub woodland belt and subsequent reedbed habitat, provide a wide variety of habitats and microhabitat conditions for invertebrates. The habitat is structurally varied and botanically diverse given the low botanical diversity normally associated with dry heathland biotopes. This heath and acid grassland grades into more typical dune habitat towards the sea.

1.2.55 The varied topography and open, yet sheltered nature of the sandy habitat, together with an abundance of flowering plants, including Restharrow (*Ononis repens*) and Common Bird's-foot-trefoil (*Lotus corniculatus*), as well as heaths and associated Gorse (*Ulex europaeus*) scrub, provide habitat of high invertebrate potential.

1.2.56 Assessment Compartment 6a contains a narrow strip of transition scrub/woodland, with a strip of coastal reed-swamp to the west transitioning into grazing marsh. Aquatic habitats surveyed here were situated in open conditions within grazing marsh, unlike the components of the ditch network within Assessment Compartments 1 and 2, and both supported reasonably diverse macrophyte assemblages.

1.2.57 Of the 248 species recorded within Assessment Compartments 6 and 6a, the 11 listed in **Table 1.9** have recognised conservation status. The table lists each species' individual conservation status alongside their habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.9: Assessment compartment 6/6a invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, SAT (Where Relevant).
Hygrolycosa rubrofasciata.	*Araneae: Lycosidae.*	IUCN Endangered; Nationally Rare.	Habitat: peatland. Resource: deep litter.
Grayling	*Lepidoptera: Nymphalidae.*	IUCN Vulnerable; Section 41 NERC Act.	Habitat: short sward and bare ground. SAT: F111 – bare sand and chalk.
Small heath.	*Lepidoptera: Nymphalidae.*	IUCN Near Threatened; Section 41 NERC Act.	Habitat: short sward & bare ground. Resource: sward/field layer; dry soil humidity. SAT: F112 – open short sward.
Great silver water beetle.	*Coleoptera: Hydrophilidae.*	IUCN Near Threatened; Nationally Scarce.	Habitat: peatland Resource: well vegetated shallow freshwater pond. SAT: W314 – reed-fen and pools.
Polydrusus (Chrysophis) formosus.	*Coleoptera: Curculionidae.*	Notable a.	Habitat: arboreal Resource: canopy; broadleaved woodland; leaves and/or stems; terrestrial aspect -larvae root feeders.
Drymus (Drymus) latus.	*Hemiptera: Lygaeidae.*	Notable b.	Habitat: tall sward & scrub. Resource: sward/field layer; dry soil humidity.
Pelenomus canaliculatus.	*Coleoptera: Curculionidae.*	Notable b.	Habitat: lake; peatland. Resource: lakeside emergent/ aquatic vegetation; well vegetated shallow freshwater pond. SAT; W314 – reed-fen and pools.
Aphanisticus pusillus.	*Coleoptera: Buprestidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: sward/field layer; damp soil humidity. SAT; F112 – open short sward.
Lesser cockroach.	*Dictyoptera: Blattellidae.*	Nationally Scarce.	Resource: shallow freshwater pond; sphagnum/moss lawn.
Hydrochus angustatus.	*Coleoptera: Hydrophilidae.*	Nationally Scarce.	Habitat: peatland.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, SAT (Where Relevant).
Saldula pilosella.	*Hemiptera: Saldidae.*	Nationally Scarce.	Habitat: brackish pools & ditches; saltmarsh. Resource: pond/seepage edge; saline silt. SAT: M311 – saltmarsh and transitional brackish marsh.

1.2.58 Species recorded within Assessment Compartment 6 had a strong affinity to the dry grassland and heath habitat found within the compartment; however, no BATs or SATs identified in the 2014 ISIS analysis produced scores above the FCT thresholds. The two best represented BATs, “grassland and scrub matrix” and “unshaded early successional mosaic” assemblages did, however, produce rarity scores approaching their respective FCTs. In addition, the “F112 – open short sward” SAT was also well represented, but again not sufficiently populated to achieve the threshold status.

1.2.59 Despite this, grayling and small heath butterflies (considered Vulnerable and Near Threatened respectively under IUCN guidelines) were abundant throughout the coastal heath/grassland zone. Of particular note was the presence of the wolf spider *Hygrolycosa rubrofasciata* (a Nationally Rare, IUCN Endangered species) which lives in deep litter in peatland habitats. This individual was collected from the scrub edge habitat which grades into reed-swamp on the border between Assessment Compartment 6 and 6a. *Aphanisticus pusillus*, a jewel beetle associated with both dry, sandy habitats and wetland rushes, was also recorded, together with several other species characteristic dry heathland and scrub.

1.2.60 In terms of habitat representativeness, and in a wider landscape context, Assessment Compartment 6 is clearly of much higher conservation value than the results of the 2014 ISIS analysis show. The sampling effort was lower than for other Assessment Compartments, and certain groups likely to be supported by the habitats, such as ground-nesting Aculeate Hymenoptera, were poorly represented in the dataset. Furthermore, the connection between similar habitats within Assessment Compartments 4 and 5 suggest importance of this compartment at a landscape scale.

1.2.61 Community Conservation Indices analysis from a single sample from a shallow scrape surveyed in Assessment Compartment 6a showed a score well above the threshold for “very high conservation value”. The sample was of relatively high diversity, with one IUCN Near Threatened species (great silver water beetle) and two Nationally Scarce beetles (*Pelenomus canaliculatus* and *Hydrochus angustatus*). A lower score was achieved from the two samples collected from surveyed ditch habitat (achieving "fairly high conservation value"), potentially due to the nutrient inputs that the ditch receives from Leiston Waste Water Treatment Works.

1.2.62 Whilst the Community Conservation Indices scores were high, BATs and SATs recorded for the combined ditch and scrape produced a robust score only for the "mineral marsh and open water" BAT, which produced a rather low rarity score. However, three species with recognised conservation status recorded are attributed to "permanent wet mire" assemblage (associated with peatland habitat, see **Table 1.9**), which was not represented well enough in ISIS for a rarity score to be produced. Two of these species are also attributed to the "W314 – reed-fen and pools" assemblage, which again was too poorly represented to produce a significant score.

1.2.63 In general, the habitats present, the position within and adjacent statutory designated sites, and the recorded fauna, all indicate that both the scrape and ditch are integral to the overall network of important habitat and can therefore be considered to be of national importance.

Assessment

1.2.64 Given that:

- the detailed analysis of the invertebrate survey data for this compartment has shown that one Endangered, one Vulnerable and two Near Threatened species under IUCN guidelines along with seven Nationally Scarce species are present;
- the reedbed, scrape and ditch habitat (Assessment Compartment 6a) were assessed as being of "very high conservation value" (with great silver water beetle recorded from the scrape);
- the sandy grassland/heathland habitat (Assessment Compartment 6) also provided habitat of high conservation value and supported grayling and small heath butterflies;
- the area is also part of a much larger ecological area designated as a Ramsar site/SSSI partly for its invertebrate fauna; and
- the implementation of primary and tertiary mitigation measures, discussed in the **ES Volume 2, Chapter 14**, would ensure there are no direct or indirect impacts on the invertebrate assemblage within Assessment Compartment 6/6a;

then the invertebrate assemblage within Assessment Compartment 6/6a would:

- be an important at the international level under the CIEEM guidelines;
- be of high importance, following the EIA-specific assessment methodology; and
- not be an IEF.

vii. Assessment compartment 7

Description

1.2.65 Assessment Compartment 7, within the greater Sizewell Marshes SSSI and not within the site, was subject to an invertebrate habitat assessment only. Wet woodland dominates this compartment and was identified as W2a *Salix cinerea-Betula pubescens-Phragmites* woodland, grading into W6a *Alnus glutinosa-Urtica dioica* woodland further north. The south-east corner is bordered by fen meadow and ditches and comprises unmanaged woodland habitat with a dense canopy of predominantly Alder, Grey Willow and Downy Birch. The small clearings within the woodland support a ground flora of Yorkshire-fog (*Holcus lanatus*) and Creeping Soft-grass (*Holcus mollis*), with some Common Reed and soft rush (*Juncus effusus*) in the wetter areas, although the field layer is largely heavily shaded. Only a small number of old trees are present, and although there is a large amount of fallen deadwood, this mainly comprises twiggy fallen branches rather than large trunks, so the value of the site for saproxylic (i.e. dead wood) invertebrates is not likely to be significant. However, some inundated dead wood, rot holes and moss habitat were recorded which have some potential to support saproxylic invertebrates.

1.2.66 Some dead and dying Downy Birch was evident in the more open areas, with birch polypore fungus *Piptoporus betulinus* providing additional potential for fungus-eating invertebrates. In particular, birch polypore can support an RDB2 species of darkling beetle *Diaperis boleti*. Whilst not recorded during the survey, the desk-study has identified *D. boleti* within the wider area.

Assessment

1.2.67 Given that this area of woodland:

- includes sub-habitats likely to be of some importance to invertebrates;
- is within the Sizewell Levels and Associated Areas CWS;
- is also adjacent to a much larger ecological area designated as an SSSI partly for its invertebrate fauna; and

- this area would not be impacted by the proposed development, as it would not be subject to direct habitat loss;

then the invertebrate assemblage within Assessment Compartment 7 would:

- be at the county level under the CIEEM guidelines;
- be of medium importance, following the EIA-specific assessment methodology; and
- not be an IEF.

viii. Assessment compartment 8

Description

1.2.68 This compartment lies within Sizewell Marshes SSSI and is adjacent to Assessment Compartments 1, 2, 4a, 9, 10 and 14, five of which are considered to contain invertebrate assemblages of national importance. Assessment Compartment 8 comprises mature Alder and Downy Birch woodland with open water bodies and a ditch along the western boundary. Mature, multi-stemmed Alder was recorded, along with mixed stands of younger and more mature birch. Some deadwood habitat is present, predominantly standing and fallen birch wood, with rot holes and peeling bark habitat, but also sap runs in some of the living trees. Some fallen branches and trunks are present within the water bodies, providing saturated wood with the potential to support specialist Diptera, including hoverflies and craneflies. The ground layer has an uneven topography and thus a varying level of surface water. The drier areas have been colonised by grasses, predominantly Yorkshire-fog, whilst the wetter areas variously support stands of Common Nettle and Water-pepper, with more scattered soft rush, hard rush (*Juncus inflexus*), Yellow Iris (*Iris pseudacorus*), Water Mint and Brooklime (*Veronica beccabunga*). Common Reed typically flanks the ditches and water bodies, and the weedy margins have been found to support Water-starwort species *Callitriche* spp. and Lesser Water-parsnip (*Berula erecta*).

1.2.69 Within the woodland, areas of exposed, un-vegetated silt and leaf litter provide habitat for specialist invertebrates such as Saldid bugs, ground beetles, rove beetles and Diptera. Fallen, wind-damaged birches have created more openness and opportunities for saproxylic invertebrates, and there was evidence of bark beetles and other wood-boring beetles in places. Drier parts of the woodland feature Pedunculate Oak (*Quercus robur*), and occasionally Hazel (*Corylus avellana*) and Holly (*Ilex aquifolium*) featured in the understorey, providing additional potential invertebrate habitat, although the ground flora was lacking diversity, with

Herb-Robert (*Geranium robertianum*) being the only abundant herb species.

1.2.70 Forty-eight species were recorded within this compartment, five of which have recognised conservation status. **Table 1.10** outlines the status of each species and highlights their habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.10: Assessment compartment 8 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat and Habitat Resource Requirements.
Dicranomyia ventralis.	*Diptera: Limoniidae.*	Notable	Habitat: peatland. Resources: wet/damp peat; wetland vegetation.
Peltodytes caesus.	*Coleoptera: Halipidae.*	Nationally Scarce.	Habitat: marshland. Resource: sparsely vegetated shallow freshwater pond.
Ochthebius (Hymenodes) nanus.	*Coleoptera: Hyraenidae.*	Nationally Scarce.	Habitat: brackish pools and ditches; marshland. Resource: sparsely vegetated shallow freshwater pond.
Odontomyia ornata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Tricholeiochiton fagesii.	*Trichoptera: Hydroptilidae.*	Nationally Scarce.	Habitat: peatland. Resource: shallow freshwater pond.

1.2.71 The species highlighted in **Table 1.10** are all associated with peatland or marshland habitats and most require a shallow aquatic resource to complete their life cycle. This does not seem to reflect the wet woodland habitat which dominates Assessment Compartment 8 and the abundance or dead wood resource. This is due to the dataset being based on just one aquatic survey of a ditch in the north-east corner of this compartment, close to the network of open ditches within Assessment Compartment 9, and so will not be representative of the full invertebrate assemblage supported within Assessment Compartment 8.

Assessment

1.2.72 Given that:

- the single aquatic invertebrate sample for this compartment has shown that at least five Nationally Scarce species are present;

- it is part of a much larger ecological area designated as a SSSI partly for its invertebrate fauna; and
- the area would not be directly affected by the proposed development with no habitat loss proposed. However, there is the potential risk of indirect affects by the proposed development;

then the invertebrate assemblage within Assessment Compartment 8 would:

- be an IEF at the national level under the CIEEM guidelines; and
- be of high importance, following the EIA-specific assessment methodology.

ix. Assessment compartment 9

Description

1.2.73 The majority of Assessment Compartment 9 lies within Sizewell Marshes SSSI and consists of open grazing marsh dissected by a network of ditches varying in width and vegetation density. The grazing marsh is bordered by wet woodland (Assessment Compartments 1 and 8) and plantation woodland (Assessment Compartments 13 and 14), providing sheltered conditions, woodland edge habitat with diverse vegetation structure, and a dead wood resource around the fringes.

1.2.74 The north-west corner of Assessment Compartment 9, which is outside but adjacent to Sizewell Marshes SSSI, comprises an area of W6a *Alnus glutinosa-Urtica dioica* woodland with dense, unmanaged stands of mainly mature Alder, Crack-willow (*Salix fragilis*) and Sycamore (*Acer pseudoplatanus*), over a dense understorey and scrub layer of Grey Willow and abundant non-native Rhododendron (*Rhododendron ponticum*). Little light persists to the ground layer, except in some more open areas at the periphery of the wood. Here, open, albeit heavily-silted and sparsely vegetated, ditches provide some potential habitat for breeding Diptera and other invertebrates associated with poorly vegetated silt and saturated wood habitat in wet woodland. Some Yellow Iris was recorded within the ditches. The ground layer within the drier parts of the woodland included abundant bracken and bramble, with some non-specialist woodland herbs, including Herb-Robert, Wood Avens (*Geum urbanum*) and Germander Speedwell (*Veronica chamaedrys*).

1.2.75 Of the 297 species were recorded in Assessment Compartment 9, 12 have recognised conservation status. **Table 1.11** outlines the status of each species and highlights their habitat and habitat resource requirements.

Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.11: Assessment compartment 9 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat and Habitat Resource Requirements.
Norfolk Hawker.	*Odonata: Aeshnidae.*	Legal Protection; IUCN Endangered (GB); Section 41 NERC Act; Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Orange-horned Green Colonel *Odontomyia angulata.*	*Diptera: Stratiomyidae.*	IUCN Vulnerable; Nationally Rare.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Timandra comae.	*Lepidoptera: Geometridae.*	Section 41 NERC Act – research only.	Habitat: tall sward and scrub. Resource: sward/field layer.
Dicranomyia ventralis.	*Diptera: Limoniidae.*	Notable	Habitat: peatland. Resources: wet/damp peat; wetland vegetation.
Molophilus bihamatus.	*Diptera: Limoniidae.*	Notable	Habitat: running water; shaded woodland floor; wet woodland. Resources: broadleaved woodland; wet humidity; heavy shade; woodland stream.
Pherbellia dorsata.	*Diptera: Sciomyzidae.*	Notable	Habitat: marshland; peatland. Resources: well vegetated shallow freshwater pond; wetland vegetation.
Peltodytes caesus.	*Coleoptera: Haliplidae.*	Nationally Scarce.	Habitat: marshland. Resources: sparsely vegetated shallow freshwater pond.
Ochthebius (Hymenodes) nanus.	*Coleoptera: Hydraenidae.*	Nationally Scarce.	Habitat: brackish pools and ditches; marshland. Resource: sparsely vegetated shallow freshwater pond.
Odontomyia argentata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Odontomyia ornata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat and Habitat Resource Requirements.
Tabanus maculicornis.	*Diptera: Tabanidae.*	Nationally Scarce.	Habitat: running water; shaded woodland floor; wet woodland. Resource: broadleaved woodland; wet humidity; heavy shade; woodland stream.
Tricholeiochiton fagesii.	*Trichoptera: Hydroptilidae.*	Nationally Scarce.	Habitat: peatland. Resource: shallow freshwater pond.

1.2.76 There were 88 and 74 species recorded within Assessment Compartment 9 associated with marshland and peatland habitat, respectively. This included three species with recognised conservation status associated with marshland (3.4%) and seven species with recognised conservation status associated with peatland (9.5%). The higher percentage for peatland suggests that this habitat within Assessment Compartment 9 is of high conservation value.

1.2.77 The majority of the species listed within **Table 1.11,** associated with marshland and peatland**,** require an aquatic resource, while only two species with recognised conservation status are associated partly with wet woodland (out of 17 in the whole dataset). This reflects the survey effort within this compartment, which was centred around the grazing ditches and their vegetated margins. One protected species (Norfolk hawker dragonfly) was recorded and it is possible that it breeds within the grazing marsh due to the suitability of ditch habitat. This is also the case for the Nationally Rare orange-horned green colonel soldierfly, considered Vulnerable under IUCN guidelines, which shares similar habitat and resource requirements to Norfolk Hawker.

Assessment

1.2.78 Given that:

- the detailed analysis of the extensive invertebrate survey data for this compartment has shown that Norfolk Hawker, one IUCN Vulnerable and at least nine Nationally Scarce species are present;
- the grazing marsh is also part of a much larger ecological area designated as a SSSI partly for its invertebrate fauna; and
- the implementation of primary and tertiary mitigation measures, discussed in the **ES Volume 2, Chapter 14**, would ensure there were no direct or indirect impacts on the invertebrate assemblage within Assessment Compartment 9;

Then the invertebrate assemblage within Assessment Compartment 9 would:

- be important at the national level under the CIEEM guidelines;
- be of high importance, following the EIA-specific assessment methodology; and
- not be an IEF.

x. Assessment compartment 10

Description

1.2.79 Assessment Compartment 10, within the greater Sizewell Marshes SSSI and not within the site, was subject to an invertebrate habitat assessment only. This large area of reedbed has a relatively dense structure, with water levels at or a little above the soil surface (0-4cm). It is more floristically diverse than typical reed-swamp, possibly because it is in the process of succession from fen meadow to reed-swamp, and for this reason the habitat lacks a deep litter layer characteristic of more mature stands of reed. Additional macrophytes recorded included Water Mint, Water-pepper, Gipsywort (*Lycopus europaeus*), Fool's-water-cress (*Apium nodiflorum*), Greater Bird's-foot-trefoil (*Lotus pedunculatus*), Nodding Bur-marigold (*Bidens cernua*) and Marsh Thistle (*Cirsium palustre*). A species of Water-starwort *Callitriche sp.* was also recorded in the wetter areas.

1.2.80 This habitat is considered likely to provide habitat for a range of species, including the larvae of wainscot moths not associated with mature reedbeds, and other stem-developing species, as well as general swamp species associated with a flowering plant resource. The presence of Nodding Bur-marigold suggests a seasonally-fluctuating water table, and invertebrate species associated with fluctuating water tables in fen habitats may also occur in this habitat.

Assessment

1.2.81 Given that Assessment Compartment 10:

- represents a particularly large area of relatively diverse reedbed habitat;
- is also part of a much larger ecological area designated as a SSSI partly for its invertebrate fauna; and
- the implementation of primary and tertiary mitigation measures, discussed in the **ES Volume 2, Chapter 14**, would ensure there were no direct or indirect impacts on the invertebrate assemblage within Assessment Compartment 10;

Then the invertebrate assemblage within Assessment Compartment 10 would:

- be important at the national level under the CIEEM guidelines;
- be of high importance, following the EIA-specific assessment methodology; and
- not be an IEF.

xi. Assessment compartment 11

Description

1.2.82 Assessment Compartment 11 is located within the west of Sizewell Marshes SSSI and comprises a habitat complex of grazing marsh, reedbed, ditches, scrapes, hedgerows, woodland and is situated between the plantation woodland in Compartment 14, to the north, and broadleaved woodland in Reckham Pits Wood, outside of the survey area to the south.

1.2.83 A total of 253 species were recorded within this compartment, 17 of which have recognised conservation status. **Table 1.12** outlines the status of each species and highlights their habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.12: Assessment compartment 11 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat and Habitat Resource Requirements.
Psacadina vittigera.	*Diptera: Sciomyzidae.*	RDB2	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation.
Psacadina zernyi.	*Diptera: Sciomyzidae.*	RDB2	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation.
Hilara hirtella.	*Diptera: Empididae.*	IUCN Near Threatened; Nationally Rare.	No available details.
Great silver water beetle.	*Coleoptera: Hydrophilidae.*	IUCN Near Threatened; Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Chiasmia clathrata.	*Lepidoptera: Geometridae.*	Section 41 NERC Act – research only.	Habitat: tall sward and scrub. Resource: sward/field layer.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat and Habitat Resource Requirements.
Dicranomyia ventralis.	*Diptera: Limoniidae.*	Notable	Habitat: peatland. Resource: wet/damp peat, wetland vegetation.
Psacadina verbekei.	*Diptera: Sciomyzidae.*	Notable	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation.
Tetanocera punctifrons.	*Diptera: Sciomyzidae.*	Notable	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation.
Viviparus contectus.	*[unassigned] Caenogastropoda: Viviparidae.*	Nationally Scarce.	Habitat: marshland. Resource: base conditions, sparsely vegetated shallow freshwater pond.
Peltodytes caesus.	*Coleoptera: Haliplidae.*	Nationally Scarce.	Habitat: marshland. Resource: sparsely vegetated shallow freshwater pond.
Ochthebius (Hymenodes) nanus.	*Coleoptera: Hydraenidae.*	Nationally Scarce.	Habitat; brackish pools and ditches; marshland. Resource: sparsely vegetated shallow freshwater pond.
Achalcus britannicus.	*Diptera: Dolichopodidae.*	Nationally Scarce.	Habitat: peatland. Resource: wet/damp peat.
Odontomyia argentata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: base conditions, well vegetated shallow freshwater pond.
Odontomyia ornata.	*Diptera: Statiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Tabanus maculicornis.	*Diptera: Tabanidae.*	Nationally Scarce.	Habitat: running water; shaded woodland floor; wet woodland. Resource: broadleaved woodland; wet humidity; heavy shade; woodland stream.
Microvelia (Microvelia) pygmaea.	*Hemiptera: Veliidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Tricholeiochiton fagesii.	*Trichoptera: Hydroptilidae.*	Nationally Scarce.	Habitat: peatland. Resource: shallow freshwater pond.

1.2.84 The number of species associated with marshland and peatland habitats were well represented within the data, at 90 and 85 species respectively. Three recorded species with recognised conservation status are associated with marshland (3.3%) while 11 species with recognised conservation status are associated with peatland (14.1%) (see **Table 1.12**). This indicates the importance of the invertebrate assemblages associated with marshland and peatland habitats within Assessment Compartment 11, and specifically that the peatland habitat is of particularly high conservation value.

1.2.85 Of particular note are the two RDB2 Sciomyzid flies, *Psacadina vittigera* and *P. zernyi,* and the IUCN Near Threatened great silver water beetle, all of which rely on the well vegetated ditches and wetland vegetation resources found within this compartment.

1.2.86 The data may reflect the nature of the sampling effort within this compartment, which was concentrated on the aquatic and terrestrial species in the ditch network and bank vegetation but indicates that the ditch network is of high conservation value.

Assessment

1.2.87 Given that:

- the detailed analysis of the invertebrate survey data for this compartment has shown that at least two RDB species, two IUCN Near Threatened species and 12 Nationally Scarce species are present;
- the area is also part of a much larger ecological unit designated as a SSSI partly for its invertebrate fauna; and
- the area may be indirectly affected by the proposed development;

Then the invertebrate assemblage within Assessment Compartment 11 would:

- be an IEF at the national level under the CIEEM guidelines; and
- be of high importance, following the EIA-specific assessment methodology.

xii. Assessment compartment 12

Description

1.2.88 Assessment Compartment 12 consists of the southern half of Sizewell Marshes SSSI and comprises grazing marsh, fen meadow and reed-swamp divided by a network of ditches, woodland and hedgerows.

1.2.89 A total of 257 species were recorded within Assessment Compartment 12, 17 of which have recognised conservation status. **Table 1.13** outlines the status of each species and highlights their habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT with which each species is associated.

Table 1.13: Assessment compartment 12 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat and Habitat Resource Requirements.
Norfolk hawker.	*Odonata: Aeshnidae.*	Legal Protection; IUCN Endangered (GB); Section 41 NERC Act; Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Anticheta brevipennis.	*Diptera: Sciomyzidae.*	RDB2	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation.
Psacadina zernyi.	*Diptera: Sciomyzidae.*	RDB2	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation.
Chiasmia clathrata.	*Lepidoptera: Geometridae.*	NERC Act – research only.	Habitat: tall sward and scrub. Resource: sward/field layer.
Cinnabar moth.	*Lepidoptera: Erebidae.*	NERC Act – research only.	Habitat tall sward and scrub. Resource sward/field layer; dry soil humidity.
Dicranomyia ventralis.	*Diptera: Limoniidae.*	Notable	Habitat: peatland. Resource: wet/damp peat; wetland vegetation.
Psacadina verbekei.	*Diptera: Sciomyzidae.*	Notable	Habitat: peatland. Resource: well vegetated shallow freshwater pond; wetland vegetation.
Dasytes plumbeus.	*Coleoptera: Dasytidae.*	Nationally Scarce.	Habitat: decaying wood. Resource: broadleaved woodland; trunks and branches; flowers (adult); bark and cambium.
Hybomitra ciureai.	*Diptera: Tabanidae.*	Nationally Scarce.	Habitat: peatland. Resource: wet/damp peat; wetland vegetation.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat and Habitat Resource Requirements.
Microvelia (Microvelia) pygmaea.	*Hemiptera: Veliidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Ochthebius (Hymenodes) nanus.	*Coleoptera: Hydraenidae.*	Nationally Scarce.	Habitats: brackish pools and ditches; marshland. Resource: sparsely vegetated shallow freshwater pond.
Odontomyia ornata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland. Resource: well vegetated shallow freshwater pond.
Parhelophilus consimilis.	*Diptera: Syrphidae.*	Nationally Scarce.	Habitat: peatland.
Peltodytes caesus.	*Coleoptera: Haliplidae.*	Nationally Scarce.	Habitat: marshland. Resource: sparsely vegetated shallow freshwater pond.
Tabanus maculicornis.	*Diptera: Tabanidae.*	Nationally Scarce.	Habitat: running water; shaded woodland floor; wet woodland. Resource: broadleaved woodland; wet humidity; heavy shade; woodland stream.
Viviparus contectus.	[unassigned] *Caenogastropoda: Viviparidae.*	Nationally Scarce.	Habitat: marshland. Resource: base conditions, sparsely vegetated shallow freshwater pond.

1.2.90 As with Assessment Compartment 11, the sampling effort within Assessment Compartment 12 focused on the aquatic and terrestrial invertebrates in the extensive ditch network and associated bankside vegetation. Seventy-eight species in the combined dataset are associated with peatland habitats, nine of which (11%) have a recognised conservation status. The most notable of these was Norfolk Hawker which requires well vegetated, shallow freshwater water bodies, a resource required by a further eight species with conservation status recorded associated with peatland habitat. Surveys identified at least seven adult Norfolk Hawker flying and landing on emergent macrophyte vegetation, and it is likely that they are breeding due to the presence of suitable habitat.

1.2.91 The high percentage of species with conservation status associated with peatland habitat, particularly the aquatic resource, indicates that these ditches may support an invertebrate assemblage of national importance.

1.2.92 The lack of survey effort means that the importance of the invertebrate assemblages associated with the other habitats present within Assessment Compartment 12 cannot be confirmed; however, considering the results of surveys within neighbouring compartments, along with the nature of Sizewell Marshes SSSI, it is likely that they are of high conservation value.

Assessment

1.2.93 Given that:

- the detailed analysis of the invertebrate survey data for this compartment has shown the presence of Norfolk hawker, two RDB2 species and at least 11 Nationally Scarce species;
- the area is also part of a much larger ecological unit designated as a SSSI partly for its invertebrate fauna; and
- the area may be indirectly affected by the proposed development;

Then the invertebrate assemblage within Assessment Compartment 12 would:

- be an IEF at the national level under the CIEEM guidelines; and
- be of high importance, following the EIA-specific assessment methodology.

xiii. Assessment compartment 13

Description

1.2.94 Assessment Compartment 13 lies within Sizewell Levels and Associated Areas CWS and consists of mostly conifer plantation (Goose Hill) on sandy substrate with a network of tracks and rides providing sheltered open corridors of shrub and ground vegetation.

1.2.95 The combined dataset for Assessment Compartment 13 showed a total of 559 species recorded. Nineteen of these have recognised conservation status and are listed in **Table 1.14** below. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.14: Assessment compartment 13 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Grayling	*Lepidoptera: Nymphalidae.*	IUCN Vulnerable; Section 41 NERC Act.	Habitat: short sward and bare ground. SAT: F111 – bare sand and chalk.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
White Admiral.	*Lepidoptera: Nymphalidae.*	IUCN Vulnerable; Section 41 NERC Act.	Habitat: arboreal. Resource: understorey; broadleaved woodland; flowers (adult); foliage, honeydew (adult).
Arachnospila (Ammosphex) consobrina.	*Hymenoptera: Pompilidae.*	RDB3	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT: F111 – bare sand and chalk.
Antlion	*Neuroptera: Myrmeleontidae.*	No current GB status.	Habitat: tall sward and scrub. Resource: exposed sand; soil and roots; dry soil humidity; sand.
Priocnemis (Umbripennis) coriacea.	*Hymenoptera: Pompilidae.*	Notable a.	Habitat: tall sward and scrub. Resource: exposed sand; sward/ field layer; dry soil humidity.
Dorytomus filirostris.	*Coleoptera: Curculionidae.*	Notable b.	Habitat: arboreal. Resource: understorey; broadleaved woodland; flowers, buds and shoots; terrestrial aspect – pupate in foliage on ground.
Xyleborus dispar.	*Coleoptera: Curculionidae.*	Notable b.	Habitat: decaying wood. Resource: broadleaved woodland; freshly dead trunks and branches. SAT: A212 – bark and sapwood decay.
Grypus equiseti.	*Coleoptera: Erirhinidae.*	Notable b.	Habitat: marshland; peatland; running water; short sward & bare ground. Resource: sward/field layer; wetland vegetation.
Priocnemis (Priocnemis) cordivalvata.	*Hymenoptera: Pompilidae.*	Notable b.	Habitat: shaded woodland floor. Resource: broadleaved woodland. SAT: F001 – scrub edge.
Dasypoda hirtipes.	*Hymenoptera: Melittidae.*	Notable b.	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT: F002 – rich flower resource; F111 – bare sand and chalk.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Catopidius depressus.	*Coleoptera: Leiodidae.*	Notable	No available details.
Hybomitra ciureai.	*Diptera: Tabanidae.*	Nationally Scarce.	Habitat: peatland. Resource: wet/damp peat; wetland vegetation. SAT: W314 – reed-fen and pools.
Anaspis (Anaspis) thoracica.	*Coleoptera: Scraptiidae.*	Nationally Scarce.	Habitat: decaying wood. Resource: broadleaved woodland; decaying wood – red rot; flowers (adult). SAT: A211 – heartwood decay.
Ectobius panzeri.	*Dictyoptera: Blattellidae.*	Nationally Scarce.	No available details.
Medetera dendrobaena.	*Diptera: Dolichopodidae.*	Nationally Scarce.	Habitat: decaying wood. Resource: beetle galleries; conifer or broadleaved woodland.
Tabanus maculicornis.	*Diptera: Tabanidae.*	Nationally Scarce.	Habitat: running water: shaded woodland floor; wet woodland. Resource: broadleaved woodland; wet humidity; heavy shade; woodland stream.
Saprinus aeneus.	*Coleoptera: Histeridae.*	Nationally Scarce.	Habitat: tall sward and scrub. Resource: dung and carrion.
Lasiambia palposa agg.	*Diptera: Chloropidae.*	Potentially Nationally Scarce.	Habitat: short sward and bare ground. Resource: exposed sand; dry soil humidity; sand. SAT: F111 – bare sand and chalk.
Geomyza majuscula.	*Diptera: Opomyzidae.*	Potentially Nationally Scarce	Habitat: tall sward and scrub.

1.2.96 Assessment Compartment 13 was subjected to a targeted antlion survey. An aggregation of approximately 300 antlion burrows were recorded under the shelter of a corrugated iron roof of Walk Barn along the north edge of this compartment.

1.2.97 Five of the eight BATs recognised within this compartment comprised a sufficient number of species to be considered robust.

1.2.98 One BAT (the “unshaded early successional mosaic” assemblage) achieved a rarity score exceeding the FCT specified by ISIS (166 compared to an FCT of 160) and was the second most species-rich. This BAT had nine species with recognised conservation status attributed to it, associated with short sword and bare ground habitat, shown in **Table 1.14**. This included IUCN Vulnerable grayling, a butterfly species, and a RDB3 “rare” spider-hunting wasp *Arachnospila consobrina*.

1.2.99 Grayling has been recorded from within several of the drier, more sandy Assessment Compartments, namely 4, 5 and 6. The species is fairly xerophilic and characteristic of arid conditions. The Grayling’s conservation status is based on a significant decline over recent decades; however, it is still relatively common in suitable habitats. In contrast, *A. consobrina* has a very restricted range in the UK with most British records from coastal habitats in south Wales. *A. consobrina* is a species of sandy habitats, including coastal dunes, but little is known of its biology.

1.2.100 The BAT with the largest number of species attributed to it, the “grassland and scrub matrix” assemblage, had a relatively low rarity score of 130 compared to the FCT ISIS threshold of 160. This is likely to reflect a lower ratio of rare species in relation to the widespread species recorded within the dataset.

1.2.101 Also of note is the presence of adult and larval white admiral butterfly within Assessment Compartment 13, which is classed as IUCN Vulnerable.

1.2.102 Twelve SATs were recognised within the Assessment Compartment 13 dataset. Of these, five achieved species scores exceeding their comparative FCT thresholds. These are: “A212 – bark and sapwood decay” and “F111 – bare sand and chalk” along with the resource based “F001 – scrub edge”, “F002 – rich flower resource” and “F003 – scrub heath and moorland”.

1.2.103 These scores indicate Assessment Compartment 13 to be a site that collectively provides a wide range of habitat niches which, in turn, support a very diverse range of specialist invertebrate assemblages of national importance. Several the SATs achieving scores exceeding the FCT were resource based and therefore somewhat intangible in terms of habitat interpretation. However, the “F111 – Bare earth and chalk” assemblage was attributed with four species of higher conservation status, shown in **Table 1.14**.

1.2.104 Much of the wood decay habitat recorded within Assessment Compartment 13 was provided by mature conifers and species contributing to the specialist “A212 – Bark and sapwood decay” assemblage. This included some species either in part or wholly associated with coniferous trees, such as *Ernobius pini* a species of Anobiid beetle uncommon along the Suffolk coast.

1.2.105 Overall, the results indicate Assessment Compartment 13 supports both BAT and SAT assemblages of national importance. The more open habitat areas benefit from shelter and there was a mixture of dry, sandy habitats, beneficial to strongly thermophilous (heat loving) species typical of heathlands, and localised geological variation provided some interesting transitions to wetlands. The mature trees, including conifers and resource of wood decay habitat, which was often left *in situ,* evidently provided habitat for a range of species associated with wood decay, including both saproxylic species and secondary colonisers such as solitary Hymenoptera. The invertebrate fauna of this compartment will inevitably benefit from the movement of specialist fauna from the adjacent coastal dunes, grassland, heathland as well as the wet woodlands and fen and grazing marsh habitats within adjacent Assessment Compartments that border the site to the south and east. At a landscape scale, Assessment Compartment 13 will provide important connectivity for these invertebrate assemblages, associated with dry sandy habitats, north and south along the Suffolk coast.

Assessment

1.2.106 Given that:

- the detailed analysis of the invertebrate survey data for this compartment has shown that at least two IUCN Vulnerable, one RDB species and 14 Nationally Scarce species are present;
- this compartment supports the broad “unshaded early successional mosaic” and specific “bare sand and chalk”, “bark and sapwood decay” assemblages of national importance;
- this area is within the Sizewell Levels and Associated Areas CWS; and
- this area will be directly impacted by the proposed development, with the loss of suitable habitat;

then the invertebrate assemblage within Assessment Compartment 13 would:

- be an IEF at the national level under the CIEEM guidelines; and
- be of high importance, following the EIA-specific assessment methodology.

xiv. Assessment compartment 14

Description

1.2.107 Assessment Compartment 14 consists of conifer plantation on a slope with a south-east aspect. The woodland is interspersed with open tracks and rides and there are cleared areas containing open scrub/grassland mosaic.

1.2.108 Within the combined dataset for this area, 161 species were recorded. Four of these have recognised conservation status and are listed in **Table 1.15** below, along with their habitat and resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.15: Assessment compartment 14 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where relevant).
White admiral.	*Lepidoptera: Nymphalidae.*	IUCN Vulnerable; Section 41 NERC Act.	Habitat: arboreal. Resource: understorey; broadleaved woodland; flowers (adult); foliage; honeydew (adult).
Procas granulicollis.	*Coleoptera: Erirhinidae.*	RDBi[19]	Habitat: shaded woodland floor Resource: acidic conditions; broadleaved woodland; damp humidity; heavy shade; undergrowth.
Scymnus (Neopullus) limbatus.	*Coleoptera: Coccinellidae.*	Notable b.	Habitat: arboreal. Resource: canopy; foliage.
Odontomyia argentata.	*Diptera: Stratiomyidae.*	Nationally Scarce.	Habitat: peatland Resource: base conditions; well vegetated shallow freshwater pond. SAT: W314 – reed-fen and pools.

1.2.109 Only two BATs were represented by a sufficient number of species to be considered robust. Neither of these achieved a rarity score exceeding their FCT thresholds. The highest-scoring BAT was the "grassland and scrub matrix" assemblage, which also contained the largest number of species attributed to it (52) and achieved a rarity score of 148 (compared with the FCT of 160). There was one species of recognised conservation status attributed to this assemblage, the rare weevil *Procas granulicollis,* classed as an RDB Indeterminate endemic species (see **Table 1.15**) and not previously recorded in Suffolk.

1.2.110 The other well-represented BAT, the "unshaded early successional mosaic" assemblage, achieved a rarity score of 145 (compared with the FCT of 160). Despite FCT status not being achieved in either the "grassland and

[19] Pre 1994 Status: Species considered to be either Endangered, Vulnerable or Rare but with insufficient information to say which.

scrub matrix" and "unshaded early successional mosaic" assemblages, the scores can be said to indicate some conservation value.

1.2.111 Also, of note is the presence of adult and larval IUCN Vulnerable white admiral butterfly within this compartment.

1.2.112 While six SATs were recognised, none of them achieved species scores approaching their FCT ISIS thresholds. The "F111 – bare sand and chalk" SAT was best represented out of these and contained five species considered sufficiently specialised to be attributed to it.

1.2.113 The combined Assessment Compartment 14 dataset adds resolution to the overall knowledge of the fauna occurring across the greater area. Whilst none of the BATs or associated SATs recorded achieved scores exceeding their FCT thresholds, the analysis identified Assessment Compartment 14 as supporting distinct "grassland and scrub matrix" and allied "unshaded early successional mosaic" assemblages. Importantly the associated F111 SAT supported species with a strong heathland association. The fauna overall was typical of that recorded in comparable habitat throughout the other Assessment Compartments; however, the stand-out species recorded with this compartment was *Procas granulicollis*.

Assessment

1.2.114 Given that:

- the detailed analysis of the invertebrate survey data for this compartment has shown that at least one IUCN Vulnerable, one RDB species and two Nationally Scarce species are present;
- this compartment supports "unshaded early successional mosaic" and "grassland scrub matrix" assemblage types of high conservation value;
- this area of woodland includes sub-habitats of some importance to invertebrates;
- this area is within the Sizewell Levels and Associated Areas CWS; but
- this area will not be directly affected by the proposed development, resulting in no habitat loss;

then the invertebrate assemblage within Assessment Compartment 14 would:

- be important at the county level under the CIEEM guidelines; and
- be of medium importance, following the EIA-specific assessment methodology;
- not be an IEF.

xv. Assessment compartment 15

Description

1.2.115 Assessment Compartment 15 consists of a network of arable fields broken up by hedgerows and is bordered by the plantation woodland in Assessment Compartments 13 and 14 to the south and east.

1.2.116 There were 443 species recorded in Assessment Compartment 15 in the combined data set, 24 of which have recognised conservation status. **Table 1.16** outlines the status of each species and highlights their habitat and habitat resource requirements. Also outlined, where relevant, is the ISIS SAT that each species is associated with.

Table 1.16: Assessment compartment 15 invertebrate species with a conservation status.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
White-letter hairstreak.	*Lepidoptera: Lycaenidae.*	Legal Protection (Sale only); IUCN Endangered; Section 41 NERC Act.	Habitat: arboreal. Resource: mature tree canopy; broadleaved woodland; flowers (adult); foliage; honeydew (adult).
Ophonus (Metophonus) parallelus.	*Coleoptera: Carabidae.*	IUCN Vulnerable; Nationally Rare.	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT: F111 – bare sand and chalk.
Empis prodromus.	*Diptera: Empididae.*	IUCN Near Threatened: Nationally Rare.	No available details.
Andrena (Plastandrena) tibialis.	*Hymenoptera: Andrenidae.*	Notable a.	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity. SAT: F002 – rich flower source.
Andrena (Poecilandrena) labiata	*Hymenoptera: Andrenidae*	Notable a	Habitat: short sward & bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT: F002 – rich flower source.
Catapion pubescens	*Coleoptera: Apionidae*	Notable b	Habitat: tall sward & scrub. Resource: sward/field layer; dry soil humidity.

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Gabrius osseticus	*Coleoptera: Staphylinidae*	Notable b	Habitat: short sward & bare ground. Resource: exposed sand; damp soil humidity; sand. SAT: F111 – bare sand and chalk.
Megalonotus praetextatus	*Hemiptera: Lygaeidae*	Notable b	Habitat: short sward & bare ground. Resource: sward/field layer; dry soil humidity. SAT: F111 – bare sand and chalk.
Megalonotus sabulicola	*Hemiptera:* *Lygaeidae*	Notable b	Habitat: short sward & bare ground. Resource: exposed sand; dry soil humidity; sand.
Nysson dimidiatus	*Hymenoptera: Crabronidae*	Notable b	Habitat: short sward & bare ground Resource: exposed sand; sward/field layer; dry soil humidity; sand.
Protapion dissimile	*Coleoptera: Apionidae*	Notable b	Habitat: short sward & bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT: F111 – bare sand and chalk.
Sibinia primita	*Coleoptera: Curculionidae*	Notable b	Habitat: short sward & bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand.
Omalium allardi.	*Coleoptera: Staphylinidae.*	Notable	No available details.
Sunius melanocephalus .	*Coleoptera: Staphylinidae.*	Notable	Habitat: tall sward and scrub. Resource: litter and ground layer; variable soil humidity.
Rhamphomyia caliginosa	*Diptera: Empididae.*	Nationally Scarce.	Habitat: shaded woodland floor: wet woodland. Resource: broadleaved woodland; wet humidity; heavy shade.
Amara (Amara) lucida.	*Coleoptera: Carabidae.*	Nationally Scarce.	Habitat: short sward and bare ground. Resource: exposed sand; sward/field layer; dry soil humidity; sand. SAT: F111 – bare sand and chalk.
Mordellistena (Mordellistena) humeralis.	*Coleoptera: Mordellidae.*	Nationally Scarce.	Habitat: decaying wood. Resource: broadleaved woodland; trunks & branches; flowers (adult).

Species	Order: Family.	Conservation Status (as of 2019).	Habitat, Habitat Resource Requirements, ISIS SAT (Where Relevant).
Podagrica fuscicornis.	*Coleoptera: Chrysomelidae.*	Nationally Scarce.	Habitat: tall sward and scrub. Resource: sward/field layer; variable soil humidity.
Saldula pilosella.	*Hemiptera: Saldidae.*	Nationally Scarce.	Habitat: brackish pools and ditches: saltmarsh. Resource: pond/seepage edge; saline silt. SAT: M311 – saltmarsh and transitional brackish marsh.
Stenolophus skrimshiranus.	*Coleoptera: Carabidae.*	Nationally Scarce.	Habitat: peatland. Resource: deep litter.
Stenolophus teutonus.	*Coleoptera: Carabidae.*	Nationally Scarce.	Habitat: marshland. Resource: drawdown zone mud/shallow litter.

1.2.117 Out of the nine BATs recognised within the ISIS analysis, four comprised a sufficient number of species to be considered robust.

1.2.118 In terms of conservation significance, one BAT ("unshaded early successional mosaic" assemblage) achieved a rarity score exceeding its FCT threshold. There were 11 species with a recognised conservation status attributed to the "unshaded early successional mosaic" assemblage, associated with short sward and bare ground habitat, including one species, the IUCN Vulnerable carabid beetle *Ophonus parallelus*.

1.2.119 In comparison, the rarity score achieved for the "grassland and scrub matrix" BAT, which contained the largest number of species attributed to it (178), was 127 compared to the FCT threshold of 160. This score is relatively low considering the species-richness of the assemblage and is likely to reflect a lower ratio of rare and uncommon species in relation to the more widespread species within the sample data recruited to this assemblage.

1.2.120 The remaining two BATs that were considered robust were "arboreal canopy" and "permanent wet mire" assemblages, to which 33 and 22 species were attributed respectively. This reflects the presence of trees and shrubs forming the hedgerows of the arable field margins and the close proximity to high quality fen habitats. IUCN Endangered white-letter hairstreak, a protected species (**Table 1.16**) attributed to the arboreal canopy BAT, was recorded during the 2015 surveys and is associated exclusively with elms (Ref. 1.29).

1.2.121 Nine SATs were recognised within Assessment Compartment 15. One SAT, "F111 – bare sand and chalk", nested within the "unshaded early successional mosaic" BAT, supported the majority of uncommon species but failed to achieve a species score close to its FCT threshold.

1.2.122 In contrast, the resource-based SAT, "F001 – scrub edge", achieved a species score of 12, exceeding its FCT threshold of 10 species. This emphasizes the importance of the scrub edge habitat within this compartment. Resource-based SATs are difficult to interpret in assessing site value, however, as they are based on more diffuse habitat resources, rather than more tangible and recognisable habitat features.

1.2.123 Overall, despite being disturbed and intensively managed in some places, Assessment Compartment 15 supported a BAT and a SAT which achieved their respective FCT thresholds, as well as 21 species with conservation status, shown in **Table 1.16**. The exceedance of the FCT threshold for the "unshaded early successional mosaic" BAT suggests that Assessment Compartment 15 supports an assemblage of national importance. However, the nested "F111" SAT (SATs being considered to be of greater intrinsic conservation value) fell short of its FCT.

1.2.124 Although the habitats are of relatively limited intrinsic value for invertebrates (not least because the fields themselves are sprayed with insecticide) the margins supported a reasonable diversity of flowering ephemeral herbs with a resource of sandy exposed ground. This habitat has structural and compositional similarities to habitat supporting diverse assemblages in nearby coastal dune, dune grassland and heath habitats, and there is a strong mutual affinity between the supported faunas. The margins also contain scrub hedgerow habitat.

Assessment

1.2.125 Given that:

- the analysis of the invertebrate survey data for this compartment has shown that at least one IUCN Endangered (White-letter hairstreak), one IUCN Vulnerable and 18 Nationally Scarce species are present;
- this compartment supports only "'scrub edge" and "unshaded early successional mosaic" assemblage types of national importance but is seen as overspill for surrounding habitat;
- habitats within this area are of limited intrinsic value, with the exception of the arable field margins; and
- the implementation of primary and tertiary mitigation measures, discussed in the **ES Volume 2, Chapter 14**, would ensure there were

no indirect impacts and limited direct impacts as a result of habitat loss on the invertebrate assemblage within Assessment Compartment 15;

then the invertebrate assemblage within Assessment Compartment 15 would:

- be important at the county level under the CIEEM guidelines;
- be of medium importance, following the EIA-specific assessment methodology; and
- not be an IEF.

1.3 Conclusions

1.3.1 Whilst overlap and duplication in the recording between surveys is inevitable, there has been an emphasis on filling gaps to ensure complete coverage, with the overall aim of characterising the invertebrate assemblages of the survey area using data collected within the field surveys.

1.3.2 The field survey results have indicated that habitats within the survey area support both terrestrial and aquatic invertebrate assemblages of high nature conservation value. The assemblages recorded include numerous species with recognised conservation status representative of the wetland habitats within the Sizewell Marshes SSSI and contiguous areas of habitat: the Minsmere to Walberswick Heaths and Marshes SSSI/Ramsar site (Assessment Compartment 6a and 6); the habitat mosaic of dry sandy habitat in Assessment Compartments 4 to 6; the plantation woodland in Assessment Compartments 13 and 14; and the arable field margins in Assessment Compartment 15.

1.3.3 In terms of ISIS analysis, the “permanent wet mire” BAT assemblage was well represented throughout Assessment Compartments 1, 3 and 4a, where the rarity scores in each exceeded the FCT threshold. The “permanent wet mire” BAT assemblages are characteristically found in wetlands where disturbance is limited. They are typical of mires and seepages which may have little open water, but which remain permanently wet and with little fluctuation in water level, often due to the presence of underlying peat (Ref. 1.30). Further to this, the nested SAT “W314 – reed-fen and pools” was also well represented in Assessment Compartments 1 and 3 and exceeded the FCT ISIS threshold in Assessment Compartment 1. These results indicate that the BAT and SAT assemblages found within Assessment Compartments 1, 3 and 4a are of national importance.

1.3.4 The other BATs within these Assessment Compartments 1, 3 and 4a may not have reached their FCT thresholds, but the rarity scores achieved indicate that they are of high conservation value. In particular, the “mineral marsh and open water" BAT assemblages are typically found in floodplain wetlands, fluctuating meres, dune slacks, carr and wet woodland. The "grassland scrub matrix" and "woodland decay" BAT assemblages found in Assessment Compartment 1 further highlight the importance of these habitats, which are well represented within these compartments and the surrounding landscape.

1.3.5 The high scores relating to the "unshaded early successional mosaic" BAT assemblage and nested "F111 – bare sand and chalk" SAT in Assessment Compartments 4 – 6 reflect the importance of arid sandy disturbed habitat. Such conditions might be expected to occur within the footprint of an industrial site which has been subject to some anthropogenically-induced disturbance and, importantly, which is approximately contiguous to an ecologically valuable coastal zone grassland habitat. Habitats within this compartment are structurally and compositionally analogous to the Section 41 NERC Act priority habitat category "open mosaic habitats on previously developed land". Such habitats often support invertebrate populations of high conservation value. There is continuation of these habitats between these Assessment Compartments and north and south along the coast. It can be surmised, therefore, that Assessment Compartments 4 to 6 add to the conservation value of these assemblages at a landscape scale.

1.3.6 The conservation value of the conifer plantations of Assessment Compartments 13 and 14 is contained within the acid grassland of tracks and rides interspersing the plantation. In particular, this is shown in Assessment Compartment 13, which supported the "unshaded early successional mosaic" BAT assemblage and five SATs. This included the "F111 – Bare sand and chalk" and "A212 – Bark and sapwood decay" SATs, where the FCT ISIS thresholds were exceeded; these are therefore of national importance, especially given the high number of species with recognised conservation status. The more open habitat areas benefit from shelter, and the mixture of dry, sandy habitats are beneficial to strongly thermophilous species typical of those more frequently found on heathlands. The mature trees, including conifers, and the resultant presence of wood decay habitat, which was often left *in situ*, evidently provided habitat for a range of species associated with this resource.

1.3.7 The value of the flower-rich arable marginal and open ground habitat in Assessment Compartment 15 cannot be easily seen in isolation from the hedgerows. Furthermore, the habitat should be seen primarily as an overspill for the surrounding higher quality, heathland, dune, sparsely vegetated coastal grassland and fen habitats. Without these habitats the arable margins would undoubtedly support an invertebrate fauna of far lower conservation value.

c) Summary of assessment compartments

1.3.8 Following a review of the known baseline within the ZOI, **Table 1.17** lists the Assessment Compartments which will be carried forward into the detailed assessment. Those carried forward are IEFs of sufficient conservation value that will be sufficiently affected by the proposed development to require material consideration within the assessment.

Table 1.17: Assessment compartments taken forward for detailed assessment.

Assessment Compartment.	Importance (CIEEM/EIA Methodology).	Justification	Scope In/Out.
1	National/High.	There will be direct impacts from the works resulting in habitat loss. Part of Sizewell Marshes SSSI with an invertebrate assemblage of national importance.	Scoped in.
2	National/High.	There may be direct impacts from the works resulting in habitat loss. Part of Sizewell Marshes SSSI with an invertebrate assemblage of national importance.	Scoped in.
3	National/High.	There may be direct impacts from the works resulting in habitat loss. Part of Sizewell Marshes SSSI with an invertebrate assemblage of national importance.	Scoped in.
4/4a	National/High.	There will be direct impacts from the works resulting in habitat loss. Contains invertebrate assemblages of national importance. Provides habitat continuance for designated sites.	Scoped in.
5	National/High.	There will be direct impacts from the works resulting in habitat loss. Part of Suffolk Shingle Beaches CWS but contains an invertebrate assemblage of national importance.	Scoped in.

Assessment Compartment.	Importance (CIEEM/EIA Methodology).	Justification	Scope In/Out.
6/6a	International/High.	There will be no direct impacts from the works resulting in habitat loss. Part of Walberswick Heaths and Marshes Ramsar site and SSSI supports an invertebrate assemblage of national importance. Whilst potential impact pathways exist, such as recreation pressure and hydrological effects, the effects are mitigated through primary and tertiary mitigation measures outlined in Section 14.12 of the ES Chapter. The invertebrate assemblage present within this compartment will not be directly affected by the proposed development.	Scoped out.
7	County/Medium.	Part of the compartment lies within Sizewell Marshes SSSI but there will be no direct impacts from the works resulting in habitat loss. Whilst potential impact pathways exist, through pollution and changes in underlying hydrology, the effects upon the invertebrate assemblages are unlikely to be significant The effects are mitigated through primary and tertiary mitigation measures outlined in Section 14.12 of the ES Chapter. The invertebrate assemblage present within this compartment will not be directly affected by the proposed development.	Scoped out.
8	National/High.	Lies within Sizewell Marshes SSSI but there will be no direct impacts from the works resulting in habitat loss. Potential impact pathways exist through pollution and changes in changes in underlying hydrology	Scoped in.

Assessment Compartment.	Importance (CIEEM/EIA Methodology).	Justification	Scope In/Out.
9	National/High.	Part of the compartment lies within Sizewell Marshes SSSI, but there will be no direct impacts from the works resulting in habitat loss. Potential impact pathways exist through pollution and changes in underlying hydrology, however the effects are mitigated through primary and tertiary mitigation measures outlined in Section 14.12 of the ES Chapter. The invertebrate assemblage present within this compartment will not be directly affected by the proposed development.	Scoped out.
10	National/High.	Lies within Sizewell Marshes SSSI, but there will be no direct impacts from the works resulting in habitat loss. Potential impact pathways exist through pollution and changes in underlying hydrology, however the effects are mitigated through primary and tertiary mitigation measures outlined in Section 14.12 of the ES Chapter. The invertebrate assemblage present within this compartment will not be directly affected by the proposed development.	Scoped out.
11	National/High.	Lies within Sizewell Marshes SSSI but there will be no direct impacts from the works resulting in habitat loss. Potential impact pathways exist through pollution and changes in underlying hydrology	Scoped in.
12	National/High.	Lies within Sizewell Marshes SSSI but there will be no direct impacts from the works resulting in habitat loss. Potential impact pathways exist through pollution changes in underlying hydrology	Scoped in.
13	National/High.	There will be direct impacts from the works resulting in habitat loss. Supports an invertebrate assemblage of national importance.	Scoped in.

Assessment Compartment.	Importance (CIEEM/EIA Methodology).	Justification	Scope In/Out.
14	County/Medium.	There will be no direct impacts from the works resulting in habitat loss. Supports an invertebrate assemblage of high conservation value, however any indirect effects are mitigated through primary and tertiary mitigation measures outlined in Section 14.12 of the ES Chapter. The invertebrate assemblage present within this compartment will not be directly affected by the proposed development.	Scoped out.
15	County/Medium.	There will be direct impacts from the works resulting in habitat loss, albeit temporary. Mostly comprising intensive arable fields. Although the field margins do support a broad invertebrate assemblage of some importance, the effects of this loss are mitigated through primary and tertiary mitigation measures outlined in Section 14.12 of the ES Chapter. The invertebrate assemblage present within this compartment will be temporarily affected by the proposed development however, it is considered that there is sufficient habitat within the surrounding area to sufficiently support the assemblage during the works.	Scoped out.

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SIZEWELL C DEVELOPMENT – MAIN DEVELOPMENT SITE: VOLUME 2, CHAPTER 14:

APPENDIX 14A4 – INVERTEBRATES

Documents included within this Appendix are as follows:

APPENDIX 14A4 INVERTEBRATES

ANNEX 14A4.1 FIGURES (provided separately)

ANNEX 14A4.2 DESK STUDY

ANNEX 14A4.3 SECONDARY DATA

- Annex 14A4.3 Amec 2007 Invertebrate Report
- Annex 14A4.3 Amec 2009 Invertebrate Report
- Annex 14A4.3 Amec 2010 Invertebrate Report
- Annex 14A4.3 Amec 2007-2010 Invertebrate Report

ANNEX 14A4.4 PRIMARY DATA

- Annex 14A4.4 Invertebrate and NVC Surveys of SSSI: Review of previous studies and methodology for further work
- Annex 14A4.4 Sizewell C Invertebrate Surveys 2014
- Annex 14A4.4 Sizewell C Invertebrate Surveys 2016

Main Development Site: Volume 2, Chapter 14: Appendix 14A4 – Invertebrates: Annex 14A4.2 Desk Study

Contents

Tables

Plates

None provided.

Figures

None provided.

1. Desk Study Results for Invertebrates

1.1.1 Records for invertebrates were requested from Suffolk Biodiversity Information Service (SBIS) in 2014 and 2018 for protected or otherwise notable species of conservation concern within 2km of the Sizewell C power station at the main development site (referred to throughout this volume as the "proposed development"). Records collected by Suffolk Wildlife Trust (SWT) are provided to SBIS.

1.1.2 The locations of all designated sites (statutory and non-statutory) within 2km of the proposed development site were also obtained. Citations for these sites, which provide information on the reasons for their designation, were reviewed to ascertain whether or not reptiles are cited as interest features of these sites.

1.1.3 The Suffolk Biodiversity Action Plan (BAP) (Ref 1.1), Suffolk's Priority Species and Habitats list (Ref 1.2), and the habitats and species of principal importance included on the Section 41 list of the Natural Environment and Communities (NERC) Act (Ref 1.3), were also reviewed with reference to any Invertebrates present, or likely to be present, within the proposed development site and the wider study area.

1.1.4 The following table presents the desk-study results for invertebrates.

Table 1.1: Desk-study results for invertebrates.

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - beetle (Coleoptera)	*Aphodius (Liothorax) plagiatus*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Nb
Insect - beetle (Coleoptera)	*Aspidapion (Aspidapion) soror*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Na
Insect - beetle (Coleoptera)	*Bembidion (Notaphemphanes) ephippium*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Na
Insect - beetle (Coleoptera)	*Bledius (Elbidus) bicornis*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Na
Insect - beetle (Coleoptera)	*Brachygluta waterhousei*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	N
Insect - beetle (Coleoptera)	*Ceutorhynchus pumilio*	-	Minsmere B. R.: Minsmere RSPB	TM4689866890	1.617113088	52.24430937	2017	Na
Insect - beetle (Coleoptera)	*Chrysolina haemoptera*	Plantain Leaf Beetle	Sizewell	TM476640	1.625259374	52.21806106	2017	Nb
Insect - beetle (Coleoptera)	*Clanoptilus marginellus*	-	Minsmere B. R.: Minsmere RSPB	TM4775765834	1.628896324	52.23444762	2017	RLGB.Lr(NT)
Insect - beetle (Coleoptera)	*Crudosilis ruficollis*	-	Minsmere B. R.: Minsmere RSPB, Eastbridge, cpt 31W (Pioneer 6)	TM4579766593	1.600801764	52.2421369	2005	Nb

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - beetle (Coleoptera)	*Demetrias (Risophilus) imperialis*	-	Minsmere B. R.: Minsmere RSPB, Eastbridge, cpt 31W (Pioneer 6)	TM457976 6593	1.600801764	52.2421369	2005	Nb
Insect - beetle (Coleoptera)	*Dicheirotrichus obsoletus*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Nb
Insect - beetle (Coleoptera)	*Dytiscus circumcinctus*	-	Minsmere B. R.: Minsmere Reserve	TM468126 6693	1.61571201	52.24258016	2015	NS-excludes
Insect - beetle (Coleoptera)	*Enochrus bicolor*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	NS
Insect - beetle (Coleoptera)	*Gronops lunatus*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Nb
Insect - beetle (Coleoptera)	*Heterocerus flexuosus*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	NS, ScotBL
Insect - beetle (Coleoptera)	*Heterocerus obsoletus*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	NS
Insect - beetle (Coleoptera)	*Hippodamia (Adonia) variegata*	Adonis' Ladybird	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Nb
Insect - beetle (Coleoptera)	*Hydrophilus piceus*	Great Silver Water Beetle	Minsmere B. R.: Minsmere	TM4767	1.618684587	52.24525069	2017	RLGB.Lr(NT)
Insect - beetle (Coleoptera)	*Lionychus quadrillum*	Ground beetle	Dunwich:	TM4766	1.617953808	52.23627726	2007	RDBGB.R
Insect - beetle (Coleoptera)	*Longitarsus dorsalis*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Nb

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - beetle (Coleoptera)	*Longitarsus quadriguttatus*	-	Thorpeness: Thorpe Ness	TM477607	1.624307261	52.18840383	2017	Na
Insect - beetle (Coleoptera)	*Meloe proscarabaeus*	Black Oil-beetle	Leiston: Waterloo Ave, Leiston	TM441146 2632	1.57334068	52.20734017	2011	Sect.41, Sect.42, UKBAP
Insect - beetle (Coleoptera)	*Odacantha melanura*	-	Minsmere B. R.: Minsmere RSPB, Eastbridge (Wet 5)	TM455656 6616	1.597427057	52.24244682	2005	Nb
Insect - beetle (Coleoptera)	*Paederus fuscipes*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Nb
Insect - beetle (Coleoptera)	*Pelenomus canaliculatus*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Nb, ScotBL
Insect - beetle (Coleoptera)	*Pelenomus zumpti*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Na
Insect - beetle (Coleoptera)	*Phyllotreta vittula*	Barley Flea Beetle	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Na
Insect - beetle (Coleoptera)	*Sibinia sodalis*	Golden Keyhole Weevil	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Na
Insect - beetle (Coleoptera)	*Silpha obscura*	-	Sizewell:	TM475625	1.622701889	52.20464584	2017	RDBGB.VU
Insect - beetle (Coleoptera)	*Tachys (Tachys) scutellaris*	-	Minsmere B. R.: Minsmere RSPB Reserve	TM4766	1.617953808	52.23627726	2004	Na
Insect - beetle (Coleoptera)	*Trypocopris vernalis*	Spring Dumbledor	Sizewell:	TM475625	1.622701889	52.20464584	2017	Nb

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - beetle (Coleoptera)	*Tychius squamulatus*	-	Sizewell:	TM475637	1.623579019	52.21541396	2017	Nb
Insect - butterfly (Lepidoptera)	*Apatura iris*	Purple Emperor	Theberton Wood:	TM4265	1.544153624	52.22952322	2013	RLGB.Lr(NT), WCA5/9.5a, WCA5/9.5b
Insect - butterfly (Lepidoptera)	*Coenonympha pamphilus*	Small Heath	Westleton Walks:	TM457672	1.59982516	52.24762718	2013	RLGB.Lr(NT), Sect.41, Sect.42, UKBAP
Insect - butterfly (Lepidoptera)	*Coenonympha pamphilus pamphilus*	Small Heath	Minsmere B. R.: Minsmere	TM465670	1.6113751	52.24547481	2016	RLGB.Lr(NT), ScotBL, Sect.41, Sect.42, UKBAP
Insect - butterfly (Lepidoptera)	*Hipparchia semele*	Grayling	Theberton: Garden-Theberton	TM439656	1.572353992	52.23406951	2013	RLGB.VU, Sect.41, Sect.42, UKBAP
Insect - butterfly (Lepidoptera)	*Hipparchia semele semele*	Grayling	Minsmere B. R.: RSPB Minsmere	TM4766	1.617953808	52.23627726	2016	RLGB.VU, ScotBL, Sect.41, Sect.42, UKBAP
Insect - butterfly (Lepidoptera)	*Lasiommata megera*	Wall	Theberton:	TM445662	1.581557418	52.23918773	2013	RLGB.Lr(NT), Sect.41,

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
								Sect.42, UKBAP
Insect - butterfly (Lepidoptera)	*Limenitis camilla*	White Admiral	Theberton Wood: Theberton Woods	TM4265	1.544153624	52.22952322	2013	RLGB.VU, Sect.41, Sect.42, UKBAP
Insect - butterfly (Lepidoptera)	*Plebejus argus*	Silver-studded Blue	Aldringham Common and Walks / Thorpeness Golf Course: Aldringham Walks	TM4661	1.599704185	52.19185671	2013	RLGB.VU, Sect.41, Sect.42, UKBAP, WCA5/9.5a, WCA5/9.5b
Insect - butterfly (Lepidoptera)	*Satyrium w-album*	White-letter Hairstreak	North Warren: Little Beauties Wood, North Warren RSPB	TM456610	1.59386349	52.19203497	2010	RLGB.EN, Sect.41, Sect.42, UKBAP, WCA5/9.5a, WCA5/9.5b
Insect - dragonfly (Odonata)	*Anaciaeschna isoceles*	Norfolk Hawker	Eastbridge:	TM46N	1.574104266	52.23761476	2012	RLGB.EN, Sect.41, UKBAP, WCA5/9.1k/l, WCA5/9.1t, WCA5/9.2, WCA5/9.4a, WCA5/9.4b, WCA5/9.4c,

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
								WCA5/9.5a, WCA5/9.5b
Insect - dragonfly (Odonata)	*Aeschna isoceles*	Norfolk Hawker	Minsmere B. R.: Minsmere	TM468669	1.615687767	52.24444305	2016	RLGB.EN, Sect.41, UKBAP, WCA5/9.1k/l, WCA5/9.1t, WCA5/9.2, WCA5/9.4.a, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a
Insect - dragonfly (Odonata)	*Coenagrion pulchellum*	Variable Damselfly	Minsmere B. R.: Minsmere, nr. Bittern Hide	TM469667	1.617003511	52.24260352	2012	RLGB.Lr(NT)
Insect - (Hymenoptera)	*Andrena (Plastandrena) tibialis*	-	Minsmere B. R.: Minsmere RSPB, Visitor Centre	TM4667	1.604065517	52.24569848	2005	Na
Insect - (Hymenoptera)	*Andrena (Poecilandrena) labiata*	Red-girdled Mining Bee	Minsmere B. R.: Minsmere	TM4767	1.618684587	52.24525069	2017	Na
Insect - (Hymenoptera)	*Bombus (Megabombus) ruderatus*	Large Garden (Ruderal) Bumblebee	Minsmere B. R.: RSPB Minsmere	TM472669	1.621535201	52.24426358	2015	Nb, Sect.41, Sect.42, UKBAP
Insect - (Hymenoptera)	*Chrysura radians*	-	Minsmere B. R.: Minsmere	TM4767	1.618684587	52.24525069	2017	Na
Insect - (Hymenoptera)	*Dasypoda hirtipes*	Pantaloon Bee	Minsmere B. R.: Minsmere	TM477670	1.628917707	52.24493617	2016	Nb

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - (Hymenoptera)	*Ectemnius (Clytochrysus) ruficornis*	-	Minsmere B. R.: Minsmere	TM4667	1.604065517	52.24569848	2017	Nb
Insect - (Hymenoptera)	*Lasioglossum (Lasioglossum) sexnotatum*	Ashy Furrow Bee	Minsmere B. R.: Minsmere	TM4767	1.618684587	52.24525069	2017	RDBGB.EN
Insect - (Hymenoptera)	*Megachile (Eutricharaea) leachella*	Silvery Leafcutter Bee	Sizewell:	TM476645	1.625625213	52.22254775	2016	Nb
Insect - (Hymenoptera)	*Nysson trimaculatus*	-	Minsmere B. R.: Minsmere RSPB, Visitor Centre	TM4667	1.604065517	52.24569848	2005	Nb
Insect - (Hymenoptera)	*Philanthus triangulum*	Bee Wolf	Minsmere B. R.: RSPB Minsmere	TM474665	1.624166082	52.24058439	2017	RDBGB.VU
Insect - (Hymenoptera)	*Sphecodes crassus*	Swollen-thighed Blood Bee	Minsmere B. R.: Minsmere	TM4767	1.618684587	52.24525069	2017	Nb
Insect - (Hymenoptera)	*Sphecodes rubicundus*	Red-tailed Blood Bee	Dunwich:	TM4767	1.618684587	52.24525069	2015	Na
Insect - lacewing (Neuroptera)	*Euroleon nostras*	Antlion	Theberton:	TM4466	1.574104266	52.23761476	2013	
Insect - moth (Lepidoptera)	*Acronicta psi*	Grey Dagger	Kenton Hills:	TM456639	1.595966354	52.21805875	2011	Sect.41, Sect.42, UKBAP

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - moth (Lepidoptera)	*Acronicta rumicis*	Knot Grass	Minsmere B. R.: Minsmere RSPB Reserve	TM463670	1.608451278	52.24556433	2010	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Agrochola helvola*	Flounced Chestnut	Minsmere B. R.: Minsmere RSPB Reserve	TM467670	1.614298906	52.24538522	2004	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Agrochola litura*	Brown-spot Pinion	Sizewell:	TM4762	1.615034523	52.20038332	2006	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Allophyes oxyacanthae*	Green-brindled Crescent	Leiston:	TM445627	1.57902811	52.20777931	2005	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Amphipoea oculea*	Ear Moth	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2006	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Amphipyra tragopoginis*	Mouse Moth	Leiston Common:	TM460634	1.601447071	52.21339351	2017	ScotBL, Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Anania verbascalis*	Golden Pearl	Minsmere B. R.: Minsmere RSPB Reserve	TM446674	1.583887777	52.24991184	2006	Nb
Insect - moth (Lepidoptera)	*Apamea anceps*	Large Nutmeg	Leiston:	TM445627	1.57902811	52.20777931	2005	Sect.41, Sect.42, UKBAP

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - moth (Lepidoptera)	*Apamea remissa*	Dusky Brocade	Minsmere B. R.: Minsmere RSPB Reserve	TM470669	1.618611491	52.24435335	2009	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Aphomia zelleri*	Twin-spot Honey	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	RDBGB.R
Insect - moth (Lepidoptera)	*Archanara neurica*	White-mantled Wainscot	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	RDBGB.R, Sect.41, UKBAP
Insect - moth (Lepidoptera)	*Arctia caja*	Garden Tiger	Minsmere B. R.: Minsmere RSPB Reserve	TM462671	1.607062226	52.24650642	2010	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Atethmia centrago*	Centre-barred Sallow	Theberton:	TM43806575	1.571000555	52.23545987	2008	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Brachmia inornatella*	Fen Crest	Minsmere B. R.: Minsmere RSPB Reserve	TM470669	1.618611491	52.24435335	2009	Nb
Insect - moth (Lepidoptera)	*Brachylomia viminalis*	Minor Shoulder-knot	Sizewell:	TM453646	1.592090693	52.22447399	2017	ScotBL, Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Calophasia lunula*	Toadflax Brocade	Thorpeness:	TM476610	1.623066358	52.19114077	2004	RDBGB.R
Insect - moth (Lepidoptera)	*Caradrina morpheus*	Mottled Rustic	Eastbridge: Eastbridge, Suffolk	TM45086606	1.589933993	52.23767356	2017	ScotBL, Sect.41,

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
								Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Celaena leucostigma*	Crescent	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Chiasmia clathrata*	Latticed Heath	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Chionodes distinctella*	Eastern Groundling	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2006	Nb
Insect - moth (Lepidoptera)	*Cirrhia icteritia*	Sallow	Leiston:	TM453646	1.592090693	52.22447399	2016	ScotBL, Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Crambus pratella*	Scarce Grass-veneer	Sizewell: Sizewell Beach	TM475630	1.623067293	52.20913256	2005	Nb
Insect - moth (Lepidoptera)	*Diarsia rubi*	Small Square-spot	Theberton:	TM43806575	1.571000555	52.23545987	2008	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Ecliptopera silaceata*	Small Phoenix	Minsmere B. R.: Minsmere RSPB Reserve	TM446674	1.583887777	52.24991184	2010	Sect.41, Sect.42, UKBAP

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - moth (Lepidoptera)	*Ennomos fuscantaria*	Dusky Thorn	Theberton:	TM43806575	1.571000555	52.23545987	2008	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Ethmia bipunctella*	Bordered Ermel	Minsmere B. R.: Minsmere RSPB Reserve	TM4666	1.603337675	52.2367249	2004	RDBGB.VU
Insect - moth (Lepidoptera)	*Eugnorisma glareosa*	Autumnal Rustic	Sizewell:	TM4762	1.615034523	52.20038332	2006	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Eulamprotes wilkella*	Painted Neb	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2006	Nb
Insect - moth (Lepidoptera)	*Eulithis mellinata*	Spinach	Leiston:	TM445627	1.57902811	52.20777931	2005	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Euxoa nigricans*	Garden Dart	Leiston:	TM453646	1.592090693	52.22447399	2016	ScotBL, Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Euxoa tritici*	White-line Dart	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2011	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Evergestis extimalis*	Marbled Yellow Pearl	Theberton:	TM43806575	1.571000555	52.23545987	2008	Nb

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - moth (Lepidoptera)	*Graphiphora augur*	Double Dart	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2004	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Gymnancyla canella*	Hoary Knot-horn	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	Na
Insect - moth (Lepidoptera)	*Helotropha leucostigma*	Crescent	Kenton Hills:	TM469651	1.615835103	52.22824599	2017	ScotBL, Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Hemistola chrysoprasaria*	Small Emerald	Leiston:	TM445627	1.57902811	52.20777931	2005	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Hepialus humuli*	Ghost Moth	Sizewell:	TM453646	1.592090693	52.22447399	2017	ScotBL, Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Herminia tarsicrinalis*	Shaded Fan-foot	Kenton Hills:	TM458639	1.598888409	52.21796957	2011	RDBGB.R
Insect - moth (Lepidoptera)	*Hoplodrina blanda*	Rustic	Sizewell:	TM4762	1.615034523	52.20038332	2006	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Hydraecia micacea*	Rosy Rustic	Kenton Hills:	TM469651	1.615835103	52.22824599	2017	ScotBL, Sect.41, Sect.42, UKBAP

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - moth (Lepidoptera)	*Malacosoma neustria*	Lackey	Minsmere B. R.: Minsmere RSPB Reserve	TM462671	1.607062226	52.24650642	2010	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Melanchra persicariae*	Dot Moth	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Melanchra pisi*	Broom Moth	Minsmere B. R.: Minsmere RSPB Reserve	TM446674	1.583887777	52.24991184	2005	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Mesoligia literosa*	Rosy Minor	Sizewell:	TM475628	1.622921119	52.20733787	2005	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Monochroa moyses*	Coast Neb	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2005	N
Insect - moth (Lepidoptera)	*Monochroa palustrella*	Wainscot Neb	Minsmere B. R.: Minsmere RSPB Reserve	TM446674	1.583887777	52.24991184	2010	Nb
Insect - moth (Lepidoptera)	*Nascia cilialis*	Orange-rayed Pearl	Minsmere B. R.: Minsmere RSPB Reserve	TM446674	1.583887777	52.24991184	2006	Na
Insect - moth (Lepidoptera)	*Nephopterix angustella*	Spindle Knot-horn	Theberton:	TM43806575	1.571000555	52.23545987	2008	Nb
Insect - moth (Lepidoptera)	*Noctua orbona*	Lunar Yellow Underwing	Kenton Hills:	TM458639	1.598888409	52.21796957	2011	ScotBL, Sect.41, Sect.42, UKBAP

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - moth (Lepidoptera)	*Nyctegretis lineana*	Agate Knot-horn	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2006	RDBGB.R
Insect - moth (Lepidoptera)	*Orthonama vittata*	Oblique Carpet	Minsmere B. R.: Minsmere RSPB Reserve	TM446674	1.583887777	52.24991184	2010	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Orthosia gracilis*	Powdered Quaker	Sizewell:	TM453646	1.592090693	52.22447399	2017	ScotBL, Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Pediasia contaminella*	Waste Grass-veneer	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	Nb
Insect - moth (Lepidoptera)	*Pediasia fascelinella*	Banded Grass-veneer	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2005	RDBGB.VU
Insect - moth (Lepidoptera)	*Pelurga comitata*	Dark Spinach	Theberton:	TM43806575	1.571000555	52.23545987	2008	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Pexicopia malvella*	Hollyhock Seed Moth	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	Nb
Insect - moth (Lepidoptera)	*Pima boisduvaliella*	Silver-edged Knot-horn	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	RDBGB.R
Insect - moth (Lepidoptera)	*Platytes alpinella*	Hook-tipped Grass-veneer	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	RDBGB.R

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - moth (Lepidoptera)	*Rhizedra lutosa*	Large Wainscot	Sizewell:	TM4762	1.615034523	52.20038332	2006	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Schoenobius gigantella*	Giant Water-veneer	Minsmere B. R.: Minsmere RSPB Reserve	TM446674	1.583887777	52.24991184	2010	Nb
Insect - moth (Lepidoptera)	*Scopula marginepunctata*	Mullein Wave	Minsmere B. R.: Minsmere RSPB Reserve	TM460672	1.604211132	52.24749319	2006	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Scopula rubiginata*	Tawny Wave	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	RDBGB.R
Insect - moth (Lepidoptera)	*Scotopteryx chenopodiata*	Shaded Broad-bar	Minsmere B. R.: Minsmere RSPB Reserve	TM477660	1.628184873	52.23596284	2010	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Scrobipalpa salinella*	Sea-aster Groundling	Minsmere B. R.: Minsmere RSPB Reserve	TM476664	1.627016274	52.23959715	2004	N
Insect - moth (Lepidoptera)	*Senta flammea*	Flame Wainscot	Eastbridge: Eastbridge, Suffolk	TM45086606	1.589933993	52.23767356	2017	RDBGB.R
Insect - moth (Lepidoptera)	*Spilosoma lubricipeda*	White Ermine	Kenton Hills:	TM464645	1.608091366	52.22308574	2011	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Spilosoma lutea*	Buff Ermine	Eastbridge: Eastbridge, Suffolk	TM45086606	1.589933993	52.23767356	2017	ScotBL, Sect.41, Sect.42, UKBAP

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - moth (Lepidoptera)	*Stathmopoda pedella*	Alder Signal	Minsmere B. R.: Minsmere RSPB Reserve	TM467670	1.614298906	52.24538522	2006	Nb
Insect - moth (Lepidoptera)	*Synaphe punctalis*	Long-legged Tabby	Sizewell:	TM475628	1.622921119	52.20733787	2005	Nb
Insect - moth (Lepidoptera)	*Tholera cespitis*	Hedge Rustic	Sizewell:	TM4762	1.615034523	52.20038332	2006	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Tholera decimalis*	Feathered Gothic	Sizewell:	TM4762	1.615034523	52.20038332	2006	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Timandra comae*	Blood-Vein	Sizewell:	TM4762	1.615034523	52.20038332	2006	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Tyria jacobaeae*	Cinnabar	Sizewell: Sizewell Belts	TM4663	1.601156438	52.20980405	2009	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Watsonalla binaria*	Oak Hook-tip	Minsmere B. R.: Minsmere RSPB Reserve	TM462671	1.607062226	52.24650642	2010	Sect.41, Sect.42, UKBAP
Insect - moth (Lepidoptera)	*Xanthia icteritia*	Sallow	Minsmere B. R.: Minsmere RSPB Reserve	TM467670	1.614298906	52.24538522	2004	Sect.41, Sect.42, UKBAP
Insect - true fly (Diptera)	*Anagnota bicolor*	-	Minsmere B. R.: Minsmere: Compt 48: North Girder	TM476664	1.627016274	52.23959715	2004	N

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - true fly (Diptera)	*Campsicnemus magius*	Fancy-legged Fly	Minsmere B. R.: Minsmere: Compt 47: West Scrape	TM474667	1.624312481	52.24237906	2004	RLGB.Lr(NT), Sect.41, UKBAP
Insect - true fly (Diptera)	*Cephalops perspicuus*	-	Minsmere B. R.: Minsmere: Compt 49: South Shore Pool	TM477466 30	1.628989344	52.23863684	2004	RLGB.Lr(NT)
Insect - true fly (Diptera)	*Chersodromia cursitans*	-	Minsmere B. R.: Minsmere: Compt 48: North Girder	TM476664	1.627016274	52.23959715	2004	N
Insect - true fly (Diptera)	*Coenosia karli*	-	Minsmere B. R.: Minsmere: Compt 49: South Shore Pool	TM477466 30	1.628989344	52.23863684	2004	N
Insect - true fly (Diptera)	*Ditaeniella grisescens*	-	Minsmere B. R.: Minsmere: Compt 59: The Dunes	TM476653	1.626210754	52.22972646	2004	N
Insect - true fly (Diptera)	*Dolichopus strigipes*	-	Minsmere B. R.: Minsmere: Compt 49: South Shore Pool	TM477466 30	1.628989344	52.23863684	2004	NS
Insect - true fly (Diptera)	*Elachiptera austriaca*	-	Minsmere B. R.: Minsmere: Compt 46: East Scrape	TM475667	1.625774263	52.24233412	2004	N
Insect - true fly (Diptera)	*Eribolus slesvicensis*	-	Minsmere B. R.: Minsmere: Compt 46: East Scrape	TM475667	1.625774263	52.24233412	2004	N
Insect - true fly (Diptera)	*Erioptera bivittata*	-	Minsmere B. R.: Minsmere: Compt 47: West Scrape	TM474667	1.624312481	52.24237906	2004	RDBGB.VU

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - true fly (Diptera)	*Hercostomus plagiatus*	-	Minsmere B. R.: Minsmere: Compt 46: East Scrape	TM475667	1.625774263	52.24233412	2004	NS
Insect - true fly (Diptera)	*Leia longiseta*	-	Minsmere B. R.: Minsmere: Compt 47: West Scrape	TM474667	1.624312481	52.24237906	2004	NS
Insect - true fly (Diptera)	*Limnophora nigripes*	-	Minsmere B. R.: Minsmere: Compt 46: East Scrape	TM475667	1.625774263	52.24233412	2004	N
Insect - true fly (Diptera)	*Lispe caesia*	-	Minsmere B. R.: Minsmere: Compt 48: North Girder	TM476664	1.627016274	52.23959715	2004	N
Insect - true fly (Diptera)	*Lispe loewi*	-	Minsmere B. R.: Minsmere: Compt 46: East Scrape	TM475667	1.625774263	52.24233412	2004	N
Insect - true fly (Diptera)	*Melanochaeta pubescens*	-	Minsmere B. R.: Minsmere: Compt 47: West Scrape	TM474667	1.624312481	52.24237906	2004	N
Insect - true fly (Diptera)	*Melieria cana*	-	Minsmere B. R.: Minsmere: Compt 59: The Dunes	TM476653	1.626210754	52.22972646	2004	N
Insect - true fly (Diptera)	*Myopites inulaedyssentericae*	-	Minsmere B. R.: Minsmere	TM46T	1.603337675	52.2367249	2016	RDBGB.R
Insect - true fly (Diptera)	*Oscinimorpha arcuata*	-	Minsmere B. R.: Minsmere: Compt 59: The Dunes	TM476653	1.626210754	52.22972646	2004	N
Insect - true fly (Diptera)	*Parydroptera discomyzina*	-	Minsmere B. R.: Minsmere: Compt 48: North Girder	TM476664	1.627016274	52.23959715	2004	RDBGB.VU
Insect - true fly (Diptera)	*Pherbellia dorsata*	-	Minsmere B. R.: Minsmere: Compt 49: South Shore Pool	TM47746630	1.628989344	52.23863684	2004	N

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - true fly (Diptera)	*Pherbellia nana*	-	Minsmere B. R.: Minsmere: Compt 49: South Shore Pool	TM477466 30	1.628989344	52.23863684	2004	N
Insect - true fly (Diptera)	*Pilaria scutellata*	-	Minsmere B. R.: Minsmere: Compt 47: West Scrape	TM474667	1.624312481	52.24237906	2004	N
Insect - true fly (Diptera)	*Psacadina zernyi*	-	Minsmere B. R.: Minsmere: Compt 49: South Shore Pool	TM477466 30	1.628989344	52.23863684	2004	RDBGB.VU
Insect - true fly (Diptera)	*Rhamphomyia caliginosa*	-	Minsmere B. R.: Minsmere: Compt 59: The Dunes	TM476653	1.626210754	52.22972646	2004	NS
Insect - true fly (Diptera)	*Sciapus laetus*	-	Minsmere B. R.: Minsmere: Compt 49: South Shore Pool	TM477466 30	1.628989344	52.23863684	2004	NS
Insect - true fly (Diptera)	*Spilogona biseriata*	-	Minsmere B. R.: Minsmere: Compt 46: East Scrape	TM475667	1.625774263	52.24233412	2004	N
Insect - true fly (Diptera)	*Stilpon lunatus*	-	Minsmere B. R.: Minsmere: Compt 46: East Scrape	TM475667	1.625774263	52.24233412	2004	NS
Insect - true fly (Diptera)	*Stratiomys longicornis*	-	Minsmere B. R.: Minsmere: The Scrape: Compts 46-48	TM475666	1.625701033	52.24143678	2004	RDBGB.VU
Insect - true fly (Diptera)	*Syntormon mikii*	-	Minsmere B. R.: Minsmere: Compt 49: South Shore Pool	TM477466 30	1.628989344	52.23863684	2004	RLGB.Lr(NT)

Order	Species Name	Common Name	Location	Grid Reference	Longitude	Latitude	Year Recorded	Conservation Status
Insect - true fly (Diptera)	*Themira biloba*	-	Minsmere B. R.: Minsmere: Compt 46: East Scrape	TM475667	1.625774263	52.24233412	2004	RDBGB.IK
Insect - true fly (Diptera)	*Thinophilus ruficornis*	-	Minsmere B. R.: Minsmere: Compt 48: North Girder	TM476664	1.627016274	52.23959715	2004	NS
mollusc	*Vertigo (Vertilla) angustior*	Narrow-mouther Whorl Snail	Minsmere B. R.: Minsmere	TM477096 6157	1.628431447	52.2373676	2008	HSD2p, RLGLB.LR(cd), ScotBL, Sect.41, Sect.42, UKBAP

1.2 Butterfly conservation data

1.2.1 The below report was provided by the Suffolk Branch of Butterfly Conservation regarding Butterflies and Moths of the Sizewell area.

Butterflies and Moths of the Sizewell Area

Introduction.

This article has been compiled by the Suffolk Branch of Butterfly Conservation to assist agencies responding to EDF Energy's Phase 3 Consultation on the Sizewell C project. It provides background information on the Lepidoptera found in the extensive area surrounding the existing Sizewell B nuclear reactor and extending to include the entire Sizewell C site and the areas that will be needed for the construction project's access roads/railways, storage etc. Consideration is given to the likely impact on habitat of resident wildlife, particularly invertebrates likely to be displaced from their established domain by the construction activity. A few opportunities for mitigation are suggested. There are no outspoken views; it is mainly a reference package showing which butterflies and moths fly in which tetrads.

The Sizewell Area.

Much of the Suffolk coast has been designated an Area of Outstanding Natural Beauty and it contains a rich diversity of flora and fauna, both within and outside the designated Site of Special Scientific Interest of Sizewell Marshes. Its pleasant walks and rich biodiversity have made it a popular destination for natural history enthusiasts, and this in turn has made its biodiversity well recorded. Features like Kenton Hills, Sizewell Belts, the coastal strip and Goose Hill all have their individual qualities and resident animals.

About the Butterfly Population.

Suffolk's 34 butterfly species (resident and regular migrants) are spread around the county unevenly. On average, each 2km square supports 15.3 species, but the Suffolk Coastal areas are better represented with over 20, whilst the squares around Sizewell B have 25, and are well monitored by two butterfly transects (Sizewell Belts and Upper Abbey Farm.) These are walked weekly from 1st April to the end of September. Long-term records show these to have 26 and 25 respectively (The White Admiral lives in Kenton Hills, but is not found on the Upper Abbey farm transect).

Common Species. The bulk of our 22 wider countryside species are widespread, though no longer abundant. Their larval host plants are also widespread. In the event that their breeding areas are covered in concrete or tarmac, one generation will die, but the species will probably survive in an adjacent field. If the concrete lies there for a decade, any surviving colony is likely to be much weakened.

Here is a list of the relatively common species, and the shorthand code used later in this document:

SS Small Skipper, **ES** Essex Skipper, **LS** Large Skipper. All 3 Skippers are dependent on uncut grassland, and will suffer from temporary degradation, as well as complete loss.

LW Large White**, SW** Small White, **GVW** Green-veined White. Not at risk.

OT Orange-tip**.** Low risk. **B** Brimstone – could benefit if re-instatement includes buckthorn planting.

PH Purple Hairstreak lives in the canopy of mature oaks, and should survive provided the oaks are not felled or subjected to airborne dust or chemicals generated by vehicle movements.

GH Green Hairstreak lives on the gorse found on heathland and might suffer from the removal of gorse along the route of the access roads.

SC Small Copper is found on the heathy areas of Sizewell Belts, where the larval host plants, sorrel or sheeps' sorrel, grow.

BA Brown Argus is not all that common; it often flies close to Common Blue colonies, provided that storksbill or cranesbill grow there.

CB Common Blue has a strong colony where the bird's-foot trefoil grows close to the coast just north of Sizewell B. With luck, it might survive there. The building of the 10 metre sea wall with the option of raising it to 14 metres will inevitably cause considerable disruption, although the objective here is sound: "to establish a naturalistic coastal grassland/dune setting with permitted access to the lower slopes".

HB Holly Blue

RA Red Admiral

ST Small Tortoiseshell

P Peacock

C Comma

SPW Speckled Wood should survive in light woodland of Kenton hills.

MB Meadow Brown**, GK** Gatekeeper,**R** Ringlet. All grass-feeding species; low risk.

Two regular immigrants, **PL** Painted Lady and **CY** Clouded Yellow, are likely to survive by flying on - to settle elsewhere in Suffolk. **[Total 22 "Common" species]**

SWF Silver-washed Fritillary is a recent arrival in Suffolk woodlands, not yet common.

UKBAP Species. Seven Suffolk butterflies are designated as UK Biodiversity Action Plan species. Their habitat requirements are more demanding, so they are more vulnerable. Six of the seven fly in the Sizewell area:

SSB Silver-studded Blue flies on heather heathland in the Sandlings -just north of the Sizewell project area at Minsmere and just south of the area at Aldringham. Arguably it is not directly at risk from Sizewell C.

WA White Admiral flies in light woodland where honeysuckle flourishes. It breeds in small numbers in and around Kenton Hills and Goose Hill. It is at serious risk of displacement by construction work.

G Grayling has undergone a serious decline across England and in Suffolk, where it has abandoned its former flight areas in the centre of the county, and has moved towards the coast to find the sparse grassland on sandy soil that is its favoured habitat. For some years it has been quite common from Kenton Hills, through Sizewell Belts and particularly amongst the grass and shingle belt between the sea and Sizewell B.The work along the sea wall could be a significant threat to this declining species. The new access road and the permanent loss of a large part of Goose Hill will similarly reduce the available habitat for this vulnerable species.

WB Wall Brown has declined along the same lines as the Grayling, and is now found only in coastal grassland (and at Carlton Marshes). It was once fairly common along the Sizewell coast, but seems now to be absent. It is very unlikely to re-colonise Sizewell, particularly during the construction phase.

SH Small Heath is a UKBAP “study species”. It still flies in the short grass areas around Sizewell B, but its health is unlikely to improve as a result of the construction work.

WLH White-letter Hairstreak lives only in elm trees. It is seen occasionally in and around Kenton Hills. Given that some planting of trees will take place in that area during the re-instatement phase, it is suggested that consideration be given to planting some of the new disease-resistant strains of elm. This would be a gesture of mitigation towards our butterflies.

[DS] The Dingy Skipper is the 7th Suffolk UKBAP species, but is restricted to West Suffolk and is thus immune to any development at Sizewell.

Butterfly Records are submitted to the Suffolk Biological Information Service (SBIS), like other biological records. They are sent annually, and the location data can be accessed by 10km grid squares or by tetrad (2km squares). The latest complete data set covers the 5 year period 2013 to 2017. The 10km square enclosing the Sizewell C development is TM 46, and the table below shows all the species recorded in that whole area, and in 20 of its subordinate 2km tetrads. The UKBAP species are listed in green. Note that some of the peripheral tetrads are outside the development area.

Suffolk Butterfly Records- 2013-2017

TM46- 10KM. Enclosing 20 recorded tetrads, averaging 22.4 species each. **Species recorded by tetrad:**

TM4060: SS ES LS CY B LW SW GVW OT GH SC CB RA PL ST P SPW G GK MB R

TM4062: SS LW SW GVW OT HB PL ST P SPW **G** GK MB R

TM4064: CY OT

TM4066: LS LW SW OT HB RA ST P SPW GK MB R

TM4068: SS CY LW SW GVW CB RA PL ST P C GK MB R

TM4260: ES LS B LW SW GVW OT GH PH SC BA CB HB RA PL ST P C SPW **G** GK MB R

TM4262: LS B LW SW GVW OT SC CB HB RA PL ST P C SPW GK MB R **SH**

TM4264: SS ES LS CY B LW SW GVW OT GH PH SC BA CB HB **WA** RA PL ST P C SWF SPW **G** GK MB R **SH** and PE (at Theberton).

TM4266: B LW SW GVW OT **WLH** SC CB HB RA PL ST P C SPW GK MB R

TM4268: LS CY LW SW GVW OT **SSB** CB RA ST P C SPW GK MB R

TM4460: [Aldringham Comm] SS ES LS CY B LW SW GVW OT GH PH SC **SSB** BA CB HB RA PL ST P C SWF SPW **WB G** GK MB R **SH**

TM4462: [Leiston Common]SS ES LS B LW SW GVW OT GH **WLH** SC BA CB HB **WA** RA PL ST P C SPW **G** GK MB R **SH**

TM4464: [Kenton Hills]SS ES LS CY B LW SW GVW OT SC BA CB HB **WA** RA PL ST P C SPW **G** GK MB R **SH**

TM4466: [Minsmere Levels] SS ES LS B LW SW GVW OT GH SC **SSB** BA CB HB **WA** RA PL SmT P C SWF SpW **WB G** GK MB R **SH**

TM4468: [Minsmere North] SS ES LS CY B LW SW GVW OT GH PH SC **SSB** BA CB HB **WA** RA PL ST P C SWF SPW **G** GK MB R **SH**

TM4660: [Aldringham] SS ES LS CY LW SW GVW OT GH PH **WLH** SC **SSB** BA CB HB WA RA PL SmT P C SPW **WB G** GK MB R **SH**

TM4662:[Sizewell Village]SS ES LS CY B LW SW GVW OT GH SC BA CB HB **WA** RA PL ST P C SPW **G** GK MB R **SH**

The total butterfly species count for the 10 Km square TM46 is thus 28 including 6 UKBAP species.

About Moths.

A large number of noteworthy moths are found along the coast and inland to the Sizewell Belts.

Moth recording coverage

Generally moth recording efforts tend to be focused on a few sites within an area due to the static nature of the recording and accessibility to take in recording equipment (moth traps and generators). The lack of records from a particular area is likely to be more a reflection of poor recording coverage, rather than the lack of moth fauna in the area. Even for those areas recorded some have only had one or two visits which due to the varying moth fauna during the year will only present a limited picture of the potential species to be found in the area. For the area under discussion the following tetrads have no moth records: TM4060, TM4062, TM4066 and TM4262. We are not aware of any particular recording in the Goose Hill area [TM4664]

Better recorded tetrads are listed below; many have records for over 200 species, and two have over 500.

Species of note
UKBAP species

White-mantled Wainscot (*Archanara neurica)* A species associated with the dried areas of reed-bed where the larvae feed on Common Reed (*Phragmites australis*). The moth flies in July and August while the larvae are feeding internally in the foodplant during May and June.

Fenn's Wainscot (*Protarchanara brevilinea)* A species restricted to the reed-beds of East Anglia. It is more tolerant of wetter reed-beds than the White-mantled Wainscot with the larvae again feeding on Common Reed (*Phragmites australis*).

Some Rare and Nationally Notable Species

Monopis monachella A micro species restricted to the Suffolk coastline and the odd area in Norfolk with occasional records recorded elsewhere in the UK. The larvae feed on animals pelts, bird pellets, dead animals and bird's nests. The adult flies from May to September.

Reed Dagger (*Simyra albovenosa)* A species associated with fen habitats where the larvae feed on Common Reed (*Phragmites australis*). The adult is double-brooded flying in May and then July to August.

Broad-bordered Bee Hawk-moth (*Hemaris fuciformis)* The larvae feed on honeysuckle in open areas such as heathland. The moth flies in May and June during the day.

Platytes alpinella (a micro)Frequents sandy and shingle habitats where the larva is thought to feed on Tortula. This localised moth is primarily associated with coastal areas in the UK but also occurs inland in the Brecks in Suffolk.

Nascia cilialis (a micro) A fenland species occurring in southern parts of the country. It is a rare species but maybe common where it occurs. It feeds on Greater Pond Sedge (*Carex riparia*). The adult flies mainly in the months of May to July.

Water Ermine (*Spilosoma urticae)* A scarce species of damp fenland habitats in the south-east of the country. The larvae is polyphagous on a number of low-growing herbaceous plants with the adults flying in June and July.

Webb's Wainscot (*Globia sparganii)* A localised moth frequenting damp habitats – fens, marshes and ditches – where its foodplants occur including Bulrush (*Typah latifolia*), Lesser Bulrush (*Typha angustifolia*), Yellow Iris (*Iris pseudacorus*), Common Club-rush (*Schoenoplectus lacustris*) and Branched Bur-reed (*Sparganium erectum*). The adult moth is on the wing from August to September.

Flame Wainscot (*Senta flammea)* A species occurring predominantly in some of the fens of East Anglia but also in a few fens in Dorset. The adult flies from May to July and the larvae feed on Common Reed (Phragmites australis)

Shaded Fan-foot *Herminia tarsicrinalis* A species inhabiting bramble thickets found in deciduous woodland. The early stages are not well known but it would seem that the larva feed on withered leaves on the ground from August to May. The flight period is from June to July.

Dotted Fan-foot *Macrochila cribrumalis* A localised species of fens with the larvae feeding on sedges and rushes. It can be found in suitable areas in East Anglia and other parts of southern England. The moth flies from June to August.

Pauper Pug *Eupithecia egenaria* A rare species appearing in a few localities scattered over England and Wales and on the wing from May to June. The larvae feed on Large-leaved Lime (*Tilia platyphylos*) and Small-leaved Lime (*Tilia cordata*).

Overview of the more notable moth species

The majority of the rarer moth species recorded in the Sizewell area are primarily associated with the wetter fenland and reed-bed habitats with a smaller number associated with the coastal sand and shingle habitats. There are also some species associated with deciduous woodland in Kenton Hills and Sizewell Belts.

Impact

Disturbance of the fen and reed-bed habitats especially with changing of water levels is likely to affect these fen/reed-bed specialists. The UKBAP species White-mantled Wainscot is known for not favouring wet reed-beds, and is perhaps our greatest concern.

None of the rarer moth species are associated with coniferous habitat and in general this type of habitat supports a lesser variety of moth species.

Moth records by tetrad
TM4064: 179 species

Nationally notable species: *Phyllonorycter quinnata, Calamotropha paludella, Pempelia formosa, Nyctegretis lineana* and Small Yellow Wave.

TM4068: 40 species

TM4260: 43 species

Nationally notable species: Kent Black Arches

TM4264: 158 species

Nationally notable species: Hornet Moth, Reed Dagger and Webb's Wainscot

TM4266: 207 species

Nationally notable species: Broad-bordered Bee Hawk-moth and Buttoned Snout

TM4268: 348 species

BAP species: White-mantled Wainscot.

Nationally notable species: *Monochroa palustrella, Nascia cilialis*, Water Ermine, Reed Dagger, Webb's Wainscot and Dotted Fan-foot

TM4460: 206 species

Rare species: *Ectoedemia sericopeza, Stigmella tiliae*, Broad-bordered Bee Hawk-moth.

TM4462: 394 species

Rare species: Stigmella tiliae.

RDB species: Tawny Wave and Shaded Fan-foot.

Nationally notable species: *Calamatropha paludella, Platytes alpinella, Pempelia formosa*, Small Yellow Wave, Water Ermine, Kent Black Arches, Buttoned Snout and Dotted Fan-foot.

TM4464: 161 species

TM4466: 543 species Rare species: *Stigmella tiliae, Monopis monachella*,

Nationally notable species: Hornet Moth, *Monochroa palustrella, Sophronia semicostella, Brachmia inornatella, Acleris logiana, Calamatropha paludella, Nascia* *cilialis, Pempelia formosa*, Small Yellow Wave, Water Ermine, Kent Black Arches, Reed Dagger, Dotted Fan-foot.

RDB species: Pauper Pug, Broad-bordered Bee Hawk-moth, Flame Wainscot, Webb's Wainscot, Shaded Fan-foot, RDB and BAP species: Fenn's Wainscot, BAP species: White-mantled Wainscot.

TM4468: 442 species

Rare species: *Monopis monachella*,

Nationally notable species: *Sophronia semicostella, Platytes alpinella, Pempelia formosa*,, Jersey Tiger, Kent Black Arches, White Colon, Dotted Fan-foot, RDB species: Tawny Wave, Flame Wainscot, Shaded Fan-foot

TM4660: 566 species

Nationally notable species: *Ectoedemia spinosella, Calamatropha paludella, Platytes alpinella, Niascia cilialis, Pempelia formosa, Pima boisduvaliella, Nyctegretis lineana* ,Small Yellow Wave, Broad-bordered Bee Hawk-moth,Water Ermine, Kent Black Arches, White Colon, Reed Dagger, Webb's Wainscot, Rosy Marbled and Dotted Fan-foot

RDB species: Tawny Wave, Toadflax Brocade, Marbled Clover, Shaded Fan-foot

TM4662: 432 species. Nationally notable species: *Cnephasia genitalana, Acleris logiana, Calamatropha paludella, Nascia cilialis, Melissoblaptes zelleri, Pempelia formosa, Pima boisduvaliella, Nyctegretis lineana, Oxyptilus distans*, Small Yellow Wave, Broad-bordered Bee Hawk-moth, White Colon, Webb's Wainscot,

RDB species: Tawny Wave, Flame Wainscot, Marbled Clover and Shaded Fan-foot.

The records presented above show clearly what a rich share of Suffolk's lepidoptera are found in the vicinity of the Sizewell C development. The likely impact on their populations can be considered as follows:

Summary of Concerns.

EDF expects to present its planning application early in 2020, and anticipates a wait of 12 to18 months before the application is approved. This time is an opportunity to consider possible mitigation measures to benefit wildlife, and to implement them ahead of the construction phase. The continuation of wildlife monitoring is important, and EDF can help by allowing unhindered access to wardens and (for example) those conducting the butterfly transects. Setting up monitoring arrangements for the water voles etc. at the new nature reserve at Aldhurst Farm (just outside the Operational foot print) is another worthwhile concession to our wildlife.

Construction. There will be damage to the wild populations early in the construction phase, where new roads are built, car parks and hard storage areas replace natural vegetation, for example around the southern margin of Goose Hill. **Wildlife will be displaced.**

Timing - Impact. The construction phase is expected to take from 9 to 12 years. Most of the physical damage to habitat will occur in the early months. Fortunately, the EDF planners are taking note of the observations of the Wildlife agencies' observations, particularly where delicate habitat or UKBAP species are involved, and the most damaging options can be avoided. Nonetheless, the impact is clear; the entire footprint of the Sizewell C operational area will have been covered in concrete. There will have been a permanent loss of almost one square kilometer of prime habitat for flora and Lepidoptera.

Operations. The final element of the construction work will involve the restoration of the land to agriculture generally and to its original condition where nature reserves, SSSI and public access can be restored. For example, soil bunds may need to be levelled and planted. Wild flowers and many insects do not benefit from nutrient-rich soils, so using nutrient-rich top-soil on roadside verges or other wildlife areas should be avoided. Such a practice will mean more topsoil is available for agricultural areas. Conservation organizations have a role to play here, and Butterfly Conservation needs to advise on what to do in support of common species as well as the UKBAP species. When the site goes operational, nature will get its chance to restore its realm.

Mitigation. Mitigation for invertebrates, is apparently limited to Aldhurst Farm, the retention of Kenton Hills and the eventual creation of heathland on the un-used parts of the EDF Estate. The higher slopes of Aldhurst Farm will revert to heathland, the extent of which is difficult to know from maps provided. - an optimistic estimate is equal to half the area of Kenton Hills. It looks as if most disturbance will be to the pine forest and if that is restored as deciduous/mixed then that might be a positive outcome for butterflies and moths.

Land around Sizewell

Three UKBAP butterfly species are presently flying in the 2 most relevant 2km squares - both TM4662 and TM 4664 support White Admiral, Grayling and Small Heath. Looking at the wider area within the 10km square TM46, the 6 UKBAP species recorded are: White-letter Hairstreak, White Admiral, Wall, Silver-studded Blue, Grayling and Small Heath.In all, 13 moth species of designated rarity are found in the area and some are threatened by disturbance of the fen and reed-bed habitats especially by changing of water levels.

This author reflects that the whole process looks like taking 15 years, by which time he will be a 90 year old armchair naturalist!

Rob Parker (Conservation Officer, Suffolk Branch of Butterfly Conservation).

Annexes:Butterfly Transect Routes: 2 PDFs attached to the covering email:

Sizewell Belts

Upper Abbey Farm

References

1.1 Suffolk Biodiversity Partnership. 2012. Suffolk Local Biodiversity Action Plan. (Online) Available from: http://www.suffolkbiodiversity.org/biodiversity-action-plans.aspx (Accessed 01 March 2019).

1.2 Suffolk Biodiversity Information Service. 2015. Priority Species and Habitats. (Online) Available from: https://www.suffolkbis.org.uk/biodiversity/speciesandhabitats (Accessed 01 February 2019)

1.3 Natural Environment and Rural Communities Act. 2006. (Online). Available from: http://www.legislation.gov.uk/ukpga/2006/16/contents (Accessed 01 March 2016).

SIZEWELL C DEVELOPMENT – MAIN DEVELOPMENT SITE: VOLUME 2, CHAPTER 14:

ANNEX 14A4.3 SECONDARY DATA

- Annex 14A4.3 Amec 2007 Invertebrate Report
- Annex 14A4.3 Amec 2009 Invertebrate Report
- Annex 14A4.3 Amec 2010 Invertebrate Report
- Annex 14A4.3 Amec 2007-2010 Invertebrate Report

EDF Energy

Sizewell

2007 Invertebrate Survey Report

March 2014

UK Protect - Commercial

AMEC Environment & Infrastructure UK Limited

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March 2014

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Document Revisions

No.	Details	Date
1	Draft Report	November 2008
2	Final Report	April 2009
3	Revised Final Report	March 2014

Note

The information contained in this report was, to the best of the issuer's knowledge, correct at the time of issue of the latest draft. Some of this information may no longer be current.

Contents

1. Introduction

1.1 Background to Development

British Energy (BE) is investigating the feasibility of nuclear new build at a range of sites within their UK land holding. Sizewell has been identified as one potential site for investigation and likely progression to EIA. AMEC Environment & Infrastructure UK Ltd (AMEC) has been appointed to lead and co-ordinate the terrestrial ecological desk study, consultation process and survey work for the site.

1.2 Scheme Description

An area of land directly north of the Sizewell 'A' and 'B' Power Stations has been identified as having the potential to accommodate nuclear new build. This area, which covers 0.316km^2/31.6ha and has an approximate central grid reference of TM473640, is referred to in this document as 'the preliminary works area.' A boundary, including an indicative access road and construction compound (accounting for a potential further 0.336km^2/33.6ha of land take) is shown in **Figure 1.1**. It should be noted that this initial development footprint is purely indicative, as environmental, landscape and visual, hydrological and other constraints have not yet been considered and taken into account. These would all be addressed as a matter of course as part of an EIA.

No detailed information on the exact nature of the proposed nuclear power station can be provided at this stage, but it is assumed for the present that the power station would be water-cooled and that there would be a requirement for additional works associated with this in the sub-tidal zone. The range of development activities that could potentially affect biodiversity interests are typical of those associated with the construction, operation and decommissioning of any large industrial structure, albeit one that it is likely to remain in place for an extended period of time.

1.3 Preliminary Works Area Description and Context

The preliminary works area comprises open sheep grazed pasture, fringed by reinstated coastal dune vegetation parts of which have been planted with trees and scrub. The hydrology and pedology of the preliminary works area were irreversibly altered as a result of works associated with the building of the Sizewell 'A' and 'B' Stations (adjacent to its southern boundary), and as a result it has lost much of its botanical merit. Habitats adjoining or in close proximity to the preliminary works area are of considerable ecological interest however. These include wet meadows (and associated wetland habitats and ditch systems), dune systems, shingle plant communities and wet semi-natural woodland. The quality of the shingle, grazing marsh and associated wetland habitats have led to substantial areas of these in close proximity to the preliminary works area being designated for their ecological interest[1].

[1] The site description for the Sizewell Marshes Site of Special Scientific Interest, adjacent to the preliminary works area, states that Sizewell Marshes are of exceptional interest for their invertebrate fauna, supporting a wide range of

The entire BE land holding at Sizewell, including the preliminary works area and the Sizewell 'B' Station (which occupies 0.36km^2/36ha) extends to approximately 6.69km^2/669ha. The dominant habitats are arable farmland and woodland/scrub, with each accounting for approximately 30% of the land area. A considerable area of coniferous and mixed woodland is present around Goose and Kenton Hills, and there are scattered blocks and linear belts of semi-natural deciduous woodland throughout. Grazing marsh and heathland/acid grassland are also well represented, with both habitats covering approximately 10% of the land holding, while fen/reedbed, foreshore and pasture each cover approximately 3% of the land within the estate.

1.4 Background

While some work on invertebrates has been conducted within the BE Estate at Sizewell, very little of this has been focused on the proposed development area.

One of the important species known to occur on the Sizewell Estate is the white admiral (*Limentis camilla*), and dedicated surveys of this species were commissioned by AMEC (formerly Entec UK Ltd) in 2007. Consequently, white admiral is not considered further in this report. There has not been a systematic programme of monitoring of Lepidoptera within the Sizewell Estate, although many of the other butterflies that occur are annually surveyed by Trudy Seagon on behalf of Suffolk Wildlife Trust. The Suffolk Moth Group has undertaken irregular moth trapping and searches for specific species in the past: species of particular note that have been recorded on the Sizewell Estate include the lunar yellow underwing (*Noctua orbona*) and the square-spotted clay (*Xestia rhomboidea*) which are UK BAP species, and the white-mantled wainscot (*Archanara neurica*) which is a Suffolk BAP species and is largely restricted in the UK to the Suffolk coast. The plume-moth *Pima boisduvaliella* is another localized species, which is also known to be present on the coast in proximity to the proposed preliminary works area. The larval food plant is sea pea (*Lathyrus japonicus*), and numbers and distribution of adults may vary in line with the amount of food plant available.

Other high profile species known to occur in the area include the Norfolk hawker dragonfly (*Aeshna isosceles*), which is protected under the Wildlife & Countryside Act 1981, whilst the ant-lion (*Euroleon nostras*), which was rediscovered in Britain in the 1990s, is only known from Walk Barn at Sizewell and from Minsmere, a few kilometres to the north. The ant-lion is a Suffolk BAP species but has not been added to Schedule 5 of the Wildlife and Countryside Act or Section 41 od the NERC Act to date (it may be added with time).

Additional historical data (including an invertebrate survey for Sizewell 'C' by Bioscan in 1991) has been reviewed. An evaluation of the species recorded in the Bioscan report has also been included.

This report therefore provides an assessment of readily available existing invertebrate records and the results of baseline survey work undertaken in 2007.

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taxa and many nationally rare or scarce species. These include terrestrial and aquatic beetles (Coleoptera), flies (Diptera), moths (Lepidoptera), dragonflies (Odonata) and spiders (Araneae).

1.5 Legislative Context

Current European and UK legislation concerning the protection of native invertebrates is briefly summarised below.

1.5.1 Wildlife & Countryside Act (1981)

The Wildlife & Countryside Act (1981) is the main piece of law in Britain to protect wildlife including invertebrates. Schedule 5 of the WCA covers the protection of invertebrates and various lower vertebrates, with some species receiving full protection (i.e. it is illegal to kill, injure or take these species) and others partial protection (it is illegal to take and/or sell these species). The Act also prohibits interference with places used for shelter or protection or intentionally disturbing animals occupying such places. Species afforded protection under the Wildlife and Countryside Act and recorded at Sizewell in 2007 are specifically discussed in the text of this report.

The Act also provides for the notification of Sites of Special Scientific Special Interest (SSSIs) based on their flora, fauna or geological or physiographical features by the county agencies. Under the WCA, Natural England has responsibility for identifying and protecting Sites of Special Scientific Interest which gives legal protection to the best sites for nature conservation in Britain.

A total of 52 invertebrates were originally listed on the WCA (1981) of which the butterflies (25 species) and moths (6 species) were the largest taxonomic groups covered. There are statutory five-yearly reviews of Schedule 5 and these have resulted in invertebrates being added and removed and their protected status being altered.

1.5.2 Countryside and Rights of Way Act (CRoW) (2000)

The CRoW Act (2000) amended the Wildlife and Countryside Act through the inclusion of a provision for the strengthening of species protection[2] and a legal basis for the Biodiversity Action Plan. One consequence of this was the requirement for the listing of species and habitats considered to be of principal importance for the conservation of biodiversity in the UK. A list was published by Defra in 2002 under Section 74 of the Act. This list has recently been superceded as a result of the requirements of the Natural Environment and Rural Communities Act (2006).

1.5.3 Natural Environment and Rural Communities Act (2006)

The Secretary of State for Environment, Food and Rural Affairs was required under Section 41(1) of the NERC Act 2006 to prepare a list of the species and habitats considered to be of principal importance for the purpose of conserving biodiversity in England. Under Section 41 of the act consultation was required with Natural England in determining the species and habitats to appear on the list and also to take steps (where they are reasonably practicable), and promote the taking of steps by others, to further the conservation of the habitats and species on the list. The Section 41 list has recently been published. It replaces the list published by Defra in 2002 under Section 74 of the Countryside and Rights of Way (CRoW) Act 2000. Planning Policy Statement 9 (PPS9) refers to the steps that local authorities should take through the

[2] The defence of accidental or reckless disturbance or destruction as a result of an otherwise lawful operation was removed.

planning process in relation to species and habitats of principal importance. The new list of species of principal importance is found at http://www.defra.gov.uk/wildlife-countryside/biodiversity/sect41-nerc.htm

1.5.4 Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora

The Habitats Regulations 1994 were intended to implement the Habitats Directive (given its full title above). The Regulations include a number of separate elements. Most relevant for invertebrates are the specific provisions for strictly protecting rare European species (listed in Annex IV of the Regulations) and various measures to implement Special Areas of Conservation (SAC) and to protect these for nature conservation (implementation of Special Protection Areas for birds will also benefit invertebrates).

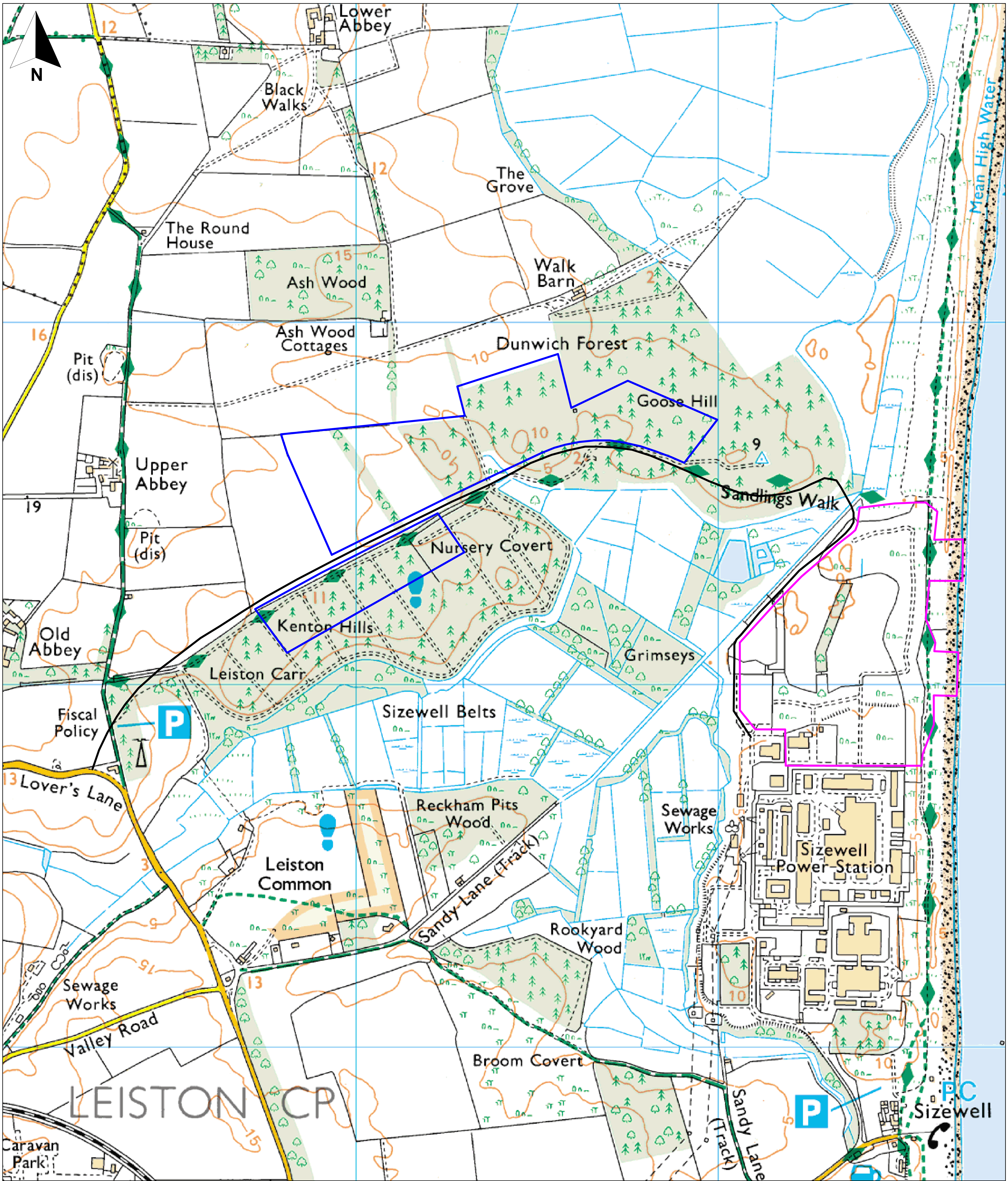
1.5.5 Survey Requirements

In view of the legislation summarised above, it is necessary to consider the likelihood of occurrence and (in some instances) the requirement to survey for species included on Schedule 5 of the Wildlife and Countryside Act and Annex IV of the Habitats Regulations. Species and habitats listed under Section 41 of the NERC Act will also need to be identified and potentially surveyed in the context of proposed new build. Surveys will be used to identify the potential for reckless disturbance of protected animal species, and destruction or damage to the structures used by them for shelter or protection. It will provide the basis, with regard to Schedule 5 and Section 41 Species, upon which mitigation, enhancement and compensation measures can be developed.

1.6 Purpose of Survey Work

The invertebrate surveys concentrated on the preliminary works area, the indicative access route and the indicative position of the construction compounds. Given the likely constraint to development resulting from the position of the Sizewell Marshes SSSI (as well as sites of European importance for nature conservation) and the built plant it was considered that there was unlikely to be a great deal of scope for change in the general location of the main proposed build area. The exact route of the access track and the construction compounds were considered subject to greater change (the latter have indeed changed in terms of position and extent since the surveys were commissioned). The aim of the survey work was therefore to obtain representative baseline data from habitats that were likely to be subject to land take as a result of development and to identify any areas within the initial footprint of particular importance for invertebrates. Survey of a number of sites within a 200m perimeter around the initial footprint was also undertaken for context. Additional baseline survey is likely to be required once hydrological work has established areas of key sensitivity in the Sizewell Marshes: to form a baseline for monitoring.

The invertebrate sampling sites were selected by the surveyor and are indicated on **Figure 1.2**. The location of the Sizewell Marshes SSSI and other statutorily protected sites of nature conservation importance are shown on **Figure 1.3**. Survey work was undertaken between June and September 2007.



Key:

Preliminary Works Area

Indicative location of Construction Compounds

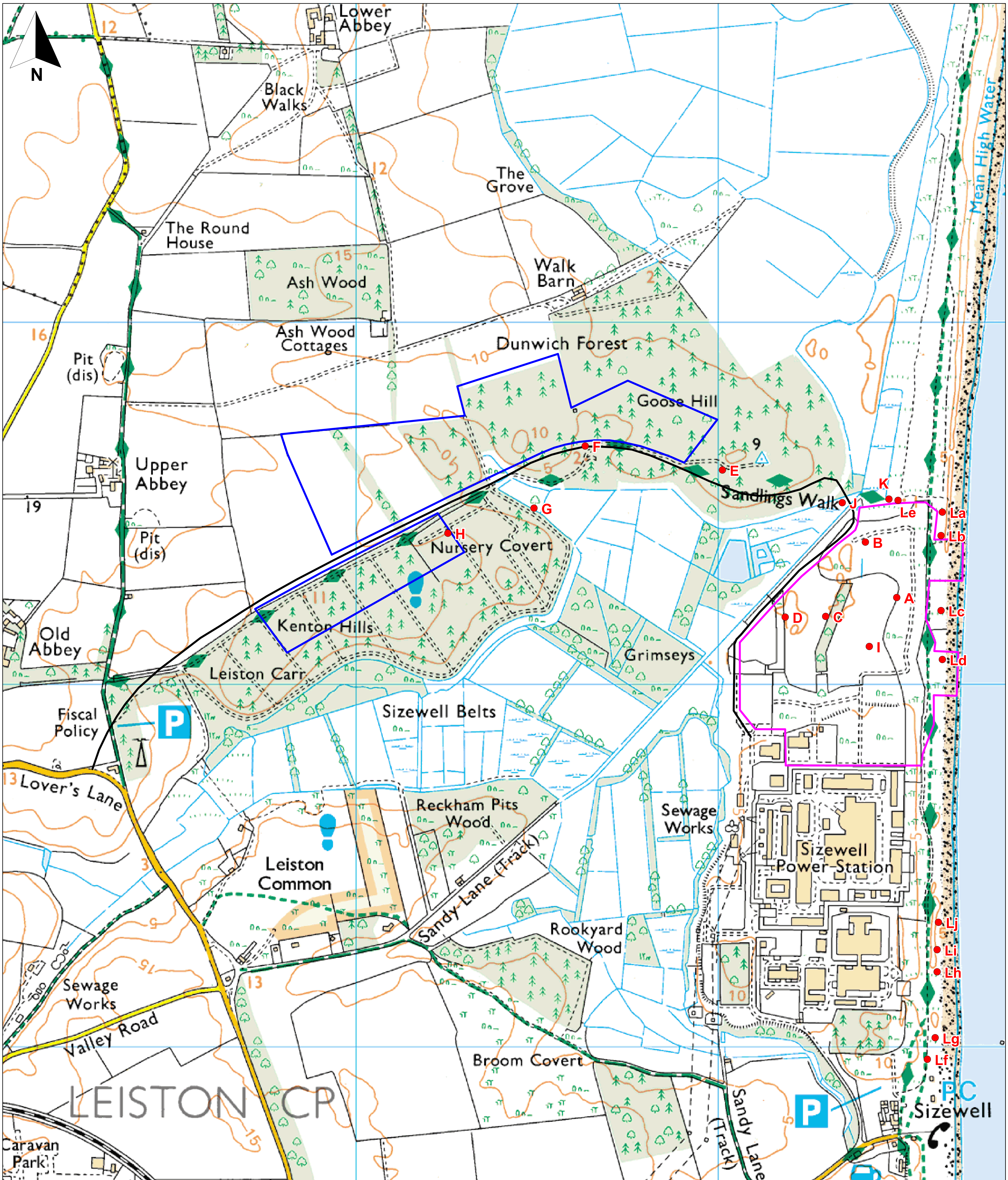
Proposed Access Route

0 m 500 m

Sizewell Invertebrate Survey Report 2007

Figure 1.1
Preliminary Works Area, Proposed Access Route and Indicative location of Construction Compounds

May 2008
19801-R161 tugwc



Key:

Pink line	Preliminary Works Area
Blue line	Indicative location of Construction Compounds
Black line	Proposed Access Route

A = Eastern Bund
B = Northern Bund
C = Central riparian belt
D = Western riparian belt
E = Traingular-shaped open area
F = Ride intersection
G = Turf pits
H = Nursery Covert
I = Southern field edge
J = Phragmites fen
K = North of power station
La-e = Coastal belt (June 2007)
Lf-j = Coastal belt (July & Sept 2007)

0 m 500 m

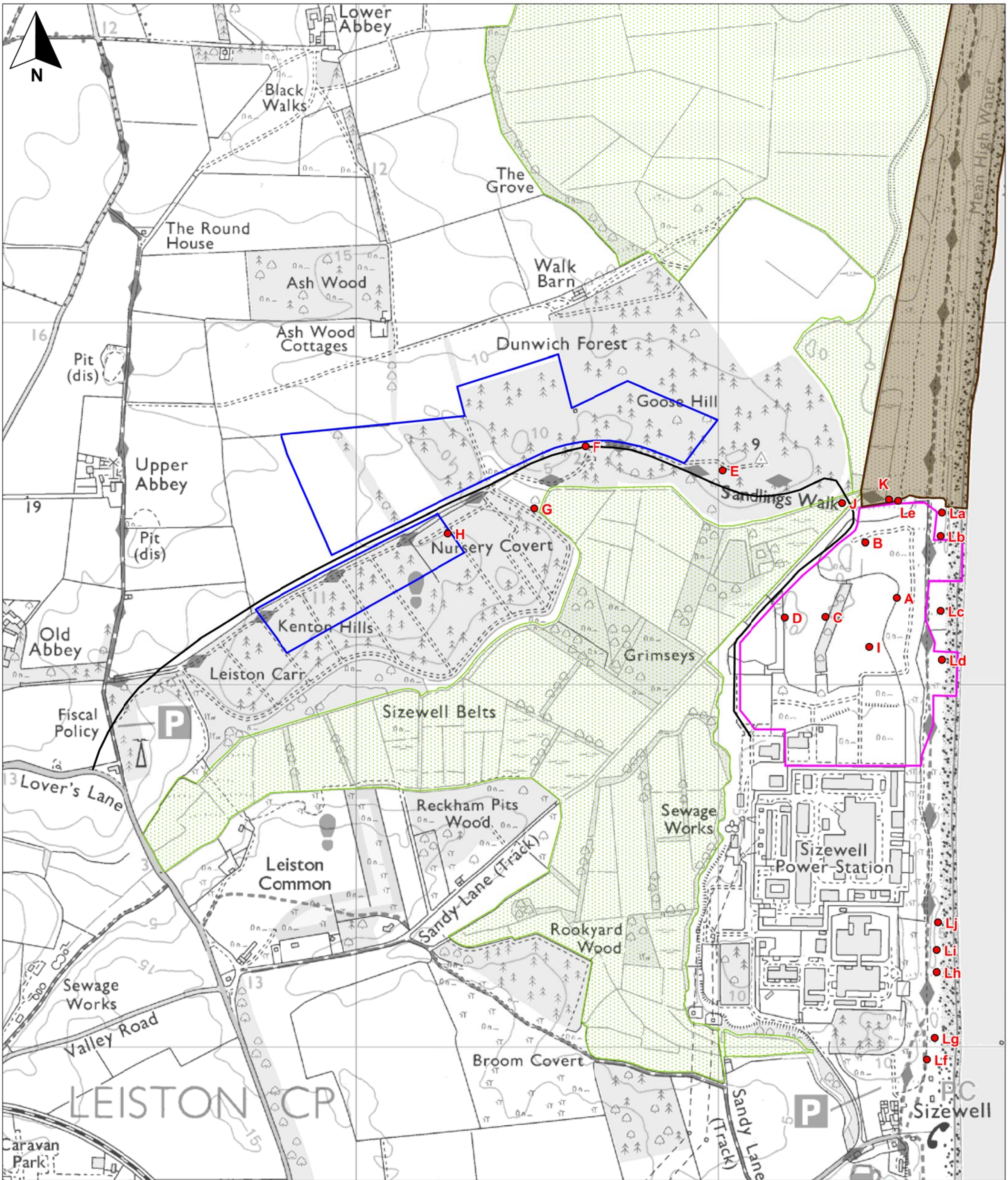
EDF

Sizewell Invertebrate Survey Report 2007

Figure 1.2
Invertebrate Sampling Sites

June 2008
19801-R162 tugwc

amec



Key:

Preliminary Works Area
Indicative location of Construction Compounds
Proposed Access Route
SSSI
SAC
SPA

A = Eastern Bund
B = Northern Bund
C = Central riparian belt
D = Western riparian belt
E = Traingular-shaped open area
F = Ride intersection
G = Turf pits
H = Nursery Covert
I = Southern field edge
J = Phragmites fen
K = North of power station
La-e = Coastal belt (June 2007)
Lf-j = Coastal belt (July & Sept 2007)

0 m — 500 m

EDF

Sizewell Invertebrate Survey Report 2007

Figure 1.3
Protected sites in relation to the proposed development area

June 2008
19801-R178 tugwc

amec

2. Methods

2.1 Desk Study

A number of sources of information have been used to provide context and background for interpreting the results of the 2007 survey work. The major sources that have been identified and used to date are;

- Sizewell Ecological Surveys (in connection with Sizewell 'C') conducted by Bioscan (UK) Ltd. Report produced in May 1991;
- Sizewell Land Management Annual Reviews 1996-2007 compiled by Suffolk Wildlife Trust & ADAS;
- Aquatic invertebrate surveys of Sizewell Belts SSSI in 1987 & 1988 undertaken by the Nature Conservancy Council;
- Survey reports on the ant-lion *Euroleon nostras* which cover the Sizewell populations.

The invertebrate surveys undertaken by Bioscan (UK) Ltd included several taxonomic groups but appeared to concentrate particularly on spiders and moths. Some of the arguments for excluding taxa from the survey (for example, most Diptera are very poorly known p.11) and the reasons for not using some methods (such as pitfall traps because of the potential for human disturbance on the relatively undisturbed Sizewell Belts) are questionable. Some taxa (notably the aculeate Hymenoptera which would be expected to be important on Sandlings habitats) are not mentioned. Seven Red Data Book and 31 Notable (= Nationally Scarce) species were recorded in the year-long survey conducted by Bioscan and details of these have been summarised in **Table 7.1**. Some of the Red Data Book and Notable species listed by Bioscan as such have since been downgraded. The results appear to incorporate the records of the aquatic invertebrate surveys undertaken on Sizewell Belts by Drake (1989a, 1989b) (see below).

The Sizewell Land Management Annual Reviews for 1996-2007 compiled by Suffolk Wildlife Trust & ADAS contain records of invertebrates recorded on the Sizewell Estate. Moth trapping has been undertaken in most years and the reports contain lists of the species recorded annually. Most of the additional invertebrates mentioned belong to popular groups such as the Rhopalocera (butterflies), Odonata or Orthoptera or mention distinctive species such as the ant-lion (*Euroleon nostras*. One species protected under the Wildlife & Countryside Act 1981 has been recorded in most years since 1999 (the Norfolk hawker dragonfly *Aeshna isosceles*), whilst one Red Data Book, eighteen Nationally Scarce species and one Suffolk BAP species (the ant-lion *Euroleon nostras*) are also mentioned in the annual reports. Two insects which are new arrivals and may be of conservation importance are also mentioned. **Table 7.2** lists these species.

The Nature Conservancy Council funded aquatic invertebrate surveys of coastal grazing marshes in Suffolk in the late 1980s and this included two surveys on the Sizewell Belts (Drake 1989a, 1989b). One Red Data Book and seven Nationally Scarce species were recorded on these surveys and details of these have been summarised in **Table 7.3**.

The ant-lion (*Euroleon nostras*) was rediscovered in Britain in 1994 (Mendel 1996, Plant 1999) from the Minsmere area of Suffolk. The rediscovery is remarkable because this insect is large, distinctive and is clearly breeding in the Suffolk Sandlings. The rediscovery prompted English Nature and the RSPB to fund surveys for this species (Plant 1998, 1999) which were mainly centred on Minsmere. In 2003 however, ant-lions were found at Walk Barn on the edge of Dunwich Forest-Goose Hill, Sizewell and they have been monitored since by Suffolk Wildlife Trust (Sizewell Land Management Annual Review 2003-2004). The number of larval pits has fluctuated from over 900 in 2004 to 199 in 2006. The ant-lion is a Suffolk BAP species and Plant (1999) has suggested Red Data Book 2 (Vulnerable) status for this species.

Invertebrate records for Minsmere RSPB reserve have been supplied by the RSPB. The reserve has a far more detailed recorded history than Sizewell. Some of the species of high nature conservation value recorded at Sizewell have also been recorded at Minsmere including the ant-lion (*Euroleon nostras*), Norfolk hawker (*Aeshna isosceles*), small red-eyed damselfly (*Erythromma viridulum*), white admiral butterfly (*Limentis camilla*) and the plume-moth *Pima boisduvaliella*. Out of a total of 754 moths recorded for the reserve in 2006, ten were Red Data Book and 44 Nationally Scarce.

No specific surveys of the protected Norfolk hawker (*Aeshna isosceles*) appear to have been undertaken at Sizewell or at Minsmere where it is thought to breed. Surprisingly, very few specific studies of this species appear to have been undertaken anywhere throughout its very limited range (Leyshon & Moore 1993, Southwood *et al.,* 2005) but the former reference covers marshes on the River Waveney near Lowestoft and may be of some relevance.

Invertebrate records for Sizewell Belts SSSI and Leiston Common have been requested from the National Biodiversity Network website but have not been supplied for reasons which are unclear.

Several other invertebrate records for Sizewell have been obtained by AMEC as part of a wide ranging desk study which has included the review of a considerable number of ecological reports (many associated with the Sizewell 'C' Application). The veracity of some of these records is questionable, and many locations are unclear, but they have nevertheless been summarised here. Records include the ant-lion (*Euroleon nostras*) on the section of coast between Sizewell Hall and Thorpeness Cliffs and another labelled Sizewell with an incorrect grid reference (TM478619[3]). Other significant records include: the centipede *Lithobius lapidicola*; the micromoths *Melissoblaptes zelleri* (pRDB3) and *Ancylis upupana*; four macro-moths (the square-spotted clay (*Xestia rhomboidea*), lunar yellow underwing (*Noctua orbona*), marbled clover (*Heliolithis viriplaca*) and shaded fan-foot (*Herminia tarsicrinalis*); two soldier-flies (*Odontomyia argentata* and *O.ornata*); and the bee-wolf (*Philanthus triangulum*). The latter (a powerfully-built solitary wasp which predates other wasps and bees) has spread dramatically in Britain in the last twenty years or so and can longer be considered of Red Data Book status.

The silver-studded blue (*Plebejus argus*) was mentioned to the surveyor by a local person as occurring on Sizewell Beach by Sizewell 'A' but this species is not mentioned in the Sizewell Land Management Annual Reviews or other published sources consulted, and this record is therefore doubtful. Silver-studded blue species is a Suffolk BAP species, and monitoring for

[3] This grid reference puts this record in the sea off Sizewell Hall!

this species occurs at Minsmere. Two other rare butterflies have been recorded at Minsmere (the swallowtail *Papilio machaon britannicus* and the Queen of Spain fritillary *Issoria lathonius*) but these are (very) unlikely to occur at Sizewell. The (local) white-letter hairstreak (*Satyrium w-album*) however, occurs on the Sizewell Estate (Carl Powell, Suffolk Wildlife Trust, pers comm.).

Some sources of information have not been consulted or contacted at this stage. These include the Suffolk Naturalist's Society Transactions and recorders for various groups. A spider survey report on Sizewell (Harvey 1990) and some early general references such as Morley (1899, 1915) have not been seen.

2.2 Field Surveys

Invertebrates were sampled from a total of twelve sample sites labelled A-L. **Table 7.4** provides details of the invertebrate sample locations whilst **Figure 1.2** shows the locations in relation to the preliminary works area, indicative access route and construction compounds. The sampling methods employed at each sample site varied according to circumstances such as possibility of human interference and the presence of sufficient vegetation in which to hide traps. The use of passive traps (such as Malaise traps – see section 2.2.4) was not an option on the beach although these were able to be deployed in woodlands and planted-up sites on the preliminary works area. **Table 7.5** provides details of the sampling methods employed at each of the sampling sites. The traps and samples were emptied or taken at monthly intervals. Descriptions of the different sampling methods used are given below.

2.2.1 Pitfall Traps

Pitfall traps comprising plastic drinking cups were placed in holes in the ground in rows of ten at nine locations giving a possible maximum of 90 pitfall traps per visit. Pitfall traps are used to sample ground-living invertebrates such as wolf spiders, millipedes, woodlice, ground beetles and rove beetles. Antifreeze (ethylene glycol) was added as a preservative. The pitfalls were put down in June 2007 and emptied in July, August and September. Consequently the results represent a maximum of 270 traps, but there were some losses, most notably due to the flooding and heavy rainfall in June and July, particularly on the imported soil of the preliminary works area (notably at Sample Site C). On emptying the traps the contents of each transect of ten traps were pooled into a single pot.

2.2.2 Sweep Netting

Sweep netting was undertaken using a 16 inch diameter net[4] mounted on a three-foot angling pole. Sweep netting was concentrated on five sampling sites on Sizewell beach on each visit and was undertaken for a period of approximately ten minutes on each visit. The five sites varied with each visit partly because of the problem of re-locating the exact sampling sites on subsequent visits and in order to cover as much of the beach as possible. The sweep net was passed through low-lying vegetation and over bare or partly vegetated ground. Sweep netting is an excellent means of obtaining low-flying insects and phytophagous insects feeding on herb or shrub layer vegetation. Diptera dominated the sweep net samples with Hymenoptera also frequent along with plant-feeding or active beetles and bugs etc. Target invertebrates within the swept material were selectively removed from the net using an aspirator (or 'pooter'). Sweep

[4] Supplied by Marris House Nets, Bournemouth

netting was only employed on the shore (low dunes, shingle, marram communities, etc) because passive trapping methods could not be employed here due to heavy public usage. Five timed sweep net samples were taken on each monthly visit (excluding August).

2.2.3 Vacuum Sampling

A portable garden vacuum (Ryobi PBV-30) with a muslin bag inserted into the vacuum tube and held in place with a thick rubber band was used at each of the same locations as the sweep net locations on three occasions. Each vacuum sample was timed at three minutes and was used to sample the vegetation and partly bare ground at each site including along the pitfall transects and around each of the water traps. The muslin bag was emptied into a sweep net and material selectively removed with an aspirator. Vacuums provide an excellent means of sampling invertebrates associated with low-growing vegetation and the diurnal ground invertebrate fauna. Vacuum sampling was only employed on the shore (low dunes, shingle, marram communities, etc) because passive trapping methods could not be employed here due to heavy public usage. Five timed vacuum samples were taken on each monthly visit (excluding August).

2.2.4 Water Traps

The water traps on this survey comprised yellow plastic washing-up bowls half-filled with tap water. These were placed on the ground at nine of the sample sites. A small amount of detergent was added to each water trap to reduce the tension of the surface film and formalin was added (5-10% volume) as a preservative. Yellow water traps are very effective at trapping flying insects[5] such as flower visiting species (Disney *et al*., 1982, Kirk 1984). In order of abundance trapped material include Diptera (many families), Hymenoptera (including aculeates such as bees, wasps and ants), Hemiptera (especially Auchenorrhyncha), Coleoptera (such as pollen beetles and flea beetles) and various minor invertebrate orders such as Orthoptera (crickets and grasshoppers). The water traps were emptied on each visit and the material was placed in alcohol for later sorting and identification. Some water traps were clearly affected by the heavy rainfall experienced in June and July 2007.

2.2.5 Malaise Traps

Malaise traps comprise large tent-like structures that act on the flight-interception model. Flying insects, on encountering the vertical screen of mesh, try to fly over the obstacle and in doing so follow the sloping roof and eventually end up in a collecting bottle in the top corner of the trap. Malaise traps are large and conspicuous and are therefore prone to human interference. They are also expensive, relatively fragile and prone to wind damage when sited in exposed locations such as coastal areas. Malaise traps work best on flight-lines such as woodland paths or woodland edges. Because of these potential problems only limited use of these was made on the survey, and they were partly used as 'insurance' in case any of the other sampling methods failed. The large amount of material collected by Malaise traps meant that only a relatively small amount of material has been examined.

2.2.6 Taxonomic Coverage

The taxonomic groups identified varied with the sampling methods. For example, all Coleoptera were identified from all the pitfall traps and from most of the water traps and

[5] Yellow and white are the most effective colours for water traps. Other colours have been found to be much less effective.

vacuum samples whilst the Araneae (spiders), Orthoptera (grasshoppers and allies), Blattodea (cockroaches), various other minor insect groups, Auchenorhyncha (leafhoppers), Heteroptera (true-bugs), Rhopalocera (butterflies), Coleoptera (beetles), selected Diptera (true-flies) and all aculeate Hymenoptera (bees, wasps and ants) were identified from the sweep and vacuum samples. A smaller number of taxa were identified from the water traps (mostly Odonata, Orthoptera, other minor groups, selected Diptera and aculeate Hymenoptera).

2.3 Personnel

Andy Godfrey undertook all the management and organisation of the work, the field sampling and reporting as well as the identification of minor insect groups, some Hemiptera, Rhopalocera, some Diptera and aculeate Hymenoptera. Andy was formerly employed as an Entomologist with the Nature Conservancy Council and has specialised in studying invertebrates whilst based in various museums and for ecological consultancies. Since 1999 Andy has worked solely as an entomologist working on conservation and development projects. Andy's particular expertise is with the Diptera which, because they are species-rich (around 7,000 British species), abundant and identifiable make them one of the most suitable group for ecological surveys. Hymenoptera with similar species-richness are much more difficult to identify (except the species-poor aculeates) and all other taxonomic groups (such as the Coleoptera and Lepidoptera) include far fewer species.

Other specialists undertook the sorting and identification of other taxonomic groups as follows:

- Araneae (Spiders): Dr Jan Woodward;
- Auchenorrhyncha (Froghoppers, leafhoppers): Dr Jan Woodward;
- Heteroptera (True-bugs): Dr Jan Woodward (Vacuum and water trap samples). Andy Godfrey (sweep net and water trap samples: selected species only);
- Coleoptera (Beetles): Mike Denton.

In addition, Harry Beaumont undertook the identification of a few micromoths and Dr Adrian Legg (Bournemouth Museum) identified the pseudoscorpions from the vacuum samples.

2.4 Limitations of the Survey

The remit of the work did not include sampling for aquatic invertebrates on Sizewell Belts SSSI for reasons given above.

The range of sampling methods employed covered the most sensitive habitats and most of the major and several minor taxonomic groups. A relatively large amount of invertebrate material was collected. Consequently, some water trap (mostly from September 2007) and most of the Malaise trap material has not been identified (this will be retained indefinitely by the surveyor and identified at a later date if required). No moth trapping was undertaken but this group is surveyed each year by Suffolk Moth Group) and is probably the best known invertebrate group on the Sizewell Estate.

As mentioned above heavy rain and flooding affected some passive traps (notably water traps and pitfall traps) and must also have deleteriously affected the activity of many invertebrates especially flying insects and warmth-loving species in June and July.

The survey work was commissioned in June 2007 and whilst invertebrate surveys commenced in that month, there was no return from passive sampling methods such as pitfall traps, water traps and Malaise traps until July 2008. Consequently, the period from April to June was either not surveyed (April to the third week in June) or only partially surveyed (approximately from the third week of June onwards). Woodland invertebrates especially saproxylic Coleoptera and Diptera are most active in May and June and consequently these could, arguably, have been under-sampled.

3. Results

3.1 Desk Study

One invertebrate (the Norfolk hawker *Aeshna isosceles*) protected under the Wildlife & Countryside Act (1981) has been recorded on the reserve and has been present in most recent years according to the Sizewell Land Management Annual Reviews. This species is thought to breed at Minsmere (based on the RSPB invertebrate records) and may well be breeding in the Sizewell Marshes.

One Suffolk BAP species the ant-lion (or Suffolk ant-lion) (*Euroleon nostras*) has a significant population on the estate. Red Data Book 2 status has been suggested for this recently re-discovered species. A second Suffolk BAP species, the silver-studded blue (*Plebejus argus*) may occur at Sizewell, but confirmed records have not been seen by the author, and this seems dubious.

Ten Red Data Book species appear to have been previously recorded on the Sizewell Estate, including three macro-moths (the white-mantled wainscot *Archanara neurica*, marbled clover *Heliolithis viriplaca* and shaded fan-foot *Herminia tarsicrinilis*), three pyralid moths *Melissoblaptes zelleri*, *Nyctegris lineana* and *Pediasia fascelinina* and one plume moth *Pima boisduvaliella*, two soldierflies (*Odontomyia argentata* and *O. ornata*) and a spider (*Clubiona frisia*). The white-mantled wainscot is associated with reedbeds and reed-fringed ditches near the coast and the larva feeds on *Phragmites*. It is currently confined in Britain to a 15km stretch of coastal Suffolk from Thorpeness to Southwold, including Sizewell and Minsmere. The marbled clover (*Heliolithis viriplaca*) occurs mainly in open Breckland, flowery chalk downland, sand or shingle beaches etc and the larvae feed on a wide variety of unrelated low plants whilst the shaded fan-foot (*Herminia tarsicrinilis*) occurs in bramble (*Rubus fruticosus* agg.) thickets and dense bramble ground cover amongst oaks and birches in ancient woodland and in more shrubby areas and the larvae probably feed in leaf litter below bramble.

Of the pyralid moths, *Melissoblaptes zelleri* occurs in sandhills and the larvae feed on the moss *Brachythecium albicans; Nyctegris lineana* is very local on flat sandy ground behind coastal sandhills and on sandy shingle in south-east England and the larva may feed on clover (*Trifolium* spp.) and other plants; whilst *Pediasia fascelinella* is extremely local on the sandhills on the coasts of Lincolnshire, Norfolk, Suffolk, Essex and south Devon (and the larva feed on dune grasses). The plume moth *Pima boisduvaliella* is a very local species found on coastal sandhills from Kent to Norfolk and in Lancashire where the larva feed on kidney vetch (*Anthyllis vulneraria*), bird's-foot trefoil (*Lotus corniculatus*), restharrow (*Ononis spinosa*) and other low plants. The two soldierflies (*Odontomyia argentata* and *O. ornata*) are rare species typically associated with coastal grazing marshes. The spider *Clubiona frisia* occurs in marram tussocks on sand dunes and appears to be restricted in Britain to Norfolk and Suffolk (there are older records for other counties). The bee-wolf (*Philanthus triangulum*) still has Red Data Book status but this is no longer appropriate since this species has dramatically increased in frequency and spread in range.

A total of forty-five Nationally Scarce (= Notable) species have been previously recorded from the Sizewell Estate (Tables 7.1-7.3)[the square-spotted clay *Xestia rhomboidea* and lunar yellow underwing *Noctua orbona* should be added to this list based on information provided by the Suffolk Biological Records Centre. Seventeen of these are moths, fourteen are beetles (all but one of which are aquatic) and ten are true-flies with single Nationally Scarce spider, dragonfly, bush-cricket and native cockroach species. These figures simply reflect the greater effort on moth recording followed by water-beetles and then aquatic soldierflies in Sizewell Belts.

The desk study records clearly emphasise the importance of the coastal habitats, especially the sand-dunes and coastal shingle and the Sizewell Marshes. Only one rare species is actually clearly associated with the important Suffolk Sandlings heath (excluding the duneland species) and this is the ant-lion. Some important species and assemblages from groups such as the terrestrial beetles and the bees, wasps and ants are likely to be present on the areas of heath and in associated woodland, but very few records were available for these (with the possible exception of the weevil *Apion affine* which has been recorded on Leiston Common) to inform this report. The silver-studded blue butterfly (*Plebejus argus*) which has partial protection under the Wildlife & Countryside Act (1981) and is a Suffolk BAP species is a characteristic heathland species and is found at Minsmere, but no there are no confirmed records for Sizewell. It is highly likely that the local county recorders for groups such as beetles and aculeate Hymenoptera will have records for Sizewell, but they have not been contacted to date.

3.2 Field Surveys

3.2.1 Araneae (Spiders)

The spiders identified from the vacuum samples from Sizewell coastal (or shore) habitats (Sample Sites La-Lj) are listed in Appendix A. No Red Data Book or Nationally Scarce species were recorded. The absence of the RDB3 *Clubiona frisia* which has already recorded on the Sizewell dunes may be due to the speed with which this species can elude capture and the fact that it is not easily sampled with a portable vacuum. In total, only twelve spider species were recorded from the fifteen samples which would appear to represent low species richness. It is possible that larger spider species were missed by the vacuum and that there was bias on the part of the surveyor in taking spiders because when collected in pooters they will predate insects in the same sample and are therefore often best sampled separately.

Spiders were not identified from the pitfall trap material because the flooding and heavy rain in June and July meant that soft-bodied invertebrates would have decomposed first and the contents suggested this.

3.2.2 Smaller Insect Orders

Selected taxa from the smaller invertebrate groups identified from the coastal habitats (La-j) by vacuum sampling are listed in Appendix E. These include the Mollusca (snails), Isopoda (woodlice), Opiliones (harvestmen), Blattoidea (cockroaches) and Orthoptera (grasshoppers and crickets). Thirteen taxa were identified and these included the Nationally Scarce lesser cockroach (*Ectobius panzeri*) as well as the local lesser marsh grasshopper (*Chorthippus albomarginatus*) which has expanded its range considerably in the last two decades or so.

The Odonata were recorded by direct observation and from individuals caught in the water traps. The latter are listed in Appendices 6 & 7 and include the yellow-veined darter (*Sympetrum flaveolum*), which until recently was a vagrant species in Britain but which has now started breeding and spreading here. The local lesser marsh grasshopper mentioned above was also recorded in some of the water traps in August (Appendix G).

Some incidental records of species belonging to the smaller invertebrate groups are also listed in Appendix I. These include the ant-lion (*Euroleon nostras*) and the Norfolk hawker (*Aeshna isosceles*). The latter was frequent at times near Sample Site F where the rides intersect in Goose Hill.

Further details of the Red Data Book and Nationally Scarce species recorded are provided in Appendix J.

3.2.3 Hemiptera (Auchenorrhyncha and Heteroptera)

The Auchenorrhyncha (leafhoppers) and Heteroptera (true-bugs) identified from the vacuum from the Sizewell coastal habitats (Sample Sites La-j) are listed in Appendix A. No Red Data Book or Nationally Scarce leafhoppers were recorded and only one Nationally Scarce bug (*Drymus latus*). The bug has unclear habitat requirements but has been found in grassland, in derelict arable land on chalk, in dense moss on chalk, at the base of cliff, on waste ground and in woods (Kirby 1992). In total, twenty-four Auchenorrhyncha and twenty-two Heteroptera were recorded from the fifteen vacuum samples. The results for these groups suggest that the habitats are relatively species-rich but appear to support few rare or uncommon species. Further details of the Red Data Book and Nationally Scarce species recorded are provided in Appendix J.

3.2.4 Coleoptera (Beetles)

The beetles identified from the pitfall traps are listed in Appendix B. One hundred and fifty-six species were recorded from these including five Nationally Scarce species. The number of Nationally Scarce species would appear to be low and may reflect the relative unimportance of the preliminary works area and the conifer plantations along the proposed access route and construction area for Coleoptera. Prior to the survey, rare or uncommon species, might have been expected on the Suffolk Sandlings heathland and woodland habitats. It is possible that the poor weather and/or absence of survey earlier in the season may also have contributed to the poorer than expected results.

The beetles identified from the vacuum samples from the coastal habitats at Sizewell (Sample Sites La-Lj) are listed in Appendix C. Two Red Data Book and three Nationally Scarce species were recorded. The two Red Data Book species are the lathridiid *Melanophthalma curticollis* and the weevil *Apion rubiginosum*. The former appears to have been found at the roots of plants and under vegetable debris on light soils, both inland and on coastal sand dunes whilst the latter occurs on disturbed ground, grassland and coastal shingle where it feeds on sheep's sorrel (*Rumex acetosella*)(Hyman & Parsons (1994a, 1994b).

The beetles identified from the water trap samples collected from Sizewell in July 2007 are listed in Appendix D. The water traps were mainly used to sample Diptera, aculeate Hymenoptera and other flying insects and consequently the Coleoptera were not a target group for this method. However, 67 species were recorded in one month which provided a better than expected result. Three Nationally Scarce species were recorded.

Several common to local and one Nationally Scarce beetle (*Silus ruficollis*) were recorded in the Malaise trap in the *Phragmites* fen (Sample Site J).

Further details of the Red Data Book and Nationally Scarce species recorded are provided in Appendix J.

3.2.5 Lepidoptera (Moths and Butterflies)

Butterflies and moths were recorded in the field or from the water traps and Malaise traps and they are listed in the appropriate appendices (Appendices 5-8). The grayling (*Hipparchia semele*) which is a localised butterfly in Britain was reasonably frequent.

Lepidoptera identified from the Malaise trap in the *Phragmites* fen to the east of the preliminary works area are listed in Appendix H. The Red Data Book 3 white-mantled wainscot (*Archanara neurica*) was recorded in one sample (Appendix H).

3.2.6 Diptera (True-flies)

Selected Diptera identified from the coastal habitats (La-j) by vacuum sampling are listed in Appendix E. A total of 90 Diptera taxa have been identified and these include two Red Data Book and eight Nationally Scarce species. The Red Data Book species are two grass-feeding species, *Opomyza punctella* and *Tricimba brachyptera*. The former has been recorded in grassland mostly in northern England and Scotland and the larvae probably develop in grasses. The latter also probably develops in grasses and is mainly known from the sandy breck grassland in Suffolk although it has been found more recently on ericaceous heathlands in Nottinghamshire by the surveyor. The Diptera results would seem to suggest that the dunes and coastal shingle are more important for this group than for Araneae, Hemiptera or Coleoptera.

Selected Diptera identified from the water traps emptied in July 2007 are listed in Appendix F. One hundred and twenty-two species have been identified and these include two Red Data Book species (the horsefly *Hybomitra ciureai* and the minute and obscure *Meonura neglecta*), five Nationally Scarce species and another species only described as new to science in 2007 (*Chyromya britannica*). The horsefly *Hybomitra ciureai* is a rare south-eastern species found on and near the coast, mostly in marshes, although its precise habitat is far from known. *Meonura neglecta* is only known from six British localities (according to Falk & Ismay in prep.) but three of these are in Suffolk. The adult habitat is unknown but is probably heathland or associated broadleaved woodland.

Selected Diptera identified from the water traps emptied in August 2007 are listed in Appendix G. A total of 335 records are given in Appendix G including two Nationally Scarce species (*Dolichopus acuticornis* and *Lispe uliginosa*).

Selected Diptera identified from the Malaise trap in the *Phragmites* fen to the east of the preliminary works area are listed in Appendix H. Two large samples have been worked through and these have produced some outstanding records. These include six Red Data Book species (*Prionocera subserricornis*, *Odontomyia ornata*, *Rhagio strigosus*, *Hybomitra ciureai*, *Antichaeta brevipennis* and *Stenomicra delicatula*), thirteen Nationally Scarce species and one species (*Chyromya brittanica*) only described as new to science in 2007. An additional rare species (added to the British list in 2006 and only known from one other locality) needs to be confirmed.

Details of the ecology, status and distribution of these species are provided in Appendix J.

3.2.7 Aculeate Hymenoptera (Bees, wasps and ants)

Few aculeate Hymenoptera were taken from the coastal habitats (La-j) by vacuum sampling. The seven species recorded are listed in Appendix E. No Red Data Book or Nationally Scarce species were recorded.

The aculeate Hymenoptera identified from the water traps emptied in July 2007 are listed in Appendix F. A total of 43 species have been identified including only one Nationally Scarce species. The paucity of rare and uncommon species is perhaps surprising for a sandy area with a good mosaic of habitats ranging from heathland, dry and wet woodlands, plantations and marsh.

Selected Diptera identified from the water traps emptied in August 2007 are listed in Appendix G. The very rare bethylid *Pseudisobrachium subcyaneum* was recorded along with the Nationally Scarce *Dolichovespula media*. The Bethylidae have not been given Red Data Book, Nationally Scarce or other statuses unlike most other aculeate Hymenoptera. *Pseudisobrachium subcyaneum* has only been recorded from four UK sites and it is associated with certain ant species (Perkins 1976).

Hymenoptera identified from the Malaise trap in the *Phragmites* fen to the east of the preliminary works area are listed in Appendix H. One parasitic wasp (*Trigonalis hahni*) was recorded in one of the samples which is regarded as very rare (Gauld & Bolton 1996). These are parasitoids of Hymenoptera or Diptera larvae.

Further details of the Red Data Book and Nationally Scarce species recorded are provided in Appendix J.

4. Discussion

4.1 Discussion of Bioscan (1991) records

Some of the records collected by Bioscan (1991) can be located within the Sizewell Estate. However, there are also limitations to the extent to which the data provided can be interpreted. In Section 4.2.2.1 Bioscan refer to where some Red Data Book and Nationally Scarce species were found (if there was only one record the site is often mentioned, but if there are several, then the sites are usually not mentioned). Figure 4.3 in Bioscan (1991) shows the general location of Red Data Book and Nationally Scarce species. Most of the current preliminary works area is outside of the survey area investigated by Bioscan with the exception of what has been termed the eastern bund in this report and which they label as DU7. This comprises the artificial sandy bund or bank planted with native and cultivated trees and shrubs which separates the bulk of the preliminary works area from Sizewell beach. According to Bioscan (ibid) they recorded two Red Data Book and two Nationally Scarce species from this area. The spiders *Clubiona frisia* (RDB3) and *Pelecopsis nemoralis* (which is no longer Nationally Scarce) are therefore the only species in the Bioscan report that can be definitely attributed to the preliminary works area. *Clubiona frisia* is a genuine rarity occurring in marram tussocks on sand dunes only on parts of the Norfolk and Suffolk coasts in Britain (Harvey *et al.,* 2002 provide a recent distribution map). It was not found on the current survey even though spiders were collected with a vacuum sampler from the fore-dunes and have been identified[6].

No other existing records could be attributed to the preliminary works area. Consequently, there are very few existing invertebrate records that relate to this area and any invertebrate assessment must be based on the current survey.

The survey conducted by Bioscan (1991) is of relatively limited use in assessing the invertebrate value of the area proposed for construction compounds and access road. This is because the Bioscan survey concentrated on the Sizewell Belts and related drainage ditches extending towards Minsmere. Their records of Red Data Book and Nationally Scarce species however increase where the Sizewell Belts and Goose Hill converge at the footbridge at TM4735264528 and a couple of sites in Drake (1989a) also relate to this area.

The existing records indicate that Sizewell Belts and other associated grazing marshes as well as the dunes are of high invertebrate value. Few of the records however can be related to the proximity of Sandlings heathland or associated woodland habitat which is surprising given the potential value of these habitats to support rare or uncommon Coleoptera or aculeate Hymenoptera.

[6] It is possible that any individuals of this species present on the dunes may have been alert enough able to avoid the vacuum.

4.2 The Apparent Importance of the Preliminary Works Area to Invertebrates

This assessment is based largely on the invertebrates recorded during the present survey. A total of seven Nationally Scarce invertebrates were recorded from preliminary works area (i.e. from Sample Sites A-D) in 2007 (**Table 7.5**). In addition, the yellow-veined darter (*Sympetrum flaveolum*) and a rare bethylid wasp (*Pseudisobrachium subcyaneum*) were also recorded. The results in **Table 7.5** seem to indicate that the northern bund supports the greatest number of species of high nature conservation value which might be related to the fact that the sample site was located on the relatively open and south facing slope of the bund and therefore received good sunlight. The loss of some samples to flooding and rain and the fact that one sample couldn't be allocated precisely to Sample Site C or D makes the figures harder to interpret. Overall, however, the results would appear to suggest that the preliminary works area is not of high nature conservation value for invertebrates, particularly when the amount of sampling has been taken into account.

The Malaise trap samples at Sample Sites A and C which have not been examined for invertebrates will almost certainly reveal rare and uncommon species possibly either associated with sand-dunes (in the case of Sample Site A) or with carr woodland (in the case of Sample Site C). The two narrow riparian strips of carr which are aligned north-south within the centre of the preliminary works area are likely to be of invertebrate value despite the results from the pitfall and water traps and the fact that standing or flowing water is absent. These strips would appear to be remnants of the former drainage ditches that occurred in this area (according to www.old-maps.co.uk) and which would have been part of the Sizewell Belts system and consequently of high nature conservation value. Similarly, the more open areas on the eastern bund are likely to support dune or other coastal species (such as *Clubiona frisia* recorded by Bioscan 1991) which to some extent may encroach into this area either permanently or temporarily from adjoining dune habitat of high value.

It is possible that the heavy rain and flooding deleteriously affected the pitfall and water traps in 2007 as well as the activity of invertebrates and this may partly reflect the paucity of rare and uncommon species recorded. Sample Site I was certainly affected this way and this partly explains the poor results from this Sample Site (the habitat, on the edge of young plantation and a hay field was not exceptional).

Two Suffolk BAP species, the ant-lion (*Euroleon nostras*) and the silver-studded blue (*Plebejus argus*) could conceivably occur within the preliminary works area as might the protected Norfolk hawker (*Aeshna isosceles*).

The current grass fields and fringing coniferous plantation within the preliminary works area are of very limited nature conservation value as regards invertebrates, whilst the surrounding man-made bunds which have been planted with a variety of native and cultivated trees and shrubs are of more value but not as much as the coastal grazing marsh or sand-hill habitats they replaced.

4.3 The Apparent Importance of the Surrounding Areas to Invertebrates

A number of areas within the Sizewell Estate are clearly of high nature conservation value for invertebrates. The Sizewell Marshes clearly supports a large number of rare and uncommon species especially moths, water beetles and soldier-flies (Bioscan 1991, Drake 1989a, 1989b). The Malaise trap located at Sample Site J falls within the Sizewell Belts and produced the largest number of rare and uncommon species identified from any of the sample sites (these taxa have been highlighted in Appendix H). Further study may be required when the precise footprint of the new power station is known and potential hydrological impacts have been modelled, but it would appear that the drainage ditches and reedbeds are of considerable nature conservation value for invertebrates and survey and monitoring will be required.

The dunes and coastal shingle along the coastal strip in front of and north of the existing power stations are also of high invertebrate value as indicated in this survey. The records of Bioscan (1991) and some of the moth records mentioned in the Sizewell Land Management Annual Reviews confirm this, although the latter often just mention 'Sizewell beach' and cannot be precisely located. Rare and uncommon invertebrate taxa recorded from the dunes, shingle and associated habitat on Sizewell beach in 2007 are summarised in **Table 7.7**. In all, seventeen rare and uncommon species were recorded. Sample Sites La-e may actually fall within the preliminary works area as defined in Figure 1.1 which includes part of the beach within this area. The reason for the variation in numbers of rare and uncommon species between individual samples is unclear but the higher values for Li and Lj may reflect greater distance from the car-park and the reduced impacts of human trampling, eutrophication from dog faeces, dumping of garden waste etc.

Kenton Hills and Goose Hill appear to be of reasonable nature conservation value for invertebrates given that much of this area is coniferous plantation. The rare and uncommon species recorded here in 2007 are summarised in **Table 7.8**. The open area at the intersection of the ride network at Sample Site F proved to be the most species-rich in terms of rare and uncommon species. This is followed by Turf Pits (Sample Site G) which comprises alder and sallow carr. Nursery Covert (Sample Site H) and the triangular-shaped area of young plantation at Sample Site E proved to be poor in terms of rare and uncommon species and this is no doubt related to the domination of these areas by conifers. Norfolk hawker (*Aeshna isosceles*) was recorded frequently at Sample Site F in 2007. North of this area is Walk Barn where the ant-lion has known populations. The location of the ant lion colony should be appropriately considered when planning the location of the construction compounds.

Outside of the proposed development areas, the Sizewell area is of high invertebrate value particularly along the coast extending north to Minsmere (Bioscan 1991), on the grazing marshes between Sizewell and Minsmere (surveyed by Drake 1989b) and at Minsmere itself (RSPB records).

The remit of the survey excluded aquatic invertebrates from the Sizewell Belts. Terrestrial invertebrates were also not sampled from here with the exception of the Malaise trap located in reedbeds at Sample Site J (placed here because it was in the perimeter zone around the preliminary works area). Once the potential hydrological effects of and the footprint of the access road and power station are known, then surveys of this area are strongly recommended.

4.4 Longevity of Baseline

A period of about five years between large-scale surveys represents an ideal survey spacing, with annual monitoring necessary to show trends in high priority species such as the ant-lion, Norfolk hawker and silver-studded blue (should this latter be present) if there is the likelihood for effects upon them. Interim surveys in order to fill in taxonomic gaps, to cover areas not surveyed or to provide data for specific reasons might be useful.

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6. Tables

Table 6.1 Invertebrates of High Nature Conservation Significance Recorded by Bioscan (1991)

Species	Family	Status
Odontomyia argentata	Stratiomyidae	RDB2
Odontomyia ornata	Stratiomyidae	RDB2
Pediasia fascelinella	Pyralidae	pRDB2
Archanara neurica	Noctuidae	RDB3
Clubiona frisia	Clubionidae	RDB3
Nyctegretis lineana	Pyralidae	pRDB3
Pima boisduvaliella	Pterophoridae	pRDB3
Mythimna flammea	Noctuidae	Notable A
Nascia cilialis	Pyralidae	Notable A
Agrotis ripae	Noctuidae	Notable B
Earias chlorana	Noctuidae	Notable B
Eulamprotes wilkella	Gelechiidae	Notable B
Euxoa cursoria	Noctuidae	Notable B
Mythimna litoralis	Noctuidae	Notable B
Pediasia contaminella	Pyralidae	Notable B
Schoenobius gigantella	Pyralidae	Notable B
Sideridis albicolon	Noctuidae	Notable B
Simyra albovenosa	Noctuidae	Notable B
Agabus conspersus	Dytiscidae	Notable B
Anacaena bipustulata	Hydrophilidae	Notable B
Coelambus paralellogrammus	Dytiscidae	Notable B
Demetrias imperialis	Carabidae	Notable B

Table 7.1 (continued) **Invertebrates of High Nature Conservation Significance Recorded by Bioscan (1991)**

Species	Family	Status
Enochrus melanocephalus	Hydrophilidae	Notable B
Enochrus ochropterus	Hydrophilidae	Notable B
Haliplus apicalis	Haliplidae	Notable B
Helophorus griseus	Helophoridae	Notable B
Ochthebius nanus	Hydraenidae	Notable B
Peltodytes caesius	Haliplidae	Notable B
Rhantus grapii	Dytiscidae	Notable B
Rhantus suturalis	Dytiscidae	Notable B
Brachyton pratense	Aeshnidae	Notable
Aulacigastra leucopeza	Aulacigastridae	Notable
Beris clavipes	Stratiomyidae	Notable
Neoascia geniculata	Stratiomyidae	Notable
Odontomyia tigrina	Stratiomyidae	Notable
Oxycera morrisii	Stratiomyidae	Notable
Stratiomys potamida	Stratiomyidae	Notable
Stratiomys singularior	Stratiomyidae	Notable

Table 6.2 Invertebrates of High Nature Conservation Significance Recorded in the Sizewell Land Management Annual Reviews between 1996 and 2007

Species	Family	Status
Argiope bruennichi	Araneidae	Nationally Scarce
Euroleon nostras	Mymeleontidae	Suffolk BAP species
Ectobius panzeri	Blattellidae	Nationally Scarce
Metrioptera roeselii	Tettigoniidae	Nationally Scarce
Aeshna isosceles	Aeshnidae	Protected WCA (1981)
Brachytron pratense	Aeshnidae	Nationally Scarce
Erythromma viridulum	Coenagrionidae	New to Britain in 1999
Apion affine	Apionidae	Nationally Scarce
Ancylis upupana	Tortricidae	Nationally Scarce
Calamotropha paludella	Pyralidae	Nationally Scarce
Chortodes elymi	Noctuidae	Nationally Scarce
Crambus pratella	Pyralidae	Nationally Scarce
Dioryctria sylvestrella	Pyralidae	New to Britain in 2000
Earias chlorana	Noctuidae	Nationally Scarce
Mythimna flammea	Noctuidae	Nationally Scarce
Nascia cilialis	Pyralidae	Nationally Scarce
Pediasia contaminella	Pyralidae	Nationally Scarce
Pima boisduvaliella	Pterophoridae	pRDB3
Scopula emutaria	Geometridae	Nationally Scarce
Sideridis albicolon	Noctuidae	Nationally Scarce
Xestia rhomboidea	Noctuidae	Nationally Scarce
Medetera jugalis	Dolichopodidae	Nationally Scarce
Vanoyia tenuicornis	Stratiomyidae	Nationally Scarce

Table 6.3 Red Data Book and Nationally Scarce invertebrates recorded from the Nature Conservancy Council funded surveys of Sizewell Belts (Drake 1989a, 1989b)

Species	Family	Status
Odontomyia argentata	Stratiomyidae	RDB2
Enochrus melanocephalus	Hydrophilidae	Nationally Scarce
Haliplus heydeni	Haliplidae	Nationally Scarce
Ochthebius nanus	Hydrophilidae	Nationally Scarce
Rhantus grapii	Dytiscidae	Nationally Scarce
Dixella attica	Dixidae	Nationally Scarce
Odontomyia tigrina	Stratiomyidae	Nationally Scarce
Stratiomys potamida	Stratiomyidae	Nationally Scarce

Table 6.4 Number and Location of Invertebrate Sampling Sites at Sizewell in 2007

Site	Grid Ref (TH)	Development area?	Description
A	47496435	Yes. PWA	Eastern bund overlooking coastal strip (planted trees and shrubs with clearings)
B	47386436	Yes. PWA	Northern bund (planted trees and shrubs)
C	47296415	Yes. PWA	Central riparian belt (carr woodland)
D	472641	Yes. PWA	Western riparian belt (carr woodland)
E	47016461	No. Perimeter	Triangular-shaped area of young plantation surrounded by mature plantations, Goose Hill (Dunwich Forest)
F	46596465	Yes. CC & AR	Plantation edge and scrub at intersection of rides, Dunwich Forest
G	464645	Yes. CC & AR	Carr woodland at Turf Pits, Kenton Hills
H	463644	Yes. CC & AR	Plantation at Nursery Covert, Kenton Hills
I	47406401	Yes. PWA	Southern edge of field/northern edge of young conifer plantation.
J	47286448	No. Perimeter	*Phragmites* fen near footbridge
K	47516452	No. Perimeter	Coastal heath north of power station.
L	4764 (La-e) 47556295 (Lf) 4763 (Lg-j)	La-e: PWA. Lg-j: Perimeter	Coastal belt (low dunes, shingle, marram, etc). La - e = June 2007, Lf-j = July & Sept 2007

PWA = preliminary works area; CC = Construction compounds; AR = General Access road area, Perimeter = Perimeter zone outside development areas.

Table 6.5 Invertebrate Sampling Methods Employed at each of the Sample Sites

Sampling Site	Invertebrate sampling methods used
A	Pitfall traps (10), water trap (1) & Malaise trap (1)
B	Pitfall traps (10) & water trap (1)
C	Pitfall traps (10), water trap (1) & Malaise trap (1)
D	Pitfall traps (10) & water trap (1)
E	Pitfall traps (10) & water trap (1)
F	Pitfall traps (10) & water trap (1)
G	Pitfall traps (10), water trap (1) & Malaise trap (1)
H	Pitfall traps (10) & water trap (1)
I	Water trap (1)
J	Malaise trap (1)
K	Pitfall traps (1)
L	Vacuum (5) and sweep net samples (5)

Table 6.6 Invertebrate Species of High Nature Conservation Value Recorded from the Sample Sites within the Preliminary Works Area in 2007.

Species	A	B	C	D	C/D
Sympetrum flaveolum	+				
Rhantus suturalis			+		
Crypticus quisquilius	+	+	+	+	
Polydrusus formosus				+	
Glocianus punctiger		+			
Dolichopus acuticornis					+
Lispe uliginosa					+
Pseudisobrachium subcyaneum		+			
Dolichovespula media					+
Nysson dimidiatus		+			
Total	**2**	**4**	**2**	**2**	**3**

No rare or uncommon species were recorded from Sample Site I.

Table 6.7 Invertebrate Species of High Nature Conservation Value Recorded from the Dunes and Shingle on Sizewell Beach in 2007

Species	La	Lb	Lc	Ld	Le	Lf	Lg	Lh	Li	Lj
Ectobius panzeri					+	+	+		+	+
Drymus latus					+					
Aphanisticus pusillus										+
Clanoptilus marginellus	+									
Melanophthalma curticollis		+								
Mantura chrysanthemi									+	
Apion rubiginosum						+			+	
Stilpon sublunata										+
Platypalpus niveiseta		+		+						
Medetera petrophila			+							
Geomyza subnigra										+
Opomyza punctella		+								
Anagnota bicolor		+								
Elachiptera pubescens										+
Trachysiphonella scutellata			+							
Tricimba brachyptera							+		+	+
Trixoscelis marginella									+	+
Total	**1**	**4**	**2**	**1**	**2**	**2**	**2**	**0**	**5**	**7**

Table 6.8 Invertebrates of High Nature Conservation Value Found in Kenton Hills and Goose Hill in 2007.

Species	H	G	F	E	Other area
Euroleon nostras					Walk Barn
Aeshna isosceles			+		
Aphanus rolandri		+			
Rhantus suturalis		+			
Catopidius depressus			+		
Scymnus limbatus	+				
Molophilus bihamatus		+			
Hybomitra ciureai			+		
Sciapus contristans				+	
Neoascia geniculata		+			
Lasiambia palposa			+		
Trachysiphonella scutellata			+		
Chyromya britannica			+		
Meonura neglecta				+	
Total	**1**	**4**	**6**	**2**	**1**

Sample Sites are arranged how they are encountered from west to east along the track from the car-park at Kenton Hills

Appendix A
Araneae, Auchenorrhyncha and Heteroptera Recorded from Sizewell Coastal Habitats in 2007

Appendix B
Coleoptera Recorded from Pitfall Traps at Sizewell in 2007

Appendix C
Coleoptera Recorded from Vacuum Samples from Sizewell Coastal Habitats in 2007

Appendix D
Coleoptera Recorded from Water Traps at Sizewell in 2007

Appendix E
Diptera and Other Invertebrates Recorded from Vacuum Samples at Sizewell in 2007

Appendix F
Diptera, Aculeate Hymenoptera and Other Invertebrates Recorded from Water Traps at Sizewell Emptied in July 2007

Appendix G
Diptera and Other Invertebrates Recorded from Water-Traps at Sizewell Emptied in August 2007

Appendix H
Invertebrates Identified from Malaise Trap in Phragmites Fen (Sample Site J) at Sizewell in 2007

8 Pages

March 2014
Doc Reg No. 34868 CA003R

Appendix I
Incidental Invertebrate Records from Sizewell for 2007

1 Page

Appendix J
Details of the Ecology, Status and Distribution of the Species of High Invertebrate Importance Recorded at Sizewell in 2007

8 Pages

March 2014
Doc Reg No. 34868 CA003R

Protected Species

Norfolk hawker *Aeshna isosceles* Odonata, Aeshnidae

The Norfolk hawker is restricted in Britain to a few grazing marshes in the Broadland area of Norfolk and Suffolk (according to Merritt *et al.*, 1996). These grazing marshes are relatively isolated from polluted water but increasingly threatened due, for example, to the change from pasture to arable farming. There is some evidence that it has spread slightly in the period since Merritt *et al.,* 1996 was published and it appears to be breeding at Minsmere, and is recorded annually now at Sizewell.

Suffolk Biodiversity Action Plan Species

Ant-lion or Suffolk ant-lion *Euroleon nostras* Neuroptera, Myrmeleontidae

There are very early references to ant-lions in Britain from 1781-1829 but a confirmed specimen was not found until a single male was found at Gorleston, Suffolk in 1931. Despite searches, no ant-lions were seen next until 1994 when they were found on Minsmere RSPB reserve. Since then records have been obtained increasingly and annually and a record for 1988 for Lowestoft has also emerged. Concentrated surveys for this species have taken place since and it is now widely known in the Minsmere area with at least two populations at Walk Barn, Sizewell (Plant 1998, 1999). The larvae lie at the base of funnel-shaped pits in sandy areas and feed on ground invertebrates that stumble into the pits.

Red Data Book Species

Prionocera subserricornis RDB2 Diptera, Tipulidae

This rare cranefly has mainly been recorded from Norfolk (Falk 1992 lists seven British localities). It occurs in ancient fenland with most records referring to ditches or pools filled with wet, black organic material and beneath the shade of carr.

***Odontomyia ornata* RDB2 Diptera, Stratiomyidae**

This soldier-fly is known from scattered coastal marshes in southern England although it is known from some inland grazing marshes (such as the Somerset Levels). The preferred ditches are those at the earlier stages of hydroseral succession, with floating cover and rich submergent vegetation, rather than ditches which are choked with emergent plants. The larvae are aquatic and develop in shallow water in ditches. The adults have been recorded from May to July and occur at flowers such as umbellifers.

***Antichaeta brevipennis* RDB2 Diptera, Sciomyzidae**

This snail-parasitoid fly is known from about a dozen sites in total, widely dispersed in England and with one in Scotland. This species is usually associated with lush vegetation beside water bodies in wetlands, existing Suffolk records refer to ditches in unimproved grazing marshes. In Denmark, the eggs and larvae have been found on the amber snails (Succineidae) and this species may also use pond snails (Lymnaeidae). The adults have been recorded from June to August.

***Stenomicra delicatula* RDB2 Diptera, Stenomicridae**

Falk & Ismay (in prep.) were only able to list eight British sites for this minute species, of which half or so are located in East Anglia. The existing records refer to a dried-up pond, long vegetation next to a spring, to an association with *Carex paniculata* and from a Malaise trap in a fen. The latter two associations are likely to be the more typical and the surveyor has repeatedly taken this species in *Carex paniculata* tussocks in fens. The early stages are not known but the larvae possibly mine the stems of monocotyledons or develop in damp decaying vegetation.

Apion rubiginosum **pRDB3 Coleoptera, Apionidae**

A local weevil of southern distribution, associated with sheep's sorrel *Rumex acetosella*, apparently with a preference for disturbed ground, grassland and coastal shingle.

Archanara neurica **RDB3 Lepidoptera, Noctuidae**

The white-mantled wainscot (*Archanara neurica*) is currently only known in Britain from a 15km stretch of coastal reedbeds on the Suffolk coast. The larvae feed on *Phragmites australis*.

Rhagio strigosus **RDB3 Diptera, Rhagionidae**

This snipe-fly has mainly been recorded from the Chalk downs of Surrey, Oxfordshire and Berkshire, with additional records from Dorset and Herefordshire. The habitat is described by Falk (1992) as "dry broadleaved woodland on Chalk". The larvae probably develop as predators in damp decayed wood or soil.

Hybomitra ciureai **RDB3 Diptera, Tabanidae**

This horsefly is a rare south-eastern species found on and near the coast, mostly in marshes, although its precise habitat is far from known. Falk (1992) stated that it is only known from six British localities. The larvae probably develop in damp soil and the marginal zones of ponds and ditches.

Opomyza punctella **RDB3 Diptera, Opomyzidae**

The former has been recorded in grassland mostly in northern England and Scotland and Falk and Ismay (in prep.) state that there are only four post-1960 sites. The larvae probably develop in grasses. The adults have been recorded from July to September, probably as several generations.

Meonura neglecta **RDB3 Diptera, Carnidae**

This minute species is only known from six British localities (according to Falk & Ismay in prep.) but three of these are in Suffolk. The adult habitat is unknown but is probably heathland or associated broadleaved woodland. The larval biology is not known but other members of this genus have been reared from a range of situations including bird's nests, animal dung and possibly carrion.

Tricimba brachyptera **RDB3 Diptera, Chloropidae**

Falk and Ismay (in prep.) only list four UK sites for this species. It is mainly known from the sandy breck grassland in Suffolk although it has been found more recently on ericaceous heathlands in Nottinghamshire by the surveyor. The larvae probably develops in grasses (most chloropids have this biology).

Melanophthalma curticollis **pRDBK Coleoptera, Latridiidae**

Small beetle found in litter on the coast. This species has probably been found at the roots of plants and under vegetable debris on light soils, both inland and on coastal sand dunes (Hyman and Parsons 1984a).

Nationally Scarce (= Notable) Species

Ectobius panzeri **Blattodea, Blattellidae**

The lesser cockroach is widespread around the coast of southern England from the Bristol Channel to Norfolk (the distribution map in Marshall and Haes 1988 is somewhat out-of-date). It occurs in a variety of mainly coastal habitats. There are scattered colonies on maritime cliffs, under wind-clipped scrub such as heather (*Calluna vulgaris*) or western gorse (*Ulex gallii*). Substantial colonies may occur under low vegetation on sand-dunes or on extensive areas of stabilized, vegetated shingle beach.

Aphanus rolandri **Heteroptera, Lygaeidae**

This ground bug has a strongly southern distribution and there are records from six English counties (Kirby 1992). This bug has been found in a range of circumstances. It has occurred in arable or neglected arable land, amongst dry leaf litter in chalk pits and on coastal cliffs and in leaf litter beneath broom on Dungeness. The localities have in common that they are sunny, sheltered and well-drained and have a covering of dry leaf litter. The bug is probably chiefly phytophagous, but it has been known to predate the eggs of a leaf beetle.

Drymus latus **Heteroptera, Lygaeidae**

The habitat requirements of this ground bug are unclear. It has been found in grassland at the edge of a marsh, in tall calcareous grassland, on derelict arable land on chalk, amongst dense moss at the margins of scrub on chalk, at the base of fallen chalk cliffs, amongst rather sparse grassland on mildly acid soil, amongst ruderal vegetation on waste ground in the London suburbs, and in a wood. The bugs are probably seed-eaters, this being the usual food of members of the family. There are records for southern England and the Midlands.

Rhantus suturalis **Coleoptera, Dytiscidae**

This is a strong flying water beetle. It is typically found in ponds in the south. It is absent from Scotland and rather scattered and local elsewhere.

Cercyon ustulatus Coleoptera, Hydrophilidae

This small scavenging beetle found among wet plant litter in marshes and at the edge of still water. It is widespread but local.

Catopidius depressus **Coleoptera, Leiodidae**

This leiodid beetle has been recorded from southern England, the Midlands and East Anglia. It has been found in a variety of situations including woodland, for example, in rabbit burrows and badger setts. It has also been recorded from carrion-baited pitfall traps in rabbit burrows.

Aphanisticus pusillus **Coleoptera, Buprestidae**

A small dull bronze jewel beetle, resembling a seed. Unlike other buprestids, members of this genus are not associated with trees or timber. This species is associated with black bog-rush (*Schoenus nigricans*) in marshy places, but is not restricted to this habitat, having also been found on dry limestone grassland. Adults have been found throughout the year. The larval requirements are unknown. Most records are from the south of England but it has been found in Yorkshire and Lancashire.

Clanoptilus marginellus **Coleoptera, Melyridae**

A moderately sized (6. 0 - 7. 0mm) long metallic green and red 'false soldier' or 'malachite' beetle. Adults on flowers, larvae of other species of this genus develop as predators under the bark of dead wood. Formerly widespread, has declined considerably and now apparently only recorded from a few counties in southern England.

Scymnus limbatus **Coleoptera, Coccinellidae**

A small ladybird found in marshy places.

Crypticus quisquilius **Coleoptera, Melandryidae**

A darkling beetle living on sand surface in sandy places, principally coastal dunes. Very uncommon inland. Coastal dunes north to Humber-Mersey.

Mantura chrysanthemi **Coleoptera, Chrysomelidae**

A local flea beetle, confined to southern England, associated with sheep's sorrel *Rumex acetosella* and possibly other *Rumex* spp.

Silus ruficollis **Coleoptera, Cantharidae**

This soldier beetle has been recorded throughout England and Wales. It occurs in river and lake margins, fens, marshes and other wetland habitats. The larvae and adults are probably predatory. The adults have been noted on lush, marginal vegetation and have been swept from *Phragmites*.

Polydrusus formosus **Coleoptera, Curculionidae**

Greenish weevil feeding on foliage of various trees and shrubs including Hazel *Corylus avellana*, oak *Quercus* spp. , willow *Salix* spp. , birch *Betula* spp. , cherry *Prunus* spp. and wild rose *Rosa* spp. . Mainly southern. Very local.

Glocianus punctiger **Coleoptera, Curculionidae**

Small weevil feeding on dandelion *Taraxacum* spp. in dry sandy places, most often on the coast. Southern species, north to Cumbria in the west, but not extending so far north in the east.

Diogma glabra **Diptera, Cylindrotomidae**

Records for this cranefly are widely dispersed in England, Wales and Scotland. It occurs in damp woodland, generally in calcareous lowland areas. The larvae usually develop in terrestrial mosses growing on stones, less often in wet mosses growing on soil. The adults have been recorded from June to August.

Molophilus bihamatus Diptera, Tipulidae

Records for this small cranefly are widely dispersed in England (nine counties) and Scotland (Sutherland only). It is usually found in wet.,alder carr. The early stages are unknown but the larvae probably develop in damp soil or leaf litter. The adults have been recorded from May to July.

Stilpon sublunata **Diptera, Hybotidae**

This minute species was listed as Notable in Falk (1992) but was downgraded in Falk and Crossley (2005) because it has now been recorded from twenty counties in Britain.

Platypalpus niveiseta Diptera, Hybotidae

Records for this small species are widely scattered in England (eight counties according to Falk and Crossley 2005). The most usual habitats appear to be old broadleaved woodland and fens. The early stages are not known, but larvae of some *Platypalpus* species have been found in soil or under moss and they are probably predacious. Adults of this genus are typically found running amongst ground vegetation or, more usually, over the surfaces of leaves on bushes and trees where they search for small insects upon which they prey.

Dolichopus linearis **Diptera, Dolichopodidae**

This species was listed as Notable in Falk (1992) but was downgraded in Falk and Crossley (2005). Assis-Fonseca (1978) state that this species is rare and East Anglia features heavily in the known sites.

Hercostomus chalybeus **Diptera, Dolichopodidae**

This species was listed as Notable in Falk (1992) but was downgraded in Falk and Crossley (2005). Assis-Fonseca (1978) state that this species is uncommon and very local and gives two |Norfolk Broads sites but none in Suffolk.

Lamprochromus elegans **Diptera, Dolichopodidae**

This species was listed as Notable in Falk (1992) but was downgraded in Falk and Crossley (2005). Assis-Fonseca (1978) lists several sites including one in the Norfolk Broads and two in the Cambridgeshire Fens.

Medetera petrophila **Diptera, Dolichopodidae**

This species was listed as Notable in Falk (1992) but was downgraded in Falk and Crossley (2005). Assis-Fonseca (1978) stated that this species is scarce and only known to him in Britain from five Scottish counties.

Sciapus contristans **Diptera, Dolichopodidae**

This species was listed as Notable in Falk (1992) but was downgraded in Falk and Crossley (2005). Assis-Fonseca (1978) mentions five British sites including one each in Suffolk and Norfolk. Since then, a taxonomic review of *Sciapus* has been undertaken and some of the records may belong to other species.

Thrypticus nigricauda **Diptera, Dolichopodidae**

There are eleven recorded sites for this species in England (eight counties) and Wales (Anglesey only). The majority of sites appear to be wetlands; they include a damp hollow with Iris and Juncus, a pond and a river bank. Members of this genus have phytophagous larvae which are plant miners developing in the stems of monocotyledons. Adults of this species have been found in June and July.

Neoascia geniculata **Diptera, Syrphidae**

Records for this small hoverfly are scattered widely in England, Wales and Scotland. It occurs in marshes and water margins where there is lush emergent vegetation such as Glyceria. The larvae probably develop in wet mud or vegetation as detritus feeders. The adults have been recorded from April to October and visit flowers such as forget-me-knot (Myosotis scorpioides) and fool's celery (Apium nodiflorum).

Pherbellia griseola **Diptera, Sciomyzidae**

This snail-parasitoid fly has been recorded widely in England, Wales and Scotland. It occurs in a wide range of wetlands including fens, bogs, dune slacks and damp woods and there is a requirement for standing water. The larvae develop as parasitoids of aquatic snails such as Lymnaea palustris. The adults have been recorded from early may to early September.

Geomyza subnigra **Diptera, Opomyzidae**

Records for this small species are scattered widely in southern England with sporadic records further north. There are about fifteen post-1960 sites for this species. Records are from dry grassland on chalk downs, heathland, dunes and shingle ridges behind beaches. The adults have been taken in numbers at the roots of Arrhenatherum elatius tussocks in Surrey and possibly in association with Bromus spp. The adults have been recorded from May to November.

Anagnota bicolor **Diptera, Anthomyzidae**

Records for this small species are widely dispersed in England, Wales and Scotland. Falk and Ismay (in prep.) state that it is usually associated with Phragmites in marshes and coastal levels but the surveyor has mostly found it in association with Carex tussocks in wetlands.

Elachiptera uniseta **Diptera, Chloropidae**

This minute species has been recorded from scattered localities in England (ten counties) and south Wales (two counties) according to Falk and Ismay (in prep.). The habitat includes fens, damp woods, gravel pits and coastal marshes. The early stages are unknown but the larvae probably develop in decaying vegetable matter or invade grass and reed stems. The adults have been recorded throughout the year.

Elachiptera pubescens **Diptera, Chloropidae**

This is mainly a coastal species of southern England (nine counties according to Falk and Ismay in prep.) and Wales (two counties). The habitat according to the above authors is brackish coastal levels but the surveyor has found this species in many other coastal habitats. Falk and Ismay (in prep.) also state that it is found to a lesser extent inland on damp heaths, in gravel pits and marshes. The early stages are unknown but the larvae probably develop in decaying vegetable matter or invade grass and reed stems.

Fiebrigella palposa **Diptera, Chloropidae**

This species is widely known from localities throughout England (one county), Wales (four counties) and Scotland (six counties) according to Falk and Ismay (in prep.). However, the surveyor has recorded this species from several England counties in addition. According to Falk and Ismay (ibid) most records refer to coastal dunes where it appears to be associated with slacks or fixed dunes. It can occasionally occur well inland on damp grassland or riverside situations. The surveyor's records mainly come from brownfield sites. The larvae are recorded as predators of grasshoppers egg-pods on the Continent but have not been reared in Britain.

Lipara rufitarsis **Diptera, Chloropidae**

This species is mainly known from southern England (nine counties according to Falk and Ismay in prep.). The habitat is wetlands including fens, gravel pits and damp heathland, with a requirement for *Phragmites* beds. The larvae develop within the stems of *Phragmites* and form galls which cause foreshortening and sterility of the host plant. The adults have been recorded from April to July.

Trachysiphonella scutellata **Diptera, Chloropidae**

This species is listed as Notable in Falk (1992) but not included in Falk and Ismay (in prep.). Trachysiphonella spp are minute flies usually found on calcareous grassland but they are also known from heathland. The early stages are not known, although in Greece, an association with ants nests has been established.

Trixoscelis marginella **Diptera, Trixoscelidae**

Records for this distinctive species are scattered widely in England, Wales and Scotland with a preference for coastal dunes or Breckland heaths. The early stages are unknown although a development in carrion or animal burrows is feasible. The adults have been recorded from June to August.

Lispe uliginosa **Diptera, Muscidae**

This poorly known species is known from nine English counties including Norfolk (Ringmere) and Suffolk (Shingle Street). Assis-Fonseca (1968) described it as uncommon. Skidmore (1985) states that this species is one of the more tolerant Lispe species in respect of acidic conditions, since he found it beside peat pools and drainage channels on Thorne Moors, South Yorkshire. It does also occur in basic marshes and fens and in saline areas both on coasts and inland.

Phaonia atriceps **Diptera, Muscidae**

This relatively distinct species is known from eight counties in England according to Assis-Fonseca (1968). It has been usually reared from pupae found under the leaf-sheaths of *Typha latifolia* and once from larva in the stem of *Phragmites* (Assis-Fonseca ibid, Skidmore 1985). The adult has been recorded from May to early September and appears to have two generations. Skidmore (1985) provides useful information on the biology of this species.

Phaonia falleni **Diptera, Muscidae**

This is *Phaonia vagans* of Assis-Fonseca (1968) and other earlier sources. Assis-Fonseca (ibid) states that it is uncommon and records it from ten English counties and one county each in Scotland and Wales. The adults have been recorded from May to September.

Dolichovespula media **Hymenoptera. Vespidae**

This social wasp has been recorded throughout England with occasional records for Wales (Edwards 1997). This author suggests that the former Red Data Book and Notable statuses given to this species no longer apply. This species arrived in Britain in the 1980s and has spread since so that it is now quite common and widespread. The adults occur between April and September.

Nysson dimidiatus **Hymenoptera, Sphecidae**

This is a small black and red solitary wasp which has been recorded widely but sparingly across England and Wales as far north as Yorkshire. It has been recorded from heathland, coastal dunes, coastal landslips, open areas in woodlands, sandpits, embankments and occasionally gardens. It favours sparsely-vegetated or short-cropped areas on dry sandy or clayey soils fully exposed to the sun. This species is parasitic on another solitary wasp, *Harpactus tumidus*.

Other Significant Species

Pseudisobrachium subcyaneum **Hymenoptera, Bethylidae**

This obscure and rare parasitic wasp has only been recorded from four UK sites and it is associated with certain ant species (Perkins 1976). Unfortunately, the Bethylidae have not been given Red Data Book, Nationally Scarce or other statuses unlike most other aculeate Hymenoptera.

Trigonalis hahni **Hymenoptera, Trigonotylidae**

Parasitic wasps have not been given Red Data Book or other statuses but this species is very rare according to Gauld & Bolton (1996). The trigonalyids are parasitoids of Hymenoptera or Diptera larvae.

Sympetrum flaveolum **Odonata, Libellulidae**

The yellow-veined darter dragonfly was until recently a vagrant species in Britain but it has now started breeding and spreading throughout southern and central England. Most of the publications on dragonflies (such as Merritt *et al.*, 1996, Brooks 1997) are therefore out-of-date as regards this species which tend to mention it as a non-breeding vagrant. The larvae will occur among aquatic vegetation in marshy pools, peat bogs and weedy parts of lakes (based on Continental literature).

Chyromya britannica **Diptera, Chyromyidae**

This small species was described as new to science in 2007 (Gibbs 2007). It was described from specimens found in four English counties (Avon, Middlesex, Nottinghamshire and Oxfordshire) and it has been reared from rot-hole debris found in tree holes. Specimens have been found in deciduous woodland, mixed woodland, an ex-industrial site with abundant sallow (Salix caprea) bushes and from a row of riverside poplar (Populus sp) trees.

Appendix K
Definitions of Red Data Book and Nationally Scarce Statuses

4 Pages

March 2014
Doc Reg No. 34868 CA003R

This text is taken from English Nature and the references mentioned are presumably referred to in an English Nature publication.

For the purposes of evaluating invertebrate faunas and priorities for conservation action, invertebrates are attributed various rarity status categories, the meanings of which are given below. Criteria for the selection of species into Red Data Book categories one to five follow Shirt (1987), with minor modifications derived from Hyman & Parsons (1992) and Parsons (1993).

Categories RDBI (Indeterminate) and RDBK (Insufficiently Known) are based on the criteria used by Wells, Pyle and Collins (1983).

Criteria for the selection of Nationally Scarce species follow Eversham (1983) and Ball (1986).

Table K1 Red Data Book Category 1 RDB1 Endangered

Definition	Taxa in danger of extinction in Great Britain and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so dramatically reduced that they are deemed to be in immediate danger of extinction. Also included are some taxa that are possibly extinct.
Criteria	Species, which are known or believed, to occur as only a single population within one 10km square of the National Grid. Species, which only occur in habitats known to be especially vulnerable. Species, which have shown a rapid and continuous decline over the last twenty years and are now estimated to exist in five or fewer 10km squares. Species which are possibly extinct but have been recorded this century but which if rediscovered would need protection.

Table K2 Red Data Book Category 2 RDB2 Vulnerable

Definition	Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are taxa of which most or all of the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.
Criteria	Species declining throughout their range. Species in vulnerable habitats.

Table K3 Red Data Book Category 3 RDB3 Rare

Definition	Taxa with small populations in Great Britain that are not at present Endangered or Vulnerable, but are at risk. These taxa are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range.
Criteria	Species, which are estimated to exist in only 15 or fewer 10km, squares. This criterion may be relaxed where populations are likely to exist in over 15 10km squares but occupy small areas of especially vulnerable habitat.

Table K4 Red Data Book Category 4 RDB4 Out of Danger

Definition	Taxa formerly meeting the criteria of one of the aforementioned categories but which are now considered relatively secure because effective conservation measures have been taken or the previous threat to their survival in Great Britain has been removed.

Table K5 Red Data Book Category 5 RDB5 Endemic

Definition	Taxa, which are not known to occur naturally outside Great Britain. Taxa within this category may also be in any of the other RDB categories or not threatened at all. There are few truly endemic species in Great Britain. Most that have been identified are in fairly obscure groups, which are relatively poorly known, and the species may well eventually be discovered elsewhere in Europe.

Table K6 Red Data Book Appendix RDBApp Extinct

Definition	Taxa which formerly had breeding populations in Great Britain but which are now believed to have died out. (Taxa not recorded since 1900)

Table K7 Red Data Book Category I RDB I Indeterminate

Definition	Taxa considered being Endangered, Vulnerable or Rare, but where there is not enough information to say which of the three categories (RDB1 to 3) is appropriate.

Table K8 Red Data Book Category K RDBK Insufficiently Known

Definition	Taxa that are suspected, but not definitely known, to belong to any of the aforementioned categories, because of lack of information.
Criteria	Taxa recently discovered or recognised in Great Britain, which may prove to be more widespread in the future (although some recent discoveries may be placed in other categories if the group to which they belong is thought not to be under- recorded). Taxa with very few or perhaps only a single known locality but which belong to poorly recorded or taxonomically difficult or unstable groups. Species with very few or perhaps only a single known locality, inhabiting inaccessible or infrequently sampled but widespread habitats, such as some northern moorland species, species associated with some agricultural situations and species which are adult only during the winter. Species with very few or perhaps only a single known locality and of questionable native status, but not clearly falling into the category of recent colonist, vagrant or introduction.

Table K9 Provisional Red Data Book pRDB

Definition	The prefix ‘p’ before any Red Data Book category implies that the grading is provisional. In the majority of cases this means that the species' status has been reconsidered and changed in a Species Group Review produced subsequent to the publication of the relevant Red Data Book. The statuses so given are described as provisional, pending the publication of a future edition of that Red Data Book. These statuses are however, based upon a greater amount of evidence than was available for the original Red Data Book and therefore are more likely to be a true representation of the species' actual status.
Definition	The prefix ‘p’ is also used for RDB status categories in groups where a Red Data Book has not yet been produced but is in preparation, or is used for species in groups covered by the original Red Data Book, where it is considered that there is evidence that the original grading was incorrect or that there has been a genuine change in status of the taxon.

Nationally Scarce (Notable) Species

The term ‘Nationally Scarce‘ was adopted and replaced the term ‘Notable‘ during the compilation of the Guidelines for the Selection of Biological SSSIs. The two terms are thus interchangeable but ‘Nationally Scarce‘ is preferable.

Ball (1986) discusses the allocation of species to Nationally Scarce categories:

“*The Invertebrate Site Register project includes the preparation of National Species Reviews which seek to identify and document uncommon species. The criteria used have been based directly on those evolved by botanists and two levels of 'National Notability' has been used. These are Notable A, for species known to occur in 30 or less 10km squares of the National Grid and Notable B for those known from 100 or less squares.* ”

Although this system can be used directly with well-recorded groups like Dragonflies, Butterflies and Grasshoppers; when dealing with many other groups of insects, the level of recording is not sufficient to apply the criteria rigorously. A combination of three alternative approaches has been employed:

1.	The approximate number of squares in which a species may occur can be estimated by looking at the number it has been recorded from as a proportion of the total in which the whole group (e. g. its family) has been recorded.
2.	Coarser measurements such as the number of vice-counties in which a species has occurred can be used (7 or less for Notable A, 20 or less for Notable B).
3.	Experts can be asked to use their field experience to judge the status of species in their particular specialist group against others with a better-established status. By consulting as many people as possible and taking a consensus of their views, geographical and personal biases can be minimized.
	In some groups in which widespread interest and recording is a rather recent phenomenon, no attempt has yet been made to separate Notable A and Notable B species, and all Nationally Notable species are simply graded 'Notable’.

Table K10 Nationally Scarce (Notable) N Notable

Definition	Species, which are estimated to occur in 16 to 100 10km, squares in Great Britain. The subdividing of this category into Nationally Scarce A and Nationally Scarce B has not been attempted for some species because of either the degree of recording that has been carried out in the group to which the species belongs, or because there is some other reason why it is not sensible to be so exact.

Table K11 Nationally Scarce (Notable) Category A Na Notable A

Definition	Taxa which do not fall within RDB categories but which are uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well recorded groups, within 7 or fewer vice-counties.

Table K12 Nationally Scarce (Notable) Category B Nb Notable B

Definition	Taxa which do not fall within RDB categories but which are uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less well recorded groups, between 8 and 20 vice-counties.

Table K13 Regionally Scarce (Notable) Nr Notable

Definition	Species which are considered to occur in 5 or less 10km squares in an area equivalent in size to a region of the old Nature Conservancy Council or larger, approximately one eighth the total area of England. Such statuses were worked out during the compilation of the Invertebrate Site Registers. They cover various groups in Scotland, in northern England as a whole, in northeast and northwest England, in vice-county Yorkshire and in the east Midlands and East Anglia. They were worked out by local entomologists.

Table K14 Local

Definition	The term is not rigidly defined, but loosely means species confined to a particular habitat type (usually associated with better quality examples of that habitat), a particular geographic area, or species that are too widespread to warrant Nationally Scarce (Notable) status but are nevertheless infrequently encountered.

Table K15 Common

Definition	Common or very widespread species, frequently recorded.

Table K16 Syanthropic Species

Definition	Species dependent upon man, his buildings, livestock or crops.

Table K17 Unknown

Definition	Species where no status has been attributed. There may be confusion over the species' taxonomy, it may belong to a poorly recorded group or may occur in an infrequently sampled habitat. As a species is entered into the Invertebrate Site Register or RECORDER, the status automatically defaults to 'Unknown'. Certain common or local species may therefore occasionally appear in this category if there has been no necessity to use the species record.

EDF Energy

Sizewell

2009 Invertebrate Survey Report

UK Protect - Commercial

March 2014

AMEC Environment & Infrastructure UK Limited

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Report for	

Report for

EDF Energy

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Document Revisions

No.	Details	Date
1	Draft Report	January 2010
2	Final Report	March 2014

Note

The information contained in this report was, to the best of the issuer’s knowledge, correct at the time of issue of the latest draft. Some of this information may no longer be current.

Contents

1. Introduction

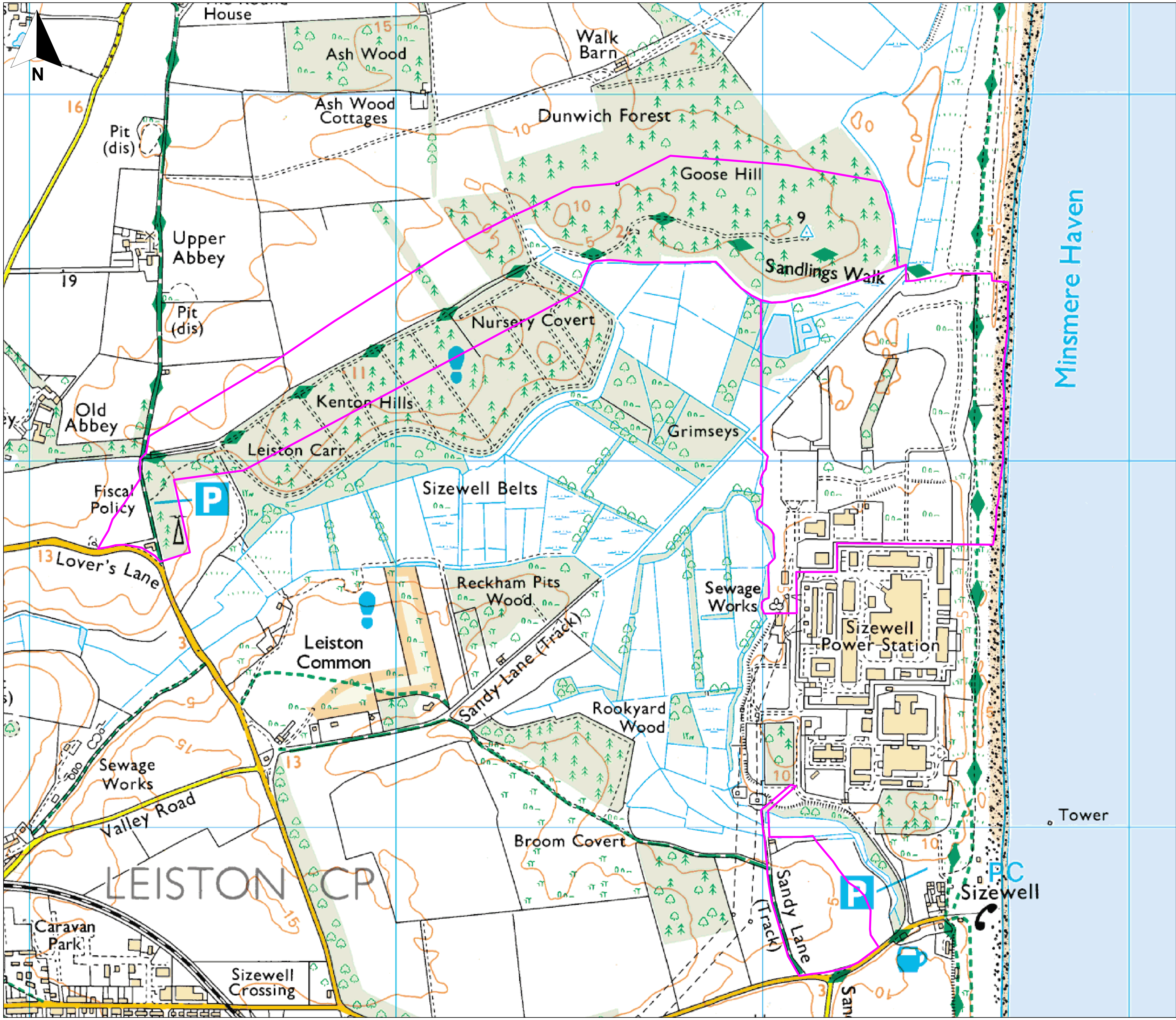
1.1 Background

An area of land directly north of the Sizewell 'B' Power Station has been identified as having the potential to accommodate new nuclear plant. This area, which covers 0.49km^2/49ha and has an approximate central grid reference of TM473640, is referred to in this document as the 'Strategic Site Area (SSA).' The access road is likely to run in an easterly direction before linking into the wider road network at Lover's Lane, although its exact route has not been determined. The indicative plant footprint and access road corridor are shown on **Figure 1.1**. In addition to these permanent development proposals there will also be a number of temporary construction activities and other associated developments, but details of these areas are yet to be ascertained.

It was clear from early in the ecological desk study (which began in late 2006) that the Sizewell Estate supported a notable assemblage of invertebrates. Survey work was undertaken by Andy Godfrey (under contract to AMEC Environment & Infrastructure UK Ltd (AMEC; formerly Entec UK Ltd) in 2007 (AMEC, 2014) with the aim of obtaining representative baseline data from habitats that were likely to be subject to land take as a result of development and to identify any areas within the initial footprint of particular importance for invertebrates. Survey of a number of sites within a 200m perimeter around the initial footprint was also undertaken for context with a view to undertaking additional survey work as development proposals evolved.

Following the evolution of the SSA boundary and the resulting potential effects on aquatic habitat associated with the Sizewell Marshes SSSI, further aquatic invertebrate survey work was proposed for 2009 to assess the importance of the SSSI for aquatic invertebrates including identifying rare and uncommon species as well as sensitive ditches and use the information to guide the proposed development, assess any potential impacts and provide suitable mitigation.

The 2009 study summarised in this report therefore complements the initial work from 2007 and 2008, and provides recommendations for further survey work in 2010. The combined reports can therefore be used as context for the Ecological Impact Assessment (EcIA) for the development proposal.



Key

SSA boundary

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Sizewell Invertebrate Survey Report 2009

Figure 1.1
SSA boundary

April 2010
19801-R702.wor tugwc

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2. Methods

2.1 Desk Study

A detailed desk study of invertebrate records and historical reports was undertaken as part of the terrestrial invertebrate survey report in 2007 (AMEC, 2014). The major sources that have been identified and used to date are;

- Sizewell Ecological Surveys (in connection with Sizewell 'C') conducted by Bioscan (UK) Ltd. Report produced in May 1991;
- Sizewell Land Management Annual Reviews 1996-2007 compiled by Suffolk Wildlife Trust & ADAS;
- Aquatic invertebrate surveys of Sizewell Belts SSSI in 1987 & 1988 undertaken by the Nature Conservancy Council.

Survey reports on the ant-lion *Euroleon nostras* which cover the Sizewell populations. The terrestrial invertebrate survey undertaken in 2007 also involved recording the adult stages of other insects with aquatic larvae such as damselflies, other dragonflies, and soldierflies from within the SSA and as such, this survey data has been utilised within this study.

Additionally, a desk study has been undertaken for the purposes of this report in order to consider aquatic invertebrates recorded on the Sizewell Belts. This mainly comprises surveys conducted by the Nature Conservancy Council by Dr Martin Drake (Drake 1989a, 1989b) and more recent, currently unpublished data collected by Dr Drake for Buglife in April 2009 (Drake in prep.). Aquatic invertebrate data in Bioscan (1991) appears to be taken from Drake (1989a).

2.2 Field Survey

Ditches were selected within Sizewell Belts SSSI for sampling. These were sampled with a standard pond net [1] in September 2009.

Each location selected was sampled for a 3-minute period by passing the net along the banks and over the beds of the shallower ditches. The contents of the net were washed and sieved on the bank (this involved placing the sample in a 1cm coarse sieve, with a 500 micron sieve and then a bowl beneath it). After several pourings, the contents of the 1cm sieve were checked for large freshwater invertebrates and if there were none or once these had been noted, the coarse fraction was returned to the watercourse. The finer fraction was placed in a pot for later examination in the lab. The samples were preserved in 10% formalin.

Once in the lab, each bulk sample was divided up into small parts and these were placed in gridded petri-dishes to which water was added. Typically, one sample would require dividing into around thirty petri-dishes for examination. The petri-dishes were then examined under a binocular stereo-microscope and invertebrates were identified and counted.

A number of physical and chemical measurements were made on site including pH, conductivity and water temperature using a Hanna HI 98129 handheld meter. A global

[1] 1mm mesh bag, net supplied by EFE/GB Nets Ltd, Totnes

positioning system (GPS) was used to obtain accurate grid references of sampling locations and species present, and notes were taken of all the habitats within the SSA that were surveyed. Survey locations are shown on **Figure 2.1**.

Generally, vouchers of Red Data Book and Nationally Scarce species have been retained and are available to check by third parties (such as national recorders) if this is required. These vouchers will be retained indefinitely by the surveyor. Red Data Book and Nationally Scarce/Notable species have been identified as such using the published and unpublished reviews such as Falk (1991), Falk & Chandler (2005) and Foster (2004). A definition of Red Data Book and Nationally Scarce/Notable statuses is provided in **Appendix A**.

Details of the prevailing weather conditions were also recorded**.**

2.3 Personnel

Andy Godfrey undertook the field sampling, sorting, identification and reporting[2].. Andy was formerly employed as an entomologist with the Nature Conservancy Council and has specialised in studying invertebrates whilst based in various museums and for ecological consultancies. Since 1999 Andy has worked solely as an entomologist working on conservation and development projects. Andy's particular expertise is with the aquatic invertebrates and Diptera which he has surveyed throughout Britain.

The National Mollusc Recorder Adrian Norris checked the *Valvata* (valve snails) specimens collected from Sizewell on the survey, commented on the mollusc list and updated the species names.

Mike Denton (Yorkshire Aleocharinae Recorder) identified the aquatic weevils, Staphylinidae and other terrestrial Coleoptera caught in the pond net samples.

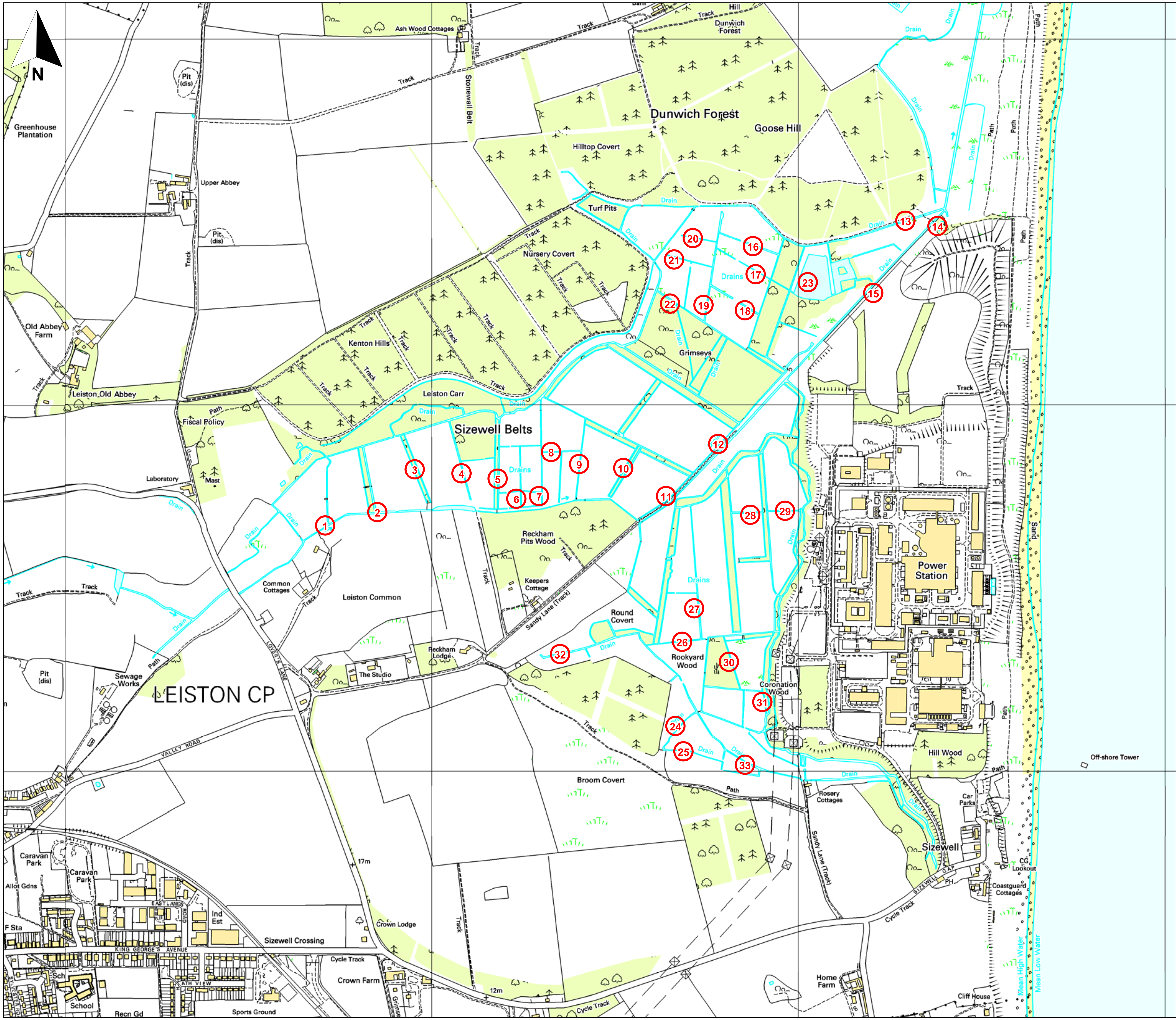
2.4 Limitations of the Survey

Field work was undertaken in late September 2009. It could be argued that lack of fieldwork earlier in the season may have resulted in species being overlooked. However, the survey period was selected to complement that which Buglife undertook on Sizewell Belts in April 2009 (Drake in prep.) and this provides a useful comparison to the present survey. The two surveys are closely comparable and differences due to the time of year appear to be small.

Sampling involved the use of a standard 1mm mesh pond-net used for three-minutes at each sample site. Qualitative sampling or more time spent taking timed sampling may have increased the species recorded but this would have been at the loss of standardization or increased the time-consuming processing time. The fact that the samples were standardized means that further analysis for example, using diversity indices can be employed should this be desired. The three-minute sampling is also comparable to previous surveys.

Other specialised sampling methods could have been employed such as the use of plankton nets (<1mm mesh), a mud corer, etc but these are largely used to obtain specialised micro-fauna such as oligochaetes. cladocera, copepoda, ostracoda and chironomid larvae which would require additional and difficult-to-obtain expertise. A moth-trap could have been used to record adult caddisflies and craneflies but use of this method for these groups is not common.

[2] Entec UK Ltd provided a field assistant for Health and Safety purposes.



Key

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Sizewell Invertebrate Survey Report 2009

Figure 2.1
Survey Locations (Entec 2009)

April 2010
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3. Results

3.1 Desk Study

Table 3.1 below summarises some of the results from previous aquatic invertebrate surveys at Sizewell undertaken by Dr Drake along with the current results.

Table 3.1 Summary of Results from Various Aquatic Invertebrate Surveys Conducted on Sizewell Belts

	No. species	No. sample sites	No. RDB spp	No. NS spp
Drake (1989a)	121	5	0	4
Drake (1989b)	147	13	1	9
Drake (in prep.)	159	9	5	15
Current (2009) survey	261	33	7	22

RDB = Red Data Book, NS = Nationally Scarce

The records of rare and uncommon species from the five samples taken by Dr Drake on behalf of the Nature Conservancy Council (NCC) in 1988 show only four Nationally Scarce (= Notable) species being recorded. This was the view taken by the surveyor who assessed Sizewell as being species- rich in aquatic invertebrates but poor in rare species (Drake 1989a).

The NCC survey in 1989 involved more sample sites (13) and resulted in 147 species altogether including one Red Data Book and nine Nationally Scarce species. The RDB species recorded was the soldierfly *Odontomyia argentata* which has aquatic larvae and is confined to a few major wetland areas. The number of rare species was found to be similar to numbers found within ditches at Minsmere which was highly rated in terms of rare and uncommon or species rich assemblages of aquatic invertebrates by the surveyor (i.e. Dr Drake). The best ditches were unshaded and predominantly well-vegetated. Species-poor ditches were generally the more heavily shaded sites including woodland ditches (Drake 1989b).

The species recorded by Dr Drake on behalf of Buglife in April 2009 are provided in Appendix B. Here nine samples yielded 159 aquatic invertebrate species in total from nine sites including potentially five Red Data Book and fifteen Nationally Scarce species. The location of these sample sites is shown in **Figure 3.1**. The RDB species recorded from this survey were the RDB2 valve snail *Valvata macrostoma* (provisional identification), the RDB2 ram's-horn snail *Anisus vorticulus*, (provisional identification) the RBD3 diving beetle *Graphocerus cinereus*, the pRDB3 diving beetle *Hydaticus tranversalis* and the soldierfly *Odontomyia ornata*. The two RDB2 snails recorded in April 2009 have been submitted to a national expert for confirmation because of the difficulty in identifying these species.

3.2 Field Surveys

- Sampling was undertaken in late September 2009. The intention being to re-sample the same locations initially surveyed by Drake (1989a, 1989b) although only the former document was available at the time of the survey and consequently only the sample sites mentioned in this could be re-sampled. The prevailing weather conditions experienced during the survey work is summarised in **Table 3.2** below.

Table 3.2 Prevailing Weather Conditions during the Field Survey

Survey Date	Weather conditions
28th September 2009	Dry and mild with 15% cloud at start of the survey and a slight breeze
29th September 2009	Dry, sunny and bright 15-20ºC. Cloudy intervals.
30th September 2009	Dry with 100% cloud at start of day and a slight breeze.

Details of the taxa recorded are provided in **Appendix C** whilst details of the sample sites are provided in **Appendix D** (survey locations are illustrated on **Figure 2.1**). In total thirty-three 3-minute samples were taken by sweeping from the banks. Species of high nature conservation value (protected species, Red Data Book and Nationally Scarce species) have been emboldened in Appendix A and details of the ecology, status and distribution of these species is provided in **Appendix E**.

A total of 215 aquatic taxa were recorded along with two fish, one amphibian and 46 terrestrial invertebrates which were also caught in the pond net. These include one protected species under the Wildlife & Countryside Act (1981), seven Red Data Book (RDB) and 21 Nationally Scarce species.

The protected, RDB and Nationally Scarce species recorded are summarised in **Table 3.3** below along with the sample sites from which they were recorded.

Table 3.3 Distribution of the Protected, Red Data Book and Nationally Scarce Invertebrate Species Recorded from Sizewell Belts in September 2009

Protected & Red Data Book 1	Where recorded
Aeshna isosceles	18
Red Data Book 1	
Odontomyia angulata	18
Red Data Book 2	
Odontomyia argentata	7, 18, 27, 29
Odontomyia ornata	3, 7, 16, 17, 18, 19, 20, 21, 22, 25, 28

Table 3.3 (continued) Distribution of the Protected, Red Data Book and Nationally Scarce Invertebrate Species Recorded from Sizewell Belts in September 2009

Protected & Red Data Book 1	**Where recorded**
Hilara hirtella	1
Psacadina vittigera	6
Red Data Book 3	
Hydrophilus piceus	7
Nationally Scarce	
Brachytron pratense	33
Tricholeiochiton fagesii	4, 20, 22
Microvelia pygmaea	5, 7, 8, 26, 27
Peltodytes caesus	2, 19, 22, 24, 27
Hydroglyphus pusillus	4, 20, 30
Rhantus suturalis	14, 18, 25, 33
Anacaena bipustulata	14
Enochrus coarctatus	4, 11, 16, 21
Enochrus melanocephalus	6, 11, 12, 19, 20, 21, 22
Enochrus ochropterus	21
Helochares lividus	11
Hydraena testacea	13, 23
Ochthebius marinus	1, 2, 7, 11, 16, 23, 26, 29, 32, 33
Protected & Red Data Book 1	**Where recorded**
Ochthebius nanus	7, 19, 20, 21, 22, 26, 30, 31, 33
Limonia ventralis	6, 8, 17, 18, 21, 22, 25, 26, 28, 30, 33
Vanoyia tenuicornis	5, 6, 7, 8, 9, 16, 17, 19, 20, 21, 24, 26, 27, 29, 30, 31, 33
Lonchoptera nitidifrons	10
Lonchoptera scutellata	12
Psacadina verbekei	4, 7, 33
Elachiptera pubescens	4, 18, 27, 31
Elachiptera uniseta	5

The protected species is the Norfolk hawker (*Aeshna isosceles*) dragonfly, a single nymph of which was recovered from sample 18. The nymph is fairly readily identifiable and adults of this species are now relatively widespread and frequent throughout the Sizewell Belts and Kenton and Goose Hills as reported in the annual Land Management Reviews and summarised in the terrestrial invertebrate report (report ref: 19801cb183). Sizewell appears to be a new and valuable site for this species, the population of which may be expanding and consequently may not be as rare as previously thought.

Three Red Data Book soldierflies belonging to the genus *Odontomyia (angulata, argentata* and *ornata*) were recorded as larvae in the ditches. Larval determinations are less reliable than adults but the adults of two, *argentata* and *ornata* have been recorded in previous surveys at Sizewell which lends credence to the larval determinations. The RDB1 *Odontomyia angulata* has not been recorded as an adult at Sizewell previously but it has been recorded in Norfolk and Suffolk (Morley & Atmore 1915). It should ideally be recorded from adults but these are elusive and rare and may be overlooked because they have an early flight period that may be under recorded by entomologists whose survey season routinely commences later in the year. Larvae of *Odontomyia angulata* were found in one sample (18), with possible *O. argentata* larvae occurring in four samples with *O. ornata* relatively frequent, being found in eleven samples.

The adults of two additional Red Data Book species were present in two samples, namely, the dance-fly *Hilara hirtella* in sample 1, and the snail-killing fly *Psacadina vittigera* in sample 6. The presence of rare terrestrial species associated with the ditches suggests these are important on the Sizewell Belts.

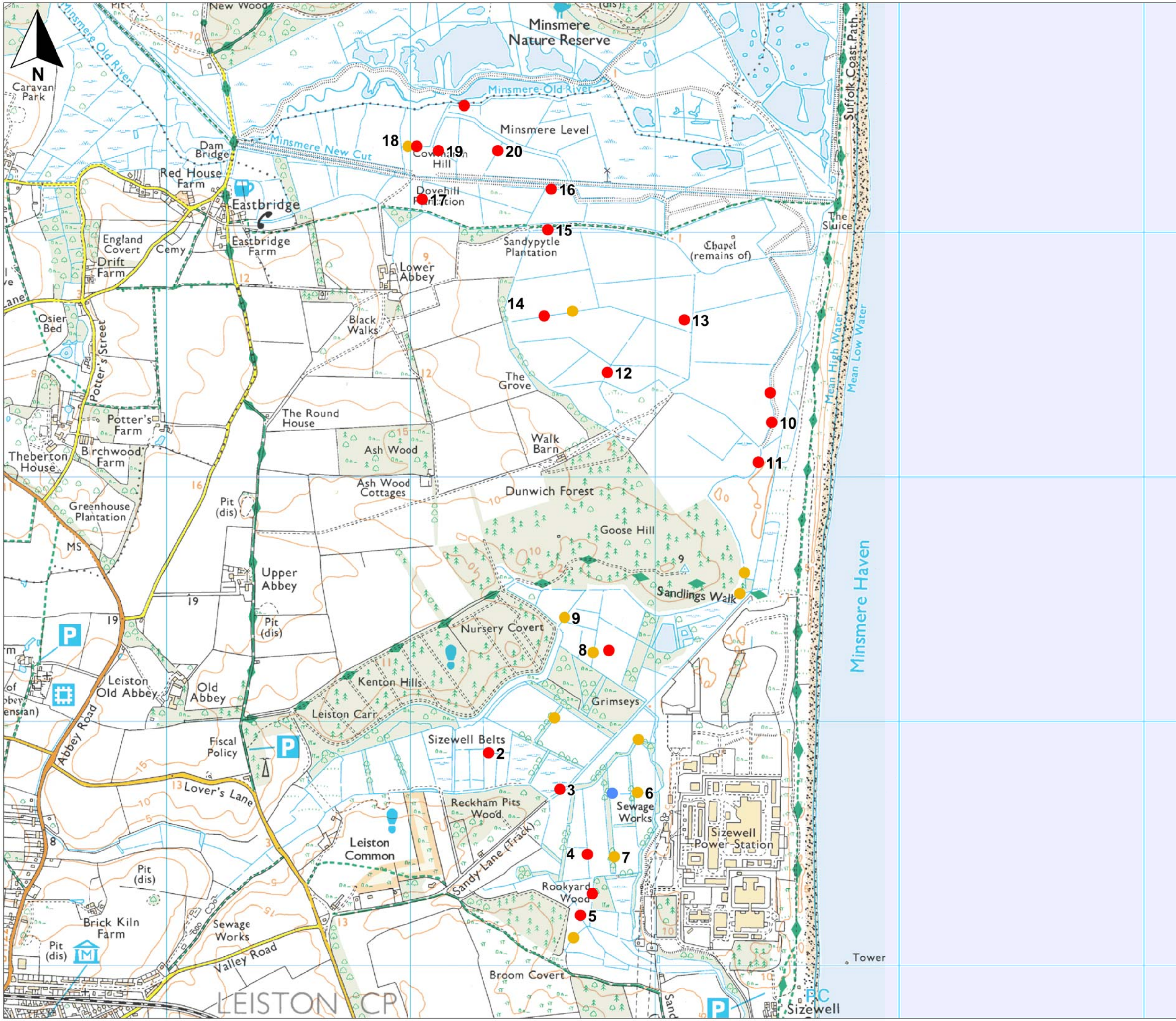
The RDB3 great silver water beetle *Hydrophilus piceus* was recorded as a single adult in one sample (7). The absence of this very large and distinctive water beetle elsewhere on the Belts is unusual particularly as no larvae (which are also very large and distinctive) were recorded either.

Of the twenty-one Nationally Scarce taxa recorded in September 2009, ten of these are water beetles, many of which are characteristic of grazing marshes. Some, such as *Ochthebius marinus*, *O. nanus* and *Enochrus melanocephalus* were relatively frequent in the samples. Five of the Nationally Scarce species are adult Diptera *(Lonchoptera nitidifrons, L. scutellata, Psacadina verbekei, Elachiptera pubescens* and *E. uniseta*) caught in the pond net and these clearly live within or near the ditch margins. The remaining Nationally Scarce species include the hairy dragonfly (*Brachytron pratense*), the minute water-bug *Microvelia pygmaea*, the cranefly *Limonia ventralis* and the soldierfly *Vanoyia tenuicornis*, all of which are known inhabitants of coastal grazing marshes and most of which have been recorded from Sizewell previously. Specimens of the minute caddisfly *Tricholeiochiton fagesii* were recovered from three samples and this poorly recorded species appears to be associated with weedy still waters.

A number of other interesting species were recorded. A single nymph of either the black darter (*Sympetrum danae*) or yellow-veined darter (*Sympetrum flaveolum*) was recorded in one sample. The black darter is normally associated with acid sites such as bogs and there does not appear to be suitable habitat for this species at Sizewell. The yellow-veined darter until recently was largely a vagrant which didn't breed in the UK. In recent years, the yellow-veined darter has been recorded breeding but whether it would use grazing marshes is not clear. Ideally, *Sympetrum* adults should be recorded to confirm the records because identification of the larvae is difficult. *Sympetrum flaveolum* was recorded from Sizewell in 2007 (AMEC, 2014).

The adults of two *Achalcus* species added to the British list in 1996, *A. britannicus* and *A. thalhammeri* were recorded. These may warrant RDB or Nationally Scarce status but these can only be given when the abundance and distribution of these species is better known (Pollett 1996, Falk & Crossley 2005).

Overall, the ditches sampled on the Sizewell Belts appear to represent good examples of grazing marsh ditches which are species rich and diverse in aquatic invertebrates. Species rarity is also good but there are many rare species that are absent or few in number that might have been expected. Better habitat management would improve the potential of some of the ditches for aquatic invertebrates.



Key

- 1989a sample sites
- 1989a quick sample sites
- 1989b sample sites

0 m — 500 m

Scale 1:15,000 @ A3

EDF

Sizewell Invertebrate Survey Report 2009

Figure 3.1
Survey Locations
(Dr Drake on behalf of Buglife, 2009)

April 2010
19801-R644.wor tugwc

amec

4. Conclusions

4.1 Relevance of Historical Records

Two of the sample sites in Drake (1989b) fall within the triangular area of Sizewell Belts within the SSA and which may therefore be directly affected by the works. These are sample sites 41 and 45. Sample site 38 is also close (within 100m) to the SSA boundary.

Several Nationally Scarce species have been recorded from these samples including *Microvelia pygmae*a, Haliplus heydeni, Rhantus grapii, Cercyon tristis, Anacaena bipustulata and *Chaetarthria seminulum* which indicates that the ditches likely to be lost or damaged are of nature conservation value for their invertebrates. The absence of Red Data Book species however suggests that these ditches might not be exceptional.

None of the sample sites in Drake (1989a, in prep.) are likely to be directly affected by the works but they could be indirectly affected particularly by hydrological changes.

The historical records from the remaining areas of Sizewell Belts indicate that it is a good example of coastal grazing marshes.

4.2 Importance of the Survey Area to Invertebrates

Ditches that are species-rich in invertebrates or which include rare and uncommon species are not concentrated in any particular area and good ditches occurred throughout the site. Ditches which produced poorer results were generally eutrophicated or more heavily shaded. More sympathetic land management such as the minimal use of fertilisers, lower stocking rates, scrub clearance and tree thinning could result in an improvement (for nature conservation) in the poorer ditches. The sewage works located immediately to the west of Sizewell B appears to be a local source of eutrophication based on a visual inspection of the ditches and invertebrate sampling.

Four of the sample sites in September 2009 were located within the triangular area of Sizewell Belts that falls within the SSA (**Figure 2.1**). These are samples 13, 14, 15 and 23. Relatively few rare or uncommon species were recorded in these samples, possibly because there are several ditches here that had a complete cover of duckweed (*Lemna* spp) and green algae and consequently were clearly nutrient-enriched. These types of ditch are often of reduced invertebrate value partly because light penetration is seriously reduced and oxygen levels are reduced. Several ditches in this area were also shaded and this is again likely to have reduced the invertebrate value of these. No Red Data Book species were recorded here but the protected and RDB1 Norfolk hawker (*Aeshna isosceles*) was recorded at sample site 18 along with three other Red Data Book species (*Odontomyia angulata, O. argentata* and *O. ornata*) about 200m west of the SSA boundary.

Four Nationally Scarce water beetles were recorded within the part of the Sizewell Belts that falls within the SSA, namely, *Rhantus suturalis, Anacaena bipustulata, Hydraena testacea* and *Ochthebius marinus*. These water beetles and the absence of other Nationally Scarce or Red Data Book species suggest that the ditches here are reasonable but not exceptional. However, as suggested above, this is likely to reflect the lack of sympathetic management and eutrophication.

The reedbed fauna here (which was sampled in 2007 with a Malaise trap) did record an exceptional insect fauna including the adults of rare species with aquatic larvae such as *Odontomyia ornata* (report ref: 19801cb183). The evidence suggests that the reedbeds here are more valuable than the ditch system and every effort should be made to ensure that they are not damaged or destroyed as a result of the proposals.

The bulk of the Sizewell Belts outside the SSA is clearly of high nature conservation value for its aquatic invertebrates. Better examples of grazing marshes may (or probably) occur in Suffolk (for example Minsmere) however, through some changes to existing management regimes, these habitats could be of equal value and are considered to be good examples of their type.

The direct and indirect impacts of the proposed power station on the Sizewell Belts should be carefully considered and effective mitigation and possibly habitat creation measures (as compensation) should be implemented to minimise these or compensate for any loss.

4.3 Longevity of Baseline

Good (i.e. professionally undertaken), detailed surveys should be useful for many years as indicated by the references to surveys as far back as late 1980s above. However, where change threatens a valuable ecosystem such as a sensitive habitat, then more regular monitoring is recommended. In this case, surveys of the entire belts could be undertaken every 2-3 years in order to ensure there is no diminution in habitat quality as a result of the land take.

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Appendix A
Invertebrate Rarity Status Definitions

4 Pages

[This document is reproduced from an English Nature document. Full details of the references given are given in the original document].

For the purposes of evaluating invertebrate faunas and priorities for conservation action, invertebrates are attributed various rarity status categories, the meanings of which are given below. Criteria for the selection of species into Red Data Book categories one to five follow Shirt (1987), with minor modifications derived from Hyman & Parsons (1992) and Parsons (1993).

Categories RDBI (Indeterminate) and RDBK (Insufficiently Known) are based on the criteria used by Wells, Pyle and Collins (1983).Criteria for the selection of Nationally Scarce species follow Eversham (1983) and Ball (1986).

Red Data Book Category 1 RDB1 - ENDANGERED

Definition	Taxa in danger of extinction in Great Britain and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so dramatically reduced that they are deemed to be in immediate danger of extinction. Also included are some taxa that are possibly extinct.
Criteria	Species, which are known or believed, to occur as only a single population within one 10km square of the National Grid. Species, which only occur in habitats known to be especially vulnerable. Species, which have shown a rapid and continuous decline over the last twenty years and are now estimated to exist in five or fewer 10km squares. Species which are possibly extinct but have been recorded this century but which if rediscovered would need protection.

Red Data Book Category 2 RDB2 - VULNERABLE

Definition	Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are taxa of which most or all of the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.
Criteria.	Species declining throughout their range. Species in vulnerable habitats.

Red Data Book Category 3 RDB3 - RARE

Definition	Taxa with small populations in Great Britain that are not at present Endangered or Vulnerable, but are at risk. These taxa are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range.
Criteria	Species, which are estimated to exist in only 15 or fewer 10km, squares. This criterion may be relaxed where populations are likely to exist in over 15 10km squares but occupy small areas of especially vulnerable habitat.

Red Data Book Category 4 **RDB4 - OUT OF DANGER**

Definition	Taxa formerly meeting the criteria of one of the aforementioned categories but which are now considered relatively secure because effective conservation measures have been taken or the previous threat to their survival in Great Britain has been removed.

Red Data Book Category 5 **RDB5 - ENDEMIC**

Definition	Taxa, which are not known to occur naturally outside Great Britain. Taxa within this category may also be in any of the other RDB categories or not threatened at all. There are few truly endemic species in Great Britain. Most that have been identified are in fairly obscure groups, which are relatively poorly known, and the species may well eventually be discovered elsewhere in Europe.

Red Data Book Appendix **RDBApp. - EXTINCT**

Definition	Taxa which formerly had breeding populations in Great Britain but which are now believed to have died out. (Taxa not recorded since 1900)

Red Data Book Category I **RDB I - INDETERMINATE**

Definition	Taxa considered being Endangered, Vulnerable or Rare, but where there is not enough information to say which of the three categories (RDB1 to 3) is appropriate.

Red Data Book Category K **RDBK - INSUFFICIENTLY KNOWN**

Definition	Taxa that are suspected, but not definitely known, to belong to any of the aforementioned categories, because of lack of information.
Criteria	Taxa recently discovered or recognised in Great Britain, which may prove to be more widespread in the future (although some recent discoveries may be placed in other categories if the group to which they belong is thought not to be under- recorded). Taxa with very few or perhaps only a single known locality but which belong to poorly recorded or taxonomically difficult or unstable groups. Species with very few or perhaps only a single known locality, inhabiting inaccessible or infrequently sampled but widespread habitats, such as some northern moorland species, species associated with some agricultural situations and species which are adult only during the winter. Species with very few or perhaps only a single known locality and of questionable native status, but not clearly falling into the category of recent colonist, vagrant or introduction.

Provisional Red Data Book **pRDB**

Definition	The prefix ‘p’ before any Red Data Book category implies that the grading is provisional. In the majority of cases this means that the species' status has been reconsidered and changed in a Species Group Review produced subsequent to the publication of the relevant Red Data Book. The statuses so given are described as provisional, pending the publication of a future edition of that Red Data Book. These statuses are however, based upon a greater amount of evidence than was available for the original Red Data Book and therefore are more likely to be a true representation of the species' actual status. The prefix ‘p’ is also used for RDB status categories in groups where a Red Data Book has not yet been produced but is in preparation, or is used for species in groups covered by the original Red Data Book, where it is considered that there is evidence that the original grading was incorrect or that there has been a genuine change in status of the taxon.

Nationally Scarce (Notable) Species

The term ‘Nationally Scarce‘ was adopted and replaced the term ‘Notable‘ during the compilation of the Guidelines for the Selection of Biological SSSIs. The two terms are thus interchangeable but ‘Nationally Scarce‘ is preferable.

Ball (1986) discusses the allocation of species to Nationally Scarce categories:

> *‘’The Invertebrate Site Register project includes the preparation of National Species Reviews which seek to identify and document uncommon species. The criteria used have been based directly on those evolved by botanists and two levels of 'National Notability’ has been used. These are Notable A, for species known to occur in 30 or less 10km squares of the National Grid and Notable B for those known from 100 or less squares.*
>
> *Although this system can be used directly with well-recorded groups like Dragonflies, Butterflies and Grasshoppers; when dealing with many other groups of insects, the level of recording is not sufficient to apply the criteria rigorously. A combination of three alternative approaches has been employed:*

1. The approximate number of squares in which a species may occur can be estimated by looking at the number it has been recorded from as a proportion of the total in which the whole group (e.g. its family) has been recorded.

Coarser measurements such as the number of vice-counties in which a species has occurred can be used (7 or less for Notable A, 20 or less for Notable B).

2. Experts can be asked to use their field experience to judge the status of species in their particular specialist group against others with a better-established status. By consulting as many people as possible and taking a consensus of their views, geographical and personal biases can be minimized.

3. In some groups in which widespread interest and recording is a rather recent phenomenon, no attempt has yet been made to separate Notable A and Notable B species, and all Nationally Notable species are simply graded 'Notable’.”

Nationally Scarce (Notable) **N - NOTABLE**

Definition.	Species, which are estimated to occur in 16 to 100 10km, squares in Great Britain. The subdividing of this category into Nationally Scarce A and Nationally Scarce B has not been attempted for some species because of either the degree of recording that has been carried out in the group to which the species belongs, or because there is some other reason why it is not sensible to be so exact.

Nationally Scarce (Notable) Category A   Na - NOTABLE A

Definition	Taxa which do not fall within RDB categories but which are uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well recorded groups, within 7 or fewer vice-counties.

Nationally Scarce (Notable) Category B   Nb - NOTABLE B

Definition	Taxa which do not fall within RDB categories but which are uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less well recorded groups, between 8 and 20 vice-counties.

Regionally Scarce (Notable)   Nr - NOTABLE

Definition	Species which are considered to occur in 5 or less 10km squares in an area equivalent in size to a region of the old Nature Conservancy Council or larger, approximately one eighth the total area of England. Such statuses were worked out during the compilation of the Invertebrate Site Registers. They cover various groups in Scotland, in northern England as a whole, in northeast and northwest England, in vice-county Yorkshire and in the east Midlands and East Anglia. They were worked out by local entomologists.

LOCAL

Definition	The term is not rigidly defined, but loosely means species confined to a particular habitat type (usually associated with better quality examples of that habitat), a particular geographic area, or species that are too widespread to warrant Nationally Scarce (Notable) status but are nevertheless infrequently encountered.

COMMON

Definition	Common or very widespread species, frequently recorded.

SYANTHROPIC SPECIES

Definition	Species dependent upon man, his buildings, livestock or crops.

UNKNOWN

Definition	Species where no status has been attributed. There may be confusion over the species' taxonomy, it may belong to a poorly recorded group or may occur in an infrequently sampled habitat. As a species is entered into the Invertebrate Site Register or RECORDER, the status automatically defaults to 'Unknown'. Certain common or local species may therefore occasionally appear in this category if there has been no necessity to use the species record.

Appendix B
Aquatic Invertebrates Recorded from Sizewell and Minsmere by Dr Martin Drake in April 2009

22 Pages

March 2014
Doc Reg No. 19801CA004R

Count of Species

Group	Order	Family	Species	GB_STATUS	Total
Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	3	10
Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	21	20
		Gammaridae	Gammarus duebeni	2	1
			Gammarus pulex	2	2
	Isopoda	Asellidae	Asellus aquaticus	2	17
			Asellus meridianus	2	3
		Ligiidae	Ligidium hypnorum	3	1
Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	2	13
		Glossiphoniidae	Glossiphonia complanata	2	6
			Glossiphonia heteroclita	3	2
			Helobdella stagnalis	2	1
			Theromyzon tessulatum	2	6
		Hirudinidae	Haemopis sanguisuga	3	10
Insecta	Coleoptera	Carabidae	Agonum thoreyi	3	7
			Bembidion assimile	2	4
			Demetrias imperialis	5	1
			Odacantha melanura	5	4
			Oodes helopioides	5	2
			Pterostichus nigrita	2	1
			Stenolophus mixtus	3	2
		Chrysomelidae	Aphthona nonstriata	3	1
			Galerucella nymphaeae	3	7
			Phaedon cochleariae	2	2
			Prasocuris junci	3	1
			Prasocuris phellandrii	3	5
			Psylliodes laticollis	3	1
		Coccinellidae	Anisosticta novemdecimpunctata	3	11
			Coccidula rufa	2	14
		Curculionidae	Hypera pollux	3	3
			Tanysphyrus lemnae	3	2
			Thryogenes nereis	3	5
		Dryopidae	Dryops luridus	2	6
		Dytiscidae	Agabus bipustulatus	2	4
			Agabus sturmii	2	8
			Colymbetes fuscus	2	4
			Colymbetini	0	5
			Dytiscus	0	12
			Dytiscus semisulcatus	3	1
			Graphoderus cinereus	10	1
			Graptodytes pictus	3	2
			Hydaticus seminiger	5	5
			Hydaticus transversalis	9	1
			Hydroglyphus geminus	5	2
			Hydroporus angustatus	2	13
			Hydroporus memnonius	2	1
			Hydroporus palustris	2	11
			Hydroporus planus	2	10
			Hydroporus pubescens	2	18
			Hydrovatus clypealis	6	1
			Hygrotus impressopunctatus	3	8
			Hygrotus inaequalis	2	12
			Hygrotus parallelogrammus	5	3
			Hyphydrus ovatus	2	13
			Ilybius ater	2	2
			Ilybius quadriguttatus	2	2
			Laccophilus hyalinus	2	2
			Laccophilus minutus	3	2
			Liopterus haemorrhoidalis	3	5
			Rhantus frontalis	5	6
			Rhantus grapii	5	4

Count of Species (continued)

Group	Order	Family	Species	GB_STATUS	Total
			Rhantus suturalis	5	11
		Gyrinidae	Gyrinus caspius	3	1
			Gyrinus paykulli	6	1
		Haliplidae	Haliplus	0	15
			Haliplus immaculatus	3	1
			Haliplus lineatocollis	2	2
			Haliplus ruficollis	2	10
			Haliplus sibiricus	3	1
			Peltodytes caesus	5	7
		Helophoridae	Helophorus aequalis	2	1
			Helophorus griseus	5	5
			Helophorus minutus	2	9
			Helophorus obscurus	2	1
		Hydraenidae	Hydraena riparia	3	2
			Hydraena testacea	5	1
			Limnebius truncatellus	2	1
			Ochthebius dilatatus	3	1
			Ochthebius marinus	5	1
			Ochthebius minimus	2	11
			Ochthebius nanus	5	2
		Hydrochidae	Hydrochus angustatus	5	2
		Hydrophilidae	Anacaena globulus	2	1
			Anacaena limbata	2	17
			Cercyon convexiusculus	5	1
			Cercyon marinus	3	6
			Cercyon tristis	5	3
			Coelostoma orbiculare	2	6
			Cymbiodyta marginellus	3	12
			Enochrus coarctatus	3	6
			Enochrus halophilus	6	3
			Enochrus melanocephalus	5	3
			Enochrus ochropterus	5	1
			Enochrus quadripunctatus	2	1
			Enochrus testaceus	3	11
			Helochares lividus	5	2
			Hydrobius fuscipes	2	11
			Hydrophilus piceus	10	2
			Laccobius bipunctatus	2	11
			Laccobius colon	3	1
		Noteridae	Noterus clavicornis	3	17
		Scirtidae	Cyphon laevipennis	3	2
			Cyphon padi	3	1
			Scirtidae	0	17
		Silvanidae	Psammoecus bipunctatus	3	1
		Staphylinidae	Paederus fuscipes	5	1
			Paederus riparius	3	3
			Stenus bifoveolatus	3	1
			Stenus boops	2	3
			Stenus cicindeloides	3	12
			Stenus formicetorum	3	1
			Stenus incrassatus	3	1
			Stenus juno	2	4
			Stenus latifrons	2	13
			Stenus melanopus	3	1
			Stenus nitidiusculus	2	6
			Stenus picipennis	3	2
			Stenus solutus	3	4
	Diptera	Chaoboridae	Chaoborus crystallinus	2	1
		Culicidae	Anopheles atroparvus	2	1
		Dixidae	Dixella attica	5	2

Count of Species (continued)

Group	Order	Family	Species	GB_STATUS	Total
			Dixella autumnalis	3	12
		Dolichopodidae	Achalcus thalhammeri	0	1
		Empididae	Clinocera stagnalis	2	1
		Ephydridae	Coenia palustris	2	4
			Hydrellia maura	2	2
			Parydra coarctata	2	2
			Pelina aenea	0	1
			Pelina similis	0	1
			Scatella stagnalis	2	3
			Scatella tenuicosta	2	2
		Lauxaniidae	Trigonometopus frontalis	3	1
		Lonchopteridae	Lonchoptera lutea	2	1
			Lonchoptera scutellata	5	1
		Ptychopteridae	Ptychoptera minuta	3	1
		Scathophagidae	Spaziphora hydromyzina	3	1
		Sciomyzidae	Pherbellia dorsata	5	2
			Pherbellia schoenherri	3	1
			Sepedon spinipes	3	3
		Sphaeroceridae	Lotophila atra	2	1
		Stratiomyidae	Odontomyia ornata	12	5
			Odontomyia tigrina	5	6
			Oplodontha viridula	3	15
			Oxycera rara	3	1
			Oxycera trilineata	3	1
			Stratiomys singularior	5	3
			Vanoyia tenuicornis	5	5
		Syrphidae	Chrysogaster	0	1
			Eristalini	0	1
			Neoascia tenur	3	1
		Tabanidae	Tabanidae	0	8
	Ephemeroptera	Baetidae	Cloeon dipterum	2	19
		Caenidae	Caenis robusta	4	2
	Hemiptera	Corixidae	Corixa panzeri	3	1
			Corixa punctata	2	2
			Corixidae	0	1
			Cymatia coleoptrata	3	2
			Hesperocorixa linnaei	2	14
			Hesperocorixa sahlbergi	2	5
			Sigara dorsalis	2	4
		Gerridae	Gerris	0	3
			Gerris lacustris	2	4
			Gerris lateralis	3	1
			Gerris odontogaster	2	8
			Gerris thoracicus	2	1
		Hebridae	Hebrus ruficeps	3	3
		Hydrometridae	Hydrometra stagnorum	2	10
		Lygaeidae	Ischnodemus sabuleti	2	1
		Naucoridae	Ilyocoris cimicoides	2	17
		Nepidae	Nepa cinerea	2	9
			Ranatra linearis	3	3
		Notonectidae	Notonecta	0	2
			Notonecta glauca	2	17
		Pleidae	Plea minutissima	2	9
		Saldidae	Chartoscirta cincta	2	7
			Saldula pallipes	2	3
			Saldula palustris	2	1
		Tingidae	Dictyla convergens	3	1
		Veliidae	Microvelia pygmaea	5	4
			Microvelia reticulata	2	16
			Velia	0	1

Count of Species (continued)

Group	Order	Family	Species	GB_STATUS	Total
	Lepidoptera	Pyralidae	Cataclysta lemnata	2	4
	Odonata	Aeshnidae	Aeshna grandis	2	1
			Aeshnidae	0	2
			Brachytron pratense	5	11
		Coenagriidae	Ischnura elegans	2	8
			Pyrrhosoma nymphula	2	6
		Coenagrionidae	Coenagrion	0	19
		Lestidae	Lestes	0	1
		Libellulidae	Sympetrum	0	5
	Trichoptera	Leptoceridae	Triaenodes bicolor	2	1
		Limnephilidae	Glyphotaelius pellucidus	2	1
			Limnephilus affinis	2	2
			Limnephilus auricula	2	1
			Limnephilus lunatus	2	4
			Limnephilus marmoratus	2	18
Mollusca	Mollusca	Acroloxidae	Acroloxus lacustris	2	3
		Bithyniidae	Bithynia leachii	3	1
			Bithynia tentaculata	2	18
		Euconulidae	Euconulus alderi	3	2
		Hydrobiidae	Potamopyrgus antipodarum	21	3
		Lymnaeidae	Lymnaea palustris	2	16
			Lymnaea stagnalis	2	8
			Radix balthica	2	17
		Physidae	Aplexa hypnorum	3	2
			Physa fontinalis	2	10
		Planorbidae	Anisus ?vorticulus	12	1
			Anisus vortex	2	18
			Bathyomphalus contortus	3	6
			Gyraulus albus	3	1
			Gyraulus crista	2	2
			Hippeutis complanatus	3	12
			Planorbarius corneus	2	17
			Planorbis carinatus	2	14
			Planorbis planorbis	2	13
		Sphaeriidae	Musculium lacustre	2	3
			Pisidium	0	15
			Sphaerium corneum	2	10
		Succineidae	Oxyloma elegans	2	6
			Succinea putris	2	1
		Valvatidae	Valvata ?macrostoma	12	1
			Valvata cristata	3	13
			Valvata piscinalis	3	1
		Vertiginidae	Vertigo antivertigo	3	1
		Viviparidae	Viviparus contectus	3	6
Tricladida	Tricladida	Dendrocoelidae	Dendrocoelum lacteum	2	2
		Dugesiidae	Dugesia lugubris	0	4
Vertebrata	Anura	(blank)	Anura	0	2
	Pisces	Esocidae	Esox lucius	0	1
		Gasterosteidae	Gasterosteus aculeatus	0	1
			Pungitius pungitius	0	11
	Squamata	Colubridae	Natrix natrix	0	1
	Urodela	Salamandridae	Triturus	0	3
			Triturus vulgaris	0	6
Grand Total					**1202**

Sizewell and Minsere 2009
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Dytiscidae	Hydaticus seminiger	1	5	Notable/Nb	Sizewell 1	TM45626367	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	1	5	Notable/Nb	Sizewell 1	TM45626367	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	1	2	Common	Sizewell 1	TM45626367	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Haliplidae	Peltodytes caesus	1	5	Notable/Nb	Sizewell 1	TM45626367	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Hemiptera	Tingidae	Dictyla convergens	1	3	Local	Sizewell 1	TM45626367	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Hemiptera	Hebridae	Hebrus ruficeps	1	3	Local	Sizewell 1	TM45626367	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Vertebrata	Squamata	Colubridae	Natrix natrix	1	0	Unknown	Sizewell 1	TM45626367	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	1	2	Common	Sizewell 1	TM45626367	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	1	3	Local	Sizewell 1	TM45626367	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Odonata	Coenagriidae	Ischnura elegans	1	2	Common	Sizewell 1	TM45626367	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	1	0	Unknown	Sizewell 1	TM45626367	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	1	2	Common	Sizewell 1	TM45626367	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Lepidoptera	Pyralidae	Cataclysta lemnata	1	2	Common	Sizewell 1	TM45626367	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Vertebrata	Urodela	Salamandridae	Triturus vulgaris	1	0	Unknown	Sizewell 1	TM45626367	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	2	3	Local	Sizewell 1	TM45626367	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Hemiptera	Veliidae	Microvelia pygmaea	2	5	Notable/Nb	Sizewell 1	TM45626367	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Diptera	Stratiomyidae	Stratiomys singularior	2	5	Notable/Nb	Sizewell 1	TM45626367	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	2	0	Unknown	Sizewell 1	TM45626367	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Odonata	Coenagriidae	Pyrrhosoma nymphula	2	2	Common	Sizewell 1	TM45626367	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Diptera	Stratiomyidae	Oxycera rara	2	3	Local	Sizewell 1	TM45626367	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	3	2	Common	Sizewell 1	TM45626367	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	3	2	Common	Sizewell 1	TM45626367	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus lunatus	3	2	Common	Sizewell 1	TM45626367	3 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus ochropterus	3	5	Notable/Nb	Sizewell 1	TM45626367	3 males	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus sibiricus	3	3	Local	Sizewell 1	TM45626367	3 males	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus sturmii	4	2	Common	Sizewell 1	TM45626367	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	4	2	Common	Sizewell 1	TM45626367	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	4	2	Common	Sizewell 1	TM45626367	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	5	2	Common	Sizewell 1	TM45626367	5 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	5	0	Unknown	Sizewell 1	TM45626367	5 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius nanus	6	5	Notable/Nb	Sizewell 1	TM45626367	6 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	8	0	Unknown	Sizewell 1	TM45626367	8 females	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	16	2	Common	Sizewell 1	TM45626367	16 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Hemiptera	Gerridae	Gerris lateralis	2	3	Local	Sizewell 1	TM45626367	1 male, 1 female	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	4	2	Common	Sizewell 1	TM45626367	1 male, 3 females	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM1	1	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	F	0	Unknown	Sizewell 1	TM45626367	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	N	2	Common	Sizewell 1	TM45626367	adult numerous	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	N	21	Naturalised	Sizewell 1	TM45626367	adult numerous	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	N	2	Common	Sizewell 1	TM45626367	larva numerous	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Sizewell 1	TM45626367	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Hemiptera	Nepidae	Nepa cinerea	O	2	Common	Sizewell 1	TM45626367	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Sizewell 1	TM45626367	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	O	2	Common	Sizewell 1	TM45626367	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	O	3	Local	Sizewell 1	TM45626367	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Sizewell 1	TM45626367	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Mollusca	Mollusca	Succineidae	Oxyloma elegans	O	2	Common	Sizewell 1	TM45626367	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Sizewell 1	TM45626367	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	O	3	Local	Sizewell 1	TM45626367	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM1	1	2009	April	Insecta	Hemiptera	Corixidae	Corixidae	O	0	Unknown	Sizewell 1	TM45626367	immature occasional	27-Apr-09	Drake, C.M.	IM
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	1	2	Common	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydrophilidae	Helochares lividus	1	5	Notable/Nb	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius marinus	1	5	Notable/Nb	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	1	2	Common	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	1	3	Local	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	1	2	Common	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	1	2	Common	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus frontalis	1	5	Notable/Nb	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Hemiptera	Saldidae	Chartoscirta cincta	1	2	Common	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon marinus	1	3	Local	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Carabidae	Bembidion assimile	1	2	Common	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Carabidae	Agonum thoreyi	1	3	Local	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Curculionidae	Thryogenes nereis	1	3	Local	Minsmere 46	TM47466521	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	1	2	Common	Minsmere 46	TM47466521	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	1	0	Unknown	Minsmere 46	TM47466521	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	1	2	Common	Minsmere 46	TM47466521	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Diptera	Ephydridae	Coenia palustris	1	2	Common	Minsmere 46	TM47466521	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Odonata	Coenagriidae	Ischnura elegans	1	2	Common	Minsmere 46	TM47466521	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Dytiscidae	Colymbetini	1	0	Unknown	Minsmere 46	TM47466521	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	1	2	Common	Minsmere 46	TM47466521	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Diptera	Tabanidae	Tabanidae	1	0	Unknown	Minsmere 46	TM47466521	1 larva	29-Apr-09	Drake, C.M.	L

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	1	3	Local	Minsmere 46	TM47466521	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Hemiptera	Gerridae	Gerris odontogaster	1	2	Common	Minsmere 46	TM47466521	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon tristis	2	5	Notable/Nb	Minsmere 46	TM47466521	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	2	3	Local	Minsmere 46	TM47466521	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	2	3	Local	Minsmere 46	TM47466521	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	2	21	Naturalised	Minsmere 46	TM47466521	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroglyphus geminus	2	5	Notable/Nb	Minsmere 46	TM47466521	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Hemiptera	Saldidae	Saldula pallipes	2	2	Common	Minsmere 46	TM47466521	2 females	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia ornata	2	12	RDB2	Minsmere 46	TM47466521	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	2	0	Unknown	Minsmere 46	TM47466521	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus affinis	2	2	Common	Minsmere 46	TM47466521	2 males	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	3	2	Common	Minsmere 46	TM47466521	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	3	5	Notable/Nb	Minsmere 46	TM47466521	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Odonata	Libellulidae	Sympetrum	3	0	Unknown	Minsmere 46	TM47466521	3 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	4	2	Common	Minsmere 46	TM47466521	4 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia tigrina	4	5	Notable/Nb	Minsmere 46	TM47466521	4 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Diptera	Ephydridae	Scatella stagnalis	6	2	Common	Minsmere 46	TM47466521	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus griseus	6	5	Notable/Nb	Minsmere 46	TM47466521	6 males	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	7	2	Common	Minsmere 46	TM47466521	7 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	7	3	Local	Minsmere 46	TM47466521	7 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	8	2	Common	Minsmere 46	TM47466521	8 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Crustacea	Amphipoda	Gammaridae	Gammarus duebeni	8	2	Common	Minsmere 46	TM47466521	8 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus impressopunctatus	10	3	Local	Minsmere 46	TM47466521	10 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	11	2	Common	Minsmere 46	TM47466521	11 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	11	2	Common	Minsmere 46	TM47466521	11 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Hemiptera	Corixidae	Sigara dorsalis	2	2	Common	Minsmere 46	TM47466521	1 male, 1 female	29-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	F	3	Local	Minsmere 46	TM47466521	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	F	2	Common	Minsmere 46	TM47466521	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Mollusca	Mollusca	Hydrobiidae	Potamopyrgus antipodarum	F	21	Naturalised	Minsmere 46	TM47466521	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	F	3	Local	Minsmere 46	TM47466521	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Diptera	Stratiomyidae	Stratiomys singularior	F	5	Notable/Nb	Minsmere 46	TM47466521	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	F	0	Unknown	Minsmere 46	TM47466521	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM10	10	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Minsmere 46	TM47466521	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM10	10	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Minsmere 46	TM47466521	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus sturmii	1	2	Common	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Dytiscidae	Liopterus haemorrhoidalis	1	3	Local	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	1	2	Common	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena globulus	1	2	Common	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	1	3	Local	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydrophilidae	Helochares lividus	1	5	Notable/Nb	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydraenidae	Hydraena testacea	1	5	Notable/Nb	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	1	2	Common	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	1	3	Local	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Crustacea	Isopoda	Asellidae	Asellus meridianus	1	2	Common	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Euconulidae	Euconulus alderi	1	3	Local	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	1	3	Local	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Carabidae	Bembidion assimile	1	2	Common	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Carabidae	Stenolophus mixtus	1	3	Local	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Carabidae	Agonum thoreyi	1	3	Local	Minsmere 44	TM47416502	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus coarctatus	1	3	Local	Minsmere 44	TM47416502	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Lepidoptera	Pyralidae	Cataclysta lemnata	1	2	Common	Minsmere 44	TM47416502	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Odonata	Aeshnidae	Aeshnidae	1	0	Unknown	Minsmere 44	TM47416502	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	1	2	Common	Minsmere 44	TM47416502	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus solutus	1	3	Local	Minsmere 44	TM47416502	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	2	2	Common	Minsmere 44	TM47416502	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	2	2	Common	Minsmere 44	TM47416502	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	2	3	Local	Minsmere 44	TM47416502	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	2	3	Local	Minsmere 44	TM47416502	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	2	2	Common	Minsmere 44	TM47416502	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Carabidae	Odacantha melanura	2	5	Notable/Nb	Minsmere 44	TM47416502	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Hemiptera	Veliidae	Microvelia pygmaea	2	5	Notable/Nb	Minsmere 44	TM47416502	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	2	0	Unknown	Minsmere 44	TM47416502	2 females	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	2	0	Unknown	Minsmere 44	TM47416502	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Odonata	Coenagriidae	Pyrrhosoma nymphula	2	2	Common	Minsmere 44	TM47416502	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	2	2	Common	Minsmere 44	TM47416502	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	4	2	Common	Minsmere 44	TM47416502	4 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	6	2	Common	Minsmere 44	TM47416502	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydrochidae	Hydrochus angustatus	6	5	Notable/Nb	Minsmere 44	TM47416502	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	6	3	Local	Minsmere 44	TM47416502	6 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	14	0	Unknown	Minsmere 44	TM47416502	14 larvas	29-Apr-09	Drake, C.M.	L

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	16	2	Common	Minsmere 44	TM47416502	16 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	21	2	Common	Minsmere 44	TM47416502	21 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	4	2	Common	Minsmere 44	TM47416502	2 males, 2 females	29-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	F	2	Common	Minsmere 44	TM47416502	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	F	2	Common	Minsmere 44	TM47416502	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Minsmere 44	TM47416502	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	F	2	Common	Minsmere 44	TM47416502	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	F	2	Common	Minsmere 44	TM47416502	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Minsmere 44	TM47416502	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	F	5	Notable/Nb	Minsmere 44	TM47416502	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	N	2	Common	Minsmere 44	TM47416502	adult numerous	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Minsmere 44	TM47416502	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Glossiphonia complanata	O	2	Common	Minsmere 44	TM47416502	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Helobdella stagnalis	O	2	Common	Minsmere 44	TM47416502	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	O	2	Common	Minsmere 44	TM47416502	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Minsmere 44	TM47416502	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea stagnalis	O	2	Common	Minsmere 44	TM47416502	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Mollusca	Mollusca	Succineidae	Oxyloma elegans	O	2	Common	Minsmere 44	TM47416502	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	O	3	Local	Minsmere 44	TM47416502	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Hemiptera	Gerridae	Gerris	O	0	Unknown	Minsmere 44	TM47416502	immature occasional	29-Apr-09	Drake, C.M.	IM
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta	O	0	Unknown	Minsmere 44	TM47416502	immature occasional	29-Apr-09	Drake, C.M.	IM
Sizewell	Minsmere	SM11	11	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	O	0	Unknown	Minsmere 44	TM47416502	larva occasional	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus sturmii	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Liopterus haemorrhoidalis	1	3	Local	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon tristis	1	5	Notable/Nb	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydrophilidae	Coelostoma orbiculare	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus melanocephalus	1	5	Notable/Nb	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	1	3	Local	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Hemiptera	Pleidae	Plea minutissima	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Hemiptera	Nepidae	Ranatra linearis	1	3	Local	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Diptera	Ephydridae	Scatella tenuicosta	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Carabidae	Odacantha melanura	1	5	Notable/Nb	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Chrysomelidae	Prasocuris phellandrii	1	3	Local	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Carabidae	Stenolophus mixtus	1	3	Local	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Carabidae	Bembidion assimile	1	2	Common	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Carabidae	Agonum thoreyi	1	3	Local	Minsmere 21	TM46806544	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Vertebrata	Urodela	Salamandridae	Triturus vulgaris	1	0	Unknown	Minsmere 21	TM46806544	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia tigrina	1	5	Notable/Nb	Minsmere 21	TM46806544	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	1	2	Common	Minsmere 21	TM46806544	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Diptera	Stratiomyidae	Oxycera trilineata	1	3	Local	Minsmere 21	TM46806544	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	1	3	Local	Minsmere 21	TM46806544	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus immaculatus	1	3	Local	Minsmere 21	TM46806544	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	1	2	Common	Minsmere 21	TM46806544	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus affinis	1	2	Common	Minsmere 21	TM46806544	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Staphylinidae	Paederus riparius	1	3	Local	Minsmere 21	TM46806544	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus boops	1	2	Common	Minsmere 21	TM46806544	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	2	2	Common	Minsmere 21	TM46806544	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	2	2	Common	Minsmere 21	TM46806544	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	2	2	Common	Minsmere 21	TM46806544	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus frontalis	2	5	Notable/Nb	Minsmere 21	TM46806544	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	2	3	Local	Minsmere 21	TM46806544	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	2	2	Common	Minsmere 21	TM46806544	2 females	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Hemiptera	Gerridae	Gerris odontogaster	2	2	Common	Minsmere 21	TM46806544	2 females	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia ornata	2	12	RDB2	Minsmere 21	TM46806544	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	2	2	Common	Minsmere 21	TM46806544	2 males	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus griseus	2	5	Notable/Nb	Minsmere 21	TM46806544	2 males	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	3	2	Common	Minsmere 21	TM46806544	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	3	2	Common	Minsmere 21	TM46806544	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	3	0	Unknown	Minsmere 21	TM46806544	3 females	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus impressopunctatus	4	3	Local	Minsmere 21	TM46806544	4 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	4	2	Common	Minsmere 21	TM46806544	4 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Curculionidae	Tanysphyrus lemnae	4	3	Local	Minsmere 21	TM46806544	4 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	4	2	Common	Minsmere 21	TM46806544	4 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	5	2	Common	Minsmere 21	TM46806544	5 adults	29-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon marinus	5	3	Local	Minsmere 21	TM46806544	5 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	6	3	Local	Minsmere 21	TM46806544	6 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	8	3	Local	Minsmere 21	TM46806544	8 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	10	2	Common	Minsmere 21	TM46806544	10 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	10	0	Unknown	Minsmere 21	TM46806544	10 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus quadripunctatus	2	2	Common	Minsmere 21	TM46806544	1 male, 1 female	29-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	5	2	Common	Minsmere 21	TM46806544	2 males, 3 females	29-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	F	2	Common	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	F	3	Local	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	F	2	Common	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	F	2	Common	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	F	0	Unknown	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	F	2	Common	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	F	2	Common	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Viviparidae	Viviparus contectus	F	3	Local	Minsmere 21	TM46806544	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	F	2	Common	Minsmere 21	TM46806544	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	F	0	Unknown	Minsmere 21	TM46806544	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	N	2	Common	Minsmere 21	TM46806544	adult numerous	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Insecta	Hemiptera	Nepidae	Nepa cinerea	O	2	Common	Minsmere 21	TM46806544	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Minsmere 21	TM46806544	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Hirudinea	Hirudinea	Hirudinidae	Haemopis sanguisuga	O	3	Local	Minsmere 21	TM46806544	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Minsmere 21	TM46806544	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	O	3	Local	Minsmere 21	TM46806544	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	O	2	Common	Minsmere 21	TM46806544	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM12	12	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea stagnalis	O	2	Common	Minsmere 21	TM46806544	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Liopterus haemorrhoidalis	1	3	Local	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	1	3	Local	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	1	2	Common	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Haliplidae	Peltodytes caesus	1	5	Notable/Nb	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	1	2	Common	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	1	2	Common	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Crustacea	Amphipoda	Gammaridae	Gammarus pulex	1	2	Common	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia leachii	1	3	Local	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	1	2	Common	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus frontalis	1	5	Notable/Nb	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Diptera	Ephydridae	Scatella stagnalis	1	2	Common	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon marinus	1	3	Local	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Carabidae	Oodes helopioides	1	5	Notable/Nb	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Carabidae	Agonum thoreyi	1	3	Local	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	1	2	Common	Minsmere 29	TM47116563	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus parallelogrammus	1	5	Notable/Nb	Minsmere 29	TM47116563	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Gyrinidae	Gyrinus caspius	1	3	Local	Minsmere 29	TM47116563	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	1	0	Unknown	Minsmere 29	TM47116563	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Diptera	Ephydridae	Coenia palustris	1	2	Common	Minsmere 29	TM47116563	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Carabidae	Pterostichus nigrita	1	2	Common	Minsmere 29	TM47116563	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	1	3	Local	Minsmere 29	TM47116563	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Odonata	Coenagriidae	Ischnura elegans	1	2	Common	Minsmere 29	TM47116563	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus minutus	1	2	Common	Minsmere 29	TM47116563	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus griseus	1	5	Notable/Nb	Minsmere 29	TM47116563	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus melanopus	1	3	Local	Minsmere 29	TM47116563	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Gyrinidae	Gyrinus paykulli	1	6	Na	Minsmere 29	TM47116563	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Hydaticus seminiger	2	5	Notable/Nb	Minsmere 29	TM47116563	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Mollusca	Mollusca	Planorbidae	Gyraulus crista	2	2	Common	Minsmere 29	TM47116563	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus solutus	2	3	Local	Minsmere 29	TM47116563	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus juno	2	2	Common	Minsmere 29	TM47116563	2 females	29-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	2	0	Unknown	Minsmere 29	TM47116563	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	3	2	Common	Minsmere 29	TM47116563	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	3	2	Common	Minsmere 29	TM47116563	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	3	5	Notable/Nb	Minsmere 29	TM47116563	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon tristis	3	5	Notable/Nb	Minsmere 29	TM47116563	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	3	3	Local	Minsmere 29	TM47116563	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	4	3	Local	Minsmere 29	TM47116563	4 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	5	2	Common	Minsmere 29	TM47116563	5 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	6	2	Common	Minsmere 29	TM47116563	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	6	2	Common	Minsmere 29	TM47116563	6 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	8	2	Common	Minsmere 29	TM47116563	8 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	8	2	Common	Minsmere 29	TM47116563	8 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	10	3	Local	Minsmere 29	TM47116563	10 adults	29-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Minsmere	SM13	13	2009	April	Crustacea	Isopoda	Asellidae	Asellus meridianus	10	2	Common	Minsmere 29	TM47116563	10 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	11	2	Common	Minsmere 29	TM47116563	11 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	13	3	Local	Minsmere 29	TM47116563	13 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	13	2	Common	Minsmere 29	TM47116563	13 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Scirtidae	Cyphon laevipennis	2	3	Local	Minsmere 29	TM47116563	1 male, 1 female	29-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus halophilus	4	6	Na	Minsmere 29	TM47116563	2 males, 2 females	29-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus impressopunctatus	F	3	Local	Minsmere 29	TM47116563	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Minsmere 29	TM47116563	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	F	2	Common	Minsmere 29	TM47116563	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	F	2	Common	Minsmere 29	TM47116563	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	F	3	Local	Minsmere 29	TM47116563	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	F	2	Common	Minsmere 29	TM47116563	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM13	13	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	N	2	Common	Minsmere 29	TM47116563	adult numerous	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Minsmere 29	TM47116563	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Minsmere 29	TM47116563	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	O	5	Notable/Nb	Minsmere 29	TM47116563	larva occasional	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM13	13	2009	April	Insecta	Diptera	Tabanidae	Tabanidae	1	0	Unknown	Minsmere 29	TM47116563	larva several	29-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	1	2	Common	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Dytiscidae	Laccophilus hyalinus	1	2	Common	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	1	3	Local	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus melanocephalus	1	5	Notable/Nb	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius dilatatus	1	3	Local	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	1	2	Common	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	1	2	Common	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Sphaeriidae	Musculium lacustre	1	2	Common	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Physidae	Aplexa hypnorum	1	3	Local	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Chrysomelidae	Galerucella nymphaeae	1	3	Local	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Carabidae	Bembidion assimile	1	2	Common	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Curculionidae	Thryogenes nereis	1	3	Local	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	1	2	Common	Minsmere 19	TM46546567	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrophilus piceus	1	10	RDB3	Minsmere 19	TM46546567	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Diptera	Sciomyzidae	Pherbellia dorsata	1	5	Notable/Nb	Minsmere 19	TM46546567	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius colon	1	3	Local	Minsmere 19	TM46546567	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	1	0	Unknown	Minsmere 19	TM46546567	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Ephemeroptera	Caenidae	Caenis robusta	1	4	Nr	Minsmere 19	TM46546567	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus lunatus	1	2	Common	Minsmere 19	TM46546567	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Diptera	Dixidae	Dixella attica	1	5	Notable/Nb	Minsmere 19	TM46546567	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Diptera	Ephydridae	Coenia palustris	1	2	Common	Minsmere 19	TM46546567	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Dytiscidae	Hydaticus seminiger	2	5	Notable/Nb	Minsmere 19	TM46546567	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	2	2	Common	Minsmere 19	TM46546567	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	2	2	Common	Minsmere 19	TM46546567	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	2	2	Common	Minsmere 19	TM46546567	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Hemiptera	Nepidae	Ranatra linearis	2	3	Local	Minsmere 19	TM46546567	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Hemiptera	Saldidae	Chartoscirta cincta	2	2	Common	Minsmere 19	TM46546567	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia tigrina	2	5	Notable/Nb	Minsmere 19	TM46546567	2 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Odonata	Coenagriidae	Ischnura elegans	2	2	Common	Minsmere 19	TM46546567	2 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	2	3	Local	Minsmere 19	TM46546567	2 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	3	5	Notable/Nb	Minsmere 19	TM46546567	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	3	3	Local	Minsmere 19	TM46546567	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	4	3	Local	Minsmere 19	TM46546567	4 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	4	0	Unknown	Minsmere 19	TM46546567	4 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	4	2	Common	Minsmere 19	TM46546567	4 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	10	2	Common	Minsmere 19	TM46546567	10 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	14	2	Common	Minsmere 19	TM46546567	14 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	2	2	Common	Minsmere 19	TM46546567	1 male, 1 female	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Staphylinidae	Paederus riparius	2	3	Local	Minsmere 19	TM46546567	1 male, 1 female	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	F	3	Local	Minsmere 19	TM46546567	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Minsmere 19	TM46546567	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	F	2	Common	Minsmere 19	TM46546567	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	F	2	Common	Minsmere 19	TM46546567	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea stagnalis	F	2	Common	Minsmere 19	TM46546567	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	F	0	Unknown	Minsmere 19	TM46546567	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Minsmere 19	TM46546567	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	F	2	Common	Minsmere 19	TM46546567	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	F	3	Local	Minsmere 19	TM46546567	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	F	2	Common	Minsmere 19	TM46546567	larva frequent	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus coarctatus	O	3	Local	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Hirudinea	Hirudinea	Hirudinidae	Haemopis sanguisuga	O	3	Local	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Minsmere	SM14	14	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Theromyzon tessulatum	O	2	Common	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	O	2	Common	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Succineidae	Oxyloma elegans	O	2	Common	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	O	2	Common	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Mollusca	Mollusca	Viviparidae	Viviparus contectus	O	3	Local	Minsmere 19	TM46546567	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	O	5	Notable/Nb	Minsmere 19	TM46546567	larva occasional	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM14	14	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	O	0	Unknown	Minsmere 19	TM46546567	larva occasional	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Graptodytes pictus	1	3	Local	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	1	2	Common	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Laccophilus hyalinus	1	2	Common	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	1	3	Local	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	1	3	Local	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	1	3	Local	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Sphaeriidae	Musculium lacustre	1	2	Common	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	1	3	Local	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus frontalis	1	5	Notable/Nb	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Chrysomelidae	Prasocuris phellandrii	1	3	Local	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Hemiptera	Saldidae	Chartoscirta cincta	1	2	Common	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon marinus	1	3	Local	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Curculionidae	Hypera pollux	1	3	Local	Minsmere 15	TM46646601	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus parallelogrammus	1	5	Notable/Nb	Minsmere 15	TM46646601	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus obscurus	1	2	Common	Minsmere 15	TM46646601	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM15	15	2009	April	Vertebrata	Urodela	Salamandridae	Triturus vulgaris	1	0	Unknown	Minsmere 15	TM46646601	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	1	0	Unknown	Minsmere 15	TM46646601	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Colymbetini	1	0	Unknown	Minsmere 15	TM46646601	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus lunatus	1	2	Common	Minsmere 15	TM46646601	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Diptera	Tabanidae	Tabanidae	1	0	Unknown	Minsmere 15	TM46646601	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	1	3	Local	Minsmere 15	TM46646601	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Ilybius quadriguttatus	1	2	Common	Minsmere 15	TM46646601	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	2	2	Common	Minsmere 15	TM46646601	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	2	2	Common	Minsmere 15	TM46646601	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	2	3	Local	Minsmere 15	TM46646601	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	2	2	Common	Minsmere 15	TM46646601	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Haliplidae	Peltodytes caesus	2	5	Notable/Nb	Minsmere 15	TM46646601	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	2	2	Common	Minsmere 15	TM46646601	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	2	2	Common	Minsmere 15	TM46646601	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Hydrobiidae	Potamopyrgus antipodarum	2	21	Naturalised	Minsmere 15	TM46646601	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	2	2	Common	Minsmere 15	TM46646601	2 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus griseus	2	5	Notable/Nb	Minsmere 15	TM46646601	2 males	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Chrysomelidae	Phaedon cochleariae	3	2	Common	Minsmere 15	TM46646601	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	3	2	Common	Minsmere 15	TM46646601	3 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	4	2	Common	Minsmere 15	TM46646601	4 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	4	3	Local	Minsmere 15	TM46646601	4 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	4	0	Unknown	Minsmere 15	TM46646601	4 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	5	2	Common	Minsmere 15	TM46646601	5 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	5	2	Common	Minsmere 15	TM46646601	5 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	5	2	Common	Minsmere 15	TM46646601	5 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Hemiptera	Corixidae	Sigara dorsalis	5	2	Common	Minsmere 15	TM46646601	5 females	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus impressopunctatus	8	3	Local	Minsmere 15	TM46646601	8 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	9	5	Notable/Nb	Minsmere 15	TM46646601	9 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	10	2	Common	Minsmere 15	TM46646601	10 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	11	2	Common	Minsmere 15	TM46646601	11 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	11	2	Common	Minsmere 15	TM46646601	11 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	12	3	Local	Minsmere 15	TM46646601	12 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	2	0	Unknown	Minsmere 15	TM46646601	1 female, 1 larva	28-Apr-09	Drake, C.M.	F, L
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	2	2	Common	Minsmere 15	TM46646601	1 male, 1 female	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	6	2	Common	Minsmere 15	TM46646601	3 males, 3 females	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus minutus	25	2	Common	Minsmere 15	TM46646601	5 males, 20 females	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM15	15	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	F	2	Common	Minsmere 15	TM46646601	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Minsmere 15	TM46646601	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	F	2	Common	Minsmere 15	TM46646601	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Planorbidae	Bathyomphalus contortus	F	3	Local	Minsmere 15	TM46646601	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	F	2	Common	Minsmere 15	TM46646601	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	F	2	Common	Minsmere 15	TM46646601	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	F	2	Common	Minsmere 15	TM46646601	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	N	0	Unknown	Minsmere 15	TM46646601	adult numerous	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Minsmere 15	TM46646601	adult occasional	28-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Hemiptera	Pleidae	Plea minutissima	O	2	Common	Minsmere 15	TM46646601	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Minsmere 15	TM46646601	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Hirudinea	Hirudinea	Hirudinidae	Haemopis sanguisuga	O	3	Local	Minsmere 15	TM46646601	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Minsmere 15	TM46646601	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	O	2	Common	Minsmere 15	TM46646601	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	O	2	Common	Minsmere 15	TM46646601	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	O	3	Local	Minsmere 15	TM46646601	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM15	15	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	O	0	Unknown	Minsmere 15	TM46646601	larva occasional	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus sturmii	1	2	Common	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	1	2	Common	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	1	2	Common	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus grapii	1	5	Notable/Nb	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	1	2	Common	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	1	2	Common	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	1	3	Local	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	1	2	Common	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Tricladida	Tricladida	Dugesiidae	Dugesia lugubris	1	0	Unknown	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Diptera	Sciomyzidae	Sepedon spinipes	1	3	Local	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Diptera	Sphaeroceridae	Lotophila atra	1	2	Common	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Chrysomelidae	Prasocuris phellandrii	1	3	Local	Minsmere 13	TM46596618	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	1	0	Unknown	Minsmere 13	TM46596618	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Staphylinidae	Paederus fuscipes	1	5	Notable/Nb	Minsmere 13	TM46596618	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Diptera	Ephydridae	Coenia palustris	1	2	Common	Minsmere 13	TM46596618	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Diptera	Dolichopodidae	Achalcus thalhammeri	1	0	Unknown	Minsmere 13	TM46596618	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM16	16	2009	April	Vertebrata	Urodela	Salamandridae	Triturus	1	0	Unknown	Minsmere 13	TM46596618	1 immature	28-Apr-09	Drake, C.M.	IM
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Odonata	Coenagriidae	Ischnura elegans	1	2	Common	Minsmere 13	TM46596618	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	1	2	Common	Minsmere 13	TM46596618	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Colymbetini	1	0	Unknown	Minsmere 13	TM46596618	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus solutus	1	3	Local	Minsmere 13	TM46596618	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	1	2	Common	Minsmere 13	TM46596618	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Liopterus haemorrhoidalis	2	3	Local	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	2	2	Common	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus impressopunctatus	2	3	Local	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	2	2	Common	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	2	3	Local	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	2	2	Common	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	2	0	Unknown	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Carabidae	Odacantha melanura	2	5	Notable/Nb	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Hemiptera	Saldidae	Chartoscirta cincta	2	2	Common	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Hemiptera	Veliidae	Microvelia pygmaea	2	5	Notable/Nb	Minsmere 13	TM46596618	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	2	2	Common	Minsmere 13	TM46596618	2 females	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	3	5	Notable/Nb	Minsmere 13	TM46596618	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	3	3	Local	Minsmere 13	TM46596618	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	3	2	Common	Minsmere 13	TM46596618	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	3	3	Local	Minsmere 13	TM46596618	3 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus minutus	3	2	Common	Minsmere 13	TM46596618	3 males	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	3	2	Common	Minsmere 13	TM46596618	3 males	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	4	2	Common	Minsmere 13	TM46596618	4 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Diptera	Dixidae	Dixella attica	4	5	Notable/Nb	Minsmere 13	TM46596618	4 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	5	2	Common	Minsmere 13	TM46596618	5 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	5	2	Common	Minsmere 13	TM46596618	5 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	5	0	Unknown	Minsmere 13	TM46596618	5 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	6	3	Local	Minsmere 13	TM46596618	6 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	7	3	Local	Minsmere 13	TM46596618	7 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	11	2	Common	Minsmere 13	TM46596618	11 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	4	2	Common	Minsmere 13	TM46596618	3 males, 1 female	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM16	16	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	F	2	Common	Minsmere 13	TM46596618	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Minsmere 13	TM46596618	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Planorbidae	Bathyomphalus contortus	F	3	Local	Minsmere 13	TM46596618	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	F	2	Common	Minsmere 13	TM46596618	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	F	2	Common	Minsmere 13	TM46596618	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	F	2	Common	Minsmere 13	TM46596618	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Minsmere 13	TM46596618	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	F	2	Common	Minsmere 13	TM46596618	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	N	2	Common	Minsmere 13	TM46596618	adult numerous	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Dytiscidae	Colymbetes fuscus	O	2	Common	Minsmere 13	TM46596618	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Hemiptera	Nepidae	Nepa cinerea	O	2	Common	Minsmere 13	TM46596618	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Minsmere 13	TM46596618	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	O	2	Common	Minsmere 13	TM46596618	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Mollusca	Mollusca	Succineidae	Succinea putris	O	2	Common	Minsmere 13	TM46596618	adult occasional	28-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Minsmere	SM16	16	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	O	3	Local	Minsmere 13	TM46596618	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	O	5	Notable/Nb	Minsmere 13	TM46596618	larva occasional	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM16	16	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	O	0	Unknown	Minsmere 13	TM46596618	larva occasional	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	1	2	Common	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus parallelogrammus	1	5	Notable/Nb	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Ilybius ater	1	2	Common	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Laccophilus minutus	1	3	Local	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	1	3	Local	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	1	2	Common	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	1	2	Common	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Hemiptera	Pleidae	Plea minutissima	1	2	Common	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Glossiphonia complanata	1	2	Common	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Diptera	Sciomyzidae	Sepedon spinipes	1	3	Local	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Carabidae	Demetrias imperialis	1	5	Notable/Nb	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Tricladida	Tricladida	Dendrocoelidae	Dendrocoelum lacteum	1	2	Common	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Chrysomelidae	Galerucella nymphaeae	1	3	Local	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroglyphus geminus	1	5	Notable/Nb	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	1	2	Common	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Curculionidae	Thryogenes nereis	1	3	Local	Minsmere 9	TM46046617	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Physidae	Aplexa hypnorum	1	3	Local	Minsmere 9	TM46046617	1 dead	28-Apr-09	Drake, C.M.	D
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Ilybius quadriguttatus	1	2	Common	Minsmere 9	TM46046617	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	1	2	Common	Minsmere 9	TM46046617	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Hemiptera	Saldidae	Saldula pallipes	1	2	Common	Minsmere 9	TM46046617	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM17	17	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Theromyzon tessulatum	1	2	Common	Minsmere 9	TM46046617	1 immature	28-Apr-09	Drake, C.M.	IM
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Colymbetes fuscus	1	2	Common	Minsmere 9	TM46046617	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia ornata	1	12	RDB2	Minsmere 9	TM46046617	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	1	3	Local	Minsmere 9	TM46046617	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Odonata	Libellulidae	Sympetrum	1	0	Unknown	Minsmere 9	TM46046617	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Diptera	Culicidae	Anopheles atroparvus	1	2	Common	Minsmere 9	TM46046617	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus memnonius	1	2	Common	Minsmere 9	TM46046617	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	1	2	Common	Minsmere 9	TM46046617	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Hemiptera	Gerridae	Gerris lacustris	1	2	Common	Minsmere 9	TM46046617	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus sturmii	2	2	Common	Minsmere 9	TM46046617	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Hydaticus seminiger	2	5	Notable/Nb	Minsmere 9	TM46046617	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	2	2	Common	Minsmere 9	TM46046617	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	2	2	Common	Minsmere 9	TM46046617	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	2	3	Local	Minsmere 9	TM46046617	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	2	3	Local	Minsmere 9	TM46046617	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Acroloxidae	Acroloxus lacustris	2	2	Common	Minsmere 9	TM46046617	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	2	2	Common	Minsmere 9	TM46046617	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	2	0	Unknown	Minsmere 9	TM46046617	2 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	3	5	Notable/Nb	Minsmere 9	TM46046617	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	3	2	Common	Minsmere 9	TM46046617	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	3	2	Common	Minsmere 9	TM46046617	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	3	2	Common	Minsmere 9	TM46046617	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	3	2	Common	Minsmere 9	TM46046617	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon marinus	3	3	Local	Minsmere 9	TM46046617	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Colymbetini	3	0	Unknown	Minsmere 9	TM46046617	3 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	3	2	Common	Minsmere 9	TM46046617	3 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus bipustulatus	4	2	Common	Minsmere 9	TM46046617	4 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	4	2	Common	Minsmere 9	TM46046617	4 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	8	2	Common	Minsmere 9	TM46046617	8 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	8	2	Common	Minsmere 9	TM46046617	8 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	9	2	Common	Minsmere 9	TM46046617	9 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	9	3	Local	Minsmere 9	TM46046617	9 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	11	2	Common	Minsmere 9	TM46046617	11 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	11	0	Unknown	Minsmere 9	TM46046617	11 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrophilus piceus	2	10	RDB3	Minsmere 9	TM46046617	1 female, 1 egg/ovum	28-Apr-09	Drake, C.M.	F, O
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus juno	4	2	Common	Minsmere 9	TM46046617	2 males, 2 females	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus minutus	7	2	Common	Minsmere 9	TM46046617	2 males, 5 females	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	6	2	Common	Minsmere 9	TM46046617	4 males, 2 females	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	F	2	Common	Minsmere 9	TM46046617	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	F	2	Common	Minsmere 9	TM46046617	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Planorbidae	Bathyomphalus contortus	F	3	Local	Minsmere 9	TM46046617	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	F	3	Local	Minsmere 9	TM46046617	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	F	0	Unknown	Minsmere 9	TM46046617	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Minsmere 9	TM46046617	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	F	3	Local	Minsmere 9	TM46046617	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Viviparidae	Viviparus contectus	F	3	Local	Minsmere 9	TM46046617	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	N	21	Naturalised	Minsmere 9	TM46046617	adult numerous	28-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	O	2	Common	Minsmere 9	TM46046617	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Minsmere 9	TM46046617	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea stagnalis	O	2	Common	Minsmere 9	TM46046617	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Minsmere 9	TM46046617	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	O	2	Common	Minsmere 9	TM46046617	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	O	3	Local	Minsmere 9	TM46046617	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM17	17	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	O	0	Unknown	Minsmere 9	TM46046617	larva occasional	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Colymbetes fuscus	1	2	Common	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus impressopunctatus	1	3	Local	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	1	2	Common	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus grapii	1	5	Notable/Nb	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	1	5	Notable/Nb	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	1	2	Common	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	1	3	Local	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	1	3	Local	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	1	2	Common	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	1	2	Common	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	1	2	Common	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus frontalis	1	5	Notable/Nb	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Carabidae	Odacantha melanura	1	5	Notable/Nb	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Diptera	Ephydridae	Parydra coarctata	1	2	Common	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Tricladida	Tricladida	Dugesiidae	Dugesia lugubris	1	0	Unknown	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Hemiptera	Saldidae	Chartoscirta cincta	1	2	Common	Minsmere 1	TM45996635	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	1	0	Unknown	Minsmere 1	TM45996635	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Diptera	Ephydridae	Pelina similis	1	0	Unknown	Minsmere 1	TM45996635	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Hemiptera	Saldidae	Saldula palustris	1	2	Common	Minsmere 1	TM45996635	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus incrassatus	1	3	Local	Minsmere 1	TM45996635	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus bipustulatus	2	2	Common	Minsmere 1	TM45996635	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	2	2	Common	Minsmere 1	TM45996635	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	2	2	Common	Minsmere 1	TM45996635	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	2	2	Common	Minsmere 1	TM45996635	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	2	2	Common	Minsmere 1	TM45996635	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	2	2	Common	Minsmere 1	TM45996635	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	2	21	Naturalised	Minsmere 1	TM45996635	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Chrysomelidae	Galerucella nymphaeae	2	3	Local	Minsmere 1	TM45996635	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	3	2	Common	Minsmere 1	TM45996635	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus juno	3	2	Common	Minsmere 1	TM45996635	3 females	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	4	2	Common	Minsmere 1	TM45996635	4 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa sahlbergi	4	2	Common	Minsmere 1	TM45996635	4 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	5	2	Common	Minsmere 1	TM45996635	5 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	5	3	Local	Minsmere 1	TM45996635	5 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	6	3	Local	Minsmere 1	TM45996635	6 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	2	2	Common	Minsmere 1	TM45996635	1 male, 1 female	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus minutus	9	2	Common	Minsmere 1	TM45996635	4 males, 5 females	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM18	18	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	F	2	Common	Minsmere 1	TM45996635	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	F	0	Unknown	Minsmere 1	TM45996635	larva frequent	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	F	2	Common	Minsmere 1	TM45996635	larva frequent	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	F	2	Common	Minsmere 1	TM45996635	larva frequent	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM18	18	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Minsmere 1	TM45996635	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Minsmere 1	TM45996635	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Mollusca	Mollusca	Acroloxidae	Acroloxus lacustris	O	2	Common	Minsmere 1	TM45996635	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	O	2	Common	Minsmere 1	TM45996635	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Minsmere 1	TM45996635	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Minsmere 1	TM45996635	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Hemiptera	Gerridae	Gerris	O	0	Unknown	Minsmere 1	TM45996635	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta	O	0	Unknown	Minsmere 1	TM45996635	immature occasional	28-Apr-09	Drake, C.M.	IM
Sizewell	Minsmere	SM18	18	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	O	5	Notable/Nb	Minsmere 1	TM45996635	larva occasional	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus sturmii	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Hydaticus seminiger	1	5	Notable/Nb	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	1	3	Local	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	1	3	Local	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Haliplidae	Peltodytes caesus	1	5	Notable/Nb	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Curculionidae	Tanysphyrus lemnae	1	3	Local	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa sahlbergi	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Hemiptera	Pleidae	Plea minutissima	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Mollusca	Mollusca	Acroloxidae	Acroloxus lacustris	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Carabidae	Oodes helopioides	1	5	Notable/Nb	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Diptera	Ephydridae	Scatella tenuicosta	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Diptera	Ephydridae	Scatella stagnalis	1	2	Common	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Chrysomelidae	Aphthona nonstriata	1	3	Local	Minsmere 3	TM46126634	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Hydraenidae	Hydraena riparia	1	3	Local	Minsmere 3	TM46126634	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Hydraenidae	Limnebius truncatellus	1	2	Common	Minsmere 3	TM46126634	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus juno	1	2	Common	Minsmere 3	TM46126634	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus semisulcatus	1	3	Local	Minsmere 3	TM46126634	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	1	0	Unknown	Minsmere 3	TM46126634	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	1	3	Local	Minsmere 3	TM46126634	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	1	0	Unknown	Minsmere 3	TM46126634	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	1	3	Local	Minsmere 3	TM46126634	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Diptera	Stratiomyidae	Vanoyia tenuicornis	1	5	Notable/Nb	Minsmere 3	TM46126634	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dryopidae	Dryops luridus	1	2	Common	Minsmere 3	TM46126634	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus auricula	1	2	Common	Minsmere 3	TM46126634	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus boops	1	2	Common	Minsmere 3	TM46126634	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus halophilus	1	6	Na	Minsmere 3	TM46126634	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus griseus	1	5	Notable/Nb	Minsmere 3	TM46126634	1 male	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Graptodytes pictus	2	3	Local	Minsmere 3	TM46126634	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	2	2	Common	Minsmere 3	TM46126634	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus aequalis	2	2	Common	Minsmere 3	TM46126634	2 males	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus minutus	2	2	Common	Minsmere 3	TM46126634	2 males	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Chrysomelidae	Galerucella nymphaeae	3	3	Local	Minsmere 3	TM46126634	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius nanus	3	5	Notable/Nb	Minsmere 3	TM46126634	3 males	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	4	2	Common	Minsmere 3	TM46126634	4 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	4	3	Local	Minsmere 3	TM46126634	4 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus impressopunctatus	5	3	Local	Minsmere 3	TM46126634	5 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	5	2	Common	Minsmere 3	TM46126634	5 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	5	2	Common	Minsmere 3	TM46126634	5 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	6	2	Common	Minsmere 3	TM46126634	6 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	6	2	Common	Minsmere 3	TM46126634	6 males	28-Apr-09	Drake, C.M.	M
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	7	2	Common	Minsmere 3	TM46126634	7 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	8	3	Local	Minsmere 3	TM46126634	8 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	11	5	Notable/Nb	Minsmere 3	TM46126634	11 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	11	2	Common	Minsmere 3	TM46126634	11 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	14	2	Common	Minsmere 3	TM46126634	14 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	28	2	Common	Minsmere 3	TM46126634	28 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	2	0	Unknown	Minsmere 3	TM46126634	1 female, 1 larva	28-Apr-09	Drake, C.M.	F, L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	2	2	Common	Minsmere 3	TM46126634	1 male, 1 female	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Hemiptera	Saldidae	Saldula pallipes	3	2	Common	Minsmere 3	TM46126634	2 males, 1 female	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM19	19	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Minsmere 3	TM46126634	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	F	2	Common	Minsmere 3	TM46126634	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Mollusca	Mollusca	Planorbidae	Bathyomphalus contortus	F	3	Local	Minsmere 3	TM46126634	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	F	2	Common	Minsmere 3	TM46126634	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	F	2	Common	Minsmere 3	TM46126634	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	F	2	Common	Minsmere 3	TM46126634	larva frequent	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Hemiptera	Nepidae	Nepa cinerea	O	2	Common	Minsmere 3	TM46126634	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Minsmere 3	TM46126634	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Minsmere 3	TM46126634	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Minsmere 3	TM46126634	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Minsmere 3	TM46126634	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	O	5	Notable/Nb	Minsmere 3	TM46126634	larva occasional	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	O	0	Unknown	Minsmere 3	TM46126634	larva occasional	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM19	19	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Minsmere 3	TM46126634	male occasional	28-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	1	2	Common	Sizewell 8	TM46236387	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	1	2	Common	Sizewell 8	TM46236387	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Hemiptera	Gerridae	Gerris lacustris	1	2	Common	Sizewell 8	TM46236387	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Hemiptera	Gerridae	Gerris thoracicus	1	2	Common	Sizewell 8	TM46236387	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	1	2	Common	Sizewell 8	TM46236387	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	1	2	Common	Sizewell 8	TM46236387	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Vertiginidae	Vertigo antivertigo	1	3	Local	Sizewell 8	TM46236387	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Diptera	Syrphidae	Neoascia tenur	1	3	Local	Sizewell 8	TM46236387	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM2	2	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Theromyzon tessulatum	1	2	Common	Sizewell 8	TM46236387	1 immature	27-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	1	0	Unknown	Sizewell 8	TM46236387	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia tigrina	1	5	Notable/Nb	Sizewell 8	TM46236387	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Odonata	Aeshnidae	Aeshnidae	1	0	Unknown	Sizewell 8	TM46236387	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus minutus	1	2	Common	Sizewell 8	TM46236387	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	1	2	Common	Sizewell 8	TM46236387	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	1	2	Common	Sizewell 8	TM46236387	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus nitidiusculus	1	2	Common	Sizewell 8	TM46236387	1 male	27-Apr-09	Drake, C.M.	M

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Diptera	Syrphidae	Chrysogaster	1	0	Unknown	Sizewell 8	TM46236387	1 pupa/pupal cocoon	27-Apr-09	Drake, C.M.	P
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	1	5	Notable/Nb	Sizewell 8	TM46236387	1 subadult male	27-Apr-09	Drake, C.M.	SUM
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	2	2	Common	Sizewell 8	TM46236387	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	2	0	Unknown	Sizewell 8	TM46236387	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Dryopidae	Dryops luridus	2	2	Common	Sizewell 8	TM46236387	2 males	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	3	3	Local	Sizewell 8	TM46236387	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	3	2	Common	Sizewell 8	TM46236387	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	3	3	Local	Sizewell 8	TM46236387	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	4	2	Common	Sizewell 8	TM46236387	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	4	3	Local	Sizewell 8	TM46236387	4 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM2	2	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	5	2	Common	Sizewell 8	TM46236387	5 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	6	3	Local	Sizewell 8	TM46236387	6 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus coarctatus	8	3	Local	Sizewell 8	TM46236387	8 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Hemiptera	Gerridae	Gerris odontogaster	3	2	Common	Sizewell 8	TM46236387	1 male, 2 females	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM2	2	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Sizewell 8	TM46236387	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	F	2	Common	Sizewell 8	TM46236387	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	F	2	Common	Sizewell 8	TM46236387	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Sizewell 8	TM46236387	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Viviparidae	Viviparus contectus	F	3	Local	Sizewell 8	TM46236387	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	F	3	Local	Sizewell 8	TM46236387	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	F	0	Unknown	Sizewell 8	TM46236387	larva frequent	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	F	2	Common	Sizewell 8	TM46236387	larva frequent	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	F	0	Unknown	Sizewell 8	TM46236387	larva frequent	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	F	2	Common	Sizewell 8	TM46236387	larva frequent	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	N	2	Common	Sizewell 8	TM46236387	adult numerous	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Sizewell 8	TM46236387	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Insecta	Hemiptera	Nepidae	Nepa cinerea	O	2	Common	Sizewell 8	TM46236387	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Sizewell 8	TM46236387	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Hirudinea	Hirudinea	Hirudinidae	Haemopis sanguisuga	O	3	Local	Sizewell 8	TM46236387	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Planorbidae	Bathyomphalus contortus	O	3	Local	Sizewell 8	TM46236387	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	O	3	Local	Sizewell 8	TM46236387	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea stagnalis	O	2	Common	Sizewell 8	TM46236387	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM2	2	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	O	3	Local	Sizewell 8	TM46236387	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	1	2	Common	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	1	2	Common	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon convexiusculus	1	5	Notable/Nb	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	1	3	Local	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Coccinellidae	Anisosticta novemdecimpunctata	1	3	Local	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	1	2	Common	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	1	2	Common	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Mollusca	Mollusca	Planorbidae	Gyraulus crista	1	2	Common	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	1	2	Common	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	1	3	Local	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Chrysomelidae	Prasocuris phellandrii	1	3	Local	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Chrysomelidae	Galerucella nymphaeae	1	3	Local	Minsmere 6a	TM46326630	1 adult	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus minutus	1	2	Common	Minsmere 6a	TM46326630	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Hydraenidae	Hydraena riparia	1	3	Local	Minsmere 6a	TM46326630	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	1	0	Unknown	Minsmere 6a	TM46326630	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus halophilus	1	6	Na	Minsmere 6a	TM46326630	1 female	28-Apr-09	Drake, C.M.	F
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	1	0	Unknown	Minsmere 6a	TM46326630	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	1	0	Unknown	Minsmere 6a	TM46326630	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Diptera	Tabanidae	Tabanidae	1	0	Unknown	Minsmere 6a	TM46326630	1 larva	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM20	20	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	2	2	Common	Minsmere 6a	TM46326630	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	2	2	Common	Minsmere 6a	TM46326630	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus frontalis	2	5	Notable/Nb	Minsmere 6a	TM46326630	2 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Odonata	Libellulidae	Sympetrum	2	0	Unknown	Minsmere 6a	TM46326630	2 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	3	2	Common	Minsmere 6a	TM46326630	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	3	2	Common	Minsmere 6a	TM46326630	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	3	2	Common	Minsmere 6a	TM46326630	3 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Coleoptera	Dytiscidae	Colymbetini	7	0	Unknown	Minsmere 6a	TM46326630	7 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Odonata	Coenagriidae	Ischnura elegans	9	2	Common	Minsmere 6a	TM46326630	9 larvas	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	17	2	Common	Minsmere 6a	TM46326630	17 adults	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Hemiptera	Corixidae	Sigara dorsalis	4	2	Common	Minsmere 6a	TM46326630	1 male, 3 females	28-Apr-09	Drake, C.M.	M, F
Sizewell	Minsmere	SM20	20	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Minsmere 6a	TM46326630	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	F	0	Unknown	Minsmere 6a	TM46326630	adult frequent	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	F	2	Common	Minsmere 6a	TM46326630	larva frequent	28-Apr-09	Drake, C.M.	L
Sizewell	Minsmere	SM20	20	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Minsmere 6a	TM46326630	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Minsmere 6a	TM46326630	adult occasional	28-Apr-09	Drake, C.M.	AD
Sizewell	Minsmere	SM20	20	2009	April	Insecta	Hemiptera	Gerridae	Gerris	O	0	Unknown	Minsmere 6a	TM46326630	immature occasional	28-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	1	2	Common	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	1	2	Common	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	1	2	Common	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus impressopunctatus	1	3	Local	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Ilybius ater	1	2	Common	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus grapii	1	5	Notable/Nb	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Hydrophilidae	Coelostoma orbiculare	1	2	Common	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	1	2	Common	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa sahlbergi	1	2	Common	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Planorbidae	Bathyomphalus contortus	1	3	Local	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	1	2	Common	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Crustacea	Isopoda	Ligiidae	Ligidium hypnorum	1	3	Local	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Lauxaniidae	Trigonometopus frontalis	1	3	Local	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Hemiptera	Saldidae	Chartoscirta cincta	1	2	Common	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Silvanidae	Psammoecus bipunctatus	1	3	Local	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Chrysomelidae	Galerucella nymphaeae	1	3	Local	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Carabidae	Agonum thoreyi	1	3	Local	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Vertebrata	Urodela	Salamandridae	Triturus	1	0	Unknown	Sizewell 12	TM46616373	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Hemiptera	Gerridae	Gerris lacustris	1	2	Common	Sizewell 12	TM46616373	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Ephydridae	Pelina aenea	1	0	Unknown	Sizewell 12	TM46616373	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Scirtidae	Cyphon padi	1	3	Local	Sizewell 12	TM46616373	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM3	3	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Theromyzon tessulatum	1	2	Common	Sizewell 12	TM46616373	1 immature	27-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Trichoptera	Limnephilidae	Glyphotaelius pellucidus	1	2	Common	Sizewell 12	TM46616373	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Ptychopteridae	Ptychoptera minuta	1	3	Local	Sizewell 12	TM46616373	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	1	2	Common	Sizewell 12	TM46616373	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	1	2	Common	Sizewell 12	TM46616373	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus nitidiusculus	1	2	Common	Sizewell 12	TM46616373	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus bifoveolatus	1	3	Local	Sizewell 12	TM46616373	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Syrphidae	Eristalini	1	0	Unknown	Sizewell 12	TM46616373	1 pupa/pupal cocoon	27-Apr-09	Drake, C.M.	P
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	2	5	Notable/Nb	Sizewell 12	TM46616373	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	2	3	Local	Sizewell 12	TM46616373	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	2	2	Common	Sizewell 12	TM46616373	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Hemiptera	Pleidae	Plea minutissima	2	2	Common	Sizewell 12	TM46616373	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Curculionidae	Thryogenes nereis	2	3	Local	Sizewell 12	TM46616373	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	2	2	Common	Sizewell 12	TM46616373	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia ornata	2	12	RDB2	Sizewell 12	TM46616373	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	2	2	Common	Sizewell 12	TM46616373	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Tabanidae	Tabanidae	2	0	Unknown	Sizewell 12	TM46616373	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	2	3	Local	Sizewell 12	TM46616373	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus picipennis	2	3	Local	Sizewell 12	TM46616373	2 males	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	3	2	Common	Sizewell 12	TM46616373	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	3	2	Common	Sizewell 12	TM46616373	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	3	3	Local	Sizewell 12	TM46616373	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Sphaeriidae	Musculium lacustre	3	2	Common	Sizewell 12	TM46616373	3 immatures	27-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia tigrina	3	5	Notable/Nb	Sizewell 12	TM46616373	3 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Stratiomyidae	Vanoyia tenuicornis	3	5	Notable/Nb	Sizewell 12	TM46616373	3 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus bipustulatus	4	2	Common	Sizewell 12	TM46616373	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	4	3	Local	Sizewell 12	TM46616373	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	4	2	Common	Sizewell 12	TM46616373	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	4	0	Unknown	Sizewell 12	TM46616373	4 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	5	2	Common	Sizewell 12	TM46616373	5 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Odonata	Coenagriidae	Pyrrhosoma nymphula	5	2	Common	Sizewell 12	TM46616373	5 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Hydrophilidae	Hydrobius fuscipes	6	2	Common	Sizewell 12	TM46616373	6 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	8	3	Local	Sizewell 12	TM46616373	8 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus sturmii	12	2	Common	Sizewell 12	TM46616373	12 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	13	3	Local	Sizewell 12	TM46616373	13 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Staphylinidae	Paederus riparius	2	3	Local	Sizewell 12	TM46616373	1 male, 1 female	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	3	2	Common	Sizewell 12	TM46616373	1 male, 2 females	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus coarctatus	4	3	Local	Sizewell 12	TM46616373	2 males, 2 females	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Hemiptera	Gerridae	Gerris odontogaster	6	2	Common	Sizewell 12	TM46616373	2 males, 4 females	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	11	2	Common	Sizewell 12	TM46616373	7 males, 4 females	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM3	3	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	F	2	Common	Sizewell 12	TM46616373	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Sizewell 12	TM46616373	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	F	2	Common	Sizewell 12	TM46616373	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	F	3	Local	Sizewell 12	TM46616373	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Sizewell 12	TM46616373	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	F	2	Common	Sizewell 12	TM46616373	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	F	2	Common	Sizewell 12	TM46616373	larva frequent	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	N	0	Unknown	Sizewell 12	TM46616373	adult numerous	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	N	0	Unknown	Sizewell 12	TM46616373	larva numerous	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Sizewell 12	TM46616373	adult occasional	27-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Sizewell	SM3	3	2009	April	Insecta	Hemiptera	Nepidae	Nepa cinerea	O	2	Common	Sizewell 12	TM46616373	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Glossiphonia complanata	O	2	Common	Sizewell 12	TM46616373	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Hirudinea	Hirudinea	Hirudinidae	Haemopis sanguisuga	O	3	Local	Sizewell 12	TM46616373	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Succineidae	Oxyloma elegans	O	2	Common	Sizewell 12	TM46616373	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Sizewell 12	TM46616373	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM3	3	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	O	3	Local	Sizewell 12	TM46616373	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	1	2	Common	Sizewell 18	TM46726344	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Hydrophilidae	Coelostoma orbiculare	1	2	Common	Sizewell 18	TM46726344	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	1	2	Common	Sizewell 18	TM46726344	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	1	3	Local	Sizewell 18	TM46726344	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Succineidae	Oxyloma elegans	1	2	Common	Sizewell 18	TM46726344	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Diptera	Sciomyzidae	Pherbellia schoenherri	1	3	Local	Sizewell 18	TM46726344	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Curculionidae	Hypera pollux	1	3	Local	Sizewell 18	TM46726344	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	1	0	Unknown	Sizewell 18	TM46726344	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Corixidae	Sigara dorsalis	1	2	Common	Sizewell 18	TM46726344	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Hydrophilidae	Cercyon marinus	1	3	Local	Sizewell 18	TM46726344	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM4	4	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Theromyzon tessulatum	1	2	Common	Sizewell 18	TM46726344	1 immature	27-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM4	4	2009	April	Vertebrata	Urodela	Salamandridae	Triturus	1	0	Unknown	Sizewell 18	TM46726344	1 immature	27-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Diptera	Stratiomyidae	Stratiomys singularior	1	5	Notable/Nb	Sizewell 18	TM46726344	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Odonata	Coenagriidae	Pyrrhosoma nymphula	1	2	Common	Sizewell 18	TM46726344	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Ephemeroptera	Caenidae	Caenis robusta	1	4	Nr	Sizewell 18	TM46726344	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	1	0	Unknown	Sizewell 18	TM46726344	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Diptera	Stratiomyidae	Vanoyia tenuicornis	1	5	Notable/Nb	Sizewell 18	TM46726344	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Dryopidae	Dryops luridus	1	2	Common	Sizewell 18	TM46726344	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	1	2	Common	Sizewell 18	TM46726344	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Gerridae	Gerris odontogaster	1	2	Common	Sizewell 18	TM46726344	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	1	2	Common	Sizewell 18	TM46726344	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Diptera	Sciomyzidae	Pherbellia dorsata	1	5	Notable/Nb	Sizewell 18	TM46726344	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Diptera	Ephydridae	Hydrellia maura	1	2	Common	Sizewell 18	TM46726344	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	1	2	Common	Sizewell 18	TM46726344	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus nitidiusculus	1	2	Common	Sizewell 18	TM46726344	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	1	5	Notable/Nb	Sizewell 18	TM46726344	1 subadult female	27-Apr-09	Drake, C.M.	SUF
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	2	2	Common	Sizewell 18	TM46726344	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	2	0	Unknown	Sizewell 18	TM46726344	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	3	2	Common	Sizewell 18	TM46726344	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	3	2	Common	Sizewell 18	TM46726344	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	3	2	Common	Sizewell 18	TM46726344	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	3	3	Local	Sizewell 18	TM46726344	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	3	3	Local	Sizewell 18	TM46726344	3 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	4	2	Common	Sizewell 18	TM46726344	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	4	2	Common	Sizewell 18	TM46726344	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Corixidae	Cymatia coleoptrata	5	3	Local	Sizewell 18	TM46726344	5 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	5	3	Local	Sizewell 18	TM46726344	5 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Veliidae	Microvelia pygmaea	5	5	Notable/Nb	Sizewell 18	TM46726344	5 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	8	2	Common	Sizewell 18	TM46726344	8 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	24	2	Common	Sizewell 18	TM46726344	24 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Corixidae	Corixa punctata	3	2	Common	Sizewell 18	TM46726344	1 male, 2 females	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Corixidae	Corixa panzeri	F	3	Local	Sizewell 18	TM46726344	2 males, female frequent	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Pleidae	Plea minutissima	F	2	Common	Sizewell 18	TM46726344	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	F	2	Common	Sizewell 18	TM46726344	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Sizewell 18	TM46726344	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	F	2	Common	Sizewell 18	TM46726344	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	F	2	Common	Sizewell 18	TM46726344	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	F	2	Common	Sizewell 18	TM46726344	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea stagnalis	F	2	Common	Sizewell 18	TM46726344	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Sizewell 18	TM46726344	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	F	2	Common	Sizewell 18	TM46726344	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	F	0	Unknown	Sizewell 18	TM46726344	larva frequent	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	N	2	Common	Sizewell 18	TM46726344	larva numerous	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM4	4	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Sizewell 18	TM46726344	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Glossiphonia complanata	O	2	Common	Sizewell 18	TM46726344	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Sizewell 18	TM46726344	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Hirudinea	Hirudinea	Hirudinidae	Haemopis sanguisuga	O	3	Local	Sizewell 18	TM46726344	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	O	0	Unknown	Sizewell 18	TM46726344	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Sizewell 18	TM46726344	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Viviparidae	Viviparus contectus	O	3	Local	Sizewell 18	TM46726344	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM4	4	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	O	2	Common	Sizewell 18	TM46726344	immature occasional	27-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Hydrophilidae	Coelostoma orbiculare	1	2	Common	Sizewell 5	TM46626321	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	1	3	Local	Sizewell 5	TM46626321	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Chrysomelidae	Prasocuris phellandrii	1	3	Local	Sizewell 5	TM46626321	1 adult	27-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Sizewell	SM5	5	2009	April	Tricladida	Tricladida	Dugesiidae	Dugesia lugubris	1	0	Unknown	Sizewell 5	TM46626321	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Euconulidae	Euconulus alderi	1	3	Local	Sizewell 5	TM46626321	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Chrysomelidae	Galerucella nymphaeae	1	3	Local	Sizewell 5	TM46626321	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Curculionidae	Thryogenes nereis	1	3	Local	Sizewell 5	TM46626321	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	1	2	Common	Sizewell 5	TM46626321	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus coarctatus	1	3	Local	Sizewell 5	TM46626321	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	1	0	Unknown	Sizewell 5	TM46626321	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Hydrochidae	Hydrochus angustatus	1	5	Notable/Nb	Sizewell 5	TM46626321	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Odonata	Coenagriidae	Ischnura elegans	1	2	Common	Sizewell 5	TM46626321	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Lepidoptera	Pyralidae	Cataclysta lemnata	1	2	Common	Sizewell 5	TM46626321	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Diptera	Tabanidae	Tabanidae	1	0	Unknown	Sizewell 5	TM46626321	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Dryopidae	Dryops luridus	1	2	Common	Sizewell 5	TM46626321	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	1	2	Common	Sizewell 5	TM46626321	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	1	2	Common	Sizewell 5	TM46626321	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus solutus	1	3	Local	Sizewell 5	TM46626321	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus nitidiusculus	1	2	Common	Sizewell 5	TM46626321	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM5	5	2009	April	Vertebrata	Urodela	Salamandridae	Triturus vulgaris	1	0	Unknown	Sizewell 5	TM46626321	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	2	2	Common	Sizewell 5	TM46626321	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	2	2	Common	Sizewell 5	TM46626321	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Dytiscidae	Laccophilus minutus	2	3	Local	Sizewell 5	TM46626321	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	2	2	Common	Sizewell 5	TM46626321	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	2	2	Common	Sizewell 5	TM46626321	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Hemiptera	Corixidae	Cymatia coleoptrata	2	3	Local	Sizewell 5	TM46626321	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	2	2	Common	Sizewell 5	TM46626321	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	2	2	Common	Sizewell 5	TM46626321	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	2	2	Common	Sizewell 5	TM46626321	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	2	2	Common	Sizewell 5	TM46626321	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	2	0	Unknown	Sizewell 5	TM46626321	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Haliplidae	Peltodytes caesus	3	5	Notable/Nb	Sizewell 5	TM46626321	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	4	2	Common	Sizewell 5	TM46626321	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	4	3	Local	Sizewell 5	TM46626321	4 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	4	3	Local	Sizewell 5	TM46626321	4 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Diptera	Chaoboridae	Chaoborus crystallinus	4	2	Common	Sizewell 5	TM46626321	4 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	5	0	Unknown	Sizewell 5	TM46626321	5 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Odonata	Coenagriidae	Pyrrhosoma nymphula	5	2	Common	Sizewell 5	TM46626321	5 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	5	3	Local	Sizewell 5	TM46626321	5 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	6	2	Common	Sizewell 5	TM46626321	6 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	7	2	Common	Sizewell 5	TM46626321	7 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus suturalis	8	5	Notable/Nb	Sizewell 5	TM46626321	8 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	11	2	Common	Sizewell 5	TM46626321	11 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Hemiptera	Gerridae	Gerris odontogaster	14	2	Common	Sizewell 5	TM46626321	10 males, 4 females	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Helophoridae	Helophorus minutus	3	2	Common	Sizewell 5	TM46626321	2 males, 1 female	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	F	3	Local	Sizewell 5	TM46626321	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Sizewell 5	TM46626321	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	F	2	Common	Sizewell 5	TM46626321	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	F	0	Unknown	Sizewell 5	TM46626321	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Sizewell 5	TM46626321	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	F	2	Common	Sizewell 5	TM46626321	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	F	2	Common	Sizewell 5	TM46626321	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	N	2	Common	Sizewell 5	TM46626321	adult numerous	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	N	3	Local	Sizewell 5	TM46626321	adult numerous	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	N	3	Local	Sizewell 5	TM46626321	adult numerous	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Hemiptera	Nepidae	Nepa cinerea	O	2	Common	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Hemiptera	Nepidae	Ranatra linearis	O	3	Local	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Glossiphonia complanata	O	2	Common	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Glossiphonia heteroclita	O	3	Local	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Hirudinea	Hirudinea	Hirudinidae	Haemopis sanguisuga	O	3	Local	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	O	2	Common	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea stagnalis	O	2	Common	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Succineidae	Oxyloma elegans	O	2	Common	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Mollusca	Mollusca	Viviparidae	Viviparus contectus	O	3	Local	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	O	3	Local	Sizewell 5	TM46626321	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM5	5	2009	April	Vertebrata	Anura		Anura	O	0	Unknown	Sizewell 5	TM46626321	immature occasional	27-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM5	5	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	O	5	Notable/Nb	Sizewell 5	TM46626321	larva occasional	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	1	2	Common	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	1	2	Common	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	1	3	Local	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	1	3	Local	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Hydraenidae	Ochthebius minimus	1	2	Common	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Haliplidae	Peltodytes caesus	1	5	Notable/Nb	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	1	2	Common	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	1	2	Common	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	1	2	Common	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	1	2	Common	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Diptera	Ephydridae	Parydra coarctata	1	2	Common	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Tricladida	Tricladida	Dugesiidae	Dugesia lugubris	1	0	Unknown	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Hemiptera	Hebridae	Hebrus ruficeps	1	3	Local	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	1	2	Common	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Carabidae	Agonum thoreyi	1	3	Local	Sizewell 15	TM46956370	1 adult	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Diptera	Lonchopteridae	Lonchoptera lutea	1	2	Common	Sizewell 15	TM46956370	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Diptera	Empididae	Clinocera stagnalis	1	2	Common	Sizewell 15	TM46956370	1 female	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	1	0	Unknown	Sizewell 15	TM46956370	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Odonata	Libellulidae	Sympetrum	1	0	Unknown	Sizewell 15	TM46956370	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Diptera	Tabanidae	Tabanidae	1	0	Unknown	Sizewell 15	TM46956370	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Trichoptera	Leptoceridae	Triaenodes bicolor	1	2	Common	Sizewell 15	TM46956370	1 larva	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Dryopidae	Dryops luridus	1	2	Common	Sizewell 15	TM46956370	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Diptera	Scathophagidae	Spaziphora hydromyzina	1	3	Local	Sizewell 15	TM46956370	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Diptera	Dixidae	Dixella autumnalis	1	3	Local	Sizewell 15	TM46956370	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Dytiscidae	Graphoderus cinereus	1	10	RDB3	Sizewell 15	TM46956370	1 male	27-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus planus	2	2	Common	Sizewell 15	TM46956370	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	2	2	Common	Sizewell 15	TM46956370	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Hemiptera	Pleidae	Plea minutissima	2	2	Common	Sizewell 15	TM46956370	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	2	3	Local	Sizewell 15	TM46956370	2 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Diptera	Lonchopteridae	Lonchoptera scutellata	2	5	Notable/Nb	Sizewell 15	TM46956370	2 females	27-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia tigrina	2	5	Notable/Nb	Sizewell 15	TM46956370	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	2	2	Common	Sizewell 15	TM46956370	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Diptera	Stratiomyidae	Vanoyia tenuicornis	2	5	Notable/Nb	Sizewell 15	TM46956370	2 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	3	2	Common	Sizewell 15	TM46956370	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	3	2	Common	Sizewell 15	TM46956370	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	3	3	Local	Sizewell 15	TM46956370	3 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	3	0	Unknown	Sizewell 15	TM46956370	3 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	5	2	Common	Sizewell 15	TM46956370	5 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	6	2	Common	Sizewell 15	TM46956370	6 adults	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	6	0	Unknown	Sizewell 15	TM46956370	6 larvas	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	3	2	Common	Sizewell 15	TM46956370	1 male, 2 females	27-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	F	3	Local	Sizewell 15	TM46956370	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	F	2	Common	Sizewell 15	TM46956370	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Sizewell 15	TM46956370	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	F	3	Local	Sizewell 15	TM46956370	adult frequent	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	F	2	Common	Sizewell 15	TM46956370	larva frequent	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM6	6	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	N	21	Naturalised	Sizewell 15	TM46956370	adult numerous	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	N	0	Unknown	Sizewell 15	TM46956370	adult numerous	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Hemiptera	Nepidae	Nepa cinerea	O	2	Common	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Glossiphonia heteroclita	O	3	Local	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Hirudinea	Hirudinea	Hirudinidae	Haemopis sanguisuga	O	3	Local	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	O	2	Common	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	O	3	Local	Sizewell 15	TM46956370	adult occasional	27-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM6	6	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	O	5	Notable/Nb	Sizewell 15	TM46956370	larva occasional	27-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus bipustulatus	1	2	Common	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Dytiscidae	Hydaticus transversalis	1	9	pRDB3	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Dytiscidae	Rhantus grapii	1	5	Notable/Nb	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus lineatocollis	1	2	Common	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Haliplidae	Peltodytes caesus	1	5	Notable/Nb	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa sahlbergi	1	2	Common	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Crustacea	Isopoda	Asellidae	Asellus meridianus	1	2	Common	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	1	2	Common	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea palustris	1	2	Common	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	1	2	Common	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	1	2	Common	Sizewell 3	TM46836344	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Hemiptera	Gerridae	Gerris odontogaster	1	2	Common	Sizewell 3	TM46836344	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	1	0	Unknown	Sizewell 3	TM46836344	1 larva	29-Apr-09	Drake, C.M.	L

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	1	3	Local	Sizewell 3	TM46836344	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Odonata	Libellulidae	Sympetrum	1	0	Unknown	Sizewell 3	TM46836344	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Odonata	Aeshnidae	Aeshna grandis	1	2	Common	Sizewell 3	TM46836344	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	1	2	Common	Sizewell 3	TM46836344	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Diptera	Tabanidae	Tabanidae	1	0	Unknown	Sizewell 3	TM46836344	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Diptera	Ephydridae	Hydrellia maura	1	2	Common	Sizewell 3	TM46836344	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus nitidiusculus	1	2	Common	Sizewell 3	TM46836344	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus boops	1	2	Common	Sizewell 3	TM46836344	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	2	2	Common	Sizewell 3	TM46836344	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	2	2	Common	Sizewell 3	TM46836344	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	2	3	Local	Sizewell 3	TM46836344	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	2	2	Common	Sizewell 3	TM46836344	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Hemiptera	Pleidae	Plea minutissima	2	2	Common	Sizewell 3	TM46836344	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	3	2	Common	Sizewell 3	TM46836344	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	3	2	Common	Sizewell 3	TM46836344	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Hemiptera	Corixidae	Corixa punctata	3	2	Common	Sizewell 3	TM46836344	3 females	29-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Hemiptera	Gerridae	Gerris lacustris	3	2	Common	Sizewell 3	TM46836344	3 females	29-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	4	3	Local	Sizewell 3	TM46836344	4 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Dytiscidae	Agabus sturmii	5	2	Common	Sizewell 3	TM46836344	5 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Hydrophilidae	Anacaena limbata	5	2	Common	Sizewell 3	TM46836344	5 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	5	21	Naturalised	Sizewell 3	TM46836344	5 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	6	2	Common	Sizewell 3	TM46836344	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	6	2	Common	Sizewell 3	TM46836344	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	9	0	Unknown	Sizewell 3	TM46836344	9 females	29-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	9	2	Common	Sizewell 3	TM46836344	9 males	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	5	2	Common	Sizewell 3	TM46836344	1 male, 4 females	29-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	F	0	Unknown	Sizewell 3	TM46836344	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	F	0	Unknown	Sizewell 3	TM46836344	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	F	2	Common	Sizewell 3	TM46836344	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	F	2	Common	Sizewell 3	TM46836344	male frequent	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Sizewell 3	TM46836344	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Glossiphonia complanata	O	2	Common	Sizewell 3	TM46836344	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Sizewell 3	TM46836344	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	O	2	Common	Sizewell 3	TM46836344	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Lymnaeidae	Lymnaea stagnalis	O	2	Common	Sizewell 3	TM46836344	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Sizewell 3	TM46836344	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	O	2	Common	Sizewell 3	TM46836344	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Arachnida	Araneae	Cybaeidae	Argyroneta aquatica	O	3	Local	Sizewell 3	TM46836344	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM7	7	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	O	0	Unknown	Sizewell 3	TM46836344	larva occasional	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Dytiscidae	Colymbetes fuscus	1	2	Common	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Dytiscidae	Liopterus haemorrhoidalis	1	3	Local	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus angustatus	1	2	Common	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	1	2	Common	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Dytiscidae	Hygrotus inaequalis	1	2	Common	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus testaceus	1	3	Local	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	1	2	Common	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Hemiptera	Veliidae	Microvelia reticulata	1	2	Common	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	1	2	Common	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	1	3	Local	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis planorbis	1	2	Common	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Diptera	Sciomyzidae	Sepedon spinipes	1	3	Local	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Carabidae	Agonum thoreyi	1	3	Local	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Tricladida	Tricladida	Dendrocoelidae	Dendrocoelum lacteum	1	2	Common	Sizewell 33	TM46746430	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Scirtidae	Cyphon laevipennis	1	3	Local	Sizewell 33	TM46746430	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Dytiscidae	Hydrovatus clypealis	1	6	Na	Sizewell 33	TM46746430	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM8	8	2009	April	Vertebrata	Urodela	Salamandridae	Triturus vulgaris	1	0	Unknown	Sizewell 33	TM46746430	1 female	29-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM8	8	2009	April	Mollusca	Mollusca	Valvatidae	Valvata ?macrostoma	1	12	RDB2	Sizewell 33	TM46746430	1 immature	29-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Dytiscidae	Dytiscus	1	0	Unknown	Sizewell 33	TM46746430	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Diptera	Stratiomyidae	Odontomyia ornata	1	12	RDB2	Sizewell 33	TM46746430	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Odonata	Lestidae	Lestes	1	0	Unknown	Sizewell 33	TM46746430	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Lepidoptera	Pyralidae	Cataclysta lemnata	1	2	Common	Sizewell 33	TM46746430	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus formicetorum	1	3	Local	Sizewell 33	TM46746430	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta marginellus	2	3	Local	Sizewell 33	TM46746430	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus melanocephalus	2	5	Notable/Nb	Sizewell 33	TM46746430	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	2	0	Unknown	Sizewell 33	TM46746430	2 females	29-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	2	3	Local	Sizewell 33	TM46746430	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	2	2	Common	Sizewell 33	TM46746430	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Diptera	Stratiomyidae	Vanoyia tenuicornis	2	5	Notable/Nb	Sizewell 33	TM46746430	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Dytiscidae	Hyphydrus ovatus	3	2	Common	Sizewell 33	TM46746430	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Hydrophilidae	Coelostoma orbiculare	3	2	Common	Sizewell 33	TM46746430	3 adults	29-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Hemiptera	Hebridae	Hebrus ruficeps	3	3	Local	Sizewell 33	TM46746430	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Dryopidae	Dryops luridus	3	2	Common	Sizewell 33	TM46746430	3 males	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	3	2	Common	Sizewell 33	TM46746430	3 males	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Hydrophilidae	Laccobius bipunctatus	4	2	Common	Sizewell 33	TM46746430	4 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	6	2	Common	Sizewell 33	TM46746430	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	6	2	Common	Sizewell 33	TM46746430	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	6	2	Common	Sizewell 33	TM46746430	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	11	3	Local	Sizewell 33	TM46746430	11 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Hydrophilidae	Enochrus coarctatus	2	3	Local	Sizewell 33	TM46746430	1 male, 1 female	29-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Hemiptera	Gerridae	Gerris odontogaster	2	2	Common	Sizewell 33	TM46746430	1 male, 1 female	29-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	F	2	Common	Sizewell 33	TM46746430	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Hemiptera	Pleidae	Plea minutissima	F	2	Common	Sizewell 33	TM46746430	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Sizewell 33	TM46746430	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	F	2	Common	Sizewell 33	TM46746430	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	F	0	Unknown	Sizewell 33	TM46746430	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Sizewell 33	TM46746430	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	F	3	Local	Sizewell 33	TM46746430	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	F	0	Unknown	Sizewell 33	TM46746430	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	F	2	Common	Sizewell 33	TM46746430	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Coleoptera	Scirtidae	Scirtidae	F	0	Unknown	Sizewell 33	TM46746430	larva frequent	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM8	8	2009	April	Hirudinea	Hirudinea	Hirudinidae	Haemopis sanguisuga	O	3	Local	Sizewell 33	TM46746430	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	O	2	Common	Sizewell 33	TM46746430	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Sizewell 33	TM46746430	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM8	8	2009	April	Vertebrata	Anura		Anura	O	0	Unknown	Sizewell 33	TM46746430	immature occasional	29-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM8	8	2009	April	Insecta	Odonata	Aeshnidae	Brachytron pratense	O	5	Notable/Nb	Sizewell 33	TM46746430	larva occasional	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Hydrophilidae	Coelostoma orbiculare	1	2	Common	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Coccinellidae	Coccidula rufa	1	2	Common	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus lineatocollis	1	2	Common	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Noteridae	Noterus clavicornis	1	3	Local	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa linnaei	1	2	Common	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Hemiptera	Corixidae	Hesperocorixa sahlbergi	1	2	Common	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Physidae	Physa fontinalis	1	2	Common	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Hemiptera	Saldidae	Chartoscirta cincta	1	2	Common	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Planorbidae	Anisus ?vorticulus	1	12	RDB2	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Curculionidae	Hypera pollux	1	3	Local	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Vertebrata	Pisces	Esocidae	Esox lucius	1	0	Unknown	Sizewell 38	TM46636444	1 adult	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Hemiptera	Veliidae	Velia	1	0	Unknown	Sizewell 38	TM46636444	1 immature	29-Apr-09	Drake, C.M.	IM
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Diptera	Stratiomyidae	Oplodontha viridula	1	3	Local	Sizewell 38	TM46636444	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Odonata	Coenagriidae	Ischnura elegans	1	2	Common	Sizewell 38	TM46636444	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	1	2	Common	Sizewell 38	TM46636444	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus lunatus	1	2	Common	Sizewell 38	TM46636444	1 larva	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus ruficollis	1	2	Common	Sizewell 38	TM46636444	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM9	9	2009	April	Vertebrata	Urodela	Salamandridae	Triturus vulgaris	1	0	Unknown	Sizewell 38	TM46636444	1 male	29-Apr-09	Drake, C.M.	M
Sizewell	Sizewell	SM9	9	2009	April	Crustacea	Amphipoda	Gammaridae	Gammarus pulex	2	2	Common	Sizewell 38	TM46636444	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Planorbidae	Gyraulus albus	2	3	Local	Sizewell 38	TM46636444	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Hemiptera	Lygaeidae	Ischnodemus sabuleti	2	2	Common	Sizewell 38	TM46636444	2 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Odonata	Coenagrionidae	Coenagrion	2	0	Unknown	Sizewell 38	TM46636444	2 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Hemiptera	Notonectidae	Notonecta glauca	3	2	Common	Sizewell 38	TM46636444	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Chrysomelidae	Prasocuris junci	3	3	Local	Sizewell 38	TM46636444	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus cicindeloides	3	3	Local	Sizewell 38	TM46636444	3 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Haliplidae	Haliplus	4	0	Unknown	Sizewell 38	TM46636444	4 females	29-Apr-09	Drake, C.M.	F
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Trichoptera	Limnephilidae	Limnephilus marmoratus	4	2	Common	Sizewell 38	TM46636444	4 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Chrysomelidae	Psylliodes laticollis	5	3	Local	Sizewell 38	TM46636444	5 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Odonata	Coenagriidae	Pyrrhosoma nymphula	5	2	Common	Sizewell 38	TM46636444	5 larvas	29-Apr-09	Drake, C.M.	L
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus pubescens	6	2	Common	Sizewell 38	TM46636444	6 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus nitidiusculus	7	2	Common	Sizewell 38	TM46636444	7 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus latifrons	7	2	Common	Sizewell 38	TM46636444	7 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Staphylinidae	Stenus picipennis	8	3	Local	Sizewell 38	TM46636444	8 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Chrysomelidae	Phaedon cochleariae	9	2	Common	Sizewell 38	TM46636444	9 adults	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Coleoptera	Dytiscidae	Hydroporus palustris	2	2	Common	Sizewell 38	TM46636444	1 male, 1 female	29-Apr-09	Drake, C.M.	M, F
Sizewell	Sizewell	SM9	9	2009	April	Crustacea	Isopoda	Asellidae	Asellus aquaticus	F	2	Common	Sizewell 38	TM46636444	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Crustacea	Amphipoda	Crangonycitidae	Crangonyx pseudogracilis	F	21	Naturalised	Sizewell 38	TM46636444	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Lymnaeidae	Radix balthica	F	2	Common	Sizewell 38	TM46636444	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Planorbidae	Planorbis carinatus	F	2	Common	Sizewell 38	TM46636444	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Valvatidae	Valvata cristata	F	3	Local	Sizewell 38	TM46636444	adult frequent	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Planorbidae	Anisus vortex	N	2	Common	Sizewell 38	TM46636444	adult numerous	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Bithyniidae	Bithynia tentaculata	N	2	Common	Sizewell 38	TM46636444	adult numerous	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Sphaeriidae	Pisidium	N	0	Unknown	Sizewell 38	TM46636444	adult numerous	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Valvatidae	Valvata piscinalis	N	3	Local	Sizewell 38	TM46636444	adult numerous	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Insecta	Hemiptera	Naucoridae	Ilyocoris cimicoides	O	2	Common	Sizewell 38	TM46636444	adult occasional	29-Apr-09	Drake, C.M.	AD

Sizewell and Minsere 2009 (continued)
Data from Martin Drake

actual count or Occasional,Frequent,Numerous

Marsh	Subsite	Code (Bugl.)	ditch number	YEAR	MONTH	Group	Order	Family	Species	Abundance 1	GB_STATUS	GB_STATUS_L	SITE_L	GRID	ABUNDANCE_STAGE	DATE	RECORDER_L	SEX_STAGE
Sizewell	Sizewell	SM9	9	2009	April	Hirudinea	Hirudinea	Erpobdellidae	Erpobdella octoculata	O	2	Common	Sizewell 38	TM46636444	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Vertebrata	Pisces	Gasterosteidae	Gasterosteus aculeatus	O	0	Unknown	Sizewell 38	TM46636444	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Vertebrata	Pisces	Gasterosteidae	Pungitius pungitius	O	0	Unknown	Sizewell 38	TM46636444	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Planorbidae	Hippeutis complanatus	O	3	Local	Sizewell 38	TM46636444	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Planorbidae	Planorbarius corneus	O	2	Common	Sizewell 38	TM46636444	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Hydrobiidae	Potamopyrgus antipodarum	O	21	Naturalised	Sizewell 38	TM46636444	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Mollusca	Mollusca	Sphaeriidae	Sphaerium corneum	O	2	Common	Sizewell 38	TM46636444	adult occasional	29-Apr-09	Drake, C.M.	AD
Sizewell	Sizewell	SM9	9	2009	April	Hirudinea	Hirudinea	Glossiphoniidae	Theromyzon tessulatum	O	2	Common	Sizewell 38	TM46636444	immature occasional	29-Apr-09	Drake, C.M.	IM

Appendix C
Aquatic Invertebrate Sample Results, Sizewell Belts (September 2009)

3 Pages

March 2014
Doc Reg No. 19801CA004R

Aquatic Invertebrates recorded from the Sizewell Belts, Leiston, Suffolk: September 2009

SAMPLE SITE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Dendrocoelum lacteum									1																								
Dugesia sp		1		5						1	5	2		5		4		2		1	3	1	1			2					6	14	
Planaria torva				2					1										1											1			
Polycelis nigra							1																										
Polycelis sp										1		6			2												1			1			1
Flatworm indet.		1					2		1	3			3						2		1	3		2	13	5			10	1			
Oligochaeta		1	9	12	1		3	1	7	21	8	2	3			1			6	2	3	2		2	1650	13	2			2	2	1	1
Eisenella tetraedra													2																				
Erpobdella octoculata		2	1		2					1			6									9											
Erpobdella testacea											3											13		1			1						
Erpobdella sp (juveniles)	1		10	2	1	8	4	1					7			11	5	1	1	2	3			2		6	4		6	1	11	1	5
Glossiphonia complanata			1												1												1				1		
Haemopsis sanguisuga																						1											
Helobdella stagnalis	1		1							16															4								
Theromyzon tessulatum		11	1	2								1										1			1		3		2		16	2	
Acroloxus lacustris												6			2	7																	
Bithynia tentaculata	8	30	4	25	102	588	55	88	17	80	44	50	15	158	45	209	240	476	120	45	74	91	1	33	16	31	152	37	71	160	68	7	56
Potamopyrgus antipodarum	3												13	4	6																		
Galba truncatula																									1								
Lymnaea stagnalis				9		2	20	14	1										4	1				11		9	82			1	9		4
Radix balthica	3	3	11	1	38		5	3		3	19	10	4	63	189	6	14	4	9	35	9	2	30	2	5	5	328	117	21	3	23		16
Stagnicola fuscus/palustris				1								1				1		2	1	6				8	6	3	10	2	12	8			
Physa fontinalis							1																	3		3		14	1	12	5		36
Physella sp	5	2											1																				
Anisus vortex	37	71	5	17	44	21	1	47	68	36	5	36	101	112	74	58	17	9	90	13		2		300	10	28	32	4	6	1	1	45	5
Bathyomphalus contortus										253			2			1																	
Gyraulus albus			775	3																				1									
Gyraulus crista			112	1												1	1	1					2					1					
Hippeutis complanata		1	675	3	4			1	3	287	5	10		1	4						6	15		1	2		1						
Planorbis carinatus		3		24	9	156	15	136	15	8	18	6	3		2	168	7	408	210	190	68			345	20	55	108		75	15	81	4	
Planorbis planorbis				8?	9		10						3	63	5		12		45		12	7	30				108	3					
Planorbarius corneus			4	12	22	25	25	20	7	50	6			5		41	30	56	135	40				11	65	20	57	8	41	1	9		
Oxyloma elegans (= pfeifferi)	4	1	6	20	9	6	40	3	5	1	2		2	28			12	6	90	11	14	7			11	11	15			14	8	2	44
Succinea putris							20																				1						
Succineidae (juveniles)																31													11				
Valvata cristata	2		87	9	2		1		5	195	1	28	8	46	93	10	1	2	24		6	5	1		132		1	2	7	1			
Valvata piscinalis													14	186																	1		
Vertigo antivertigo				7			1	1								7				1							1						4
Viviparus contectus						11		6																		1	2			1			
Pisidium sp		1	5	12		3	1	6	9		1	2	1	4		17	9	102	18	3	3	1			495	1			11		1		2
Musculium lacustre			6																														
Sphaerium corneum			9	18		6	3	1	1	7	4			2	1	36	21		33	1	4				37		3		3	8		5	
Argyroneta aquatica				3		18	60	2	4															2		8	8	17	5	5			
Arrhenurus cuspidifer			1	4	4				1									3	3	11	2	11					3	1			2		
Hydrachna globosa																						1											
Hydryphantes ruber																														1			
Limnesia undulata					10															1		1									1		1
Piona uncata												1																					
Unionicola deltoides																				1													
Cladocera (unidentified)																1					1									1	>1000		
Daphnia longispina																												135					
Daphnia pulex																																3400	24
Eurycercus lamellatus								7	1															30						2		10	3
Scapholeberis mucronata										69							1																
Simocephalus vetulus			225	1													4	42	2					1020		2	1						56
Copepoda			3				1			138	8	126						1				1	132	75			8	3	2	1	1		3
Ostracoda	1	15	200	2				2			5	1			1	16			2		7	2		31	4			3		2		3	33
Asellus aquaticus	18	15	1	6	4	9	319	68	5	9	29	32	24	84	29	31	5	7	2	9	18	13	8	75	49	13	8	4	48	208	18	12	11
Crangonyx pseudogracilis	1	1	3	25	7	10	150	20	51	46	270	144	15	3	2	60	8	42	255	75	434	50	3	600	45	40	23	8	134	86	9	45	76
Gammarus zaddachi													1		1																		
Caenis horaria			2	2	1																	91		1								1	
Cloeon dipterum	15	54	2500	302	86	12	80	9	204		9	264		2	3	162	860	433	7		3	158	440	1485	6	225	168	513	40	256	323	198	368
Coenagrionidae (early instars)		2	25						24					14				21					1		6	164	272					28	
Coenagrion puella		1		160	25	156	120	197	36	3	41	1		7		209	100		120	135	71	700		585		7		130	155	224	23	107	192
Ischnura elegans	1																											2?				1?	
Pyrrhosoma nymphula		2	25		57		70		192			3	7	7		6					9				1					64			12
Aesnidae (early instars)								4									1	1						13						5		2	10
Aeshna cyanea										1																							
Aeshna isosceles																		**1**															
Aeshna mixta																														4			
Brachytron pratense																																	**1**
Libellulidae (early instars)			1	6			1	20	1								1	5	25	8	6	100		105		2	8	108		26	2		5
Libellula quadrimaculata																		1							1								
Libellula sp (early instars)																	1																
Sympetrum danae/flaveolum																												9					
Sympetrum sp																				3				15									
Agraylea sexmaculata																															2		
Tricholeiochiton fagesii				**1**																**1**		**1**											
Athripsodes aterrimus				2	3	3																				1					2		
Leptocerus tineiformis																	2																
Triaenodes bicolor				1	1		5				1					17	1	3								1		1	2	3	15		1
Limnephilus lunatus					7	15	11											4						15		4				80		3	56
Limnephilidae (early instars)																											26				4		136
Phryganea sp					2	1											1					1		45		1		8		80	5		8
Trichoptera (early instars)																1	2		5					75	1				10			96	
Corixa panzeri																											4	6					
Corixa punctata																	2						1				1	4					
Cymatia coleoptrata																								9				135				1	
Gerris lacustris			1		1																									1	2		
Gerris lateralis																															1		
Gerris odontogaster					2		1	1																1				2				6	
Gerris sp (nymph)										1							3	1						1			1	1			1	1	
Hebrus ruficeps				1																													1
Hesperocorixa linnai			1		1											1			4	5		6	6				1	8		1		1	
Hesperocorixa sahlbergi			2		1					10		1						2					17										
Hydrometra stagnorum	2				1					1	1		4	1	3	3			1														2
Ilyocoris cimicoides			4	17	2				2		13					6	1	7	15	2	8	15				12	9		4	4	8	1	
Mesovelia furcata																				1													
Microvelia pygmaea					**1**		**1**	**1**																		**1**	**12**						
Microvelia reticulata			1	33	4		2					1						2	4									4	5		1		
Microvelia sp (inc. nymphs)																1										1							
Nepa cinerea						1					1						1				2			3									
Notonecta glauca	1	3	6	4	2	2	2	6	6	15		5			2	25	30	20	2			4	3	3			3	7	1	3		5	1
Plea minutissima				6							2					5	19	57	2	24	21	75		3		3	2	3	1	1	7	1	6
Sigara concinna								1																									
Sigara dorsalis																												3					
Sigara lateralis		1																										1					
Cataclysta lemnata	6	4	50	33	60	252	65	81	492	10	18	20	1	1		45	23	68	27	7	21	19		43	9	90	32	12	227	208	36	96	14
Gyrinus substriatus													1	1			6							1							3		
Haliplus confinis																												1					
Haliplus fluviatilis													1																				
Haliplus lineatocollis													1	4	7																		1
Haliplus obliquus																												1					
Haliplus ruficollis group (inc. F)		13	4				1		1						1		4			2		1	1			1				4	11		1
Haliplus ruficollis (M)										1							1				2	1								1	2		
Haliplus sibiricus	5	9											1																				
Peltodytes caesus		**1**																	**2**			**1**		**1**			**1**						
Noterus clavicornis				5		1			1		1	1				7	4			3	7	5		3					1		1	3	
Agabus bipustulatus			1								2			1	2	2																	
Agabus sturmii			1							5	1			2	8																		

SAMPLE SITE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Agabus sp (unidentified)																6																	
Dytiscus semisulcatus						1																											
Hydroglyphus geminus (= pusillus)				1																1										1			
Hydroporus erythrophthalmus														1																			
Hydroporus incognitus														7																			
Hydroporus palustris										3					6																		
Hydroporus planus				1																													
Hydroporus pubescens							1									1			1	1	1												
Hydroporus striola														1																			
Hygrotus impressopunctatus																1					1		1										
Hygrotus inaequalis														5								1	6				1	7					
Hyphydrus ovatus												1				2												6				2	
Ilybius ater																													1	1			
Laccophilus minutus							1																				1						1
Rhantus suturalis														1				2							2								1
Anacaena bipustulata														1																			
Anacaena globulus													2	1																			
Anacaena limbata				1						1	1		3	1	1	2		1			2		7	1	2	1			3	1		1	3
Anacaena lutescens																					1												
Coelostoma orbiculare																						1											
Cymbiodyta marginella											2									1	5		23										
Enochrus coarctatus				1							1					2					1												
Enochrus melanocephalus						1					1	1							1	1	1	3											
Enochrus ochropterus																					8												
Enochrus testaceus																																	1
Helochares lividus											1																						
Hydrobius fuscipes																							1		3		1			1			
Hydrophilus piceus							1																										
Laccobius biguttatus																										1		3					
Laccobius bipunctatus											3	1				1					2				13								3
Helophorus minutus gp (F)		1	2				1				2																1			1			
Helophorus minutus (M)							2				2					1	1						2		1	2			2				
Hydraena testacea													2										1										
Hydraena riparia (M)												4											1										
Hydraena riparia gp (F)														1																			
Ochthebius marinus	1	1					1				2					1							1			1			1			1	1
Ochthebius minima			6	1							1					2				2		2				1							1
Ochthebius nanus							1												2	5	96	26				2				14	7		4
Dryops luridus					1	4	2												1	4	2	1		6		3	2	1					
Cyphon sp (L)			9	304	6	12	22	4	2		44	1				58	3	2	17	3	744	18	3	1	99	31	26	1	237	12	8	1	72
Tanysphyrus lemnae																1																	
Stenopelmus rufinasus				1		1			1																		1						
Tipulidae (L)	1	3																	1			1			2					1	1		1
Limonia ventralis (L)						3											7	1			18	2			3	1		2		16			3
Limonia ventralis (P)								1													6									9			
Limoniidae (other)(L)			2	3	2	1	1	1	1	2						2	2		1			2	1		1	2	3		7		2		
Limoniidae (other)(P)															2		2																
Ptychoptera minuta (L)																							6		10				1				
Chironomini (L)	5	4	1	3	1		2			46	4	5	1	6	16	1	41	5					4		1		20	1	2		6	1	
Chironomus sp (PE)																												2				1	
Orthocladiinae (L)		1	3				2			1				1		1	33	2									5	2		3	4	2	
Orthocladiinae (P)																								1						2			
Acricotopus lucens (P)																	1																
Orthocladius sp (PE)																		1															
Psectrocladius limbatellus (PE)																												1					
Tanypodinae (L)				1				1		2						2			4						90		4	1	3		1		
Tanypodinae (P/PE)																	1						1	1	1		3						
Psectrotanypus varius (P/PE)																																14	3
Procladius (Holotanypus) sp (P/PE)	1														1											1							
Xenopelopia falcigera (P)												1													1								
Chaoborus crystallinus (L)									2	3	1	3				2		1									3						1
Aedes cantans/annulipes (P)																					1				3								
Anopheles atroparvus (L)												1						1			1	5			15			3				1	
Anopheles atroparvus (P)												1						1				1											1
Coquillettidia richardii (L)											2																						
Culicidae (poor condition)							2									1								1				1		1			
Culicinae (L)																					6												
Culicinae (P)																										1							
Dixella amphibia (L)							1			1		1											1										
Dixella amphibia (P)							5																				2						
Dixella attica/autumnalis (L)			1	2			3		1			1					6	8			1						9	1					1
Dixella aestivalis/autumnalis (P)							3										1							1									
Dixella sp (L)(poor condition)												1																					
Ceratopogonidae (L)			1	1	1		1																		4		1			1	2		1
Atrichopogon sp (L)											1																						
Pericomini (L)		1		10			4		1	2						1							2		3	1			8	1			
Psychoda sp (L)				2																									2				
Tonnoirella pulchra (L)				1	1		4			1									1							2	3				1		2
Odontomyia angulata (L)																		1															
Odontomyia cf argentata (L)							2											1									1		1				
Odontomyia ornata (L)			1				1									1	1	2	3	1	9	5			1			2					
Odontomyia sp (L)				1															5								1						
Oplodontha viridula (L)			1	3			7				3							3	18	16	20	36			3	2	3		13	4		1	4
Oxycera rara (L)							6									2			6	5	27	13			5								3
Oxycera trilineata (L)																							1										
Stratiomys sp (L)																												1		2			
Vanoyia tenuicornis					4	4	28	5	3							9	1		13	3	1			1		1	38		12	5	1		8
Stratiomyidae (L)				61																													
Hybomitra sp (L)											1																						
Tabanidae (L)																									1								
Syrphidae (L)																3																	
Sciomyzidae (L)				1			9				1		1											2			2	1					
Elgiva cucullaria (P)								1																									
Ephydridae (L)																					1								2				
Ephydra sp (PE)	1																																
VERTEBRATA																																	
Gasterosteus aculeatus	2	3	4	4		1							1	4	2		1														15		
Pungitius pungitius	2		1		2	2																	4		2								
Triturus sp (efts)						1	1	1	1											4	1					1	2			1			
TERRESTRIAL INVERTEBRATES IN POND NET SAMPLES																																	
Arianta arbustorum																						1	2										
Carychium sp																1																	
Euconulus alderi				8	1		1	1																			2						1
Pachygnatha clerkii			1	3	1	6	10	4		1	1		6	3		9	2	9	4	2	7				1	3	9		1	1	2		
Tetrix subulata	1																																
Tetrix undulata																																1	
Dolichonabis limbatus	1						3																										
Stenodema calcaratum												1																					
Agonum thoreyi																																	1
Lesteva sicula				1																													
Carpelimus corticinus							1																										
Stenus brunnipes											1																						
Stenus flavipes											1																						
Stenus incrassatus																1													1	1			
Stenus latifrons				1	1																						1						
Stenus nitidiusculus				1							3					2	1															1	1
Stenus picipennis				1												2																	
Paederus riparius																1																	
Pachnida nigella									2																								
Psammoecus bipunctatus										1																							

SAMPLE SITE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Atomaria mesomela										1																							
Coccidula rufa						1														2		2											
Rhyzobius litura																															1		
Cartodere bifasciatus										1																							
Bruchus loti																			1														
Galerucella tenella							1																										
Longitarsus gracilis																											1						
Protapion apricans				1																													
Ischnopterapion loti																					1						1						
Sitona hispidulus					1																												
Sitona lineatus					2	3													2	1	2						1						
Thryogenes nereis																6					5										1		
Datonychus melanostictus													1																				
Molophilus obscurus (A)												1															1						
Dixella amphibia (A)					2																												
Dixella autumnalis (A)									1								2										1						1
Scatopse notata (A)	1																																
Stilpon graminum (A)											1					2			1					1							1		
Hilara hirtella (A)	**1**																																
Achalcus britannicus (A)				1																													
Achalcus cinereus											1																						
Achalcus flavicollis (A)								1																									
Achalcus thalhammeri (A)												1																					
Campsicnemus scambus (A)					1																												
Sympycnus desoutteri (A)	1																1																
Lonchoptera furcata (A)																									1								
Lonchoptera lutea (A)															1																		
Lonchoptera nitidifrons (A)										**1**																							
Lonchoptera scutellata (A)												**1**																					
Pherbellia schoenherri (A)					1																1												
Psacadina verbekei (A)				**1**			**1**																										**1**
Psacadina vittigera (A)						**1**																											
Geomyza balachowskyi (A)													1									1											
Geomyza tripunctata (A)																				1													
Opomyza florum (A)		1			1																												
Elachiptera brevipennis (A)																									1								
Elachiptera cornuta (A)					3							1																					
Elachiptera pubescens (A)				**3**														**1**									**1**				**1**		
Elachiptera megaspis (A)				1																													
Elachiptera tuberculifera (A)																									1								
Elachiptera uniseta (A)					**2**																												
Diastata ornata (A)								1									1																
Coenia palustris (A)																									3				2				
Hydrellia albilabris (A)		3									1		1						1		1	1	1			1			5				2
Hydrellia maura (A)	3																1																
Parydra coarctata (A)	1																																
Parydra littoralis (A)																	1												2				
Scatella stagnalis (A)	1																																
Scatella tenuicornis (A)	3	1					1												1							1			6	2			

KEY TO ABBREVIATIONS
A = Adult(s)
F = Female(s)
L = Larva(e)
M = Male(s)
P = Pupa(e)
PE = Pupal exuvia(e)

Appendix D
Details of the Aquatic Invertebrate Sample Sites, Sizewell Belts (September 2009)

1 Page

Details of the Aquatic Invertebrate Samples Sites on the Sizewell Belts, Leiston, Suffolk, September 2009

SAMPLE SITE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Grid Reference (TM)	4570663753	4583663813	4596863838	4607663832	4616363782	4623763769	4629463763	4643263843	4639963858	4650863830	4659763729	4674063861	4731564520	4736364499	4723164356	4684764450	4682664401	4683664286	4675964296	4673164464	4667764408	4668864326	4710064329	4667463125	4667063054	4670563363	4673863445	4683863709	4694763717	4685463176	4686963127	4638863330	4679263028
Survey Date	28/09/09	28/09/09	28/09/09	28/09/09	28/09/09	28/09/09	28/09/09	28/09/09	28/09/09	28/09/09	28/09/09	28/09/09	29/09/09	29/09/09	29/09/09	29/09/09	29/09/09	29/09/09	29/09/09	29/09/09	29/09/09	29/09/09	29/09/09	30/09/09	30/09/09	30/09/09	30/09/09	30/09/09	30/09/09	30/09/09	30/09/09	30/09/09	30/09/09
Channel width (cm)	250	200	150	150	150	100	100	150	250	200	250	250	250	250	200	150	300	150	250	150	100	150	250	200	150	200	200	250	150	200	300	250	300
Mid-channel depth (cm)	Not recorded	Not recorded	72	Not recorded	Not recorded	84	100	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	80	62	50	Not recorded	Not recorded	65	Not recorded	Not recorded	75	81	Not recorded	Not recorded	Not recorded	60	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded
Depth ¼ width (cm)	100	50	60	60	53	57	56	69	67	50	60	81	50	Not recorded	Not recorded	50	52	54	69	55	60	68	61	53	6	Not recorded	63	36	63	95	58	72	76
pH	7.37	7.76	7.8	7.96	7.6	7.53	7.55	8.21	7.99	7.91	7.26	8.6	7.78	7.83	7.86	7.9	7.84	8.34	8.2	7.6	7.6	7.48	7.25	7.37	7.38	7.79	7.98	8.01	7.5	7.93	7.76	7.72	7.94
Conductivity (µS/cm)	940	1143	994	1040	1004	960	904	926	885	773	612	781	1050	1014	1021	490	1048	1002	693	944	905	904	3880	484	861	775	809	1245	1596	1073	854	782	672
Water temp. (ºC)	13.4	13.7	14.4	15.2	14.2	15.9	15.1	16.7	17.2	14.7	15.6	14.9	13.1	13.2	14.7	16.1	16.5	15.8	16.4	17.7	17.7	17.6	16.1	14.5	14.4	15.8	16	15.9	16.3	16.1	15.3	15.7	15.4
Total dissolved solids (ppm)	475	572	493	519	498	480	Not recorded	460	442	390	304	386	535	509	493	248	523	499	342	461	440	448	1940	243	415	387	402	620	798	533	426	391	333
Algal cover (%)	0	20	10	0	20	10	0	10	10	75	75	50	70	40	30	1	1	5	80	75	75	75	60	0	0	0	0	15	0	15	1	30	20
Floating veg. cover (%)	25	25	10	25	25	20	70	40	70	20	85	10	70	40	20	85	5	25	0	2	2	2	10	0	0	85	50	5	100	50	5	0	10
Marginal cover (%)	5	25	15	30	40	70	80	20	30	Not recorded	15	Not recorded	10	40	2	20	15	20	20	Not recorded	20	15	Not recorded	15	100	15	20	10	20	10	10	20	50
Grazing	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1	2	0	0	0	2	2	2
Shade (%)	10	50	30	0	50	0	0	0	0	50	30	50	20	50	70	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0
Turbidity	25	70	90	50	125	11	1	25	12	90	90	1	20	45	1	3	1	1	8	6	40	30	45	7	40	17	9	1	1	10	1	1	5
RB land-use	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
LB land-use	1	1	1	1	1	1	1	1	1	1	1	2	3	2	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1
Alisma plantago-aquatica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Alnus glutinosa	0	0	1	0	1	0	1	0	1	1	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	1	1	0	0
Apium nodiflorum	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	1	1	0	1	0	1	1	1	1	1	1	1	1
Betula pendula	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Callitriche stagnalis	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Calystegia sepium	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Carex paniculata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Carex sp	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0
Charophytes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Cirsium	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Eleocharis	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Elodea canadensis	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Epilobium	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
Equisetum	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Eupatorium cannabinum	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Glyceria	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grasses	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrocharis morsus-ranae	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	1	1	1	0	0	0	0	0	1	0	1	0	1	1	1	1	0	1
Hydrocotyle vulgaris	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iris pseudacorus	0	0	1	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus effusus	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Juncus (jointed)	0	0	1	1	1	1	0	1	1	1	1	0	0	0	0	1	0	1	1	1	1	1	0	1	1	1	1	1	1	0	1	0	1
Lemna spp	1	1	1	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Lemna minor	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Lemna trisulca	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	1
Lycopus europaeus	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lythrum salicaria	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Mentha aquatica	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	1	0	0	0	1	1	0	0	1	1	0	0	1	1	1	1	1	1
Myriophyllum sp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Phragmites australis	0	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	1	0	0	0	0	1	1	1	0	1	1	1	0	0	0	1
Polygonum persicaria	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quercus	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranunculus flammula	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Ranunculus sceleratus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Ranunculus sp	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Rorippa nasturtium-aquaticum	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubus fruticosus agg.	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rumex hydrolapathum	0	0	0	1	0	1	1	1	1	0	1	0	0	0	0	0	1	0	1	0	1	1	0	1	0	1	1	0	1	0	0	1	1
Rumex obtusifolius	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Rumex palustris	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salix alba	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salix caprea	0	0	1	0	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0
Salix fragilis	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scirpus sp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Sparganium erectum	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Typha angustifolia	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Urtica dioica	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Utricularia sp	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0
Cladophora (blanketweed)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0

NOTES ON PARAMETERS
Water flow was absent and consequently not measured
Channel width (row 5): Width given is the average when minimum and maximum were recorded
Mid-channel depth (row 6) was often too difficult or dangerous to measure. Therefore, the depth at ¼ width (row 7) was measured where possible.
Channel depth (rows 6 & 7): Where a range was recorded, the maximum is given
Grazing (row 15): 0 = not grazed, 1 = evidence of grazing, 2 = stock present
Turbidity (row 17) was measured with a turbidity tube
Land-use (rows 18 & 19): 1 = Pasture, 2 = reedbed, 3 = forestry
For plant and algal species (rows 20-68), 0 = absent, 1 = present

Appendix E
Details of the Ecology, Status and Distribution of the Protected, Red Data Book and Nationally Scarce Species recorded in September 2009

8 Pages

Up to date distribution maps of the species mentioned below may be found on the National Biodiversity Network Gateway website at: www.nbn.org.uk.

Protected under the Wildlife & Countryside Act (1981)
Aeshna isosceles (Odonata, Aeshnidae)

The Norfolk hawker breeds in unpolluted grazing marsh dykes which contain water soldier in areas where the water table is maintained at a high level. Other plants often present are frogbit, pondweeds and greater bladderwort. The dragonfly is confined to the Norfolk and Suffolk Broads. It is restricted to a few grazing marshes which are relatively isolated from polluted water. The above information is from Merritt et al (1997). In recent years this species has proved to be relatively frequent at Sizewell and this may indicate an upturn in the species fortunes.

Red Data Book 1
Aeshna isosceles (Odonata, Aeshnidae)

See above account.

Odontomyia angulata (Diptera, Stratiomyidae)

This soldier-fly is poorly known in Britain. There are old records from East Anglia including the Norfolk Broads and several fens in the Breck and Cambridgeshire. The only recent British records according to Stubbs and Drake (2001) are from ponds at two sites in Norfolk, and from Oxfordshire where a few adults were found close to a fenland pool. The larvae have been found among vegetation in shallow water.

Red Data Book 2
Odontomyia argentata (Diptera, Stratiomyidae)

This soldier-fly is poorly known in Britain. It was once more widely distributed from Somerset and Dorset to east Anglia, but now appears to have contracted to a small number of sites in East Anglia and a few in Hampshire and Berkshire. However, the fact that it is an elusive, early spring species means that its presence may go undetected in fens and marshes. The larvae have been reported on the Continent in rotting alder wood, flood refuse, moss and from flood-plain pools that dry up in summer. In Britain, the larvae have been found in very shallow water of pools vulnerable to summer drought, and the adults have been found by shallow ditches which almost certainly provide the larval habitat at some sites.

An adult of this species was recorded twenty years ago from Sizewell by Dr Martin Drake. The larvae collected in September 2009 could represent this species but ideally the adults should be reared from larvae or adults caught to confirm the determinations.

Odontomyia ornata (Diptera, Stratiomyidae)

This soldier-fly has two strongholds; namely, the Somerset Levels and the Gwent Levels, where it is widespread and not uncommon. There are also sizeable populations on the freshwater parts of coastal levels in East Sussex. The species has been recorded sparsely as adults or larvae in similar habitat in West Sussex, Kent, Essex, Suffolk and Norfolk. The adults may frequently be seen on umbellifers such as hemlock water dropwort but the larvae are usually much easier to locate. The larvae may be locally common in ditches on grazing levels. They may be free-floating or crawling among aquatic vegetation near the surface, especially within tangles of ivy-leaved duckweed and frogbit. The preferred ditches are wide (more than 1m) and have a rich and structurally diverse cover of floating vegetation. Almost certainly the key to this species survival is the presence of extensive areas of ditches that are cleaned out on a cycle of about five years.

Hilara hirtella (Diptera, Empididae)

Records of this dance-fly appear to be confined to sites in Suffolk: West Stow (1913), Barton Mills (1913), Cavenham Heath NNR (1981) and Tuddenham Fen NNR (1990). There are further unspecified sites in Cambridgeshire and Suffolk (Falk & Crossley 2005). The habitat requirements of this species are unclear: some records relate to the River Lark whilst a recent record reports the adults skimming low over puddles on a road. The larvae probably develop as predators in damp soil in the vicinity of rivers. The adults have been recorded in September, October and November. Collin (1961) mentioned that this species was not uncommon at various localities in Suffolk and Cambridgeshire. However, the scarcity of recent information suggests that it may now be more restricted. The late flight period may have led to some under-recording.

Psacadina vittigera (Diptera, Sciomyzidae)

Falk (1991) was only able to give six British records for this species namely in Norfolk (two sites), Cambridgeshire (two sites), Oxfordshire (one site) and Suffolk (one site at Foxhall Pond with numerous dates between 1896 and 1904). This species occurs in wetlands, especially fens, with standing water probably being a requirement. The larvae are probably parasitoids of freshwater snails at the margins of water-bodies. This is an extremely rare southern species with only four post-1960 sites according to Falk (1991).

Red Data Book 3

Hydrophilus piceus (Coleoptera, Hydrophilidae)

In Britain, *H. piceus* is largely confined to drains in coastal levels. Those specially favoured are choked with vegetation such as ivy-leaved duckweed (*Lemna trisulca*) and fringed by common reed (*Phragmites australis*). *H. piceus* is a summer breeder (larvae reported from mid-May to the beginning of August in the Netherlands). The larvae feed on water snails, and the presence of *Hydrophilus* may be implied from the characteristic biting marks to be seen on empty snail shells. In the Somerset Levels, adults are found mainly in rhynes that have been recently cleared, whereas larvae occur in ditches thickly choked with vegetation. Adults have often been caught in light traps, and may occasionally be seen below street lamps, or on greenhouse roofs.

Hydrophilus piceus has been recorded from a total of 68 ten kilometre in Britain, 42 of them in England from 1950 onwards, plus three in Wales. The equivalent counts since 1990 are 17 and three. It appears to have contracted in range in that there are no modern records for the English Midlands, the Cambridgeshire Fens, Glamorgan and the immediate vicinity of London. It is, however, well established in the Somerset Levels, the Broads, and coastal levels in Kent and Sussex.

Loss of traditional grazing fen may result in loss of this species, particularly if drains are destroyed or become overgrown. Drainage of the Cambridgeshire Fens and the London Marshes in the 19th Century must have resulted in the greatest reductions in this species in Britain, indicating the potential for further decline.

Conditions favouring an abundance of large molluscs are essential for breeding by this species; piecemeal clearance of drains using hand shovels is better than large scale clearance using heavy plant in that larger invertebrates can escape. Much of the area where *H. piceus* occurs in the Broads and on levels in Gwent, Somerset, Kent and Sussex is protected by scheduling as SSSI, and smaller areas are protected as NNR and wildlife reserves.

Nationally Scarce
Brachytron pratense

The hairy dragonfly is most commonly found in Britain on the coastal levels and grazing marshes of Somerset, Sussex, Kent and Norfolk. It also occurs in the fens of Anglesey, the Cheshire meres and on the wetlands along the coast of South Wales and Suffolk. This species breeds in mesotrophic ponds, lakes including mature gravel pits, canals, ditches and marshy fens where there is plenty of tall emergent vegetation such as common club-rush, common reed, bulrush and great fen-sedge. This species has a short flight season from mid-May to mid-July. It can be found with other species that favour unpolluted well-vegetated dykes and fens (Merritt et al 1997).

Tricholeiochiton fagesii (Trichoptera, Hydroptilidae)

This small caddisfly has been recorded from a small loch in Perthshire, three ponds on the Wirral in Merseyside, a pool in Shropshire, a fishing lake in Hampshire, a bog in Gwynedd, a bog in South Glamorgan and from marshes in the Norfolk Broads in 2009. The habitat is weedy still waters. It is clearly a widespread species although with few records (Wallace 1991).

Microvelia pygmaea (Hemiptera, Veliidae)

This minute water bug has been recorded mainly from south-eastern England and East Anglia east of a line between Poole and the Wash. It is found in dense vegetation usually in weedy ditches. A few records are from marginal vegetation in larger bodies of water (Huxley 2003).

Peltodytes caesus (Coleoptera, Haliplidae)

P. caesus is confined to lowland slow-moving drains and ponds with permanent water, often brackish, always base-rich, and usually with a soft, muddy bottom. Typically, these lie in areas of old grazing fen on coastal marsh systems, though it does occur well inland in Oxfordshire. The larva and adults feed on filamentous algae, and possibly also on stoneworts. Oviposition occurs in the spring on submerged vegetation. Fully grown larvae and teneral adults occur later in the summer, and it is likely that this species overwinters as adults out of the water. Adults have been recorded attracted to light in mainland Europe.

Peltodytes caesus has been recorded from 63 hectads in England and Wales since 1950, and 35 since 1990, with old records for Lancashire, around the Wash and inland in southern England. This species was found in one sample of the British Countryside Survey in 1990. It was noted as one of three species to disappear from the Wash drainage system. *P. caesus* is in decline in Denmark, possibly because of pollution, and it appears in many Red Lists in Europe.

The decline in this species must be associated with habitat loss, but it would also appear to be sensitive to changes in water quality and land use, possibly the conversion of grazing fen to arable land, which results in a reduction in the number of dykes.

Most of the drainage systems on which it occurs are protected as SSSI under management agreements. One of the few inland sites, Otmoor, is also an SSSI and an RSPB Reserve. In the absence of clear guidance on its habitat requirements, maintenance of traditional grazing fen must be considered appropriate for its conservation.

Hydroglyphus pusillus (Coleoptera, Dytiscidae)

This species is most characteristic of recently created still water sites with a clay or mud substratum, but it is also typical of the shallow rhyne systems of the Somerset Levels, and will occur amongst shallowly flooded moss. It is often recorded in flight and can occur in atypical sites in years of abundance.

Hydroglyphus pusillus has been recorded from 123 hectads in England and Wales since 1950, and 115 since 1990. This species was found in one sample of the British Countryside Survey in 1990. The northernmost record is for Gosforth, South Northumberland, where the species no longer occurs despite an abundance of apparently suitable habitats provided by subsidence ponds. Dispersal in hot summers accounts for the widespread occurrence of this species, which is sufficiently restricted in most years to qualify for Nationally Scarce status, albeit marginally (Foster 2000).

This species is not under threat, but its British population probably contracts to pockets in southern England when there is a succession of severe winters. No special conservation measures are necessary, other than construction of ponds.

Rhantus suturalis (Coleoptera, Dytiscidae)

R. suturalis occurs in exposed lowland ponds and ditches amongst vegetation. It is unusual among *Rhantus* spp. in that it overwinters as adults in the water rather than away from it. The development time of 33 days at about 20ºC from egg laying to adult eclosion is short compared to 52 days for the common *Agabus bipustulatus* under similar conditions. This species is often attracted to light at night and readily takes to flight.

Rhantus suturalis has been recorded from 136 ten kilometre squares in England and four in Wales since 1950. It has been recorded from 89 English and two Welsh hectads since 1990. Many isolated records, including two for the only Scottish site, probably represent the full extent of range of a dispersive species.

This species is not under threat. The creation of new ponds will be beneficial to this species. It is not confined to primary fen conditions and does not require statutory protection.

Anacaena bipustulata (Coleoptera, Hydrophilidae)

A. bipustulata has been described in the Netherlands as a fluviatile species with preference for coastal environments around deltas and estuaries. It reaches to 800 m in river valleys and is also found in brackish water." In Britain, it is rather more restricted than this, being found mainly in ditches and ponds in former fenland, though also occasionally inland in small streams in the Weald. *Anacaena* adults and larvae are semi-aquatic. *Anacaena* adults deposit long-masted egg-cases on debris, and larvae hatch in 8-10 days, taking possibly as long as two months to complete development. The larvae are predaceous. *Anacaena bipustulata* has been observed to fly in Spain.

Anacaena bipustulata has been recorded from 142 ten kilometre squares in England and four in Wales from 1950 onwards. It been recorded from 76 ten kilometre squares since 1990. The restricted distribution and habitat indicate the need to provide this species with the lowest scarcity status. This species is still common in Somerset. This species is not under threat.

Enochrus coarctatus (Coleoptera, Hydrophilidae)

This species was originally accorded Scarce B status, but, with over 200 ten km records from 1950 onwards, widely distributed in England, Scotland and Wales, this species cannot be considered as having a scarcity status.

Enochrus melanocephalus (Coleoptera, Hydrophilidae)

There are recent published records for South and North Somerset, East Sussex, East and West Kent, East and West Norfolk, Cambridgeshire, Bedfordshire, Huntingdonshire, Northamptonshire, Monmouth, Anglesey, North Lincolnshire, Leicestershire, Nottinghamshire, Derbyshire, Cheshire, South-west Yorkshire and Durham.

On the Continent, this species has been described as developing in the algal bloom of shallow stagnant waters that are fully exposed to the sun. In England, it is found in exposed, base-rich sites including coastal pools and ditches with a brackish influence. In 1993, following the drought of 1992, this species appeared for the first time in well surveyed pools of the West Norfolk pingo fens. It also colonises new ponds created by extractive industries. The life history details of *Enochrus* species appear to vary considerably from one species to another and the life history of individual British species has not been described. An egg-case is produced, sometimes under water, and larval development may last between one and two months. Adults feed on algae and decaying plants whereas the larvae are predaceous.

This species has been recorded from 66 ten kilometre squares in England from 1990 onwards. This species is not under threat. *Enochrus melanocephalus* is a pioneer species that will benefit from the creation of new pools.

Enochrus ochropterus (Coleoptera, Hydrophilidae)

There are recent published records for East Cornwall, Dorset, South and North Somerset, East Sussex, East and West Kent, Huntingdonshire, East Suffolk, West Norfolk, East and West Gloucester, Monmouth, Brecon, Pembroke, Cardigan, Anglesey, Leicestershire, Derbyshire, Cumberland, Kirkcudbrightshire, Roxburghshire, Raasay, and Moray. *E. ochropterus* is a northern and central European species, ranging from Denmark and Fennoscandia to central France, northern Italy, the Balkans, and Siberia.

E. ochropterus is typical of mesotrophic mires, including small base-enriched sections of other nutrient poor bogs, base-flushed peat cuttings and mossy dune-slack and oxbow pools. It can occur in fen carr and appears to be particularly common in litter zones or where mosses are decaying after trampling. The life history details of *Enochrus* species appear to vary considerably from one species to another and the life history of individual British species has not been described. An egg-case is produced, sometimes under water, and larval development may last between one and two months. Adults feed on algae and decaying plants whereas the larvae are predaceous.

This species has been recorded from 45 ten kilometre squares in England from 1990 onwards, plus twelve in Wales and six in Scotland.

This species does not appear to be under threat, except from drainage of bogs and mires as a result of development. A limited amount of disturbance of bog surfaces may be beneficial to this species in that new pockets of moss growth as created in association with decaying plant matter. *E. ochropterus* occurs in a large number of NNR, SSSI and wildlife reserves widely distributed across Britain.

Helochares lividus (Coleoptera, Hydrophilidae)

Helochares lividus has been recorded from 174 ten kilometre squares from 1990 onwards and it was found in five samples of the British Countryside Survey in 1990. These data indicate the need for this species to lose its Nationally Scarce status (Foster 2000).

Hydraena testacea (Coleoptera, Hydraenidae)

This species is found in stagnant water in association with a well-developed marginal vegetation line, but it also occurs in slow-moving water in canals and streams, being found in the moist zone just above the main water line. The seasonal occurrence of adults is strongly bimodal, with peaks in June and September.

Hydraena testacea has been recorded from 108 ten kilometre squares in England, four in Wales and three in Scotland from 1950 onwards, the equivalent values since 1990 being 62, one and one.

Despite some evidence of contraction in range, this species is not under threat. No special conservation measures are considered necessary for this species (Foster 2000).

Ochthebius marinus (Coleoptera, Hydraenidae)

There are recent published records for South and North Somerset, Dorset, East Sussex, East Kent, East and West Norfolk, Monmouth, Westmorland, Cumberland, Durham, South and North Northumberland, and East Lothian. The northernmost sites are in Aberdeenshire and Ayrshire.

This species occurs in a wide range of brackish habitats, and has rarely been recorded inland. This species flies readily.

Ochthebius marinus has been recorded from 92 ten kilometre squares in England, 14 in Wales and eleven in Scotland from 1950 onwards, the equivalent counts for 1990 onwards being 33, four and five respectively. Despite the low counts recently, there is no evidence of contraction in range.

This species cannot be considered under threat. It occurs in a wide range of coastal sites subject to statutory protection.

Ochthebius nanus (Coleoptera, Hydraenidae)

There are recent published records for North Somerset, East Sussex, East and West Kent, and South-west Yorkshire. This species occurs in stagnant water pools and in slow-flowing drains in lowland rich and grazing fen.

This species has been recorded from 33 ten kilometre squares in England from 1950 onwards, and nine since 1990. There are no modern records for Wales and there is considerable evidence of contraction in range in England, particularly on the coastal levels previously occupied in Lincolnshire and West Norfolk, and from the Cambridgeshire Fens.

Despite the association of this species with brackish habitats in south-east England, its decline elsewhere appears to be associated with loss of peat substrata. The change in range might also be interpreted as a result of climatic deterioration.

The decline of this species requires its special consideration, despite its continued abundance in coastal habitats. It occurs in many sites subject to statutory protection.

Limonia ventralis (Diptera, Limoniidae)

Records of this crane-fly are widely dispersed throughout England, Scotland and Wales. Many records refer to brackish ditches on coastal levels, whilst other records refer to inland locations at muddy, sparsely vegetated margins of lakes and ponds. Whilst brackish conditions are clearly tolerated, it does not appear to be essential and sparse emergent vegetation is probably a more essential feature. There are about 30 post-1960 sites according to Falk (1991).

Vanoyia tenuicornis (Diptera, Stratiomyidae)

This soldier-fly occurs mainly on the southern lowlands of England and Wales, but it has been found as far north as Yorkshire. It generally occurs in fens or wet meadows, coastal seepages or wet dune-slacks. Some sites are brackish, suggesting that the larvae may tolerate slightly saline conditions. Larvae that were reared to adults were found in South Wales in seepages, at the transition of dune grassland to saltmarsh and in a grazed freshwater fen where they were found amongst moss and sedge litter.

Lonchoptera nitidifrons (Diptera, Lonchopteridae)

This pointed-wing fly was given Notable status in Falk (1991) but demoted in the recent review by Falk and Chandler (2005). Drake (2002) found that this species was mainly recorded from unmanaged sites with little or no grazing and from circum-neutral vegetation types such as reedbeds, tall-herb reed fen, fen meadow and various swamp communities.

Lonchoptera scutellata (Diptera, Lonchopteridae)

Records for this pointed-wing fly are widely dispersed throughout England. There are records from only three Welsh sites. This species is associated with sedges (mainly *Carex riparia* and *C. acutifolius*) at water margins, in fens and in damp woods; it is also found in tussocks of *Carex paniculata* in the winter months. The larval biology is unknown, but the larvae may develop in leaf litter or decaying vegetable matter in the above situations. This is a widespread but very local species with at least 46 post-1960 sites according to Falk & Chandler (2005).

Psacadina verbekei (Diptera, Sciomyzidae)

This snail-killing fly has been recorded widely in England as far north as Yorkshire and Wales. It has been recorded on a range of wetlands including fens, damp heaths, riversides and dune-slacks. Standing water is probably a requirement, although records appear to relate to both bog and base-rich conditions. The larvae develop as parasitoids of aquatic snails such as *Lymnaea* spp and appear to be adapted to life at the margins of aquatic habitats. This is a widespread but very local species with about 25 post-1960 sites.

Elachiptera pubescens (Diptera, Chloropidae)

This is essentially a coastal species of southern England according to Falk and Ismay (in prep.). The recorded habitats include coastal grazing marsh and to a lesser extent, damp heathland, gravel pits and marshland. There may be a requirement for *Phragmites* beds. The early stages are unknown; the larvae probably develop in decaying vegetable matter although they may invade grass and reed stems. This species is widespread but local in the south, although may be locally frequent on the South Essex marshes. There are about twenty post-1960 sites according to Falk and Ismay (in prep.).

Elachiptera uniseta (Diptera, Chloropidae)

This minute fly has been recorded from scattered localities throughout England and South Wales (two counties only however here). It occurs in wetlands including fens, damp woods, gravel pits and coastal marshes. The early stages are unknown; the larvae probably develop in decaying vegetable matter although they may invade grass or reed stems. The adults have been recorded virtually throughout the year and appear to be associated with reeds and tussocks of grasses and sedges according to Falk and Ismay (in prep.) although the surveyor has found the species frequently in marginal or emergent vegetation such as *Glyceria*.

EDF Energy

Sizewell

2010 Invertebrate Survey Report

UK Protect - Commercial

March 2014

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Document Revisions

No.	Details	Date
1	Draft Report	February 2011
2	Final Report	March 2014

Note

The information contained in this report was, to the best of the issuer's knowledge, correct at the time of issue of the latest draft. Some of this information may no longer be current.

Contents

1. Introduction

1.1 Background

An area of land directly north of the Sizewell 'B' Power Station has been identified as having the potential to accommodate new nuclear plant. This area, which covers 0.49km^2/49ha and has an approximate central grid reference of TM473640, is referred to in this document as the 'Strategic Site Area (SSA).' An access road to the proposed new power station is likely to run in an easterly direction before linking into the wider road network at Lover's Lane. The indicative plant footprint and access road corridor are shown on the sample location plan in **Figure 1.1.** In addition to these permanent development proposals, there will also be a number of temporary construction activities and other associated developments, but details of these areas are yet to be ascertained.

It was clear from early in the ecological desk study (which began in late 2006) that the Sizewell Estate supported a notable assemblage of invertebrates. Terrestrial invertebrate survey work was undertaken in 2007 by the surveyor with the aim of obtaining representative baseline data from habitats that were likely to be subject to land take as a result of development and to identify any areas within the initial footprint of particular importance for invertebrates. Survey of a number of sites within a 200m perimeter around the initial footprint was also undertaken for context with a view to undertaking additional survey work as development proposals evolved. The results of this work have previously been reported (AMEC Environment & Infrastructure UK Ltd (AMEC), 2014a).

Following the evolution of the SSA boundary and the resulting potential effects on aquatic habitat associated with the Sizewell Marshes SSSI, aquatic invertebrate survey work was undertaken in September 2009 to assess the importance of the SSSI for aquatic invertebrates including identifying rare and uncommon species as well as sensitive ditches, and to provide information to guide the proposed development, enable assessment of any potential impacts and enable suitable mitigation. The results of this work were reported earlier this year (AMEC, 2014b). Previous surveys have concentrated on terrestrial invertebrates on the access road corridor, the development footprint and adjoining coastal strip and on aquatic macro-invertebrates in the adjoining Sizewell Belts SSSI. The present report provides results on terrestrial invertebrates recorded from ditches in the Sizewell Belts, on invertebrates recorded in the reedbeds within the SSA and on the protected and UK BAP Norfolk hawker dragonfly (*Aeshna isosceles)* which occurs throughout the site. The combined reports will be used as context for the Ecological Impact Assessment (EcIA) for the development proposal.

1.2 Purpose of the Survey Work

The present surveys were undertaken to provide baseline information on invertebrates in habitats that may be either directly or indirectly affected by the proposed works on Sizewell Belts SSSI. In addition, the Norfolk hawker is, arguably, the highest-profile invertebrate recorded on the Sizewell Estate and given its protected status and other designations (UK BAP and Red Data Book 1) it was felt useful to confirm its presence and location on the site and to determine whether it was breeding within the SSA.

2. Methodology

2.1 Survey Protocol

Ditches were selected within Sizewell Belts SSSI for sampling. These were sampled in groups in June 2010 with a 16 inch diameter sweep net attached to a six foot angling pole. The net was passed through bankside vegetation, over the ditches and alongside overhanging bushes and trees. **Figure 1.1** shows the locations of the ditches sampled. Invertebrates recorded were selectively removed with an aspirator (or pooter) and placed in alcohol for later determination. Conspicuous insects such as butterflies, day-flying moths, dragonflies and certain bumblebees were recorded in the field. Reedbed insects within the SSA were sampled by means of two Malaise traps which were erected in early and late June 2010 at two separate locations (the location of the Malaise traps are indicated in **Figure 1.1**). Malaise traps are large flight interception traps that work by impeding an insect's forward movement, forcing the individual to move around the obstacle and in doing so, ending up in a collecting head containing preservative. Malaise traps collect large quantities of material and are particularly effective in reedbeds and fens. Norfolk hawker was recorded by locating adults and checking these using binoculars.

2.2 Personnel

Andy Godfrey undertook the field sampling, sorting, identification and reporting. Andy was formerly employed as an entomologist with the Nature Conservancy Council and has specialised in studying invertebrates whilst based in various museums and for ecological consultancies. Since 1999 Andy has worked solely as an entomologist working on conservation and development projects. Andy's particular expertise is in aquatic invertebrates and Diptera, which he has surveyed throughout Britain for over 30 years.

2.3 Constraints

Fieldwork was confined to June 2010, partly to the requirement to identify material and report by the end of July 2010[1]. Further material was obtained from both malaise traps in late summer 2010 and this material has been retained for identification and evaluation should this be required. Additional material from earlier or later months would increase the accuracy of evaluation of the site for invertebrates but is not essential to the provision of a robust EcIA.

Sweep netting could also have been employed to sample the reedbeds and could have been used to cover a wider area. However, Malaise traps are extremely effective at collecting material and saved tens of man-days manual sampling. Also, many cryptic invertebrates which are rarely encountered by other sampling methods, can be obtained using Malaise traps. Pitfall trapping and water trapping were other invertebrate survey methods considered, but these are difficult to use and ineffective respectively in reedbeds.

Because of the large amount of material collected, identification has focused on selected target groups. All unidentified material has been retained.

[1] The project timescales have since changed.

3. Results

The prevailing weather conditions experienced during the survey work are summarised in **Table 3.1** below.

Table 3.1 Prevailing Weather Conditions

Survey Date	Weather Conditions
2 June 2010	Sunny, warm, no cloud cover. No significant wind.
3 June 2010	Sunny, no cloud cover No significant wind.
4 June 2010	Bright and sunny, no cloud cover, cool breeze
23 June 2010	Hot and sunny, no cloud cover, slight breeze

Details of the taxa recorded are provided in **Appendix A** and the survey locations are illustrated in **Figure 1.1**. In total, 13 blocks of ditches were sampled by sweeping from the banks. Species of high nature conservation value (species protected under the Wildlife & Countryside Act 1981, UK BAP, Red Data Book and Nationally Scarce species) have been emboldened in **Appendix A** and details of the ecology, status and distribution of these species are provided in **Appendix B**. Definitions of Red Data Book and Nationally Scarce statuses are provided in **Appendix C**.

A total of 239 terrestrial invertebrate taxa were recorded in June 2010. These include one species protected under the Wildlife & Countryside Act (1981), three UK BAP species, seven Red Data Book (RDB) species and 12 Nationally Scarce species.

The protected, UK BAP, RDB and Nationally Scarce species recorded are summarised in **Table 3.2** along with the sample sites from which they were recorded.

Table 3.2 Distribution of the Protected, Red Data Book and Nationally Scarce Invertebrate Species Recorded from Sizewell Belts in September 2009

Protected (Wildlife & Countryside Act 1981)	Where recorded (see Figure 1.1)
Aeshna isosceles	Malaise trap
UK Biodiversity Action Plan	
Aeshna isosceles	Malaise trap
Chiasmia clathrata	E,J
Tyria jacobaeae	H,I

Table 3.2 (continued) Distribution of the Protected, Red Data Book and Nationally Scarce Invertebrate Species Recorded from Sizewell Belts in September 2009

Red Data Book 1	
Aeshna isosceles	Malaise trap
Red Data Book 2	
Antichaeta brevipennis	G
Odontomyia ornata	A,E,J, Malaise trap
Parhelophilus consimilis	G
Psacadina zernyi	D,I
Red Data Book 3	
Hybomitra ciureai	I
Subclytia rotundiventris	Malaise trap
Nationally Scarce	
Anagnota bicolor	J
Brachytron pratense	C,E,F,G,J,L
Crossocerus binotatus	Malaise trap
Demetrias imperialis	I
Lipara rufitarsis	Malaise trap
Odontomyia tigrina	A,B,D,E,F,G,J
Psacadina verbekei	J
Spanochaeta dorsalis	D,E,J
Tetanocera punctifrons	E
Thereva plebeia	I
Vanoyia tenuicornis	A,E,F,G,I
Zophomyia tenella	A,B,D,E,F,G,J
Rare (according to Ferrière & Kerrich, 1958)	
Chalcis sispes	A

A single specimen of the Norfolk hawker was recorded in the first erected Malaise trap (location indicated in **Figure 1.1**) which was emptied on 23 June 2010 (see **Appendix D** for further records). Further individuals were observed in June 2010 on grazing marsh on Sizewell Belts immediately west of Sizewell 'B' power station and immediately northwest of the proposed site of Sizewell 'C'. This species is relatively widespread and frequent throughout the Sizewell Belts and Kenton and Goose Hills, as reported in the annual Land Management Reviews and summarised in the previous terrestrial invertebrate report (AMEC, 2014b). The locations of this species known to the surveyor are summarised in **Table 3.2**. This species is also present at Minsmere and in the Chapel Marshes (Mendel, 1992).

Two UK BAP moths were recorded from the ditch margins in June 2010. These are the latticed heath (*Chiasmia clathrata*) and cinnabar moth. (*Tyria jacobaeae*). Both are active during the day and are common and widespread species. They were given UK BAP status at the suggestion of Butterfly Conservation because there is evidence that they are declining. Neither is particularly associated with grazing marshes or wetlands in general and they are usually found in drier, open habitats.

Four Red Data Book insects were swept from the grazing marshes. *Antichaeta brevipennis* is a snail-killing fly found in lush vegetation beside water-bodies. It has previously been recorded from ditches in unimproved grazing marsh in Suffolk (Falk, 1991). Another snail-killing fly, *Psacadina zernyi,* was recorded and this is associated with fens in particular. Most of the British records of this very rare species are from Norfolk. The soldier-fly *Odontomyia ornata* was frequently recorded as larvae in the aquatic macro-invertebrate survey undertaken on the Sizewell Belts in September 2009 (AMEC, 2014b). The adult records are useful for confirming the provisional larval determinations. The larvae of this species can be locally common in ditches on grazing levels despite its RDB2 status. The hoverfly *Parhelophilus consimilis* is normally associated with eutrophic bogs but has been found in fens in eastern England. The other two *Parhelophilus* species which are local and associated with wetlands were also recorded from the survey.

Two RDB3 insects were recorded from the survey. The horsefly *Hybomitra ciureai* appears to be associated with brackish coastal marshes or grazing levels. The larvae probably develop in damp soil and in the marginal zones of ponds and ditches. Most of the records of this species are from Essex but it has been recorded from Suffolk, from Walberswick National Nature Reserve. The distinctive tachinid *Subclytia rotundiventris* is normally associated with broadleaved woodland including birch scrub in areas of wet heath and fen, heaths and calcareous grassland. The larvae are parasitoids of several species of shield bug. One individual was taken in the Malaise trap in the increasingly scrubbed-over reedbeds.

Twelve Nationally Scarce (formerly Notable) invertebrates were recorded during the survey. The hairy dragonfly (*Brachytron pratense*) was frequent in the ditches on the grazing marshes in June and shared the habitat with the Norfolk hawker. The hairy dragonfly is a well known inhabitant of coastal levels and grazing marshes. The ground beetle *Demetrias imperialis* has been recorded from *Phragmites* and *Typha* beds as well as a variety of other wetland habitats. It appears to have increased its range in recent years. The soldier fly *Odontomyia tigrina* is found in wetlands in southern England including ditches on coastal levels. Another soldier fly, *Vanoyia tenuicornis,* was found in five samples on the grazing marsh and larvae of this species were frequently encountered in the ditches in September 2009. The stiletto-fly *Thereva plebeia* is usually associated with dry habitats and may have been blown onto the grazing marsh from the nearby sandhills or Sandlings habitat. Two Nationally Scarce snail-killing flies were recorded from the grazing marsh ditches, namely *Psacadina verbekei* and *Tetanocera punctifrons*. Both are found in wetlands and have larvae that either predate or parasitise aquatic molluscs. *Lipara rufitarsis* produces distinctive galls on *Phragmites* and is consequently particularly associated with *Phragmites* beds. Based on the surveyor's experience, the minute *Anagnota bicolor* is usually found in grass and sedge tussocks in wetlands, although another source suggests it is associated with reedbeds. The muscid *Spanochaeta dorsalis* is found in marshes and marshy woods and it has been found on *Phragmites* by the surveyor previously. *Zophomyia tenella* is a tachinid that has been recorded from a variety of habitats including woodland, calcareous grassland and coastal dunes. The larval stages are unknown. The solitary wasp *Crossocerus binotatus* has been found sparingly throughout England where it is associated with deadwood and timber in a variety of situations including woodland margins, open woodland, farmland, parkland and wetland margins.

4. Discussion

4.1 Importance of the Reedbeds Within the SSA to Invertebrates

The current and previous invertebrate surveys on the Sizewell Estate have confirmed that the protected and UK BAP Norfolk hawker dragonfly occurs within the reedbed habitat within the SSA. The main habitat of this species is almost certainly the ditches on the Sizewell Belts SSSI but adults also bask on tree trunks on the forest tracks and a nymph was recorded on the edge of the SSA in September 2009. It is illegal to knowingly kill or injure a species protected under the Wildlife & Countryside Act 1981 and this extends to damaging breeding, nesting or roosting habitat in some protected species. Suitable mitigation for Norfolk hawker should be put in place to avoid destruction or damage to potential habitat for this species within the SSA. Habitat management recommendations for this species may be found on the British Dragonfly Society's website at www.dragonflysoc.org.uk.

In addition to the Norfolk hawker, the current survey recorded two Red Data Book insects (*Odontomyia ornata* and *Subclytia rotundiventris*) and two Nationally Scarce insects (*Lipara rufitarsis* and *Crossocerus binotatus*) from the reedbed within the SSA. The aquatic invertebrate survey conducted in September 2009 (AMEC, 2014b) did not record any Red Data Book species in the water bodies or ditches here, probably because they were clearly nutrient-enriched and often shaded. Four Nationally Scarce water beetle species were recorded within the reedbeds in the SSA however. The main invertebrate survey in 2007 (AMEC, 2014a) recorded Red Data Book and Nationally Scarce species along the proposed new road route from Lover's Lane, through Kenton Hills and Dunwich Forest/Goose Hill. At least seven Red Data Book and 14 Nationally Scarce terrestrial insect species were recorded using a Malaise trap located within the reedbed in the SSA (Sample Site J) in 2007 (AMEC, 2014a).

Overall, the results suggest that the reedbeds are of high nature conservation value for invertebrates and any adverse effects from the proposed development should be minimised.

4.2 Importance of the Grazing Marsh Ditches on the Sizewell Belts SSSI to Terrestrial Invertebrates

The Norfolk hawker appeared to be relatively frequent on the ditches on the Sizewell Belts SSSI. This may represent the most southerly British population of this restricted species.

The present survey also recorded two further UK BAP, five Red Data Book and ten Nationally Scarce terrestrial insect species on the Sizewell Belts SSSI, as well as another species regarded as rare - the parasitic wasp *Chalcis sispes*. The results indicate that the ditches are of high nature conservation value for terrestrial invertebrates, or the terrestrial stages of aquatic invertebrates (AMEC, 2014b). The UK BAP, RDB and Nationally Scarce species recorded in June 2010 utilise a variety of larval or adult habitats including aquatic snail parasites (*Antichaeta brevipennis*, *Psacadina zernyi*, *P. verbekei* and probably *Tetanocera punctifrons*), a shield bug parasite (*Subclytia rotundiventris*), aquatic nymphs or larvae in grazing marsh ditches (*Brachytron pratense*, *Odontomyia ornata*, *O. tigrina*a, *Vanoyia tenuicornis*, possibly *Hybomitra ciureai*), various open ground and dry habitats (*Chiasmia clathrata* and *Tyria* *jacobaeae*), larvae in eutrophic bogs, occasionally fens (*Parhelophilus consimilis*), marshes and marshy woods (*Spanochaeta dorsalis*) and on dead wood and timber in various habitats (*Crossocerus binotatus*). The various larval hosts, and micro- and macro-habitats used by adults and larvae suggest that a wide range of conditions are utilised on the Sizewell Belts, although the ditches are almost certainly the most important.

Adequate measures should be put in place to ensure the protection and integrity of the ditches and other habitats on the SSSI.

4.3 Requirements for Re-Survey

A period of about five years between large-scale surveys represent an ideal survey spacing, with annual monitoring necessary to show trends in high-priority invertebrate species, possibly only the protected Norfolk hawker and the ant-lion *Euroleon nostras*, which is a Suffolk BAP species and only occurs in Britain at the two locations mentioned at Sizewell and at Minsmere. Interim surveys in order to fill in taxonomic gaps, to cover areas not surveyed or to provide data for specific reasons can provide additional information to the data set but would usually be identified and agreed through further consultation with statutory consultees and other interested parties. The surveyor considers that most of the more useful (for assessing habitat quality) and identifiable taxa have been covered in the survey and that the most important areas and habitats have been surveyed for invertebrates. With around 25,000 invertebrates in Britain it is easy to find taxonomic groups that have not been covered in a survey (examples at Sizewell, might include the jumping plant lice, barklice, the more specialised Diptera, sawflies and parasitic wasps) but these groups are often difficult to identify and their ecology is poorly known and so they are often not covered in surveys. A (very) good argument would be required to include these.

5. References

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Appendix A
Terrestrial Invertebrates Recorded from the SSA reedbeds and Sizewell Belt ditches, June 2010

5 Pages

Appendix B
Details of the Ecology, Status and Distribution of the Protected, UK BAP, Red Data Book and Nationally Scarce Species recorded in June 2010

4 Pages

Up-to-date distribution maps of the species mentioned below may be found on the National Biodiversity Network Gateway website at: www.nbn.org.uk.

Protected under the Wildlife & Countryside Act (1981)

*Aeshna isosceles (*Odonata, Aeshnidae*)*
The Norfolk hawker breeds in unpolluted grazing marsh dykes which contain water soldier in areas where the water table is maintained at a high level. Other plants often present are frogbit, pondweeds and greater bladderwort. The dragonfly is confined to the Norfolk and Suffolk Broads. It is restricted to a few grazing marshes which are relatively isolated from polluted water. The above information is from Merritt et al. (1997). In recent years this species has proved to be relatively frequent at Sizewell and this may indicate an upturn in the species fortunes.

UK Biodiversity Action Plan

*Aeshna isosceles (*Odonata, Aeshnidae*)*
See above account.

*Chiasmia clathrata (*Lepidoptera, Geometridae*)*
The latticed is a common and widespread moth. It is most abundant around lucerne crops and generally occurs in lower numbers in open ground including gardens, and ranging from calcareous grassland and fens to acid heathland and moorland. It sometimes occurs in open woodland and on derelict urban sites. The caterpillar feeds on clovers, trefoils and lucerne. This moth is declining according to data held by Butterfly Conservation.

*Tyria jacobaeae (*Lepidoptera, Arctidae*)*
The cinnabar is a resident, common and widespread day-flying moth. It is most numerous on well drained, rabbit grazed grassland, including mature sand dunes and heathland but also in many other open habitats including gardens and woodland rides. The caterpillar feeds mainly on common ragwort but feeds on other ragworts, groundsels and has been reported on colt's-foot. This moth is declining according to data held by Butterfly Conservation.

Red Data Book 1

*Aeshna isosceles (*Odonata, Aeshnidae*)*
See above account.

Red Data Book 2

*Antichaeta brevipennis (*Diptera, Sciomyzidae*)*
Falk (1991) noted this from about a dozen sites in total, widely dispersed throughout England (six counties including Norfolk and Suffolk) and also from Scotland (one county). This species is usually associated with lush vegetation beside water bodies in wetlands; the previous Suffolk records refer to ditches in unimproved grazing marsh. In Denmark, the early stages have been found on snails such as *Succinea* and it may also use *Galba truncatula* (at least in the laboratory). The adults have been recorded from June to August.

*Odontomyia ornata (*Diptera, Stratiomyidae*)*
This soldier fly has two strongholds, namely the Somerset Levels and the Gwent Levels, where it is widespread and not uncommon. There are also sizeable populations on the freshwater parts of coastal levels in East Sussex. The species has been recorded sparsely as adults or larvae in similar habitat in West Sussex, Kent, Essex, Suffolk and Norfolk. The adults may frequently be seen on umbellifers such as hemlock water dropwort but the larvae are usually much easier to

locate. The larvae may be locally common in ditches on grazing levels. They may be free-floating or crawling among aquatic vegetation near the surface, especially within tangles of ivy-leaved duckweed and frogbit. The preferred ditches are wide (more than 1m) and have a rich and structurally diverse cover of floating vegetation. Almost certainly the key to this species' survival is the presence of extensive areas of ditches that are cleaned out on a cycle of about five years.

*Parhelophilus consimilis (*Diptera, Syrphidae*)*

This hoverfly is widespread throughout England, Scotland and Wales. Adults are associated with accumulations of wet, decaying matter, particularly *Typha*, in eutrophic bogs but also occasionally in fens in eastern England. The adults are usually found in lush vegetation fringeing water-bodies and rarely stray far from water. The larva is undescribed.

*Psacadina zernyi (*Diptera, Sciomyzidae*)*

Falk (1991) was only able to give eight British records for this species, most of which were in Norfolk (five sites) along with two sites in Sussex and a single site in Surrey. This species occurs in wetlands, especially fens, with standing water probably being a requirement. The larvae are probably parasitoids of freshwater snails at the margins of water bodies. This is an extremely rare southern species with only six post-1960 sites according to Falk (1991).

Red Data Book 3

*Hybomitra ciureai (*Diptera, Tabanidae*)*

Falk (1991) was only able to cite six known localities for this species, namely in Essex (three locations), Suffolk (Walberswick NNR only), Kent (one location) and Sussex (one location). The habitat of this species is probably brackish coastal marshes or grazing levels. The larvae probably develop in damp soil and in the marginal zones of ponds and ditches. The adults have been found in July and August.

*Subclytia rotundiventris (*Diptera, Tachinidae*)*

This distinctive parasitic fly has been recorded from southern and central England (ten counties according to the Tachinid Recording Scheme website (tachinidae.org.uk). There are well over a dozen post-1960 localities with an increase in recent years. The habitat is broadleaved woodland including birch scrub in areas of wet heath and fen, heaths and calcareous grassland. The larvae are parasitoids of several species of shield bug (Hemiptera, Acanthosomatidae) including species associated with birch, juniper and gorse. The adults have been recorded from May to September.

Nationally Scarce

*Brachytron pratense (*Odonata, Aeshnidae*)*

The hairy dragonfly is most commonly found in Britain on the coastal levels and grazing marshes of Somerset, Sussex, Kent and Norfolk. It also occurs in the fens of Anglesey, in the Cheshire meres and on the wetlands along the coast of South Wales and Suffolk. This species breeds in mesotrophic ponds, lakes including mature gravel pits, canals, ditches and marshy fens where there is plenty of tall emergent vegetation such as common club-rush, common reed, bulrush and great fen-sedge. This species has a short flight season from mid-May to mid-July. It can be found with other species that favour unpolluted, well vegetated dykes and fens (Merritt *et al.*, 1997).

*Demetrias imperialis (*Coleoptera, Carabidae*)*

This ground beetle has been recorded throughout southern England and the east Midlands. This species has increased in recent years and is now locally common in some areas of southern England. It has been recorded from fens, broads, marshes, ponds, gravel pits, brackish marshes and tidal rivers. It has been found in reedbeds and *Typha* beds. The adults have been recorded from January to October.

*Anagnota bicolor (*Diptera, Anthomyzidae*)*

This minute anthomyzid fly has been recorded throughout England (14 counties or vice-counties), Wales (four counties) and Scotland (five counties). There are sixteen post-1960 sites according to Ismay and Falk (in prep.). These same authors claim that this species is usually associated with *Phragmites* stands in marshes and coastal levels, but in the surveyor's experience it is more likely to be associated with grass and sedge tussocks in wetlands. There are records of the larvae developing in the galls of the chloropid fly *Lipara* but this seems unlikely larval micro-habitat in the surveyor's opinion.

*Lipara rufitarsis (*Diptera, Chloropidae*)*

This chloropid fly has been recorded mainly from southern England (nine counties according to Ismay and Falk, in prep.). This species is widespread in the south but highly localised with about a dozen post-1960 sites. It is found in wetlands including fens, gravel pits and damp heathland, and has a requirement for *Phragmites* beds. The larvae develop within the stems of *Phragmites* and form galls which cause foreshortening and sterility of their host plant. The galls are narrow, unlike the distinctive cigar-shaped galls of the common *Lipara lucens*. The adults have been recorded from April to July.

*Odontomyia tigrina (*Diptera, Stratiomyidae*)*

This soldier fly has been recorded widely in the southern half of England and Wales, and there is an old (pre-1909) isolated record from Aviemore in Scotland. The vast majority of records are from southern England. This species is found in wetlands including fens, ponds, canals and ditches in coastal levels. It appears to prefer water bodies with a rich flora and where both emergent and floating vegetation is present. On the Gwent and Somerset Levels it was found to prefer narrower ditches with much emergent vegetation and to be less frequent in large drainage ditches, in ditches choked with vegetation and in those cleared the previous year. The larvae have been found in shallow water at the margins of ponds and ditches and in marshes (both freshwater and slightly brackish) amongst vegetable matter. The adults have been recorded from May to July and occur on flowers such as umbels or vegetation near the breeding sites.

*Psacadina verbekei (*Diptera, Sciomyzidae*)*

This snail-killing fly has been recorded widely in England as far north as Yorkshire and Wales. It has been recorded on a range of wetlands including fens, damp heaths, riversides and dune-slacks. Standing water is probably a requirement, although records appear to relate to both bog and base-rich conditions. The larvae develop as parasitoids of aquatic snails such as *Lymnaea* spp. and appear to be adapted to life at the margins of aquatic habitats. This is a widespread but very local species with about 25 post-1960 sites.

*Spanochaeta dorsalis (*Diptera, Muscidae*)*

This distinctive muscid has been recorded throughout southern and central England (12 counties according to D'Assis-Fonseca, 1968) and in two Welsh counties. It is found in marshes and marshy woods. The adults have been recorded from June to August.

*Tetanocera punctifrons (*Diptera, Sciomyzidae*)*

Records of this species are scattered widely in England (nine counties or vice-counties), Wales (two counties) and Scotland (three counties). It is found in wetlands, especially damp woodland and also riverside situations, damp heathland and coastal marshes. The larvae are probably predators or parasitoids of gastropod molluscs, but it is unclear whether aquatic or terrestrial species or snails or slugs are used. This species is widespread with about 20 post-1960 records according to Falk (1991).

*Thereva plebeia (*Diptera, Therevidae*)*

Old records of this species are widespread in southern England as far north as Warwickshire, Cambridgeshire and Norfolk, although there is a strong south-easterly bias with many records for Greater London and surrounding areas. A range of dry habitats are favoured by this species including heathlands, commons, and ruderal and suburban habitats. Some disturbance may be necessary to produce the areas of loose soil and sparse vegetation favoured by this species. Larval development appears to take place in dry soil, and it has been reared from a larva found in an allotment in Epsom, Surrey. The adults have been recorded from late April to mid August.

*Vanoyia tenuicornis (*Diptera, Stratiomyidae*)*

This soldier fly occurs mainly on the southern lowlands of England and Wales, but it has been found as far north as Yorkshire. It generally occurs in fens or wet meadows, coastal seepages or wet dune-slacks. Some sites are brackish, suggesting that the larvae may tolerate slightly saline conditions. Larvae that were reared to adults were found in South Wales in seepages, at the transition of dune grassland to saltmarsh and in a grazed freshwater fen where they were found amongst moss and sedge litter.

*Zophomyia tenella (*Diptera, Tachinidae*)*

This parasitic fly has been recorded from southern England, the Midlands (Worcs), Wales and northern England (Westmorland). It has been recorded from woodland, calcareous grassland and coastal dunes. The hosts are unknown.

*Crossocerus binotatus (*Hymenoptera, Sphecidae*)*

This solitary wasp has been recorded sparingly throughout England (about 20 vice-counties by the early 1990s) and has also been recorded from single counties in Wales and Scotland. This species is very widespread but exceedingly scarce in most areas of the UK. It is associated with dead wood and timber in a variety of situations including woodland margins, open woodland, non-intensive farmland, parkland, wetland margins, gardens and railway cuttings. Nesting occurs in dead wood. Warm, sunny situations are probably favoured for nesting.

Appendix C
Invertebrate Rarity Status Definitions

6 Pages

[This document is reproduced from an internal English Nature document. Full details of the references below are given in the original document].

For the purposes of evaluating invertebrate faunas and priorities for conservation action, invertebrates are attributed various rarity status categories, the meanings of which are given below. Criteria for the selection of species into Red Data Book categories one to five follow Shirt (1987), with minor modifications derived from Hyman & Parsons (1992) and Parsons (1993).

Categories RDBI (Indeterminate) and RDBK (Insufficiently Known) are based on the criteria used by Wells, Pyle and Collins (1983).Criteria for the selection of Nationally Scarce species follow Eversham (1983) and Ball (1986).

Red Data Book Category 1 RDB1 - ENDANGERED

Definition	Taxa in danger of extinction in Great Britain and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so dramatically reduced that they are deemed to be in immediate danger of extinction. Also included are some taxa that are possibly extinct.
Criteria	Species, which are known or believed, to occur as only a single population within one 10km square of the National Grid. Species, which only occur in habitats known to be especially vulnerable. Species, which have shown a rapid and continuous decline over the last twenty years and are now estimated to exist in five or fewer 10km squares. Species which are possibly extinct but have been recorded this century but which if rediscovered would need protection.

Red Data Book Category 2 RDB2 - VULNERABLE

Definition	Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are taxa of which most or all of the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.
Criteria.	Species declining throughout their range. Species in vulnerable habitats.

Red Data Book Category 3 RDB3 - RARE

Definition	Taxa with small populations in Great Britain that are not at present Endangered or Vulnerable, but are at risk. These taxa are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range.
Criteria	Species, which are estimated to exist in only 15 or fewer 10km, squares. This criterion may be relaxed where populations are likely to exist in over 15 10km squares but occupy small areas of especially vulnerable habitat.

Red Data Book Category 4 **RDB4 - OUT OF DANGER**

Definition	Taxa formerly meeting the criteria of one of the aforementioned categories but which are now considered relatively secure because effective conservation measures have been taken or the previous threat to their survival in Great Britain has been removed.

Red Data Book Category 5 **RDB5 - ENDEMIC**

Definition	Taxa, which are not known to occur naturally outside Great Britain. Taxa within this category may also be in any of the other RDB categories or not threatened at all. There are few truly endemic species in Great Britain. Most that have been identified are in fairly obscure groups, which are relatively poorly known, and the species may well eventually be discovered elsewhere in Europe.

Red Data Book Appendix **RDBApp. - EXTINCT**

Definition	Taxa which formerly had breeding populations in Great Britain but which are now believed to have died out. (Taxa not recorded since 1900)

Red Data Book Category I **RDB I - INDETERMINATE**

Definition	Taxa considered being Endangered, Vulnerable or Rare, but where there is not enough information to say which of the three categories (RDB1 to 3) is appropriate.

Red Data Book Category K **RDBK - INSUFFICIENTLY KNOWN**

Definition	Taxa that are suspected, but not definitely known, to belong to any of the aforementioned categories, because of lack of information.
Criteria	Taxa recently discovered or recognised in Great Britain, which may prove to be more widespread in the future (although some recent discoveries may be placed in other categories if the group to which they belong is thought not to be under- recorded). Taxa with very few or perhaps only a single known locality but which belong to poorly recorded or taxonomically difficult or unstable groups. Species with very few or perhaps only a single known locality, inhabiting inaccessible or infrequently sampled but widespread habitats, such as some northern moorland species, species associated with some agricultural situations and species which are adult only during the winter. Species with very few or perhaps only a single known locality and of questionable native status, but not clearly falling into the category of recent colonist, vagrant or introduction.

Provisional Red Data Book **pRDB**

Definition	The prefix 'p' before any Red Data Book category implies that the grading is provisional. In the majority of cases this means that the species' status has been reconsidered and changed in a Species Group Review produced subsequent to the publication of the relevant Red Data Book. The statuses so given are described as provisional, pending the publication of a future edition of that Red Data Book. These statuses are however, based upon a greater amount of evidence than was available for the original Red Data Book and therefore are more likely to be a true representation of the species' actual status. The prefix 'p' is also used for RDB status categories in groups where a Red Data Book has not yet been produced but is in preparation, or is used for species in groups covered by the original Red Data Book, where it is considered that there is evidence that the original grading was incorrect or that there has been a genuine change in status of the taxon.

Nationally Scarce (Notable) Species

The term 'Nationally Scarce' was adopted and replaced the term 'Notable' during the compilation of the Guidelines for the Selection of Biological SSSIs. The two terms are thus interchangeable but 'Nationally Scarce' is preferable.

Ball (1986) discusses the allocation of species to Nationally Scarce categories:

''The Invertebrate Site Register project includes the preparation of National Species Reviews which seek to identify and document uncommon species. The criteria used have been based directly on those evolved by botanists and two levels of 'National Notability' has been used. These are Notable A, for species known to occur in 30 or less 10km squares of the National Grid and Notable B for those known from 100 or less squares.

Although this system can be used directly with well-recorded groups like Dragonflies, Butterflies and Grasshoppers; when dealing with many other groups of insects, the level of recording is not sufficient to apply the criteria rigorously. A combination of three alternative approaches has been employed:

1. *The approximate number of squares in which a species may occur can be estimated by looking at the number it has been recorded from as a proportion of the total in which the whole group (e.g. its family) has been recorded.*

   Coarser measurements such as the number of vice-counties in which a species has occurred can be used (7 or less for Notable A, 20 or less for Notable B).

2. *Experts can be asked to use their field experience to judge the status of species in their particular specialist group against others with a better-established status. By consulting as many people as possible and taking a consensus of their views, geographical and personal biases can be minimized.*

3. *In some groups in which widespread interest and recording is a rather recent phenomenon, no attempt has yet been made to separate Notable A and Notable B species, and all Nationally Notable species are simply graded 'Notable'.''*

Nationally Scarce (Notable) N - NOTABLE

Definition.	Species, which are estimated to occur in 16 to 100 10km, squares in Great Britain. The subdividing of this category into Nationally Scarce A and Nationally Scarce B has not been attempted for some species because of either the degree of recording that has been carried out in the group to which the species belongs, or because there is some other reason why it is not sensible to be so exact.

Nationally Scarce (Notable) Category A Na - NOTABLE A

Definition	Taxa which do not fall within RDB categories but which are uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well recorded groups, within 7 or fewer vice-counties.

Nationally Scarce (Notable) Category B Nb - NOTABLE B

Definition	Taxa which do not fall within RDB categories but which are uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less well recorded groups, between 8 and 20 vice-counties.

Regionally Scarce (Notable) Nr - NOTABLE

Definition	Species which are considered to occur in 5 or less 10km squares in an area equivalent in size to a region of the old Nature Conservancy Council or larger, approximately one eighth the total area of England. Such statuses were worked out during the compilation of the Invertebrate Site Registers. They cover various groups in Scotland, in northern England as a whole, in northeast and northwest England, in vice-county Yorkshire and in the east Midlands and East Anglia. They were worked out by local entomologists.

LOCAL

Definition	The term is not rigidly defined, but loosely means species confined to a particular habitat type (usually associated with better quality examples of that habitat), a particular geographic area, or species that are too widespread to warrant Nationally Scarce (Notable) status but are nevertheless infrequently encountered.

COMMON

Definition	Common or very widespread species, frequently recorded.

SYANTHROPIC SPECIES

Definition	Species dependent upon man, his buildings, livestock or crops.

UNKNOWN

Definition	Species where no status has been attributed. There may be confusion over the species' taxonomy, it may belong to a poorly recorded group or may occur in an infrequently sampled habitat. As a species is entered into the Invertebrate Site Register or RECORDER, the status automatically defaults to 'Unknown'. Certain common or local species may therefore occasionally appear in this category if there has been no necessity to use the species record.

Appendix D
Known Records of Norfolk Hawker from Sizewell

1 Pages

EDF Energy

Sizewell C New Nuclear Power Station: Terrestrial and Freshwater Ecology, and Ornithology

2007-2010 Invertebrate Survey Report

UK Protect - Commercial

March 2014

AMEC Environment & Infrastructure UK Limited

amec

Report for
EDF Energy

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Document Revisions

No.	Details	Date
1	Draft Report	June 2012
2	Final Report	March 2014

Note

The information contained in this report was, to the best of the issuer’s knowledge, correct at the time of issue of the latest draft. Some of this information may no longer be current.

Contents

1. Introduction

1.1 Purpose of this Report

An area of land directly north of Sizewell B Nuclear Power Station, which is located near Leiston in Suffolk, has been identified as having the potential to accommodate the proposed development of one or more new nuclear reactors. This proposed development is known as Sizewell C. The site of the proposed development has an approximate central National Grid Reference (NGR) of TM473640.

AMEC Environment and Infrastructure UK Ltd ('AMEC') was commissioned in 2007 to provide terrestrial and freshwater ecological, and ornithological services in relation to Sizewell C. The purpose of this report, which outlines the findings of survey work undertaken for invertebrates in the period 2007-2010, is to inform the design of Sizewell C and the Environmental Statement for the scheme.

1.2 Survey Area

The survey areas and methodologies used have been adopted following consultation with statutory and non-statutory consultees and other stakeholders, taking into account best practice guidelines, and site-specific and project-specific characteristics. The survey areas adopted are precautionary in that they allow for the iterative development of the scheme design by covering a larger area than is likely to be affected by the proposals. Based on the information available at the time the surveys were undertaken, it was assessed that the relevant Zones of Influence of the proposed development would be likely not to extend further than the defined study areas.

2. Methods

2.1 Desk Study

A number of sources of information have been used to provide context and background for interpreting the results of the survey work. The major sources that have been identified and used to date (2010) are:

- Sizewell Ecological Surveys (in connection with Sizewell 'C') conducted by Bioscan (UK) (Bioscan, 1991);
- Sizewell Land Management Annual Reviews 1996-2007 compiled by Suffolk Wildlife Trust and ADAS (SWT/ADAS, 1996-2007);
- Aquatic invertebrate surveys of Sizewell Belts SSSI in 1987 and 1988 undertaken by the Nature Conservancy Council (Drake, 1989a,b);
- More recent, currently unpublished data collected by Drake for Buglife in April 2009 (Drake in prep.);
- Survey reports on the ant-lion (*Euroleon nostras*) which cover the Sizewell populations; and
- Invertebrate records for Minsmere RSPB reserve, supplied by the RSPB.

Contextual information regarding white admiral butterfly (*Limenitis camilla*) within the study area was obtained from the following sources:

- The Suffolk Wildlife Trust [1];
- The Suffolk Butterfly Recorder (Rob Parker);
- RSPB Minsmere (Robin Harvey);
- The United Kingdom Butterfly Monitoring Scheme;
- Suffolk Natural History Society (the Transactions of the Suffolk Natural History Society).

Several other invertebrate records for Sizewell have been obtained by AMEC as part of a wide ranging desk study which has included the review of a considerable number of ecological reports (many associated with the Sizewell C Application). The veracity of some of these records is questionable, and many locations are unclear, but they have nevertheless been summarised here.

[1] Both from personal communications and from the annual land management reviews produced in conjunction with ADAS.

Some sources of information have not been consulted at this stage. These include the Suffolk Naturalist's Society Transactions and recorders for various groups, a spider survey report on Sizewell (Harvey, 1990) and some early general references such as Morley (1899, 1915).

2.2 Field Surveys

2.2.1 2007 Invertebrate Survey

Invertebrates were sampled from a total of twelve sample sites labelled A-L. Table 2.1 provides details of the invertebrate sample locations whilst Figure 2.1 shows these locations. The sampling methods employed at each sample site varied according to circumstances such as possibility of human interference and the presence of sufficient vegetation in which to hide traps. The use of passive traps (such as Malaise traps – see section 2.2.4) was not an option on the beach although these were able to be deployed in woodlands and planted-up sites on the preliminary works area. Table 2.2 provides details of the sampling methods employed at each of the sampling sites.

Table 2.1 Number and Location of Invertebrate Sampling Sites at Sizewell in 2007

Site	OS Grid Ref (TH)	Description
A	47496435	Eastern bund overlooking coastal strip (planted trees and shrubs with clearings)
B	47386436	Northern bund (planted trees and shrubs)
C	47296415	Central riparian belt (carr woodland)
D	472641	Western riparian belt (carr woodland)
E	47016461	Triangular-shaped area of young plantation surrounded by mature plantations, Goose Hill (Dunwich Forest)
F	46596465	Plantation edge and scrub at intersection of rides, Dunwich Forest
G	464645	Carr woodland at Turf Pits, Kenton Hills
H	463644	Plantation at Nursery Covert, Kenton Hills
I	47406401	Southern edge of field/northern edge of young conifer plantation.
J	47286448	*Phragmites* fen near footbridge
K	47516452	Coastal heath north of power station.
L	4764 (La-e) 47556295 (Lf) 4763 (Lg-j)	Coastal belt (low dunes, shingle, marram, etc). La - e = June 2007, Lf-j = July and Sept 2007

Table 2.2 Invertebrate Sampling Methods Employed at each of the Sample Sites

Sampling Site	Invertebrate sampling methods used
A	Pitfall traps (10), water trap (1) and Malaise trap (1)
B	Pitfall traps (10) and water trap (1)
C	Pitfall traps (10), water trap (1) and Malaise trap (1)
D	Pitfall traps (10) and water trap (1)
E	Pitfall traps (10) and water trap (1)
F	Pitfall traps (10) and water trap (1)
G	Pitfall traps (10), water trap (1) and Malaise trap (1)
H	Pitfall traps (10) and water trap (1)
I	Water trap (1)
J	Malaise trap (1)
K	Pitfall traps (1)
L	Vacuum (5) and sweep net samples (5)

The traps and samples were emptied or taken at monthly intervals. Descriptions of the different sampling methods used are given below.

Pitfall Traps

Pitfall traps comprising plastic drinking cups were placed in holes in the ground in rows of ten at nine locations giving a possible maximum of 90 pitfall traps per visit. Pitfall traps are used to sample ground-living invertebrates such as wolf spiders, millipedes, woodlice, ground beetles and rove beetles. Antifreeze (ethylene glycol) was added as a preservative. The pitfalls were put down in June 2007 and emptied in July, August and September. Consequently the results represent a maximum of 270 traps, but there were some losses, most notably due to the flooding and heavy rainfall in June and July (notably at Sample Site C). On emptying the traps the contents of each transect of ten traps were pooled into a single pot.

Sweep Netting

Sweep netting was undertaken using a 16 inch diameter net[2] mounted on a three-foot angling pole. Sweep netting was concentrated on five sampling sites on Sizewell beach on each visit and was undertaken for a period of approximately ten minutes on each visit. The five sites varied with each visit partly because of the problem of re-locating the exact sampling sites on

[2] Supplied by Marris House Nets, Bournemouth

subsequent visits and in order to cover as much of the beach as possible. The sweep net was passed through low-lying vegetation and over bare or partly vegetated ground. Sweep netting is an excellent means of obtaining low-flying insects and phytophagous insects feeding on herb or shrub layer vegetation. Diptera dominated the sweep net samples with Hymenoptera also frequent along with plant-feeding or active beetles and bugs etc. Target invertebrates within the swept material were selectively removed from the net using an aspirator (or 'pooter'). Sweep netting was only employed on the shore (low dunes, shingle, marram communities, etc) because passive trapping methods could not be employed here due to heavy public usage. Five timed sweep net samples were taken on each monthly visit (excluding August).

Vacuum Sampling

A portable garden vacuum (Ryobi PBV-30) with a muslin bag inserted into the vacuum tube and held in place with a thick rubber band was used at each of the same locations as the sweep net locations on three occasions. Each vacuum sample was timed at three minutes and was used to sample the vegetation and partly bare ground at each site including along the pitfall transects and around each of the water traps. The muslin bag was emptied into a sweep net and material selectively removed with an aspirator. Vacuums provide an excellent means of sampling invertebrates associated with low-growing vegetation and the diurnal ground invertebrate fauna. Vacuum sampling was only employed on the shore (low dunes, shingle, marram communities, etc) because passive trapping methods could not be employed here due to heavy public usage. Five timed vacuum samples were taken on each monthly visit (excluding August).

Water Traps

The water traps on this survey comprised yellow plastic washing-up bowls half-filled with tap water. These were placed on the ground at nine of the sample sites. A small amount of detergent was added to each water trap to reduce the tension of the surface film and formalin was added (5-10% volume) as a preservative. Yellow water traps are very effective at trapping flying insects[3] such as flower visiting species (Disney *et al*., 1982; Kirk, 1984). In order of abundance trapped material included Diptera (many families), Hymenoptera (including aculeates such as bees, wasps and ants), Hemiptera (especially Auchenorrhyncha), Coleoptera (such as pollen beetles and flea beetles) and various minor invertebrate orders such as Orthoptera (crickets and grasshoppers). The water traps were emptied on each visit and the material was placed in alcohol for later sorting and identification. Some water traps were clearly affected by the heavy rainfall experienced in June and July 2007.

Malaise Traps

Malaise traps comprise large tent-like structures that act on the flight-interception model. Flying insects, on encountering the vertical screen of mesh, try to fly over the obstacle and in doing so follow the sloping roof and eventually end up in a collecting bottle in the top corner of the trap. Malaise traps are large and conspicuous and are therefore prone to human interference. They are also expensive, relatively fragile and prone to wind damage when sited in exposed locations such as coastal areas. Malaise traps work best on flight-lines such as woodland paths or woodland edges. Because of these potential problems only limited use of these was made on the survey, and they were partly used as 'insurance' in case any of the other sampling methods

[3] Yellow and white are the most effective colours for water traps. Other colours have been found to be much less effective.

failed. The large amount of material collected by Malaise traps meant that only a relatively small amount of material has been examined.

Taxonomic Coverage

The taxonomic groups identified varied with the sampling methods. For example, all Coleoptera were identified from all the pitfall traps and from most of the water traps and vacuum samples whilst the Araneae (spiders), Orthoptera (grasshoppers and allies), Blattodea (cockroaches), various other minor insect groups, Auchenorhyncha (leafhoppers), Heteroptera (true-bugs), Rhopalocera (butterflies), Coleoptera (beetles), selected Diptera (true-flies) and all aculeate Hymenoptera (bees, wasps and ants) were identified from the sweep and vacuum samples. A smaller number of taxa were identified from the water traps (mostly Odonata, Orthoptera, other minor groups, selected Diptera and aculeate Hymenoptera).

2.2.2 2009 Invertebrate Survey

Ditches were selected within Sizewell Belts SSSI for sampling. These were sampled with a standard pond net [4] in September 2009.

Each location selected was sampled for a 3-minute period by passing the net along the banks and over the beds of the shallower ditches. The contents of the net were washed and sieved on the bank (this involved placing the sample in a 1cm coarse sieve, with a 500 µm sieve and then a bowl beneath it). After several pourings, the contents of the 1cm sieve were checked for large freshwater invertebrates and if there were none or once these had been noted, the coarse fraction was returned to the watercourse. The finer fraction was placed in a pot for later examination in the lab. The samples were preserved in 10% formalin.

Once in the lab, each bulk sample was divided up into small parts and these were placed in gridded petri-dishes to which water was added. Typically, one sample would require dividing into around thirty petri-dishes for examination. The petri-dishes were then examined under a binocular stereo-microscope and invertebrates were identified and counted.

A number of physical and chemical measurements were made on site including pH, conductivity and water temperature using a Hanna HI 98129 handheld meter. A global GPS was used to obtain accurate grid references of sampling locations and species present, and notes were taken of all the habitats within the SSA that were surveyed. Survey locations are shown on Figure 2.2.

Generally, vouchers of Red Data Book and Nationally Scarce species have been retained and are available to check by third parties (such as national recorders) if this is required. These vouchers will be retained indefinitely by the surveyor. Red Data Book and Nationally Scarce/Notable species have been identified as such using the published and unpublished reviews such as Falk (1991), Falk and Chandler (2005) and Foster (2004). A definition of Red Data Book and Nationally Scarce/Notable statuses is provided in Annex 2, Appendix A.

Details of the prevailing weather conditions were also recorded.

4 1mm mesh bag, net supplied by EFE/GB Nets Ltd, Totnes

2.2.3 2010 Invertebrate Survey

Ditches were selected within Sizewell Belts SSSI for sampling. These were sampled in groups in June 2010 with a 16 inch diameter sweep net attached to a six foot angling pole. The net was passed through bankside vegetation, over the ditches and alongside overhanging bushes and trees. Figure 2.3 shows the locations of the ditches sampled. Invertebrates recorded were selectively removed with an aspirator (or pooter) and placed in alcohol for later determination. Conspicuous insects such as butterflies, day-flying moths, dragonflies and certain bumblebees were recorded in the field. Reedbed insects within the SSA were sampled by means of two Malaise traps which were erected in early and late June 2010 at two separate locations (the location of the Malaise traps are indicated in Figure 2.3). Malaise traps are large flight interception traps that work by impeding an insect's forward movement, forcing the individual to move around the obstacle and in doing so, ending up in a collecting head containing preservative. Malaise traps collect large quantities of material and are particularly effective in reedbeds and fens. Norfolk hawker was recorded by locating adults and checking these using binoculars.

2.2.4 2007 White Admiral Survey

Surveys were undertaken of habitats considered suitable to support white admiral in Goose and Kenton Hills. These were aimed at detecting adult insects. Surveys were carried out on the following dates:

- 7, 8 and 10 July;
- 4, 5 and 10 August.

White admiral generally has a single brood with adults flying from late June to mid-August (Asher *et al*., 2001). The surveys were therefore conducted within the optimal period for this species. During each visit a 2-hour walked transect was carried out across the survey area during the middle of the day (avoiding any unfavourable weather conditions, such as rain or fog). The transects were divided into 15 minute intervals in order to continuously assess the weather conditions and help with mapping any white admiral sightings. For each sighting, the location was recorded with a hand-held GPS device and notes on apparent behaviour were made. Following a sighting, the recorders remained within the vicinity for a further 5 minutes to record any other individuals. Figure 2.4 shows the transect route taken.

2.2.5 2009 White Admiral Larval Survey

Preliminary Survey

The survey area was visited on 10 June 2009 and searched over a four hour period for suitable sites to carry out the larval searches later in the season. The frequency of suitable areas of habitat and general occurrence of the larval food plant, honeysuckle (*Lonicera periclymenum*) was greater in the western part of the survey area (Kenton Hills) with the most suitable habitat (ride/woodland edge and clearings in partial sun) being in the southern part of the woodland. Despite the considerable area of conifer plantation in the eastern part of the survey area (Goose Hills), which appears superficially similar in character to Kenton Hills, honeysuckle was found to be more occasional and as such opportunities for establishing search areas were far more limited.

A total of 20 search areas were selected during the preliminary survey and each was photographed. Each search area comprised a 50m x 50m square area of woodland found to hold a sufficient quantity of larval food plant (accessible to the surveyor) to enable a 30-minute search to be carried out within each search area. These were numbered 1 – 20 and centred on the 8-figure grid references detailed in Table 2.3.

Table 2.3 White Admiral Search Areas

Search Area	Grid Reference	Search Area	Grid Reference	Search Area	Grid Reference	Search Area	Grid Reference
1	TM4668 6467	6	TM4637 6456	11	TM4624 6403	16	TM4585 6401
2	TM4675 6477	7	TM4654 6442	12	TM4608 6407	17	TM4579 6422
3	TM4682 6488	8	TM4657 6431	13	TM4598 6431	18	TM4572 6390
4	TM4662 6473	9	TM4645 6420	14	TM4595 6408	19	TM4566 6390
5	TM4645 6458	10	TM4633 6414	15	TM4591 6404	20	TM4563 6382

The locations of the search areas are shown on Figure 2.5.

Larval Survey

This survey was carried out on 11 and 12 August 2009 and comprised a 30-minute search of honeysuckle up to a height of 3m from ground level at each of the 20 search areas listed above. The site and number of white admiral larvae, or unassociated occasions of characteristic feeding damage (i.e. damage likely to have been caused by separate larvae), was recorded. Due to the habit of adult butterflies laying ova singly and the localised feeding pattern of individual pre-hibernation larvae (Heath and Emmet, 1990), where two or three leaves in close proximity showed feeding damage it was only recorded as a single instance of damage.

2.3 Personnel

For the 2007-2009 invertebrate surveys, Andy Godfrey undertook all the management and organisation of the work, the field sampling and reporting as well as the identification of minor insect groups, some Hemiptera, Rhopalocera, some Diptera and aculeate Hymenoptera. Andy was formerly employed as an Entomologist with the Nature Conservancy Council and has specialised in studying invertebrates whilst based in various museums and for ecological consultancies. Since 1999 Andy has worked solely as an entomologist working on conservation and development projects. Andy's particular expertise is with the Diptera which, because they are species-rich (around 7,000 British species), abundant and identifiable make them one of the most suitable group for ecological surveys. Hymenoptera with similar species-richness are much more difficult to identify (except the species-poor aculeates) and all other taxonomic groups (such as the Coleoptera and Lepidoptera) include far fewer species.

Other specialists undertook the sorting and identification of other taxonomic groups during the Invertebrate Survey 2007 are as follows:

- Araneae (spiders): Dr Jan Woodward;

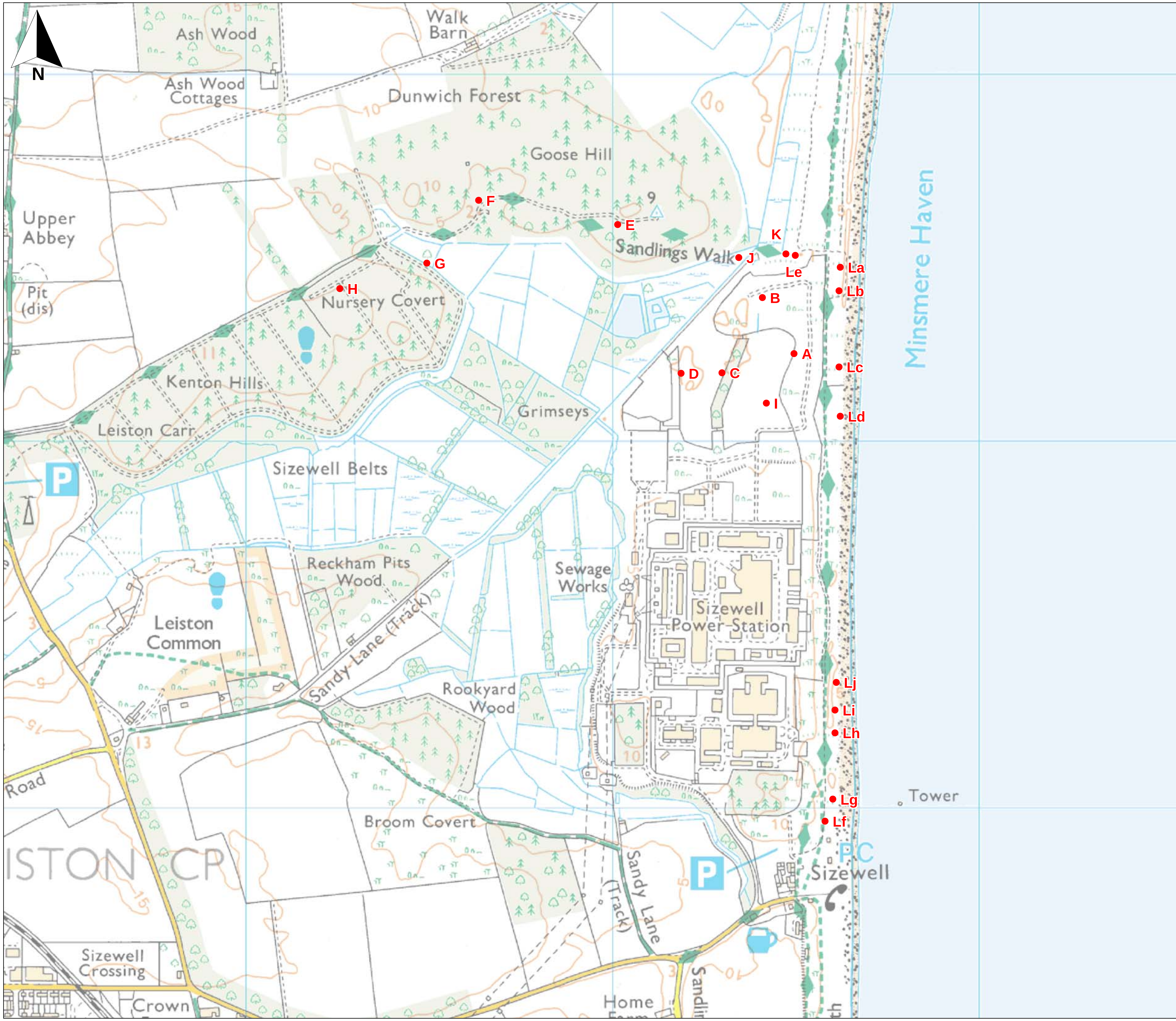
- Auchenorrhyncha (froghoppers, leafhoppers): Dr Jan Woodward;
- Heteroptera (true bugs): Dr Jan Woodward (vacuum and water trap samples). Andy Godfrey (sweep net and water trap samples: selected species only);
- Coleoptera (beetles): Mike Denton.

In addition, Harry Beaumont undertook the identification of a few micromoths and Dr Adrian Legg (Bournemouth Museum) identified the pseudoscorpions from the vacuum samples.

During the Invertebrate Surveys 2009:

- The National Mollusc Recorder Adrian Norris checked the *Valvata* (valve snails) specimens collected from Sizewell on the survey, commented on the mollusc list and updated the species names.
- Mike Denton (Yorkshire Aleocharinae Recorder) identified the aquatic weevils, Staphylinidae and other terrestrial Coleoptera caught in the pond net samples.

The white admiral 2007 and 2009 surveys were carried out by suitably qualified and experienced entomologists Tim Sykes and Sean Clay respectively.



Key

● Sample site

A = Eastern Bund
B = Northern Bund
C = Central riparian belt
D = Western riparian belt
E = Traingular-shaped open area
F = Ride intersection
G = Turf pits
H = Nursery Covert
I = Southern field edge
J = Phragmites fen
K = North of power station
La-e = Coastal belt (June 2007)
Lf-j = Coastal belt (July & Sept 2007)

0 m 500 m
Scale 1:10000 @ A3

Sizewell C Invertebrate Survey Report 2007-2010

Figure 2.1
Invertebrate sampling sites 2007

June 2012
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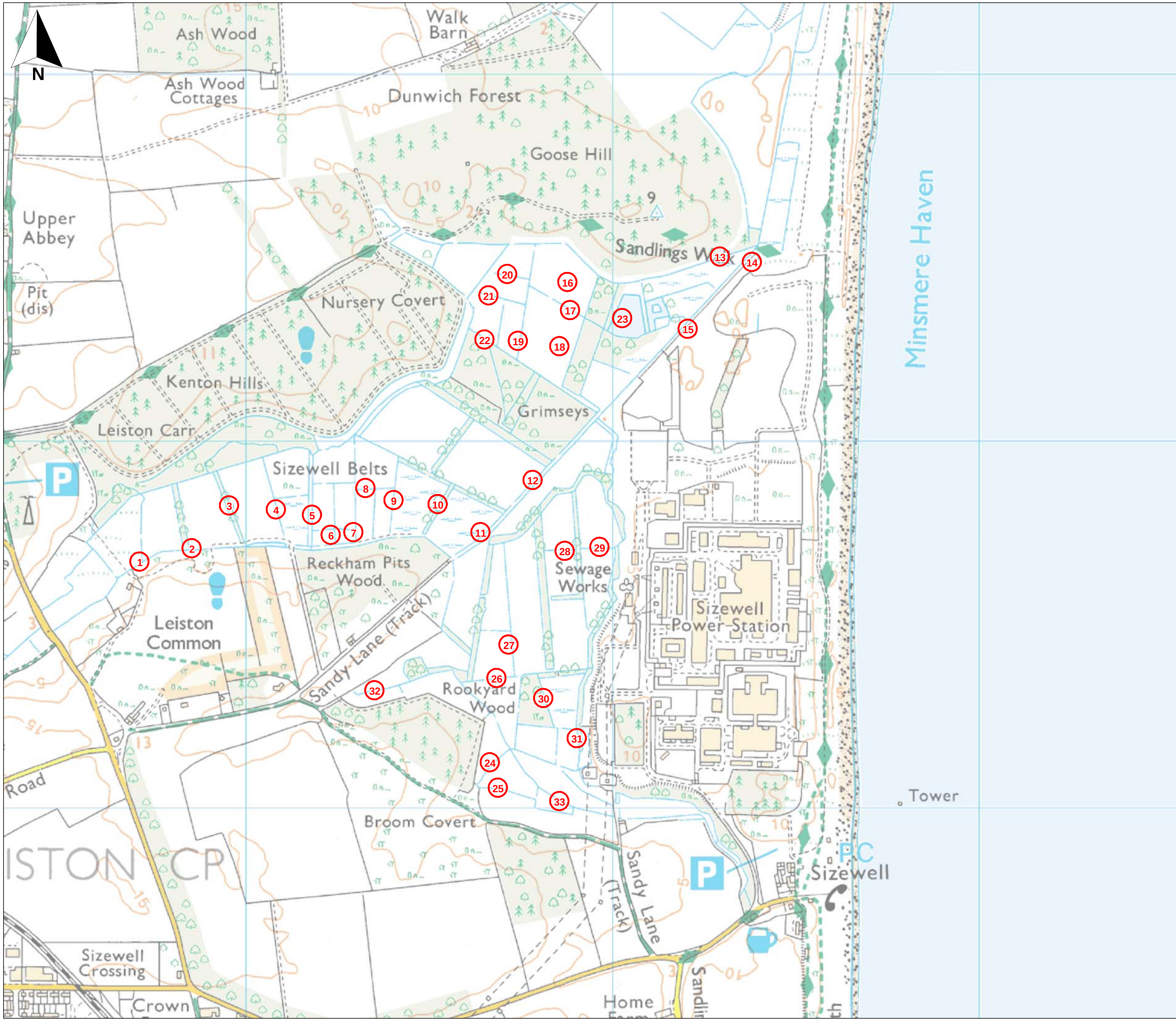

Key

1 Sample site

0 m 500 m

Scale 1:10000 @ A3

EDF

Sizewell C Invertebrate Survey Report 2007-2010

Figure 2.2
Invertebrate sampling sites 2009

June 2012
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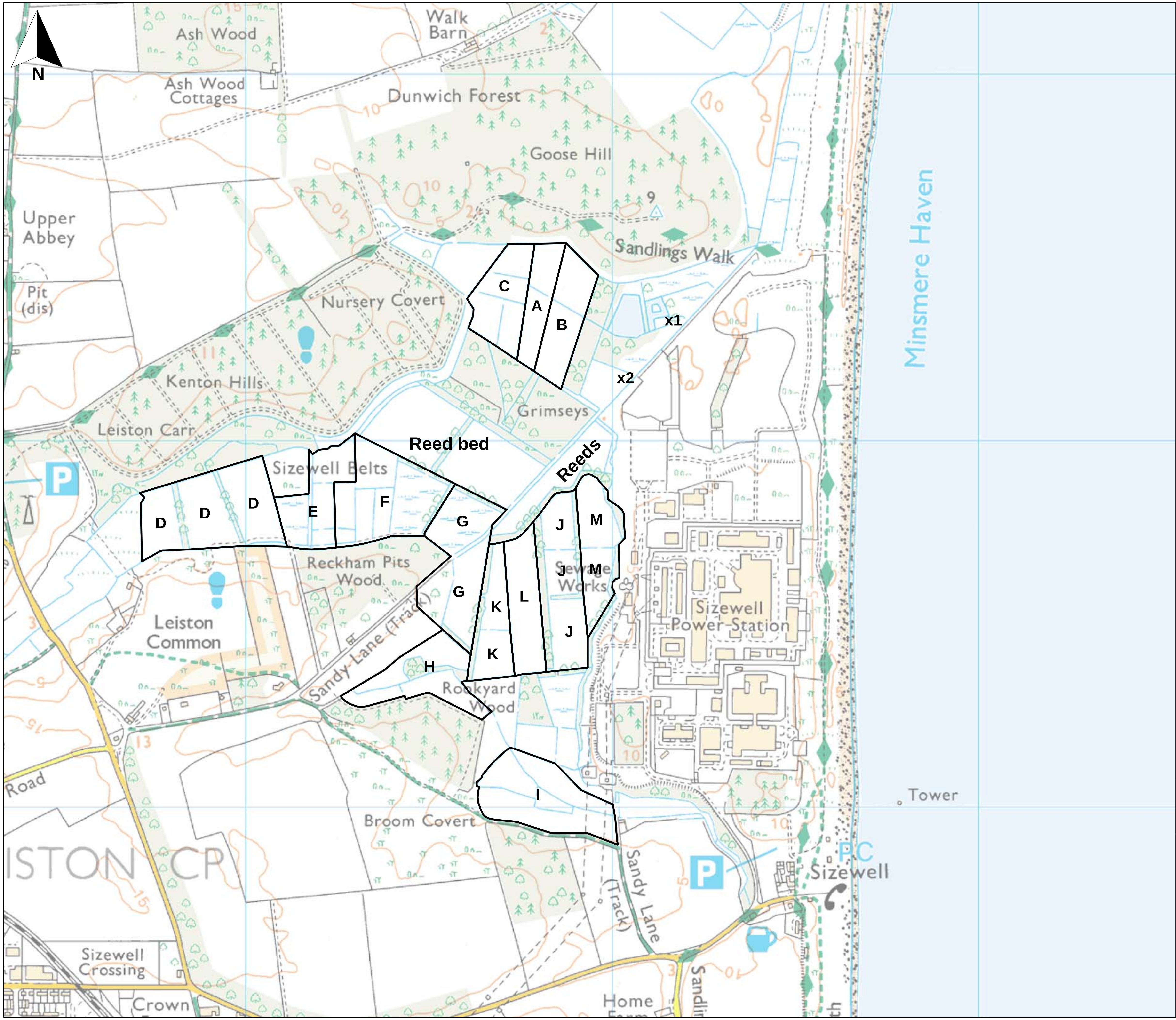

Key

A - M ditches surveyed for terrestrial invertebrates: June 2010

Malaise traps in reed beds = x1 or x2

0 m 500 m

Scale 1:10000 @ A3

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Sizewell C Invertebrate Survey Report 2007-2010

Figure 2.3
Invertebrate sampling sites 2010

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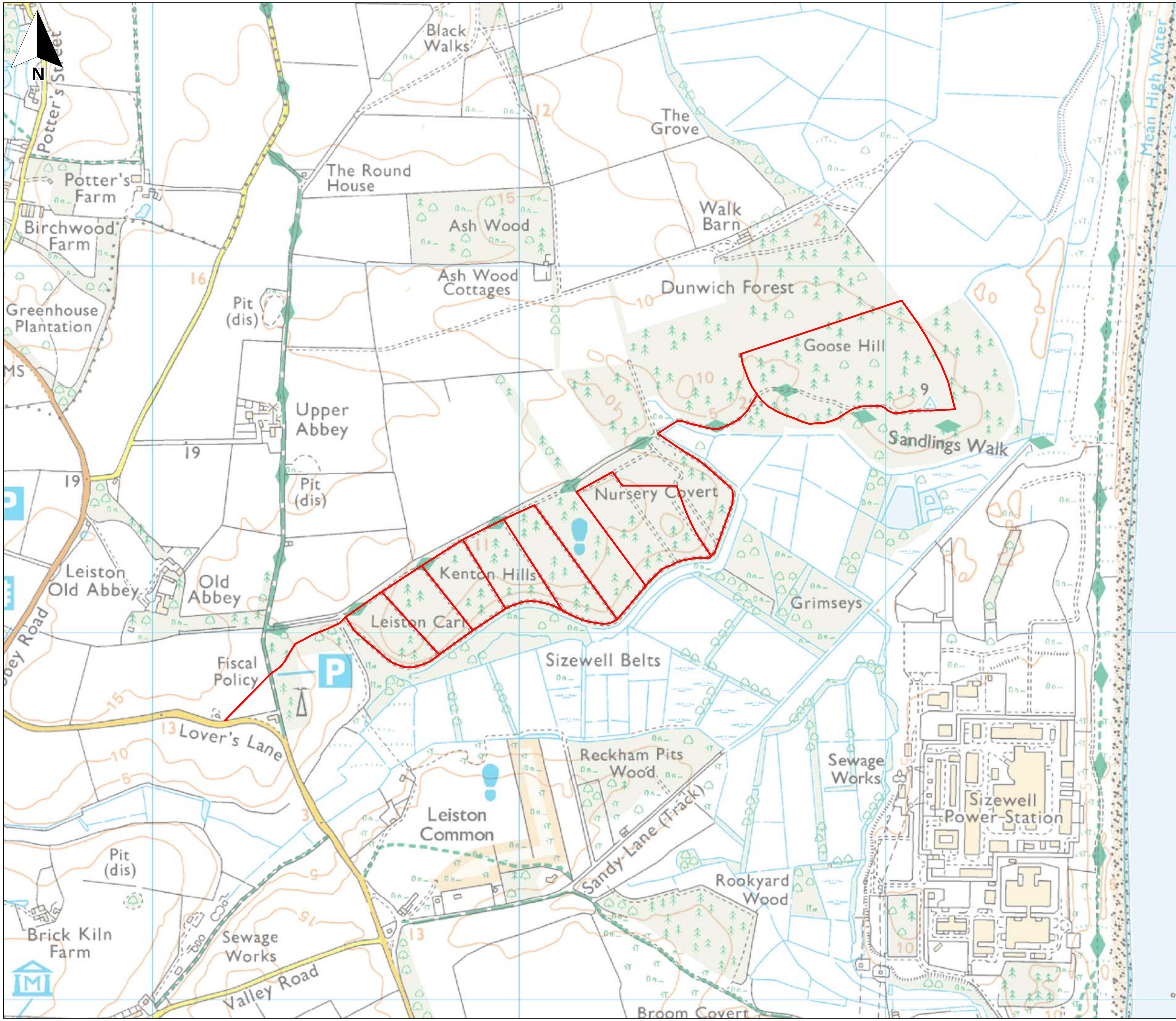

Key

Transect route

0 m 500 m

Scale 1:10000 @ A3

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Sizewell C Invertebrate Survey Report 2007-2010

Figure 2.4
Transect route used for the 2007 white admiral survey

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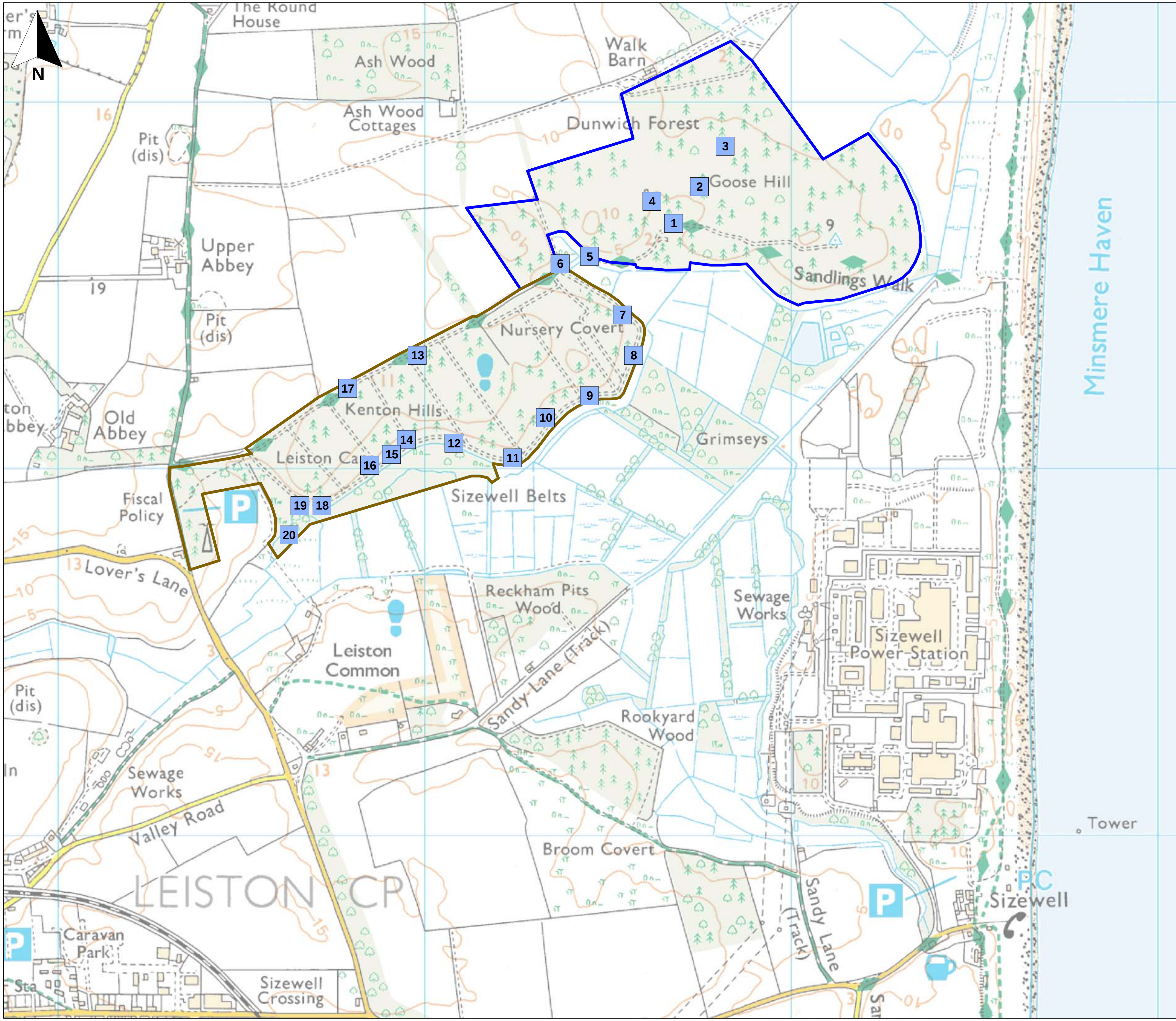

Key

Goose Hill

Kenton Hills

0 m 500 m

Scale 1:10000 @ A3

EDF

Sizewell C Invertebrate Survey Report 2007-2010

Figure 2.5
White admiral larval search areas

June 2012
28130-A447.wor tugwc

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3. Results

3.1 Desk Study

The invertebrate surveys undertaken by Bioscan included several taxonomic groups but appeared to concentrate particularly on spiders and moths. Some of the arguments for excluding taxa from the survey (for example, most Diptera are very poorly known, p.11) and the reasons for not using some methods (such as pitfall traps because of the potential for human disturbance on the relatively undisturbed Sizewell Belts) are questionable. Some taxa (notably the aculeate Hymenoptera which would be expected to be important on Sandlings habitats) are not mentioned. Seven Red Data Book and 31 Notable (= Nationally Scarce) species were recorded in the year-long survey conducted by Bioscan and details of these have been summarised in Table 3.1. Some of the Red Data Book and Notable species listed by Bioscan as such have since been downgraded. The results appear to incorporate the records of the aquatic invertebrate surveys undertaken on Sizewell Belts by Drake (1989a, 1989b).

Table 3.1 Invertebrates of High Nature Conservation Significance Recorded by Bioscan (1991)

Species	Family	Status
Odontomyia argentata	Stratiomyidae	RDB2
Odontomyia ornata	Stratiomyidae	RDB2
Pediasia fascelinella	Pyralidae	pRDB2
Archanara neurica	Noctuidae	RDB3
Clubiona frisia	Clubionidae	RDB3
Nyctegretis lineana	Pyralidae	pRDB3
Pima boisduvaliella	Pterophoridae	pRDB3
Mythimna flammea	Noctuidae	Notable A
Nascia cilialis	Pyralidae	Notable A
Agrotis ripae	Noctuidae	Notable B
Earias chlorana	Noctuidae	Notable B
Eulamprotes wilkella	Gelechiidae	Notable B
Euxoa cursoria	Noctuidae	Notable B

Species	Family	Status
Mythimna litoralis	Noctuidae	Notable B
Pediasia contaminella	Pyralidae	Notable B
Schoenobius gigantella	Pyralidae	Notable B
Sideridis albicolon	Noctuidae	Notable B
Simyra albovenosa	Noctuidae	Notable B
Agabus conspersus	Dytiscidae	Notable B
Anacaena bipustulata	Hydrophilidae	Notable B
Coelambus paralellogrammus	Dytiscidae	Notable B
Demetrias imperialis	Carabidae	Notable B
Enochrus melanocephalus	Hydrophilidae	Notable B
Enochrus ochropterus	Hydrophilidae	Notable B
Haliplus apicalis	Haliplidae	Notable B
Helophorus griseus	Helophoridae	Notable B
Ochthebius nanus	Hydraenidae	Notable B
Peltodytes caesius	Haliplidae	Notable B
Rhantus grapii	Dytiscidae	Notable B
Rhantus suturalis	Dytiscidae	Notable B
Brachyton pratense	Aeshnidae	Notable
Aulacigastra leucopeza	Aulacigastridae	Notable
Beris clavipes	Stratiomyidae	Notable
Neoascia geniculata	Stratiomyidae	Notable
Odontomyia tigrina	Stratiomyidae	Notable
Oxycera morrisii	Stratiomyidae	Notable
Stratiomys potamida	Stratiomyidae	Notable
Stratiomys singularior	Stratiomyidae	Notable

The Sizewell Land Management Annual Reviews for 1996-2007 contain records of invertebrates recorded on the Sizewell Estate. Moth trapping has been undertaken in most years and the reports contain lists of the species recorded annually. Most of the additional invertebrates mentioned belong to popular groups such as the Rhopalocera (butterflies), Odonata or Orthoptera or mention distinctive species such as the ant-lion. One species protected under the Wildlife and Countryside Act 1981 has been recorded in most years since 1999 (the Norfolk hawker dragonfly [*Aeshna isosceles*]), whilst one Red Data Book, eighteen Nationally Scarce species and one Suffolk BAP species (the ant-lion) are also mentioned in the annual reports. Two insects which are new arrivals and may be of conservation importance are also mentioned. Table 3.2 lists these species.

Table 3.2 Invertebrates of High Nature Conservation Significance Recorded in the Sizewell Land Management Annual Reviews between 1996 and 2007

Species	Family	Status
Argiope bruennichi	Araneidae	Nationally Scarce
Euroleon nostras	Mymeleontidae	Suffolk BAP species
Ectobius panzeri	Blattellidae	Nationally Scarce
Metrioptera roeselii	Tettigoniidae	Nationally Scarce
Aeshna isosceles	Aeshnidae	Protected WCA (1981)
Brachytron pratense	Aeshnidae	Nationally Scarce
Erythromma viridulum	Coenagrionidae	New to Britain in 1999
Apion affine	Apionidae	Nationally Scarce
Ancylis upupana	Tortricidae	Nationally Scarce
Calamotropha paludella	Pyralidae	Nationally Scarce
Chortodes elymi	Noctuidae	Nationally Scarce
Crambus pratella	Pyralidae	Nationally Scarce
Dioryctria sylvestrella	Pyralidae	New to Britain in 2000
Earias chlorana	Noctuidae	Nationally Scarce
Mythimna flammea	Noctuidae	Nationally Scarce
Nascia cilialis	Pyralidae	Nationally Scarce
Pediasia contaminella	Pyralidae	Nationally Scarce
Pima boisduvaliella	Pterophoridae	pRDB3

Species	Family	Status
Scopula emutaria	Geometridae	Nationally Scarce
Sideridis albicolon	Noctuidae	Nationally Scarce
Xestia rhomboidea	Noctuidae	Nationally Scarce
Medetera jugalis	Dolichopodidae	Nationally Scarce
Vanoyia tenuicornis	Stratiomyidae	Nationally Scarce

The Nature Conservancy Council funded aquatic invertebrate surveys of coastal grazing marshes in Suffolk in the late 1980s and this included two surveys on the Sizewell Belts (Drake 1989a,b). One Red Data Book and seven Nationally Scarce species were recorded during these surveys and details of these have been summarised in Table 3.3.

Table 3.3 Red Data Book and Nationally Scarce invertebrates recorded from the Nature Conservancy Council funded surveys of Sizewell Belts

Species	Family	Status
Odontomyia argentata	Stratiomyidae	RDB2
Enochrus melanocephalus	Hydrophilidae	Nationally Scarce
Haliplus heydeni	Haliplidae	Nationally Scarce
Ochthebius nanus	Hydrophilidae	Nationally Scarce
Rhantus grapii	Dytiscidae	Nationally Scarce
Dixella attica	Dixidae	Nationally Scarce
Odontomyia tigrina	Stratiomyidae	Nationally Scarce
Stratiomys potamida	Stratiomyidae	Nationally Scarce

The ant-lion was rediscovered in Britain in 1994 (Mendel, 1996; Plant, 1999) from the Minsmere area of Suffolk. The rediscovery is remarkable because this insect is large and distinctive and is clearly breeding in the Suffolk Sandlings. The rediscovery prompted English Nature and the RSPB to fund surveys for this species (Plant 1998, 1999) which were mainly centred on Minsmere. In 2003, however, ant-lions were found at Walk Barn on the edge of Dunwich Forest-Goose Hill, Sizewell and they have been monitored since by Suffolk Wildlife Trust (SWT/ADAS, 2003-2004). The number of larval pits has fluctuated from over 900 in

2004 to 199 in 2006. The ant-lion is a Suffolk BAP species and Plant (1999) has suggested Red Data Book 2 (Vulnerable) status for this species.

Some of the species of high nature conservation value recorded at Sizewell have also been recorded at Minsmere including ant-lion, Norfolk hawker, small red-eyed damselfly (*Erythromma viridulum*), white admiral butterfly (*Limenitis camilla*) and the plume-moth *Pima boisduvaliella*. Out of a total of 754 moths recorded for the reserve in 2006, ten were Red Data Book and 44 Nationally Scarce species.

No specific surveys of the protected Norfolk hawker appear to have been undertaken at Sizewell or at Minsmere where it is thought to breed. Surprisingly, very few specific studies of this species appear to have been undertaken anywhere throughout its very limited range (Leyshon and Moore, 1993; Southwood *et al.,* 2005) but the former reference covers marshes on the River Waveney near Lowestoft and may be of some relevance. Norfolk hawker has, however, been recorded at Sizewell and has been present in most recent years according to the Sizewell Land Management Annual Reviews. This species is thought to breed at Minsmere (based on the RSPB invertebrate records) and may well be breeding in the Sizewell Marshes.

One Suffolk BAP species the ant-lion (or Suffolk ant-lion) (*Euroleon nostras*) has a significant population on the estate. Red Data Book 2 status has been suggested for this recently re-discovered species. A second Suffolk BAP species, the silver-studded blue (*Plebejus argus*) may occur at Sizewell, but confirmed records have not been seen by the author, and this seems dubious.

Ten Red Data Book species appear to have been previously recorded on the Sizewell Estate, including three macro-moths (the white-mantled wainscot *Archanara neurica*, marbled clover *Heliolithis viriplaca* and shaded fan-foot *Herminia tarsicrinilis*), three pyralid moths *Melissoblaptes zelleri*, *Nyctegris lineana* and *Pediasia fascelinina* and one plume moth *Pima boisduvaliella*, two soldierflies (*Odontomyia argentata* and *O. ornata*) and a spider (*Clubiona frisia*). The white-mantled wainscot is associated with reedbeds and reed-fringed ditches near the coast and the larva feeds on *Phragmites*. It is currently confined in Britain to a 15km stretch of coastal Suffolk from Thorpeness to Southwold, including Sizewell and Minsmere. The marbled clover (*Heliolithis viriplaca*) occurs mainly in open Breckland, flowery chalk downland, sand or shingle beaches etc and the larvae feed on a wide variety of unrelated low plants whilst the shaded fan-foot (*Herminia tarsicrinilis*) occurs in bramble (*Rubus fruticosus* agg.) thickets and dense bramble ground cover amongst oaks and birches in ancient woodland and in more shrubby areas and the larvae probably feed in leaf litter below bramble.

Of the pyralid moths, *Melissoblaptes zelleri* occurs in sandhills and the larvae feed on the moss *Brachythecium albicans; Nyctegris lineana* is very local on flat sandy ground behind coastal sandhills and on sandy shingle in south-east England and the larva may feed on clover (*Trifolium* spp.) and other plants; whilst *Pediasia fascelinella* is extremely local on the sandhills on the coasts of Lincolnshire, Norfolk, Suffolk, Essex and south Devon (and the larva feed on dune grasses). The plume moth *Pima boisduvaliella* is a very local species found on coastal sandhills from Kent to Norfolk and in Lancashire where the larva feed on kidney vetch (*Anthyllis vulneraria*), bird's-foot trefoil (*Lotus corniculatus*), restharrow (*Ononis spinosa*) and other low plants. The two soldierflies (*Odontomyia argentata* and *O. ornata*) are rare species typically associated with coastal grazing marshes. The spider *Clubiona frisia* occurs in marram tussocks on sand dunes and appears to be restricted in Britain to Norfolk and Suffolk (there are older records for other counties). The bee-wolf (*Philanthus triangulum*) still has Red Data

Book status but this is no longer appropriate since this species has dramatically increased in frequency and spread in range.

A total of forty-five Nationally Scarce (= Notable) species have been previously recorded from the Sizewell Estate (Tables 3.1-3.3). Seventeen of these are moths, fourteen are beetles (all but one of which are aquatic) and ten are true-flies with single Nationally Scarce spider, dragonfly, bush-cricket and native cockroach species. These figures simply reflect the greater effort on moth recording followed by water-beetles and then aquatic soldierflies in Sizewell Belts.

The desk study records clearly emphasise the importance of the coastal habitats, especially the sand-dunes and coastal shingle and the Sizewell Marshes. Only one rare species is actually clearly associated with the important Suffolk Sandlings heath (excluding the duneland species) and this is the ant-lion. Some important species and assemblages from groups such as the terrestrial beetles and the bees, wasps and ants are likely to be present on the areas of heath and in associated woodland, but very few records were available for these (with the possible exception of the weevil *Apion affine* which has been recorded on Leiston Common) to inform this report. The silver-studded blue butterfly (*Plebejus argus*) which has partial protection under the Wildlife and Countryside Act (1981) and is a Suffolk BAP species, is a characteristic heathland species and is found at Minsmere, but no there are no confirmed records for Sizewell. It is highly likely that the local county recorders for groups such as beetles and aculeate Hymenoptera will have records for Sizewell, but they have not been contacted to date.

Other invertebrate records for Sizewell obtained by AMEC include ant-lion on the section of coast between Sizewell Hall and Thorpeness Cliffs and another labelled Sizewell with an incorrect grid reference (TM478619[5]). Other significant records include: the centipede *Lithobius lapidicola*; the micromoths *Melissoblaptes zelleri* (pRDB3) and *Ancylis upupana*; four macro-moths (the square-spotted clay (*Xestia rhomboidea*), lunar yellow underwing (*Noctua orbona*), marbled clover (*Heliolithis viriplaca*) and shaded fan-foot (*Herminia tarsicrinalis*); two soldier-flies (*Odontomyia argentata* and *O.ornata*); and the bee-wolf (*Philanthus triangulum*). The latter (a powerfully-built solitary wasp which predates other wasps and bees) has spread dramatically in Britain in the last twenty years or so and can no longer be considered of Red Data Book status.

The silver-studded blue (*Plebejus argus*) was mentioned to the surveyor by a local person as occurring on Sizewell Beach by Sizewell A but this species is not mentioned in the Sizewell Land Management Annual Reviews or other published sources consulted, and this record is therefore doubtful. Silver-studded blue is a Suffolk BAP species, and monitoring for this species occurs at Minsmere. Two other rare butterflies have been recorded at Minsmere, swallowtail (*Papilio machaon britannicus*) and the Queen of Spain fritillary (*Issoria lathonius*) but these are very unlikely to occur at Sizewell. The (local) white-letter hairstreak (*Satyrium w-album*), however, occurs on the Sizewell Estate (Carl Powell, Suffolk Wildlife Trust, pers comm.).

Table 3.4 summarises some of the results from previous aquatic invertebrate surveys at Sizewell undertaken by Drake.

[5] This grid reference puts this record in the sea off Sizewell Hall!

Table 3.4 Summary of Results from Various Aquatic Invertebrate Surveys Conducted on Sizewell Belts

	No. species	No. sample sites	No. RDB spp	No. NS spp
Drake (1989a)	121	5	0	4
Drake (1989b)	147	13	1	9
Drake (in prep.)	159	9	5	15

RDB = Red Data Book, NS = Nationally Scarce

The records of rare and uncommon species from the five samples taken by Drake on behalf of the NCC in 1988 show only four Nationally Scarce (= Notable) species being recorded. This was the view taken by the surveyor who assessed Sizewell as being species-rich in aquatic invertebrates but poor in rare species (Drake, 1989a).

The NCC survey in 1989 involved more sample sites (13) and resulted in 147 species altogether including one Red Data Book and nine Nationally Scarce species. The RDB species recorded was the soldierfly *Odontomyia argentata* which has aquatic larvae and is confined to a few major wetland areas. The number of rare species was found to be similar to numbers found within ditches at Minsmere which was highly rated in terms of rare and uncommon or species rich assemblages of aquatic invertebrates by the surveyor (i.e. Drake). The best ditches were unshaded and predominantly well-vegetated. Species-poor ditches were generally the more heavily shaded sites including woodland ditches (Drake, 1989b).

The species recorded by Drake on behalf of Buglife in April 2009 are provided in Annex 2 Appendix B. Here nine samples yielded 159 aquatic invertebrate species in total from nine sites including potentially five Red Data Book and fifteen Nationally Scarce species. The location of these sample sites is shown in Figure 3.1. The RDB species recorded from this survey were the RDB2 valve snail *Valvata macrostoma* (provisional identification), the RDB2 ram's-horn snail *Anisus vorticulus* (provisional identification), the RDB3 diving beetle *Graphocerus cinereus,* the pRDB3 diving beetle *Hydaticus tranversalis* and the soldierfly *Odontomyia ornata.* The two RDB2 snails recorded in April 2009 had been submitted to a national expert for confirmation because of the difficulty in identifying these species.

During the initial desk study the presence of the white admiral within the area was determined from the Millennium Atlas of Suffolk Butterflies. White admiral has a localised distribution in Suffolk, despite the fact that the larval food plant, honeysuckle, is widespread[6]. Kenton Hills has been described as one of the best sites in Suffolk (with public access) for seeing this species (Stewart, 2001).

Rob Parker, the Suffolk Butterfly Recorder, supplied extracts from the annual reports for the county, compiled by the Butterfly Conservation Trust as well as a number of distribution maps (see Annex 4 Appendix A) of tetrads within which white admirals have been recorded. Up to 2006, white admirals had been recorded in 91 of 1,088 tetrads in Suffolk. In 2005, they were recorded in 32 tetrads, including 6 new sites, and a partial second brood was noted. In 2006 the

[6] This is likely to be a result of the fact that honeysuckle is widespread in hedgerows and gardens while white admiral tends to breed on honeysuckle in woodland habitats.

species had a good year being recorded in 39 tetrads, with recorders at 4 sites noting a partial second brood. In 2007, the species was recorded within 23 tetrads, 2 of which comprised additions to the cumulative tetrad total[7].

Robin Harvey (RSPB) supplied the results of transect surveys carried out at Minsmere in 2007. These surveys are not specifically aimed at white admirals, but do survey suitable habitat for this species. A total of 3 individuals were recorded during the formal butterfly surveys at Minsmere, and a further 2 casual observations were made during the year. In 2006, 8 white admirals were recorded on the walked transects with a further 7 casual records. Both the county recorder and the RSPB at Minsmere considered 2007 to be a poor year for white admirals due to long periods of wet weather (particularly in June).

At a local level, white admiral seems to be consistently recorded in the vicinity even in years in which the species is recorded in few tetrads. This can be seen from the distribution maps in Annex 4 Appendix A. In 2007, of the 23 tetrads in which white admiral was recorded, 10 were clustered to the north of the EDF Estate at Sizewell.

At a national level, white admiral is thought to have suffered a slight decline over the past 20 years (UK Butterfly Monitoring Scheme, http://www.ukbms.org). Of the 116 sites where white admiral is known to occur / have occurred and for which more than 5 years of data are available, the species is thought to be: extinct at 10; a recent coloniser at 8; stable at 68; declining at 17; and increasing at 13.

3.2 Field Surveys

3.2.1 2007 Invertebrate Survey

Summaries of the notable invertebrate species recorded are provided in Tables 3.5-3.7.

Table 3.5 Invertebrate Species of High Nature Conservation Value Recorded from the Sample Sites within the proposed Preliminary Works Area 2007

Species	A	B	C	D	C/D
Sympetrum flaveolum	+				
Rhantus suturalis			+		
Crypticus quisquilius	+	+	+	+	
Polydrusus formosus				+	
Glocianus punctiger		+			
Dolichopus acuticornis					+

[7] It should be noted that these records do not mean that this species in actually breeding on all these sites.

Species	A	B	C	D	C/D
Lispe uliginosa					+
Pseudisobrachium subcyaneum		+			
Dolichovespula media					+
Nysson dimidiatus		+			
Total	**2**	**4**	**2**	**2**	**3**

No rare or uncommon species were recorded from Sample Site I.

Table 3.6 Invertebrate Species of High Nature Conservation Value Recorded from the Dunes and Shingle on Sizewell Beach in 2007

Species	La	Lb	Lc	Ld	Le	Lf	Lg	Lh	Li	Lj
Ectobius panzeri					+	+	+		+	+
Drymus latus					+					
Aphanisticus pusillus										+
Clanoptilus marginellus	+									
Melanophthalma curticollis		+								
Mantura chrysanthemi									+	
Apion rubiginosum						+			+	
Stilpon sublunata										+
Platypalpus niveiseta		+		+						
Medetera petrophila			+							
Geomyza subnigra										+
Opomyza punctella		+								
Anagnota bicolor		+								
Elachiptera pubescens										+
Trachysiphonella scutellata			+							

Species	La	Lb	Lc	Ld	Le	Lf	Lg	Lh	Li	Lj
Tricimba brachyptera							+		+	+
Trixoscelis marginella									+	+
Total	**1**	**4**	**2**	**1**	**2**	**2**	**2**	**0**	**5**	**7**

Table 3.7 Invertebrates of High Nature Conservation Value Found in Kenton Hills and Goose Hill in 2007.

Species	H	G	F	E	Other area
Euroleon nostras					Walk Barn
Aeshna isosceles			+		
Aphanus rolandri		+			
Rhantus suturalis		+			
Catopidius depressus			+		
Scymnus limbatus	+				
Molophilus bihamatus		+			
Hybomitra ciureai			+		
Sciapus contristans				+	
Neoascia geniculata		+			
Lasiambia palposa			+		
Trachysiphonella scutellata			+		
Chyromya britannica			+		
Meonura neglecta				+	
Total	**1**	**4**	**6**	**2**	**1**

Sample Sites are arranged how they are encountered from west to east along the track from the car-park at Kenton Hills

Araneae (Spiders)

The spiders identified from the vacuum samples from Sizewell coastal (or shore) habitats (Sample Sites La-Lj) are listed in Annex 1 Appendix A. No Red Data Book or Nationally Scarce species were recorded. The absence of the RDB3 *Clubiona frisia* which has already recorded on the Sizewell dunes may be due to the speed with which this species can elude capture and the fact that it is not easily sampled with a portable vacuum. In total, only twelve spider species were recorded from the fifteen samples which would appear to represent low species richness. It is possible that larger spider species were missed by the vacuum and that there was bias on the part of the surveyor in taking spiders because when collected in pooters they will predate insects in the same sample and are therefore often best sampled separately.

Spiders were not identified from the pitfall trap material because the flooding and heavy rain in June and July meant that soft-bodied invertebrates would have decomposed first and the contents suggested this.

Smaller Insect Orders

Selected taxa from the smaller invertebrate groups identified from the coastal habitats (La-j) by vacuum sampling are listed in Annex 1, Appendix E. These include the Mollusca (snails), Isopoda (woodlice), Opiliones (harvestmen), Blattoidea (cockroaches) and Orthoptera (grasshoppers and crickets). Thirteen taxa were identified and these included the Nationally Scarce lesser cockroach (*Ectobius panzeri*) as well as the local lesser marsh grasshopper (*Chorthippus albomarginatus*) which has expanded its range considerably in the last two decades or so.

The Odonata were recorded by direct observation and from individuals caught in the water traps. The latter are listed in Appendices 6 and 7 and include the yellow-veined darter (*Sympetrum flaveolum*), which until recently was a vagrant species in Britain but which has now started breeding and spreading here. The local lesser marsh grasshopper mentioned above was also recorded in some of the water traps in August (Annex 1, Appendix G).

Some incidental records of species belonging to the smaller invertebrate groups are also listed in Annex 1, Appendix I. These include the ant-lion (*Euroleon nostras*) and the Norfolk hawker (*Aeshna isosceles*). The latter was frequent at times near Sample Site F where the rides intersect in Goose Hill.

Further details of the Red Data Book and Nationally Scarce species recorded are provided in Annex 1, Appendix J.

Hemiptera (Auchenorrhyncha and Heteroptera)

The Auchenorrhyncha (leafhoppers) and Heteroptera (true-bugs) identified from the vacuum from the Sizewell coastal habitats (Sample Sites La-j) are listed in Annex 1, Appendix A. No Red Data Book or Nationally Scarce leafhoppers were recorded and only one Nationally Scarce bug (*Drymus latus*). The bug has unclear habitat requirements but has been found in grassland, in derelict arable land on chalk, in dense moss on chalk, at the base of cliff, on waste ground and in woods (Kirby 1992). In total, twenty-four Auchenorrhyncha and twenty-two Heteroptera were recorded from the fifteen vacuum samples. The results for these groups suggest that the habitats are relatively species-rich but appear to support few rare or uncommon species. Further details of the Red Data Book and Nationally Scarce species recorded are provided in Annex 1, Appendix J.

Coleoptera (Beetles)

The beetles identified from the pitfall traps are listed in Annex 1, Appendix B. One hundred and fifty-six species were recorded from these including five Nationally Scarce species. The number of Nationally Scarce species would appear to be low and may reflect the relative unimportance of the preliminary works area and the conifer plantations along the proposed access route and construction area for Coleoptera. Prior to the survey, rare or uncommon species, might have been expected on the Suffolk Sandlings heathland and woodland habitats. It is possible that the poor weather and/or absence of survey earlier in the season may also have contributed to the poorer than expected results.

The beetles identified from the vacuum samples from the coastal habitats at Sizewell (Sample Sites La-Lj) are listed in Annex 1, Appendix C. Two Red Data Book and three Nationally Scarce species were recorded. The two Red Data Book species are the lathridiid *Melanophthalma curticollis* and the weevil *Apion rubiginosum*. The former appears to have been found at the roots of plants and under vegetable debris on light soils, both inland and on coastal sand dunes whilst the latter occurs on disturbed ground, grassland and coastal shingle where it feeds on sheep's sorrel (*Rumex acetosella*)(Hyman and Parsons (1994a, 1994b).

The beetles identified from the water trap samples collected from Sizewell in July 2007 are listed in Annex 1, Appendix D. The water traps were mainly used to sample Diptera, aculeate Hymenoptera and other flying insects and consequently the Coleoptera were not a target group for this method. However, 67 species were recorded in one month which provided a better than expected result. Three Nationally Scarce species were recorded.

Several common to local and one Nationally Scarce beetle (*Silus ruficollis*) were recorded in the Malaise trap in the *Phragmites* fen (Sample Site J).

Further details of the Red Data Book and Nationally Scarce species recorded are provided in Annex 1, Appendix J.

Lepidoptera (Moths and Butterflies)

Butterflies and moths were recorded in the field or from the water traps and Malaise traps and they are listed in the appropriate appendices (Appendices 5-8). The grayling (*Hipparchia semele*) which is a localised butterfly in Britain was reasonably frequent.

Lepidoptera identified from the Malaise trap in the *Phragmites* fen to the east of the preliminary works area are listed in Annex 1, Appendix H. The Red Data Book 3 white-mantled wainscot (*Archanara neurica*) was recorded in one sample (Annex 1, Appendix H).

Diptera (True-flies)

Selected Diptera identified from the coastal habitats (La-j) by vacuum sampling are listed in Annex 1, Appendix E. A total of 90 Diptera taxa have been identified and these include two Red Data Book and eight Nationally Scarce species. The Red Data Book species are two grass-feeding species, *Opomyza punctella* and *Tricimba brachyptera*. The former has been recorded in grassland mostly in northern England and Scotland and the larvae probably develop in grasses. The latter also probably develops in grasses and is mainly known from the sandy breck grassland in Suffolk although it has been found more recently on ericaceous heathlands in Nottinghamshire by the surveyor. The Diptera results would seem to suggest that the dunes and coastal shingle are more important for this group than for Araneae, Hemiptera or Coleoptera.

Selected Diptera identified from the water traps emptied in July 2007 are listed in Annex 1, Appendix F. One hundred and twenty-two species have been identified and these include two Red Data Book species (the horsefly *Hybomitra ciureai* and the minute and obscure *Meonura neglecta*), five Nationally Scarce species and another species only described as new to science in 2007 (*Chyromya britannica*). The horsefly *Hybomitra ciureai* is a rare south-eastern species found on and near the coast, mostly in marshes, although its precise habitat is far from known. *Meonura neglecta* is only known from six British localities (according to Falk and Ismay in prep.) but three of these are in Suffolk. The adult habitat is unknown but is probably heathland or associated broadleaved woodland.

Selected Diptera identified from the water traps emptied in August 2007 are listed in Annex 1, Appendix G. A total of 335 records are given in Annex 1, Appendix G including two Nationally Scarce species (*Dolichopus acuticornis* and *Lispe uliginosa*).

Selected Diptera identified from the Malaise trap in the *Phragmites* fen to the east of the preliminary works area are listed in Annex 1, Appendix H. Two large samples have been worked through and these have produced some outstanding records. These include six Red Data Book species (*Prionocera subserricornis*, *Odontomyia ornata*, *Rhagio strigosus*, *Hybomitra ciureai*, *Antichaeta brevipennis* and *Stenomicra delicatula*), thirteen Nationally Scarce species and one species (*Chyromya brittanica*) only described as new to science in 2007. An additional rare species (added to the British list in 2006 and only known from one other locality) needs to be confirmed.

Details of the ecology, status and distribution of these species are provided in Annex 1, Appendix J.

Aculeate Hymenoptera (Bees, wasps and ants)

Few aculeate Hymenoptera were taken from the coastal habitats (La-j) by vacuum sampling. The seven species recorded are listed in Annex 1, Appendix E. No Red Data Book or Nationally Scarce species were recorded.

The aculeate Hymenoptera identified from the water traps emptied in July 2007 are listed in Annex 1, Appendix F. A total of 43 species have been identified including only one Nationally Scarce species. The paucity of rare and uncommon species is perhaps surprising for a sandy area with a good mosaic of habitats ranging from heathland, dry and wet woodlands, plantations and marsh.

Selected Diptera identified from the water traps emptied in August 2007 are listed in Annex 1, Appendix G. The very rare bethylid *Pseudisobrachium subcyaneum* was recorded along with the Nationally Scarce *Dolichovespula media*. The Bethylidae have not been given Red Data Book, Nationally Scarce or other statuses unlike most other aculeate Hymenoptera. *Pseudisobrachium subcyaneum* has only been recorded from four UK sites and it is associated with certain ant species (Perkins 1976).

Hymenoptera identified from the Malaise trap in the *Phragmites* fen to the east of the preliminary works area are listed in Annex 1, Appendix H. One parasitic wasp (*Trigonalis hahni*) was recorded in one of the samples which is regarded as very rare (Gauld and Bolton 1996). These are parasitoids of Hymenoptera or Diptera larvae.

Further details of the Red Data Book and Nationally Scarce species recorded are provided in Annex 1, Appendix J.

3.2.2 2009 Invertebrate Survey

Table 3.8 summarises the results of the 2009 survey, along with some of the results from previous aquatic invertebrate surveys at Sizewell undertaken by Drake.

Table 3.8 Summary of Results from 2009 Aquatic Invertebrate Survey of Sizewell Belts, With Results of Previous Surveys for Comparison

	No. species	No. sample sites	No. RDB spp	No. NS spp
Drake (1989a)	121	5	0	4
Drake (1989b)	147	13	1	9
Drake (in prep.)	159	9	5	15
AMEC 2009 survey	261	33	7	22

RDB = Red Data Book, NS = Nationally Scarce

The NCC survey in 1989 involved more sample sites (13) and resulted in 147 species altogether including one Red Data Book and nine Nationally Scarce species. The RDB species recorded was the soldierfly *Odontomyia argentata* which has aquatic larvae and is confined to a few major wetland areas. The number of rare species was found to be similar to numbers found within ditches at Minsmere which was highly rated in terms of rare and uncommon or species rich assemblages of aquatic invertebrates by the surveyor (i.e. Dr Drake). The best ditches were unshaded and predominantly well-vegetated. Species-poor ditches were generally the more heavily shaded sites including woodland ditches (Drake 1989b).

3.2.3 2010 Invertebrate Survey

The prevailing weather conditions experienced during the survey work are summarised in Table 3.9.

Table 3.9 Prevailing Weather Conditions

Survey Date	Weather Conditions
2 June 2010	Sunny, warm, no cloud cover. No significant wind.
3 June 2010	Sunny, no cloud cover No significant wind.
4 June 2010	Bright and sunny, no cloud cover, cool breeze
23 June 2010	Hot and sunny, no cloud cover, slight breeze

Details of the taxa recorded are provided in Annex 3, Appendix A. Species of high nature conservation value (species protected under the Wildlife and Countryside Act 1981, UK BAP, Red Data Book and Nationally Scarce species) have been emboldened in Annex 3, Appendix A and details of the ecology, status and distribution of these species are provided in Annex 3, Appendix B.

A total of 239 terrestrial invertebrate taxa were recorded in June 2010. These include one species protected under the Wildlife and Countryside Act (1981), three UK BAP species, seven Red Data Book (RDB) species and 12 Nationally Scarce species.

The protected, UK BAP, RDB and Nationally Scarce species recorded are summarised in Table 3.10 along with the sample sites from which they were recorded.

Table 3.10 Distribution of the Protected, Red Data Book and Nationally Scarce Invertebrate Species Recorded from Sizewell Belts in June 2010

Protected (Wildlife and Countryside Act 1981)	Where recorded (see Figure 2.3)
Aeshna isosceles	Malaise trap
UK Biodiversity Action Plan	
Aeshna isosceles	Malaise trap
Chiasmia clathrata	E,J
Tyria jacobaeae	H,I
Red Data Book 1	
Aeshna isosceles	Malaise trap
Red Data Book 2	
Antichaeta brevipennis	G
Odontomyia ornata	A,E,J, Malaise trap
Parhelophilus consimilis	G
Psacadina zernyi	D,I
Red Data Book 3	
Hybomitra ciureai	I
Subclytia rotundiventris	Malaise trap
Nationally Scarce	
Anagnota bicolor	J
Brachytron pratense	C,E,F,G,J,L
Crossocerus binotatus	Malaise trap
Demetrias imperialis	I

Protected (Wildlife and Countryside Act 1981)	Where recorded (see Figure 2.3)
Lipara rufitarsis	Malaise trap
Odontomyia tigrina	A,B,D,E,F,G,J
Psacadina verbekei	J
Spanochaeta dorsalis	D,E,J
Tetanocera punctifrons	E
Thereva plebeia	I
Vanoyia tenuicornis	A,E,F,G,I
Zophomyia tenella	A,B,D,E,F,G,J
Rare (according to Ferrière and Kerrich, 1958)	
Chalcis sispes	A

A single specimen of the Norfolk hawker was recorded in the first erected Malaise trap (location indicated in Figure 2.3) which was emptied on 23 June 2010 (see Annex 3 Appendix C for further records). Further individuals were observed in June 2010 on grazing marsh on Sizewell Belts immediately west of Sizewell B power station and immediately northwest of the (then) proposed site of Sizewell C. The locations of this species known to the surveyor are summarised in Table 3.10.

Two UK BAP moths were recorded from the ditch margins in June 2010. These are the latticed heath (*Chiasmia clathrata*) and cinnabar moth (*Tyria jacobaeae*). Both are active during the day and are common and widespread species. They were given UK BAP status at the suggestion of Butterfly Conservation because there is evidence that they are declining. Neither is particularly associated with grazing marshes or wetlands in general and they are usually found in drier, open habitats.

Four Red Data Book insects were swept from the grazing marshes. *Antichaeta brevipennis* is a snail-killing fly found in lush vegetation beside water-bodies. It has previously been recorded from ditches in unimproved grazing marsh in Suffolk (Falk, 1991). Another snail-killing fly, *Psacadina zernyi,* was recorded and this is associated with fens in particular. Most of the British records of this very rare species are from Norfolk. The soldier-fly *Odontomyia ornata* was frequently recorded as larvae in the aquatic macro-invertebrate survey undertaken on the Sizewell Belts in September 2009 (Entec, 2010). The adult records are useful for confirming the provisional larval determinations. The larvae of this species can be locally common in ditches on grazing levels despite its RDB2 status. The hoverfly *Parhelophilus consimilis* is normally associated with eutrophic bogs but has been found in fens in eastern England. The other two *Parhelophilus* species which are local and associated with wetlands were also recorded from the survey.

Two RDB3 insects were recorded from the survey. The horsefly *Hybomitra ciureai* appears to be associated with brackish coastal marshes or grazing levels. The larvae probably develop in damp soil and in the marginal zones of ponds and ditches. Most of the records of this species are from Essex but it has been recorded from Suffolk, from Walberswick National Nature Reserve. The distinctive tachinid *Subclytia rotundiventris* is normally associated with broadleaved woodland including birch scrub in areas of wet heath and fen, heaths and calcareous grassland. The larvae are parasitoids of several species of shield bug. One individual was taken in the Malaise trap in the increasingly scrubbed-over reedbeds.

Twelve Nationally Scarce (formerly Notable) invertebrates were recorded during the survey. The hairy dragonfly (*Brachytron pratense*) was frequent in the ditches on the grazing marshes in June and shared the habitat with the Norfolk hawker. The hairy dragonfly is a well known inhabitant of coastal levels and grazing marshes. The ground beetle *Demetrias imperialis* has been recorded from *Phragmites* and *Typha* beds as well as a variety of other wetland habitats. It appears to have increased its range in recent years. The soldier fly *Odontomyia tigrina* is found in wetlands in southern England including ditches on coastal levels. Another soldier fly, *Vanoyia tenuicornis,* was found in five samples on the grazing marsh and larvae of this species were frequently encountered in the ditches during the September 2009 ditch survey. The stiletto-fly *Thereva plebeia* is usually associated with dry habitats and may have been blown onto the grazing marsh from the nearby sandhills or Sandlings habitat. Two Nationally Scarce snail-killing flies were recorded from the grazing marsh ditches, namely *Psacadina verbekei* and *Tetanocera punctifrons*. Both are found in wetlands and have larvae that either predate or parasitise aquatic molluscs. *Lipara rufitarsis* produces distinctive galls on *Phragmites* and is consequently particularly associated with *Phragmites* beds. Based on the surveyor's experience, the minute *Anagnota bicolor* is usually found in grass and sedge tussocks in wetlands, although another source suggests it is associated with reedbeds. The muscid *Spanochaeta dorsalis* is found in marshes and marshy woods and it has been found on *Phragmites* by the surveyor previously. *Zophomyia tenella* is a tachinid that has been recorded from a variety of habitats including woodland, calcareous grassland and coastal dunes. The larval stages are unknown. The solitary wasp *Crossocerus binotatus* has been found sparingly throughout England where it is associated with deadwood and timber in a variety of situations including woodland margins, open woodland, farmland, parkland and wetland margins.

3.2.4 2007 White Admiral Survey

The transect surveys on site conducted as part of this survey confirmed the continued presence of white admiral on site in 2007. Table 3.11 summarises the number of sightings for each transect and the grid reference of each sighting and Figure 3.2 plots the location of the sightings from the walked transects as well as the incidental records and numbers of individuals recorded at each location.

Table 3.11 White Admiral Transect Results 2007

Date	Number of sightings	OS Grid references
07/07/07	3	TM 4593 6406, TM 4590 6402, TM 4590 6402
08/07/07	6	TM 46082 64085, TM 46308 64113, TM 46435 64215, TM 46376 64542, TM 46733 64841, TM 46344 64150,
10/07/07	2	-TM 46011 64230, TM 46980 64475
04/08/07	0	-
05/08/07	0	-
10/08/07	0	-

Incidental observations were also made during other protected species surveys and outside of the formal transect walks. These are summarised in Table 3.12, together with the grid reference for each sighting.

Table 3.12 White Admiral Incidental Records from the Sizewell Estate in 2007

Date	Number of sightings	Grid references
08/07/07	1	TM 46011 64230
08/07/07	1	TM 46980 64475
04/08/07	1	TM 4632 6452

Habitat Associations

The transect route and the white admiral records were situated within and around the margins of the habitat defined as Dry Woodland 31 community by the National Vegetation Classification survey undertaken in 2007 (reported in full in Entec doc reference number 19801cr145). The woodland canopy is dominated by Corsican pine (*Pinus nigra* ssp. *laricio*) and the field layer is dominated by bracken (*Pteridium aquilinum*) and bramble (*Rubus fruticosus* agg.), with Yorkshire fog (*Holcus lanatus*). The ground layer includes climbing corydalis (*Ceratocapnos claviculata*) with mosses often forming a dense carpet. Collectively, these species are indicative of dry, mildly acid soil conditions.

There are two variants within this community. The first, community 31a, is found throughout Kenton Hills and is characterised by a sparse sub-canopy layer consisting almost entirely of scattered silver birch (*Betula pendula*) saplings and a field layer that includes a suite of acidophile herbs and mosses. This woodland is characterised by much more open woodland, with wider rides, more ground flora and under storey and wide areas of recently felled vegetation, which results in more flowering species available for the adult white admirals. Honeysuckle was not recorded during the NVC vegetation survey of this woodland, but it is present. The second sub community, 31b which is found throughout Goose Hills, is a honeysuckle (*Lonicera periclymenum*) and male fern (*Dryopteris filix-mas*) community. Corsican pine dominates the canopy, though pedunculate oak (*Quercus robur*) and silver birch are occasionally found above shrubs including elder (*Sambucus nigra*) and hazel (*Corylus avellana*), and saplings of silver birch and sycamore (*Acer pseudoplatanus*). Honeysuckle, male fern and the moss *Brachythecium rutabulum* are common. The canopy cover is more diverse but is also denser with fewer gaps.

Associated with these woodland stands are many rides of varying width. In total, six differing communities of rides were identified during the NVC survey, with some areas being characterised by bracken and many others having moss, grass and sedge communities.

The majority of white admiral sightings were from the first variant of the dry woodland, located in the southern section of the Kenton Hills. Only two sightings were from Goose Hills, with one of these being an incidental record.

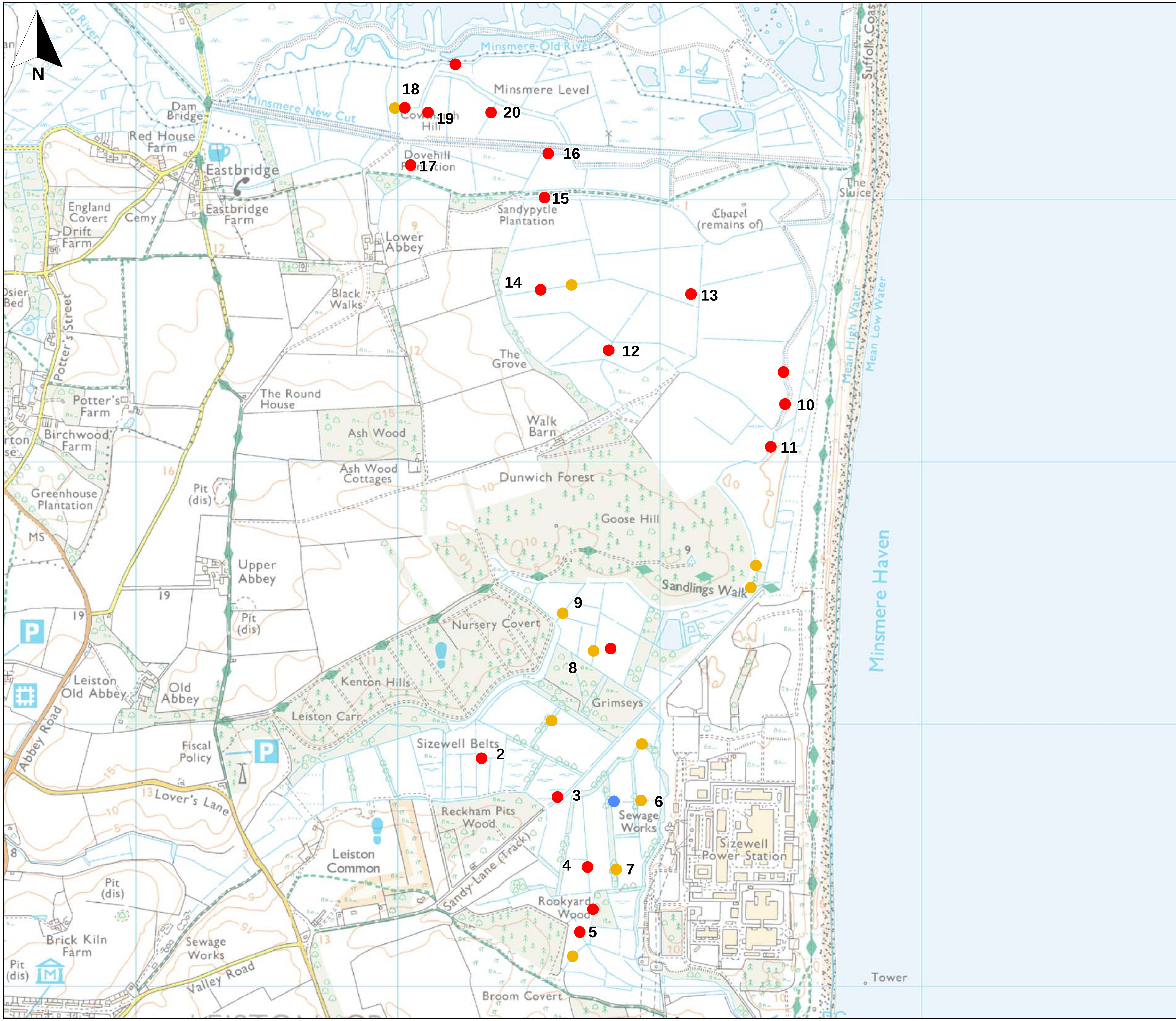
3.2.5 2009 White Admiral Larval Survey

A summary of the results of the 2009 survey work is presented in Table 3.13.

Table 3.13 Summary of 2009 White Admiral Larval Survey Results

Search Area	Larvae Recorded	Incidences of Larval Damage	Description of Vegetation
1	0	0	Food plant occurring within 10 metres of ride-edge in pine plantation up to a height of approximately 8 metres, with bracken (*Pteridium aquilinum*) predominant in the ground flora.
2	0	0	Food plant occurring on an isolated patch of mid-plantation Pinus to a height of approximately 5 metres, in a shaded area well away from any clearings or rides. Little food plant present elsewhere in the vicinity. Bracken predominant in ground flora.
3	0	0	Food plant occurring within 5 metres of ride-edge, principally growing in hawthorn (*Crataegus monogyna*) and the lower branches of sweet chestnut (*Castanea sativa*) to a height of approximately 4 metres. Little food plant present in the pine plantation in this area.
4	1	1	Food plant occurring as a single clump growing up one Pinus tree (to right of photograph), but in greater amounts trailing up adjacent small silver birch (*Betula pendula*) trees to a height of approximately 5 metres. Situated at junction of rides and within 5 metres of ride-edge. Bracken predominant in ground flora.
5	0	1	Food plant largely occurring on pine trunks, but with some present in the silver birch, sycamore (*Acer pseudoplatanus*) and Rhododendron (*Rhododendron ponticum*) understorey. Site adjacent to ride junction and within 12 metres of ride-edge, with mainly bracken ground cover.
6	0	0	Food plant occurring in a shaded area on pine trunks and within English elm (*Ulmus procera*) and sycamore understorey. Site adjacent to but laid back from ride junction, with the search area between 5 and 25 metres from the ride-edge.
7	0	3	Food plant occurring in a rather shaded area in damp silver birch and alder (*Alnus glutinosa*) woodland to a height of approximately 6 metres, but also as low-level ground coverage. Search area outside but adjacent to the main perimeter ride, and within 4 metres of ride-edge
8	1	2	Food plant occurring principally on pine trunks, but also within sycamore understorey, to a height of approximately 7 metres. Search area up to 15 metres from the ride-edge, with bracken the predominant ground cover in this area.
9	0	2	Food plant occurring principally in young silver birch scrub, adjacent to a pine plantation, to a height of approximately 4 metres. Search area along ride-edge and no further than 3 metres from the ride-edge, with bracken the predominant ground cover.
10	1	3	Food plant occurring within ride-edge mixed scrub woodland, principally on rowan (*Sorbus aucuparia*), hornbeam (*Carpinus betulus)*, wild cherry (*Prunus avium*) and silver birch. Search area within 5 metres of ride-edge, with bracken the predominant ground cover.
11	0	0	Food plant occurring in a shaded area of mainly damp silver

Search Area	Larvae Recorded	Incidences of Larval Damage	Description of Vegetation
			birch and alder woodland, growing up trunks and in lower branches and scrubby growth, to a height of approximately 5 metres. Search area outside main perimeter ride, between 3 and 8 metres from the ride-edge. Ground flora chiefly composed of Bracken and grasses.
12	2	5	Food plant growing up through bracken ground cover onto lower trunks of *Pinus* trees to a height of approximately 10 metres. Search area adjacent to junction in rides and no further than 8 metres from the ride-edge.
13	0	1	Food plant (including a variant with variegated leaves) growing up through Bracken ground cover onto lower trunks of pines and sycamore, Silver birch and rhododendron understorey to a height of approximately 7 metres. Search area adjacent to junction in rides and extending from ride-edge to about 35 metres into the plantation.
14	2	4	Food plant growing up through bracken ground cover onto lower trunks of pines and silver birch understorey to a height of approximately 10 metres. Search area laid back from ride, generally between 15 and 50 metres from ride-edge.
15	1	6	Food plant growing up through largely bracken ground cover onto lower trunks of pine trees and silver birch understorey to a height of approximately 10 metres. Search area within 20 metres of ride-edge.
16	1	3	Food plant growing up through bracken ground cover onto lower trunks of pine trees to a height of approximately 10 metres. Search area within 12 metres of ride-edge.
17	0	0	Food plant growing up through bracken and foxglove (*Digitalis purpurea*) ground cover onto lower trunks of pine trees to a height of approximately 8 metres. Search area mainly between 10 and 25 metres of ride-edge, though small amounts of food plant searched up to the ride-edge.
18	0	0	Food plant occurring in a shaded area, largely growing through the lower branches of hawthorn, oak (*Quercus robur*) and rhododendron, to a height of approximately 6 metres. Ground cover chiefly composed of bracken, bramble (*Rubus fruticosus* agg.) and stinging nettle (*Urtica dioica*).
19	0	2	Food plant growing up through bramble ground cover onto lower trunks of pine trees and into elder (*Sambucus nigra*) bushes, to a height of approximately 8 metres. Search area within 15 metres of ride-edge.
20	0	0	Food plant occurring in damp, shady, deciduous woodland by the boardwalk at the start of the ‘Sizewell Belts Trail’. Growing mainly in English elm scrub but extending to a height of approximately 14 metres into dead elm branches above. Alder and ash (*Fraxinus excelsior*) trees also frequent in this area holding smaller amounts of honeysuckle. Search area mainly adjacent to ride-edge and not extending more than 5 metres from it. Ground vegetation dominated by stinging nettle.



Key

- 1989a sample sites
- 1989a quick sample sites
- 1989b sample sites

0 m 600 m

Scale 1:14000 @ A3

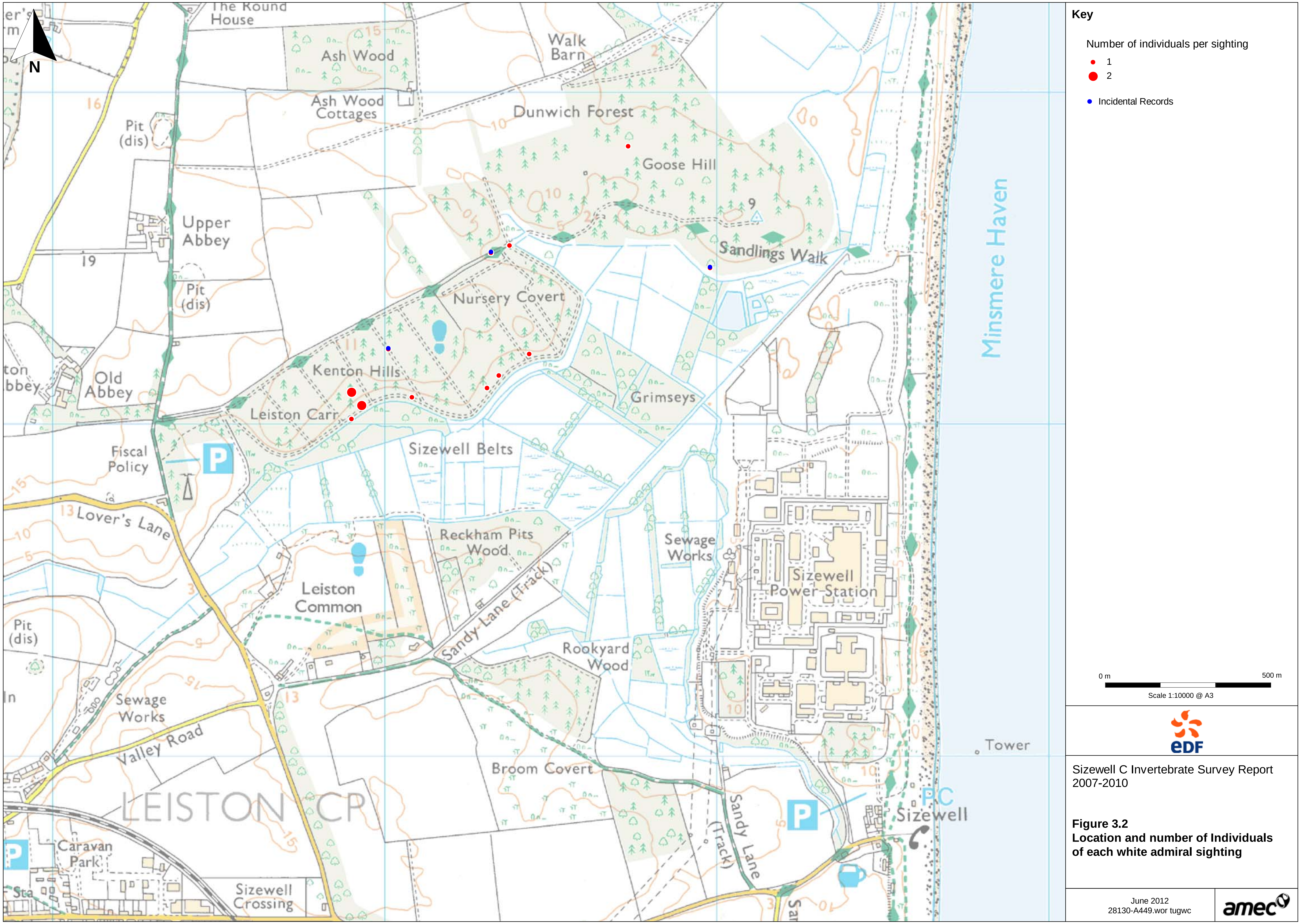
EDF

Sizewell C Invertebrate Survey Report 2007-2010

Figure 3.1
Survey locations (Drake on behalf of Buglife, 2009)

June 2012
28130-A448.wor tugwc

amec



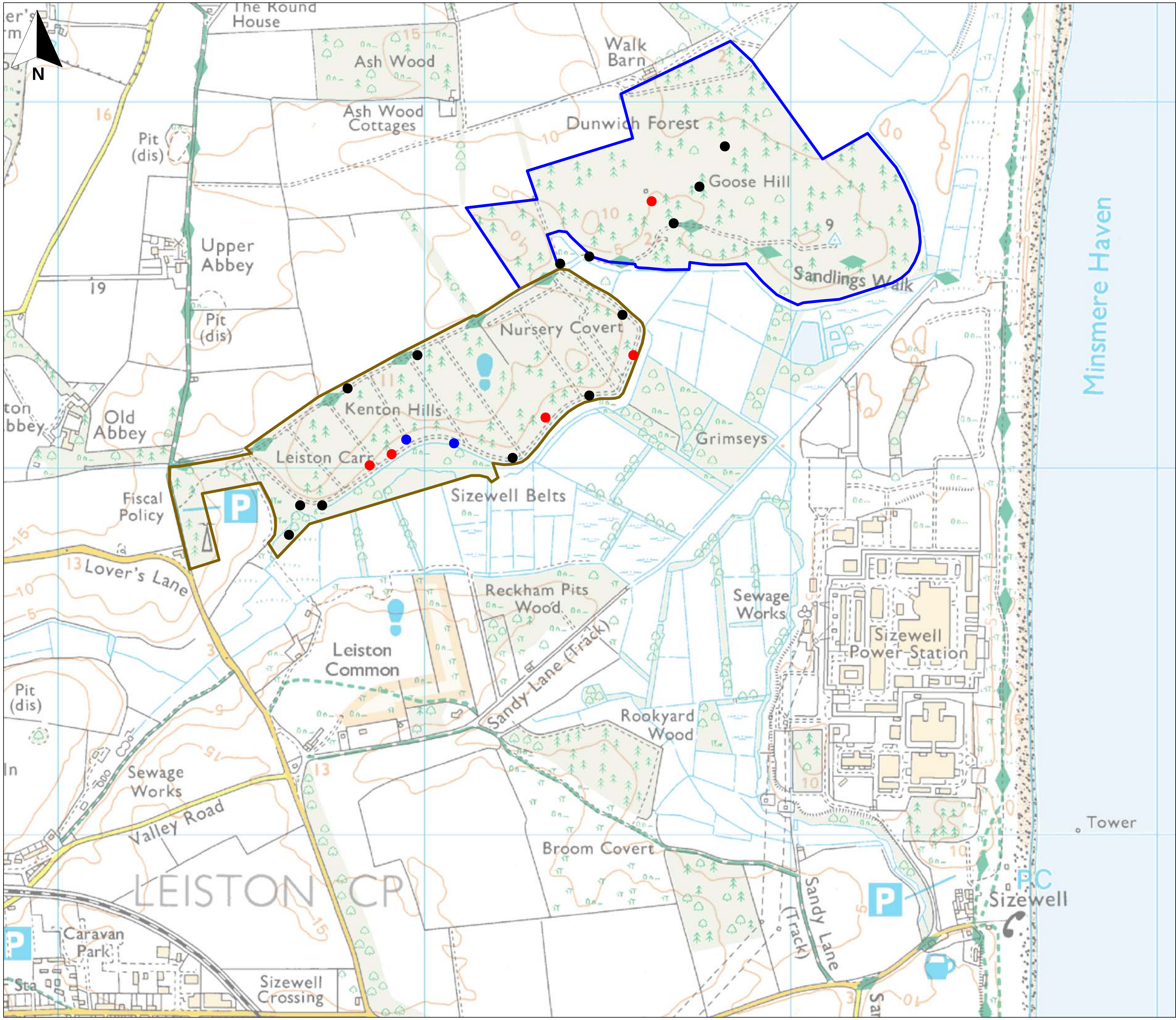
EDF

Sizewell C Invertebrate Survey Report 2007-2010

Figure 3.2
Location and number of Individuals of each white admiral sighting

June 2012
28130-A449.wor tugwc

amec



Sizewell C Invertebrate Survey Report 2007-2010

Figure 3.3
Distribution of white admiral larvae

June 2012
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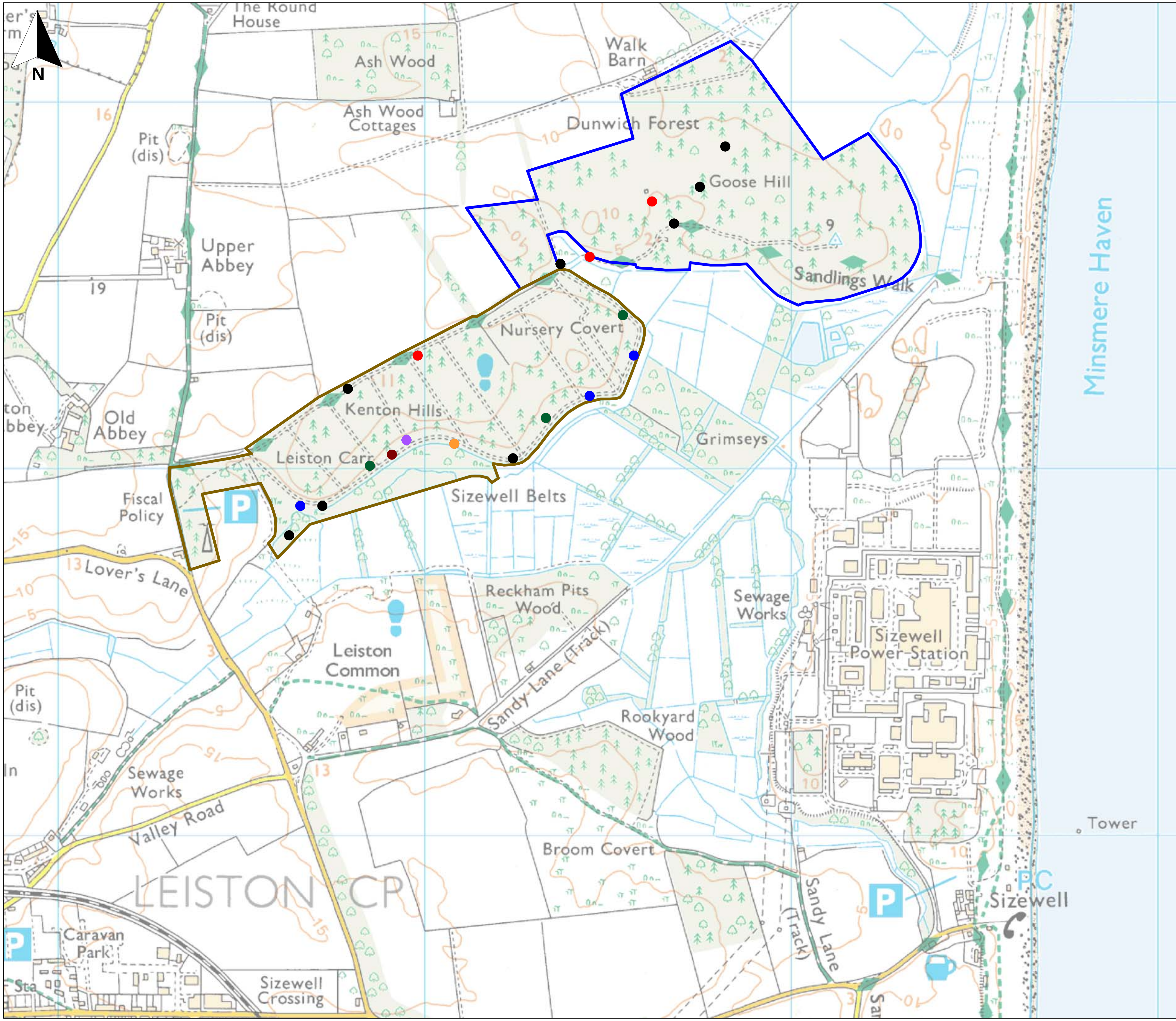
amec



Key

Goose Hill

Kenton Hills

Incidences of Larval Feeding Damage Recorded

= 0

= 1

= 2

= 3

= 4

= 5

= 6

0 m 500 m

Scale 1:10000 @ A3

EDF

Sizewell C Invertebrate Survey Report 2007-2010

Figure 3.4
Incidence of larval damage

June 2012
28130-A451.wor tugwc

amec

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Figures

Annex 1
Invertebrate Survey Report 2007 Appendices

Annex 2
Invertebrate Survey Report 2009 Appendices

March 2014
Doc Reg No. 34868ca069

Annex 3
Invertebrate Survey Report 2010 Appendices

March 2014
Doc Reg No. 34868ca069

Annex 4
White Admiral Survey Report 2007
Appendices

March 2014
Doc Reg No. 34868ca069

Annex 5
White Admiral Larval Survey Report 2009
Appendices

March 2014
Doc Reg No. 34868ca069

SIZEWELL C DEVELOPMENT – MAIN DEVELOPMENT SITE: VOLUME 2, CHAPTER 14:

ANNEX 14A4.4 PRIMARY DATA

- Annex 14A4.4 Invertebrate and NVC Surveys of SSSI: Review of previous studies and methodology for further work

- Annex 14A4.4 Sizewell C Invertebrate Surveys 2014

- Annex 14A4.4 Sizewell C Invertebrate Surveys 2016

3	25/7/14	Jon Davies	Mark Lang	Final	Final EDF changes made	**Steve Mannings/ Judith Linnane**
2	18/7/14	Jon Davies	Mark Lang	Draft	Proposed EDF changes made	
1	27/05/14	Jon Davies	Mark Lang	Draft		
Rev.	**Date**	**Prepared by**	**Checked by**	**Status**	**Reasons for revision**	**Approved by**

DIRECTION PRODUCTION INGENIERIE **Centre National d'Equipement Nucléaire**	1ST PARTNER	2ND PARTNER

CONTRACTOR REF. No	CONTRACTOR WBS CODE
CONTRACTOR COMPANY NAME **HYDER CRESSWELL**	CONTRACT NUMBER **NNB GenCo Ref:** SZC-NNBPEA-XX-000-PAP-000722 SAFETY related **Yes ☐ No ☐**

APPLICABILITY:

- 1: Document related to Unit 1
- 2: Document related to Unit 2
- 9: Document that applies to buildings/systems common to units 1 & 2
- 0: documents that relate exclusively to buildings or systems that are common to the whole site (e.g. OSC building, parkings, ancillary buildings...)

NUCL/REP/EPR/UKEPR							
HPC (doc: HK)				SZC (doc: SZ)			
0	1	2	9	0	1	2	9
				X			

SYSTEM

00

BUILDING

00

SCALE	**DESCRIPTION:** Sizewell C Ecological Support Invertebrate and NVC Surveys of SSSI: Review of previous studies and Methodology for further work
SIZE	
PAGE	

DOCUMENT REFERENCE No

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Sizewell C Ecological Support

Invertebrate and NVC Surveys of SSSI: Review of previous studies and Methodology for further work

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Invertebrate and NVC Surveys of SSSI: Review of previous studies and Methodology for further work

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1 Introduction

EDF Energy/NNB GenCo (hereafter referred to as NNB) is to submit an application for a Development Consent Order (DCO) to construct and operate a new nuclear power station, Sizewell C, near the town of Leiston in Suffolk. The proposal site lies within an area of high landscape and ecological sensitivity, within an Area of Outstanding Natural Beauty (AONB) and adjacent to and/or within the Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC), the Sandlings Special Protection Area (SPA) and the Outer Thames Estuary SPA. A small part lies within the Sizewell Marshes Site of Special Scientific Interest (SSSI).

Following on from NNB's Stage 1 Pre-Application Consultation on its initial proposals and options for Sizewell C, which ended on 6th February 2013, NNB's priorities have been to progress the conceptual engineering design and technical studies relating to the development, as well as to undertake further environmental studies in order to inform the ongoing conceptual work and EIA, as well as the further stages of consultation.

This document presents the methodology for undertaking detailed and targeted invertebrate and Phase 2 botanical/National Vegetation Classification (NVC) surveys within those parts of the north-eastern corner of Sizewell Marshes SSSI that are likely to be lost permanently through construction of the Sizewell C platform - one area to the north-west of the proposed Sizewell C platform (hereafter referred to as the 'SSSI Triangle') and the other to the west of the platform (see Figure 4, Appendix A). Based on current proposals for permanent land take it has been agreed with Natural England that the following designated features need to be compensated for at Aldhurst Farm: reedbed; lowland ditch systems; invertebrates; and rare vascular plants. It has been agreed that other options will need to be considered to compensate for the loss of fen meadow habitat (rush pasture and fen meadow).

Previous extensive invertebrate surveys carried out by Amec between 2007 and 2010 extended across the entire Sizewell Estate including the SSSI, but were not focused specifically on the SSSI Triangle or the area directly west of the proposed Sizewell C platform. The primary purpose of the current invertebrate/NVC surveys is therefore to focus on these areas in order to gain further detailed information on the status and distribution of invertebrates and habitats to provide a comprehensive and authoritative baseline for EIA purposes and to inform the design and proposed management regime at Aldhurst Farm. Natural England's current view is that the new reedbed and lowland ditch creation within Aldhurst Farm should provide adequate compensation for the invertebrate assemblage, although the potential invertebrate fauna associated with wet woodland requires further consideration. This will involve a combination of more intensive sampling and the mapping of habitats to allow the impacts to be better understood and quantified.

A similar survey methodology is to be employed in adjacent parts of the Minsmere to Walberswick Heaths and Marshes SAC/Ramsar and in the coastal habitats along the Sizewell frontage, but whilst this is briefly addressed here, these areas are not the main focus of this document. Similarly, it should also be noted that this study is part of a wider invertebrate and botanical assessment of the Sizewell C Main Development Site that will be reported upon in the Environmental Statement.

The report firstly summarises the existing information for the SSSI, including the methodology and results from the previous Amec studies within and close to these parts of the SSSI, draws preliminary conclusions from this work and then uses this survey information to set out the scope for the methodology for the additional work for 2014.

2 Existing information

2.1 SSSI citation

The SSSI citation for Sizewell Marshes (English Nature, 1992) provides the following 'Description and Reasons for Notification':

"Sizewell Marshes are important for their large area of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates…. Several nationally scarce plants are also present. The site occupies a low-laying basin of deep fen peat. The water table is permanently high, with the area being prone to flooding, and there is an extensive network of ditches across the site.

In the areas of unimproved wet meadow the principal grass species are Sweet Vernal-grass Anthoxanthum odoratum*, Crested Dog's-tail* Cynosurus cristatus*, Rough-stalked Meadow-grass* Poa trivialis *and Yorkshire-fog* Holcus lanatus*. There are many other typical species including Marsh Pennywort* Hydrocotyle vulgaris*, Ragged Robin* Lychnis flos-cuculi*, Large Bird's-foot-trefoil* Lotus uliginosus*, Marsh-orchids* Dactylorhiza *spp., Bogbean* Menyanthes trifoliata*, Bog Pimpernel* Anagallis tenella*, Yellow Iris* Iris pseudacorus*, sedges* Carex *spp. and rushes* Juncus *spp. The nationally scarce Marsh Dock* Rumex palustris *and Greater Water-parsnip* Sium latifolium *are also present. It is considered that these communities are representative of the* Juncus subnodulosus - Cirsium palustre *fen-meadow and the J*. effusus/acutiflorus – Galium palustre *rush-pasture, as described in the National Vegetation Classification. In addition, several areas of reedbed dominated by Common Reed* Phragmites australis *and alder carr occur.*

The extensive ditch system supports a diverse aquatic flora which includes the nationally scarce Soft Hornwort Ceratophyllum submersum*, Fen Pondweed* Potamogeton coloratus *and Whorled Water-milfoil* Myriophyllum verticillatum*. The variety of ditch depths and widths, together with their fringing vegetation provide an important contribution to the site's habitat value for invertebrates and birdlife.*

Sizewell Marshes are of exceptional interest for their invertebrate fauna, supporting a wide range of taxa and many nationally rare or scarce species. These include terrestrial and aquatic beetles (Coleoptera), flies (Diptera), moths (Lepidoptera), dragonflies (Odonata) and spiders (Araneae)."

2.2 Previous invertebrate surveys

Extensive invertebrate surveys were undertaken by Amec in 2007, 2009 and 2010, in combination with a comprehensive desk study. This is reported in the consolidated invertebrate survey report (Amec 2014). The detailed results of these surveys are presented in the Amec report and are not therefore repeated here. However, the following paragraphs provide a summary of this previous survey work.

2.2.1 2007 surveys

The results of the invertebrate surveys carried out in 2007 are summarised in Table 1, below, which presents the number of invertebrate species of high nature conservation value (i.e. 'nationally scarce', Red Data Book or protected status) recorded at each of the sites sampled. Nationally scarce species are those that are estimated to occur in between 16 to 100 10km squares in Great Britain; RDB species are estimated to exist in only 15 or fewer 10km squares. The locations of the sampling sites are shown on Figure 1 in Appendix A (reproduced from the Amec Report).

The majority of the sites sampled were within areas across the wider development site (i.e. the Sizewell C platform area, Kenton Hills and the coastal strip), with just one sampling location within or close to the SSSI. This was the area of '*Phragmites* fen' near the footbridge at the north-eastern corner of the SSSI Triangle (Site J on Figure 1), which is considered representative of the wide range of habitats present, given its proximity to ditches, reedbed and wet woodland (as well as conifer plantations). A Malaise trap (a tent-like structure for catching flying insects) was used here, which produced a large number of rare and uncommon species (20 in total, as set out in Table 1, below). However, this is perhaps unsurprising, given that this was the only sample site within the SSSI. It should therefore be noted that different levels of sampling effort were employed at each of the sites in Table 1, so no quantitative comparison can be made between them.

Table 1. Summary invertebrate results from 2007. [Sites within or close to SSSI shaded grey]

Site (Figure 1)	Description	Sampling methods used	No. of species of high value
A	Eastern bund overlooking coastal strip (planted trees and shrubs with clearings)	Pitfall traps (10), water trap (1) & Malaise trap (1)	2
B	Northern bund (planted trees and shrubs)	Pitfall traps (10) & water trap (1)	4
C	Central riparian belt (carr woodland)	Pitfall traps (10), water trap (1) & Malaise trap (1)	2
D	Western riparian belt (carr woodland)	Pitfall traps (10) & water trap (1)	2
E	Perimeter Triangular-shaped area of young plantation surrounded by mature plantations, Goose Hill (Dunwich Forest)	Pitfall traps (10) & water trap (1)	2
F	Plantation edge and scrub at intersection of rides, Dunwich Forest	Pitfall traps (10) & water trap (1)	6
G	Carr woodland at Turf Pits, Kenton Hills	Pitfall traps (10), water trap (1) & Malaise trap (1)	4
H	Plantation at Nursery Covert, Kenton Hills	Pitfall traps (10) & water trap (1)	1
I	Southern edge of field/northern edge of young conifer plantation.	Water trap (1)	-
J	*Phragmites* fen near footbridge	Malaise trap (1)	20
K	Coastal heath north of power station	Pitfall traps (10)	
L	Coastal belt (low dunes, shingle, marram, etc.) – 10 locations (La – Lj)	Vacuum (5) and sweep net samples (5)	17

The samples from the Malaise trap at Site J were dominated by flies, including six Red Data Book species and 11 nationally scare or rare species. Five of the RDB species are closely associated with reedbeds and/or lowland ditches, the habitats that will be the focus of the habitat creation at Aldhurst Farm:

- the RDB2 cranefly *Prionocera subserricornis* occurs in ancient fenland with most records referring to ditches or pools filled with wet, black organic material;
- the RDB2 soldierfly *Odontomyia ornata* is a species of ditches, preferably those at the earlier stages of hydroseral succession, with floating cover and rich submerged vegetation, rather than ditches which are choked with emergent plants;
- the RDB2 snail-parasitoid fly *Antichaeta brevipennis* is usually associated with lush vegetation beside water bodies in wetlands, with existing Suffolk records referring to ditches in unimproved grazing marshes;
- the tiny RDB2 fly *Stenomicra delicatula* is generally associated with *Carex paniculata* tussocks in fens, with the larvae thought to develop in damp decaying vegetation; and
- the RDB3 horsefly *Hybomitra ciureai* is a rare south-eastern species found on and near the coast, mostly in marshes, with the larvae probably developing in damp soil and the marginal zones of ponds and ditches.

The other RDB species recorded, the RDB3 snipe-fly *Rhagio strigosus,* has mainly been recorded from dry broadleaved woodland on chalk, with the larvae probably developing as predators in damp decayed wood or soil. It is therefore not a specialist of the wet woodland due to be affected by the proposals.

Of the 11 other rare fly species, three of these would also be considered to be reedbed, fen or bog specialists:

- The habitat requirement for *Lipara rufitarsis* is *Phragmites* reedbeds, generally within wetlands including fens, gravel pits and damp heathland, with the larvae developing within the reed stems;
- *Phaonia atriceps* is a species associated with *Typha latifolia* and *Phragmites*; and
- *Anagnota bicolor* is usually associated with *Phragmites* in marshes and coastal levels but also with *Carex* tussocks in wetlands.

A further five are more generalist wetland species:

- The snail-parasitoid fly *Pherbellia griseola* occurs in a wide range of wetlands, including fens, bogs, dune slacks and damp woods, and has a requirement for standing water (the larvae are parasitoids of aquatic snails such as *Lymnaea palustris*)*;*
- The habitats used by *Elachiptera uniseta* include fens, damp woods, gravel pits and coastal marshes, with the larvae probably developing in decaying vegetable matter or reed stems;
- *Lamprochromus elegans* is known from the Norfolk Broads and the Cambridgeshire Fens (though precise habitat requirements are not provided);
- *Thrypticus nigricauda* has been recorded from a variety of wetlands, including damp hollows with *Iris* and *Juncus*, ponds and river banks; and
- *Hercostomus chalybeus* is a species simply known to have been recorded in the Norfolk Broads (though again precise habitat requirements are not available).

Of the remaining three rare fly species recorded within the SSSI Triangle, two do not have clear habitat affiliations (*Dolichopus linearis* and *Phaonia falleni*), whilst the other species, *Chyromyia brittanica*, is a woodland generalist, having been found in rot-hole debris in deciduous woodland, mixed woodland and an ex-industrial site with abundant sallow bushes (*Salix caprea*) and riverside poplar trees.

Finally, in addition to the rare flies, three other rare invertebrates were recorded in the Malaise samples from the SSSI Triangle:

- The soldier beetle *Silis ruficollis* is a species of river and lake margins, fens, marshes and other wetland habitats, including *Phragmites*;
- the parasitic wasp *Trigonalis hahnii* has no known habitat associations; and
- the RDB3 white-mantled wainscot moth *Archanara neurica,* which is also a Suffolk BAP species, is a reedbed specialist, whose larvae feed on *Phragmites*.

In addition to Site J, the sampling point located in the riparian wet woodland on the western edge of the platform area (Site D on Figure 1) is also close to where wet woodland within the SSSI would be lost as a result of the proposals, and is therefore of interest. However, this woodland did not appear to be of particular value for invertebrates, compared with some of the other survey locations, and whilst the results of this sampling revealed the presence of two nationally scarce species, neither are specialists of valuable wet woodland. The weevil *Polydrusus formosus* feeds on the foliage of a wide variety of trees and shrubs (including hazel, oak, willow, birch, cherry and wild rose) whilst the darkling beetle *Crypticus quisquilius* is actually a species of coastal sand dunes and is not therefore a woodland specialist.

Finally, the other notable sampling location from this 2007 survey was the dunes and shingle habitat along the coastal strip in front of, and north of, the existing power stations (Site L). Although a relatively high number of species of nature conservation importance were recorded in these habitats, it should be noted that this partly reflects the much greater sampling effort here, as 10 separate locations were sampled along this strip (Sites La to Lj; see Figure 1). Given that this site is not within the SSSI, these species are not described in detail here.

2.2.2 2009 surveys

In 2009, more targeted sampling was carried out in the SSSI ditches and other water bodies (see Figure 2, Appendix A) to assess the importance of Sizewell Marshes for aquatic invertebrates. Each location selected was surveyed using the standard methodology (i.e. sampled for a 3-minute period using a pond net).

Of the 33 ditches sampled, four were within the SSSI Triangle: one was within the pond/reedbed in the centre of the site (Site 23 on Figure 2), whilst the other three were around the perimeter, one on Leiston Drain (on the northern edge of the Triangle; Site 13) and two on Sizewell Ditch to the south (Sites 14 and 15). A further two were in the area of the SSSI west of the platform (Sites 28 and 29). These locations are highlighted with grey shading in Table 2, below, which shows the number of species of high nature conservation value recorded in each of the sample sites.

Table 2. Summary of the aquatic invertebrate survey results for the SSSI from 2009. [Sites within or close to areas of SSSI due to be lost shaded grey]

Site ID (Fig 2)	No. of Protected Species	No. of RDB1 species	No. of RDB2 species	No. of RDB3 species	No. of nationally scarce spp.
1	1 (*Aeshna isosceles*)	1 (*Aeshna isosceles*)	1 (*Hilara hirtella*)		1
2					2
3			1 (*Odontomyia ornata*)		
4					5
5					3
6			1 (*Psacadina vittigera*)		3
7			2 (*Odontomyia argentata, O. ornata*)	1 (*Hydrophilus piceus*)	5
8					3
9					1
10					1
11					4
12					2
13					1
14					2
15					
16			1 (*Odontomyia ornata*)		3
17			1 (*Odontomyia ornata*)		2
18	1 (*Aeshna isosceles*)	2 (*Aeshna isosceles, Odontomyia angulata*)	2 (*Odontomyia argentata, O. ornata*)		3
19			1 (*Odontomyia ornata*)		4
20			1 (*Odontomyia ornata*)		5
21			1 (*Odontomyia ornata*)		5
22			1 (*Odontomyia ornata*)		5
23					2
24					2
25			1 (*Odontomyia ornata*)		2
26					5
27			1 (*Odontomyia ornata*)		4
28			1 (*Odontomyia ornata*)		1
29			1 (*Odontomyia argentata*)		2
30					4
31					3
32					1
33					6

These results suggest that relatively few rare or uncommon species were present within the two areas due to be affected (the Triangle and the area west of the proposed Sizewell C platform, shaded grey in the table), compared with elsewhere in the SSSI. This was attributed in the Amec report to the relatively high nutrient status in these ditches (many were covered with Duckweed). Nevertheless, four nationally scarce water beetles were recorded from the SSSI Triangle samples (13, 14, 15 and 23), namely, *Rhantus suturalis*, *Anacaena bipustulata*, *Hydraena testacea* and *Ochthebius marinus*. These water beetles, and the absence of other nationally scarce or Red Data Book species, suggest that the ditches here are reasonable but not exceptional. The ditches to the west of the SZC platform (Sites 28 and 29) supported two Red Data Book Category 2 (RDB2) soldierflies (*Odontomyia ornata* and *O. argentata*) and three nationally scarce species, the beetle *Ochthebius marinus*, the cranefly *Limonia ventralis* and the soldierfly *Vanoyia tenuicornis*.

The most valuable site in the 2009 survey appeared to be the ditch at Site 18, to the west of the SSSI Triangle, which supported not only the protected Norfolk Hawker dragonfly but also the RDB1 soldierfly *Odontomyia angulata*, as well as two RDB2 species (*Odontomyia argentata* and *O. ornata*) and three nationally scarce species. Other notably valuable ditches were Site 7 (located to the north of Reckham Pits Wood) from which two RDB2 species (the same two as at Site 18) and five nationally scarce species were recorded, and Sites 20, 21 and 22 (also located to the west of the Triangle), all of which supported the RDB2 soldierfly *O. ornata* as well as five nationally scarce species.

Overall, it was considered that the ditches sampled across Sizewell Marshes appeared to represent good examples of grazing marsh ditches which are species-rich in aquatic invertebrates.

2.2.3 2010 surveys

The 2010 invertebrate surveys involved Malaise trapping and sweep netting of bankside ditch vegetation across the SSSI (see Figure 3, Appendix A, for sampling areas). Malaise traps were deployed in two locations, both positioned alongside the Sizewell Ditch within the SSSI Triangle (Sites 'x1' and 'x2' on Figure 3). The sweep-net surveys were carried out along ditches across the remainder of the SSSI, including in the area just to the west of the proposed Sizewell C platform (Sites J and M on Figure 3). Table 3, below, shows the number of species of high nature conservation value recorded in each of the sample sites.

Table 3. Summary of the Malaise and sweep-net invertebrate survey results for the SSSI from 2010. [Sites within or close to areas of SSSI due to be lost are shaded grey]

Site ID (Figure 3)	No. of Protected Species	No. of RDB1 species	No. of RDB2 species	No. of RDB3 species	No. of nationally scarce spp.
Triangle Malaise (x1, x2)	1 (*Aeshna isosceles*)	1 (*Aeshna isosceles*)	1 (*Odontomyia ornata*)	1 (*Subclytia rotundiventris*)	2
A			1 (*Odontomyia ornata*)		4
B					2
C					1
D			1 (*Psacadina zernyi*)		3
E			1 (*Odontomyia ornata*)		6
F					4
G			2 (*Antichaeta brevipennis, Parhelophilus consimilis*)		4
H					
I			1 (*Psacadina zernyi*)	1 (*Hybomitra ciureai*)	3
J			1 (*Odontomyia ornata*)		6
K					
L					1
M					

Five rare and/or scarce species were recorded in the SSSI Triangle Malaise traps. Three of these are specialists of ditches and/or reedbeds: the protected/RDB1 Norfolk hawker *Aeshna isosceles* breeds in unpolluted grazing marsh ditches; the RDB2 soldierfly *Odontomyia ornata* (which is common across Sizewell Belts) is a species of relatively young, non-choked ditches; and the nationally scarce *Lipara rufitarsis* is a chloropid fly whose larvae develop within the stems of *Phragmites*. The other two species are woodland generalists: the RDB3 tachinid fly *Subclytia rotundiventris* occurs in broadleaved woodland including birch scrub in areas of wet heath and fen, but also heaths and calcareous grassland, whilst the nationally scarce *Crossocerus binotatus* is a solitary wasp associated with dead wood and timber in a variety of situations (including woodland margins, open woodland, non-intensive farmland, parkland, wetland margins, gardens and railway cuttings). Neither are therefore closely associated with wet woodland.

The sweep net sampling of the ditches at Site J, west of the Sizewell C platform (see Figure 3), also recorded the two rare ditch species Norfolk hawker and *Odontomyia ornata,* as well as a further six nationally scarce species, suggesting that these ditches are also of high nature conservation value for invertebrates. The nationally scarce species were: *Anagnota bicolor* (a very small fly usually associated with *Phragmites* stands in marshes and coastal levels, or with grass and sedge tussocks in wetlands); the hairy dragonfly *Brachytron pratense* (which favours ditches and marshy fens where there is plenty of tall emergent vegetation such as common club-rush and common reed); *Odontomyia tigrina* (a soldier fly of coastal wetlands, which favours species-rich ditches); *Psacadina verbekei* (a snail-killing fly recorded from a range of wetland habitats, including fens); *Spanochaeta dorsalis* (a fly of marshy woodlands which has also been found on *Phragmites*); and *Zophomyia tenella* (a parasitic fly that has been recorded from a variety of habitats, including woodland, calcareous grassland and coastal dunes).

No such species of high nature conservation value were recorded from Site M, which is closer to the platform. These results would suggest that, compared with the other sample locations, Site M, and indeed Sites B, C, H, K and L (see Figure 3), are of relatively lower nature conservation importance for invertebrates.

2.2.4 Summary of invertebrate surveys and preliminary conclusions

The results of the surveys from 2007, 2009 and 2010 provide very valuable baseline information regarding the invertebrate communities of the area around Sizewell C, including the SSSI Triangle.

With regard to the different habitats present, the 2009 and 2010 surveys focused on the ditch habitats, looking at the aquatic and terrestrial invertebrate faunas respectively. Whilst the 2007 sampling did involve more terrestrial invertebrate surveys, only two sampling sites were located within (or near) the SSSI Triangle and none was within the area immediately west of the SZC platform. The aim of the 2014 surveys (see below) is therefore to provide significantly more data on the invertebrate faunas of the areas of the SSSI due to be lost to the permanent land take (and the potential temporary land take).

The reedbed within the SSSI Triangle was clearly found to be of nature conservation value for its invertebrates. However, it should be emphasized that there are extensive areas of other reedbed habitat elsewhere across the SSSI (for example the two large areas south-west of Grimseys; see Figure 8 for the NVC habitat map), and it will therefore be useful to understand how valuable these areas are for invertebrates so that the Triangle reedbed assemblage can be assessed in context.

The lowland ditches, both within the SSSI Triangle and the area directly west of the SZC platform, also appear to be of value for invertebrates, although there is a high degree of variability across the SSSI, largely due to differing levels of vegetation growth and nutrient status. The new ditches to be created at proposed compensation site at Aldhurst Farm will necessarily be bare early on, but the creation of a varied structure of microhabitats, along with active management and enhanced connectivity with the SSSI, should help to optimise their value for these (and other) species over the medium to longer term.

The fen meadow to the west of the Sizewell C platform (Sites J and M from the 2010 survey; see also the purple shading on Figure 8) could also be of some importance for invertebrates, although the sampling of this habitat to date has concentrated on the ditches rather than the meadow itself. The majority of the SSSI comprises subtly different variants of this habitat type (NVC community M22), so again there are extensive areas of fen meadow that will be unaffected by the proposals. Nevertheless, it will be important to understand the particular value of the fields that will be affected.

Finally, the wet woodland habitat within the two areas of the SSSI due to be affected has been classified as W5a *Alnus glutinosa – Carex paniculata* (see pale green shading on Figure 8), which is the most commonly-occurring wet woodland community and is described as ‘widespread throughout the English lowlands'. It is thus perhaps likely to support fewer invertebrates of nature conservation value than other wet woodland communities, two of which (W6a and W2a) are present in other parts of the SSSI; the intention is therefore that these will also be targeted in the 2014 surveys. The proposals would nevertheless leave intact the majority of the W5a woodland across Sizewell Marshes and would not affect the other wet woodland areas, many of which are more mature and likely to be of greater interest entomologically.

Clearly, one of the main aims of the compensation proposals for the Sizewell C project will be to create new habitats of optimal value for the invertebrate assemblages that would be affected by temporary and permanent land take from the SSSI. Table 4, below, therefore identifies the habitat affiliations of the rare species recorded from both the SSSI Triangle and the area immediately west of the SZC platform across all three surveys.

Table 4. Habitat affiliations of the rare species recorded from the SSSI Triangle and the area immediately west of the SZC platform.

Species	Status	Reedbed/ fen	Ditches/ ponds	Wet woodland	Fen meadow	Generalist/ not known
Aeshna isosceles	RDB1		✓			
Odontomyia angulata	RDB1		✓			
Odontomyia argentata	RDB2	✓	✓			
Odontomyia ornata	RDB2		✓			
Prionocera subserricornis	RDB2		✓			
Antichaeta brevipennis	RDB2		✓			
Stenomicra delicatula	RDB2	✓				
Hybomitra ciureai	RDB3	✓	✓			
Archanara neurica	RDB3	✓				
Subclytia rotundiventris	RDB3					✓
Lipara rufitarsis	NS	✓				
Phaonia atriceps	NS	✓				
Anagnota bicolor	NS	✓				
Pherbellia griseola	NS	✓		✓		
Elachiptera uniseta	NS	✓		✓		
Lamprochromus elegans	NS					✓
Thrypticus nigricauda	NS					✓
Hercostomus chalybeus	NS					✓
Dolichopus linearis	NS					✓
Phaonia falleni	NS					✓
Chyromyia brittanica	NS					✓
Silis ruficollis	NS	✓				
Trigonalis hahnii	-					✓
Polydrusus formosus	NS					✓
Crypticus quisquilius	NS					✓
Rhantus suturalis	NS		✓			
Anacaena bipustulata	NS		✓			
Hydraena testacea	NS		✓			
Ochthebius marinus	NS		✓			
Limonia ventralis	NS		✓			
Vanoyia tenuicornis	NS	✓	✓		✓	
Crossocerus binotatus	NS					✓
Brachytron pratense	NS	✓	✓			
Odontomyia tigrina	NS		✓			
Psacadina verbekei	NS	✓	✓		✓	
Spanochaeta dorsalis	NS	✓		✓		
Zophomyia tenella	NS					✓

This indicates that of the rare species recorded within the areas of the SSSI due to be directly affected, the majority are either reedbed/fen or ditch specialists, or they are habitat generalists (or associated with other habitat types). Only three are wet woodland specialists and two are species of fen meadow. It is therefore perhaps appropriate for the design of the Aldhurst Farm scheme to focus on creation of permanently wet reedbed and ditches, as these habitats (which are scarce in Suffolk) are the key designated features to be affected. In addition, the particular entomological interest of these habitats can be maximised in the medium to long term through appropriate management.

It is therefore clearly important that the 2014 surveys provide a more comprehensive understanding of the invertebrate assemblages - as well as the total area and distribution - of the SSSI habitats due to be lost, as this will be necessary for informing the compensation proposals.

With regard to the creation of the compensatory reedbeds, in particular, it is well understood that invertebrate diversity is optimised if all stages of reedbed succession are provided, from young reed in open water to old reed with scrub invasion. A variety of other habitats is also important, including bare marginal substrates and shallow pools/ditches with abundant emergent and submerged aquatic plants. Provision of an intimate mosaic of these stages and habitats can be especially valuable, as many invertebrate have different requirements at various times in their life cycle.

Therefore, in order to inform the compensation proposals, a better understanding of the actual mix of wetter and drier reedbed across the Triangle, and the presence of other habitat features of value to invertebrates, will be very beneficial. Certainly the better the mix of these elements in the habitat creation at Aldhurst Farm the more valuable the compensation area will be for biodiversity.

2.3 Previous botanical surveys

Phase 2 botanical/NVC surveys were carried out by Amec in both 2007 and 2008. The detailed results of these surveys are presented in the respective Amec reports. The locations of the NVC quadrats for the 2007 survey are shown on Figure 5 (Appendix A) with the results (i.e. the NVC communities present) shown on Figure 6. This study focused on the habitats closest to the proposed works, and included not only the wetland habitats but also other habitats within the likely zone of influence of the works. It also included a large number of quadrats within the Minsmere south levels.

The aim of follow-up survey in 2008 was to extend the survey to cover the whole of the SSSI (including carrying out dyke vegetation surveys) in order to allow the subsequent assessment to consider the impacts of the Sizewell C proposals in the context of the wider marshland resource. The locations and results of the dyke vegetation surveys for the 2008 survey are shown on Figure 7, whilst the full NVC mapping for the SSSI, including the locations of the 2008 quadrats, are shown on Figure 8.

The surveys of the SSSI Triangle recorded S26 *Phragmites australis – Urtica dioica* reedbed/tall herb fen over much of the eastern part of the site (dark blue shading), with W5a *Alnus glutinosa – Carex paniculata* wet woodland (*Phragmites australis* sub-community) over much of the central and western part (pale green shading), and an area of S4a *Phragmites australis – Lemna minor* reed swamp in the centre (pale blue shading). The latter was surrounded by an embankment supporting OV25 *Holcus lanatus - Arrhenatherum elatius* grassland (brown shading) (see Figure 8).

The part of the SSSI just to the west of the platform comprised W5a *Alnus glutinosa – Carex paniculata* wet woodland along the base of the platform (pale green shading), with S26 *Phragmites australis – Urtica dioica* reedbed in the field occupying the northern part of this area (dark blue shading). The two southern fields in this area (purple shading on Figure 8) comprised M22 *Juncus subnodulosus – Cirsium paulstre* fen-meadow (*Iris pseudacorus* sub-community with affinity to MG12a and *Festuca arundinacea* marshy grassland).

The NVC survey of the southern part of the SAC (see Figure 4 for the location, and Figure 8 for the NVC mapping) indicated that the habitat alongside the Leiston Ditch (which drains northwards towards Minsmere Sluice) was also S4a *Phragmites australis – Lemna minor* reed swamp (pale blue shading).

The NVC map of the Sizewell Marshes SSSI shows that whilst much of the habitat due to be lost under the footprint of Sizewell C comprises S26 reedbed, which is to be a large focus of the habitat replacement strategy, extensive areas of this habitat will remain within the SSSI (the two large square areas of this habitat to the west of Grimseys). Similarly, the large majority of the wet woodland and fen meadow habitat within the SSSI will also remain untouched.

The aim of the survey work for 2014 is to update this map, such that the total area and distribution of these habitats can be accurately assessed.

3 Methodologies

3.1 Invertebrate survey

It is clear from the invertebrate survey work described in Section 2.2, above, that the baseline evaluation would benefit from a more systematic assessment of the invertebrate communities within the SSSI Triangle and the area of the SSSI west of the Sizewell C platform. This is to include not only more detailed survey of the reedbed, lowland ditches, wet woodland and fen meadow habitats, but also more detailed mapping of invertebrate habitats. The aim is to survey a representative sample of each habitat, so that detailed species lists can be compiled.

The areas that will be subject to invertebrate survey are shown in Figure 4, Appendix A. These include not only those areas within the SSSI that would be directly affected but also those within the SAC and on the coast. Further details are provided in the following paragraphs.

SSSI Triangle and the area west of the Sizewell C platform

In order to better inform the assessment of the impacts of the Sizewell C proposals on the SSSI, and the habitat replacement design, more detailed invertebrate surveys are proposed. Whilst some invertebrate surveys have been carried out in the areas due to be directly affected, systematic mapping and sampling of the habitats present within the SSSI Triangle and the area west of the platform (see Figure 4) has not been undertaken before.

In particular, the terrestrial invertebrate communities associated with the reedbed, wet woodland and fen meadow habitats within these areas have received relatively little attention.. More comprehensive surveying of the habitats within these areas is therefore proposed to better understand the invertebrate assemblages present, which can then be used in both the detailed assessment of impacts and the design of the proposed compensation scheme at Aldhurst Farm.

With regard to the SSSI Triangle (see Figures 4 and 8), terrestrial invertebrate sampling will be carried out within the large areas of S26 reedbed and W5a wet woodland habitat (dark blue and pale green shading on Figure 8, respectively) as well as in the S4a reed swamp in the centre (pale blue shading) and the surrounding embankment of OV25 grassland (brown shading). Aquatic invertebrate sampling within the SSSI Triangle will focus on the Leiston Drain (forming the northern boundary) and the Sizewell Ditch (the southern boundary).

With regard to the area west of the SZC platform (see Figures 4 and 8), terrestrial invertebrate habitat assessment and sampling will focus on the W5a wet woodland along the base of the platform (pale green shading on Figure 8), the S26 reedbed in the field in the northern part of this area (dark blue shading), and the M22 fen-meadow in the two southern fields (purple shading). The aquatic invertebrate sampling will focus on the ditches surrounding the habitat parcels in this area.

The specific locations for the terrestrial and aquatic invertebrate sampling will be determined in the field, once the habitats have been appraised by the entomologist carrying out the work. They are not therefore mapped here, although Figure 8 does show the locations and distribution of the habitats to be sampled. However, all sampling locations will be geo-referenced during the surveys so that they can be accurately mapped for the assessment and reporting.

Minsmere to Walberswick SAC and Coastal Strip CWS

In addition to the SSSI Triangle and the area west of the Sizewell C platform, it is also proposed that further invertebrate surveys are carried out in the adjacent parts of the Minsmere to Walberswick Heaths and Marshes SAC/Ramsar and in the coastal habitats (see Figure 4).

The surveys within the southern part of the SAC will comprise aquatic invertebrate sampling within the ditch that forms the western boundary (an extension of Leiston Drain), as well as terrestrial invertebrate sampling within the adjacent reedbed (see the blue strip on Figure 8) and the dune grassland to the east of this. The aim of this work is to provide a baseline to assess any potential water- or air-quality impacts on the SAC associated with the proposals.

Given that the coastal habitats were comprehensively surveyed in 2007 (Site L in 2.2.1, above, see Figure 1), the focus of the survey along the coastal strip will be to map the invertebrate habitats present and carry out targeted survey work, rather than undertake extensive sampling. This, combined with the detailed Amec survey data from 2007, will provide a robust baseline for the assessment.

3.1.1 Broad objectives

The broad objectives of the proposed field survey are as follows:

- Conduct terrestrial and aquatic invertebrate surveys using Common Standards Monitoring (CSM)-compatible techniques building on, and complementary to, information derived from previous survey and desk study work;
- Record, delineate and describe key invertebrate habitats present on site in terms of broad vegetation type, habitat structure and current management;
- Evaluate invertebrate species and assemblages recorded using CSM-compatible indices such as ISIS, as well as water quality indices (such as Biological Working Party Score (BMWP) and Average Score Per Taxon (ASPT)) for aquatic samples;
- Produce a report including findings/species lists, an evaluation of key habitat and species assemblages and appraisal of the conservation value of the site for invertebrates; and
- Provide recommendations regarding potential development constraints/mitigation including site-specific habitat creation advice.

3.1.2 Methods

Desk study

Existing information pertaining to the invertebrate fauna of the site has been reviewed to inform this methodology. Reference material including original SSSI and SAC citations, condition assessment documentation and existing invertebrate-specific studies and species lists (including Suffolk Wildlife Trust data), as well as the Amec reports from 2007, 2009 and 2010, have been scrutinised and used as a basis to fine-tuning the sampling approach.

Invertebrate habitat survey

Broad habitats within the various sampling sites would be mapped and plant communities recorded with sufficient resolution to characterise each individual sampling zone in terms of habitat type, structure and condition, with particular reference to the invertebrate assemblages supported (the NVC communities present will be recorded separately in the botanical survey, see below).

Habitat data would be collected specifically with a view to informing aspects of habitat creation. Features known to be of importance to key invertebrate species recorded historically on site would be targeted during the survey.

Aquatic invertebrate survey

The selection of sampling sites would aim to reasonably represent the heterogeneity of habitat and therefore the macro-invertebrate fauna of the site as a whole. Two sampling events would occur, the first during early June 2014 and the second at the time of the final terrestrial survey during August.

Each aquatic invertebrate sample would be collected in accordance with the Murray Bligh (1999) 3-minute sweep method (as used by the Environment Agency). Each sample would be collected from a sufficient range of different representative meso-habitats to adequately cover the main invertebrate niches of the water body in question. The total sample time per water body would be timed for three minutes, the sampling time divided between the different meso-habitats and the watch stopped after each sweeping to enable the contents of the net to be deposited in the sample tray.

Each sample would be transferred to a sealed plastic sample pot, preserved and transported to the laboratory for washing sorting and identification.

Washing, sorting and identification of samples

The sample would be thoroughly washed and graded by rinsing the samples through a series of different sized meshes. Samples would then be sorted into a plastic sorting square (as standardly used by the EA).

Samples would then be identified to family level, enabling Biological Monitoring Working Party (BMWP) and Average Score per Taxon (ASPT) scores to be calculated for the sample. Where appropriate, samples would then be identified to species level, for the requirements of Community Conservation Indices (CCI) methodology (Chadd and Extence, 2004). Where necessary, specimens would be identified using appropriate, current taxonomic keys, such as volumes produced by the Freshwater Biological Association (FBA) and Field Studies Council (FSC).

Data analysis

Data would be input directly into a spreadsheet set up to calculate BMWP scores using Walley and Hawkes' (1997) revised scoring system; ASPT scores would be calculated by dividing the resultant BMWP score by the number of scoring families. Scores would be interpreted in accordance with protocols in EA and Pond Conservation (2002) and Chadd and Extence (2004).

Data would also be analysed alongside terrestrial invertebrate data using ISIS, an analytical package developed by Natural England as a standard method for the conservation evaluation of British invertebrate communities.

Terrestrial Invertebrate Sampling

In accordance with Drake *et al* (2007) sampling would be undertaken using a combination of standard capture methods recommended for Common Standards Monitoring of different habitat types. In accordance with CSM protocol, data would be collected using repeatable techniques enabling subsequent analysis using ISIS and allowing data to be comparable between sampling sites. As set out above, sampled habitat is expected to include reed swamp, fen meadow and wet woodland. Sampling would be undertaken in suitably dry, sunny weather, over three discrete visits (early June, July and August).The precise approach to sampling varies according to habitat; it is expected that a combination of some of the following sampling methods would be used (note that pitfall trapping would not be used due to the potential risk of encountering unexploded ordnance).

Sweep-net
A standard sweep net would be used to collect specimens from wet grassland/ditch edge, swamp and scrub habitat. Timed sweeps would be undertaken in representative habitat, in accordance with Drake *et al* (2007)

Beating tray
A beating tray would be used to collect specimens from trees and scrub habitat (wet woodland).

Suction Sampling
A suction sampler would be used to collect ground-dwelling specimens not easily retrieved by other sampling methods. Suction sampling can be timed, enabling repeatable surveys to be undertaken.

Direct searching
Direct searching would be carried out beneath refuges such as rocks, under bark and in the crevices of standing and fallen trees.

Water traps
Water traps would be used for capturing flying insects such as social and solitary bees, wasps (Aculeate Hymenoptera), true flies (Diptera) and other aerial taxa.

Moth Trapping
A Robinson trap using a single generator would be used to survey for moths.

3.1.3 Identification

Where practical, species would be identified on site without undue disturbance; however, many species cannot be adequately identified in the field, and it is necessary for samples to be taken for *ex situ* identification using a binocular microscope and appropriate taxonomic keys, as required. If necessary, specialist verification of rare or uncommon species would be sought from the appropriate county recorder or expert in the relevant species group.

3.1.4 Reporting and analysis

The report would include an executive summary, background, methodology, results/discussion and an evaluation of the conservation value of the different survey sites' invertebrate fauna and habitat (including main vegetation communities). Species data would be input into Natural England's ISIS analytical package and the output discussed and evaluated as appropriate.

Whilst overlap and duplication in the recording between surveys is inevitable, there has been an emphasis on filling gaps, with the overall aim of characterising the site's invertebrate assemblages using both historic data and data collected within the proposed surveys. The final report for the EIA will therefore use all of this information (synthesizing the data from the previous studies, and adding the results from this study) to provide an authoritative assessment of the invertebrate baseline.

The report would also include outline suggestions for mitigation with particular reference to creation of invertebrate habitat replicating habitat recorded on site and, where possible, advice relating to the potential translocation of habitat features of particular importance for invertebrates. Tables listing total species recorded and, where appropriate, the UK conservation status would also be included, as well as a figure indicating the sample sites and the distribution of the different invertebrate habitats, and photographs of these habitats and features.

3.1.5 Programme

- First Visit – Week commencing 2nd June 2014
- Second Visit – Week Commencing 14th July 2014
- Third visit – August (to be confirmed)

- Reporting – The aim is that an initial draft report will be prepared by the end of October. In parallel, inputs regarding invertebrates will be provided to the Planning Application to be prepared for the creation of the proposed replacement habitat at Aldhurst Farm.

3.2 Phase 2 botanical/NVC survey

3.2.1 Broad objectives

The broad aims of the NVC survey will be as follows:

- To update and review the existing NVC survey for the areas of Sizewell Marshes likely to affected by the development.
- To undertake a vegetation survey of the strip of SAC that is adjacent to the northern edge of the C Station Platform.
- To review the coastal vegetation in front of the C Station Platform.

The areas that will be subject to vegetation survey are shown on Figure 4.

3.2.2 Methods

SSSI Triangle and the area west of the Sizewell C platform

- To update the existing NVC survey a repeat survey will be undertaken. This will involve surveying up to 5 quadrats in areas of homogenous vegetation and recording vegetation frequency using the DOMIN scale.
- A total of 10-15 quadrats would be surveyed within the SSSI Triangle. Within the area west of the platform, it is proposed that a minimum of 5 quadrats would be surveyed in each of the wet woodland, reedbed and fen meadow habitats.
- In addition, in each compartment a detailed plant species list will also be compiled by undertaking a walkover survey and recording plant species using the DAFOR scale.
- The ditches within the survey compartments will be sampled using a throw attached to the end of a line.
- The location of quadrats will be recorded using GPS.
- A representative collection of photographs of vegetation and habitat types will also be collected.

Although the main purpose of this document is to describe the methodologies proposed for the areas of the SSSI due to be affected, similar studies are also proposed for the nearby parts of the Minsmere SAC and the coastal habitats of the County Wildlife Site. The proposed methods for these areas are therefore also set out, below.

Minsmere to Walberswick SAC Vegetation

- The strip of SAC habitat extending northwards from the C Station Platform will be sampled using the same methodology outlined above.
- Quadrats would be surveyed within the reedbed and within the dune grassland.
- The presence of plant species forming interest features of the Minsmere to Walberswick SSSI/ SAC/Ramsar site will be recorded, and large stands of such vegetation (more than 5 metres square) will be pinpointed with GPS.

Coastal Strip CWS

- The information pertaining to the County Wildlife Site designation and SAC designation will be reviewed, where appropriate.
- An NVC survey of the Coastal vegetation will be undertaken using the methodology outlined above.
- Quadrats would be surveyed within the shingle habitats, the sand dunes and within the dune grassland.
- The presence of plant species forming interest features of the CWS will be recorded, and large stands of such vegetation (more than 5 metres square) will be pinpointed with GPS.

3.2.3 Reporting

The final reporting will include a detailed NVC and plant species inventory of the areas of Sizewell Marshes SSSI likely to be affected by the development proposals. The report will include a comparison with the previous NVC survey and will highlight if any significant changes in community have occurred.

The assessment of the SAC vegetation will also include a detailed NVC and plant species inventory of the areas of the SAC that could potentially be affected by the development proposals. This will include a review of the presence or otherwise of plant species indicative of the interest features of the SAC, SSSI and Ramsar site.

The assessment of the coastal vegetation will include a detailed NVC and plant species inventory of the coastal habitats forming part of the Sizewell Coast CWS. This information will be used to inform long-term mitigation measures to safeguard and or restore the coastal vegetation.

Figures will be produced highlighting the location of quadrats and vegetation communities and boundaries.

3.2.4 Programme

- First Visit – Week commencing 2nd June 2014
- Second Visit – Week Commencing 14th July 2014
- Third visit (if required) – August (to be confirmed)
- Reporting – The aim is that an initial draft report will be prepared by the end of October. In parallel, inputs regarding habitat and plant communities will be provided to the Planning Application to be prepared for the creation of the proposed replacement habitat at Aldhurst Farm.

APPENDIX A

Figures

Figure 1. Amec invertebrate sampling sites 2007

Key:

Preliminary Works Area

Indicative location of Construction Compounds

Proposed Access Route

A = Eastern Bund
B = Northern Bund
C = Central riparian belt
D = Western riparian belt
E = Traingular-shaped open area
F = Ride intersection
G = Turf pits
H = Nursery Covert
I = Southern field edge
J = Phragmites fen
K = North of power station
La-e = Coastal belt (June 2007)
Lf-j = Coastal belt (July & Sept 2007)

0 m 500 m

EDF

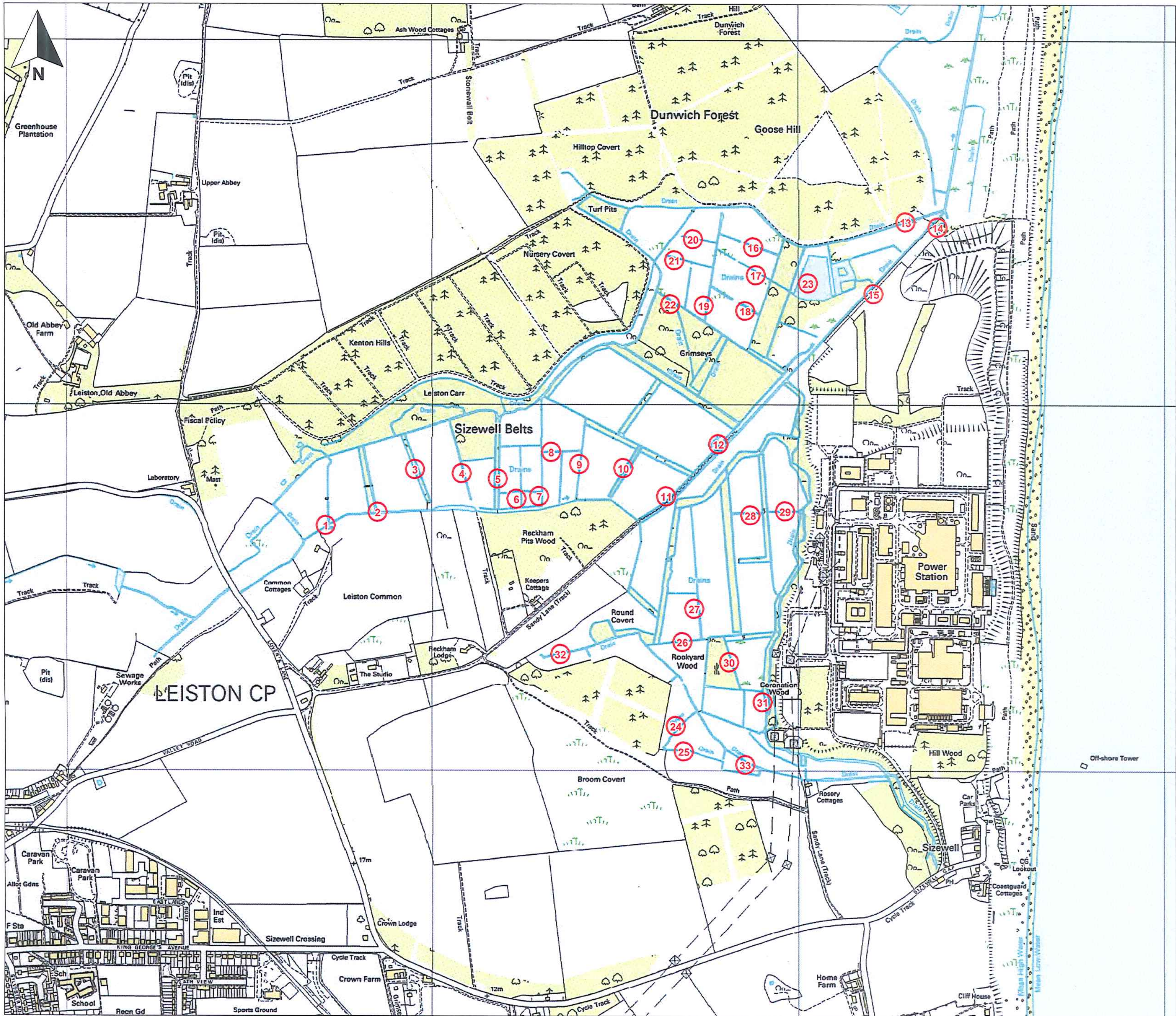
Sizewell Invertebrate Survey Report 2007

Figure 1.2
Invertebrate Sampling Sites

June 2008
19801-R162 tugwc

amec

Figure 2. Amec invertebrate sampling sites 2009



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Key

0 m 500 m

Scale 1:10,000 @ A3

EDF

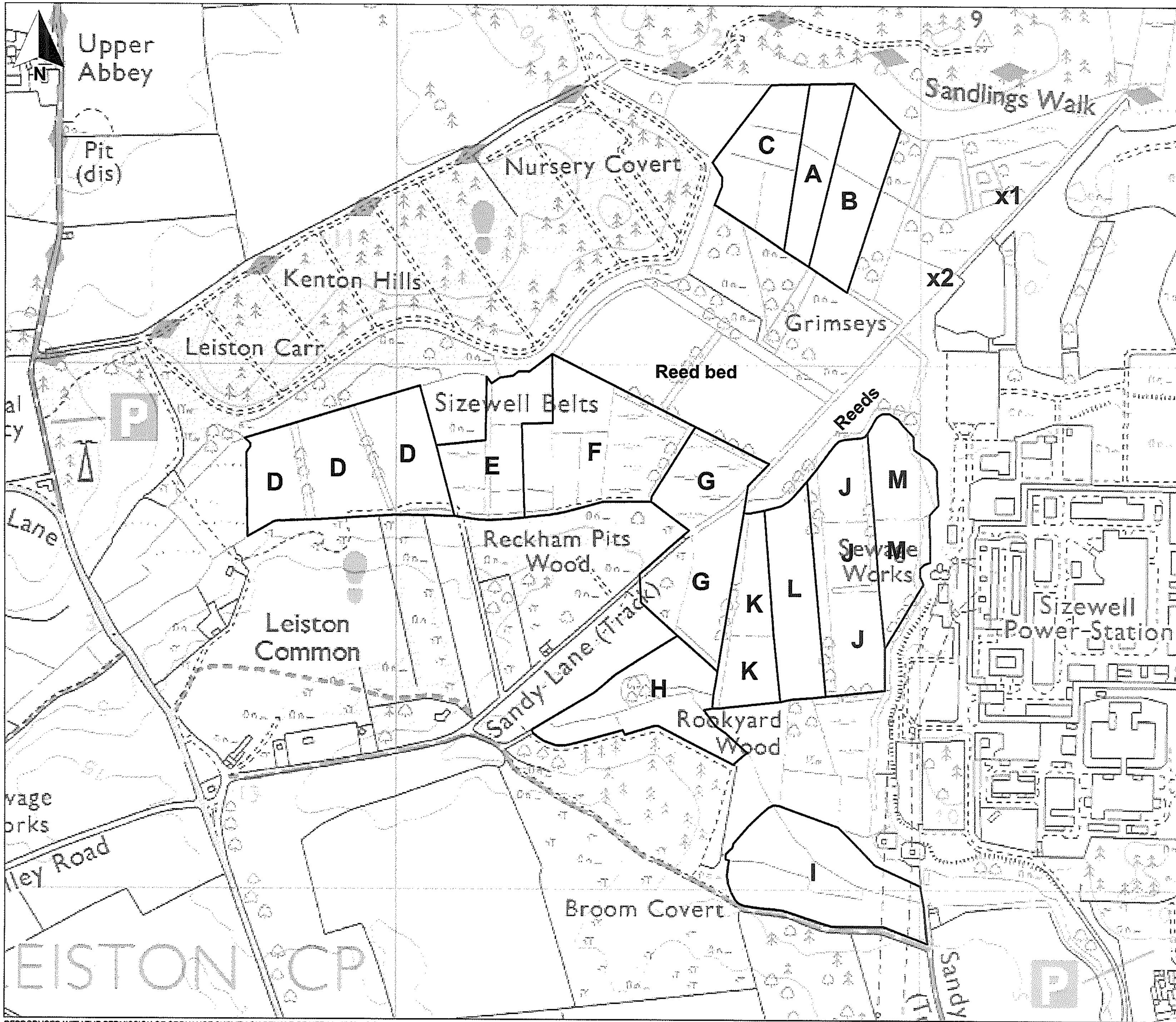
Sizewell Invertebrate Survey Report 2009

Figure 2.1
Survey Locations (Entec 2009)

April 2010
19801-R625.wor tugwc

amec

Figure 3. Amec invertebrate sampling sites 2010



Key

A - M ditches surveyed for terrestrial invertebrates: June 2010

Malaise traps in reed beds = x1 or x2

eDF

Sizewell Invertebrate Survey Report 2010

Figure 1.1
Location of the invertebrate sample sites within the SSA and Sizewell Belts in June 2010

February 2011
28130-A128.wor tugwc

Entec

Figure 4. Areas where invertebrate and/or Phase 2 botanical surveys will occur in 2014

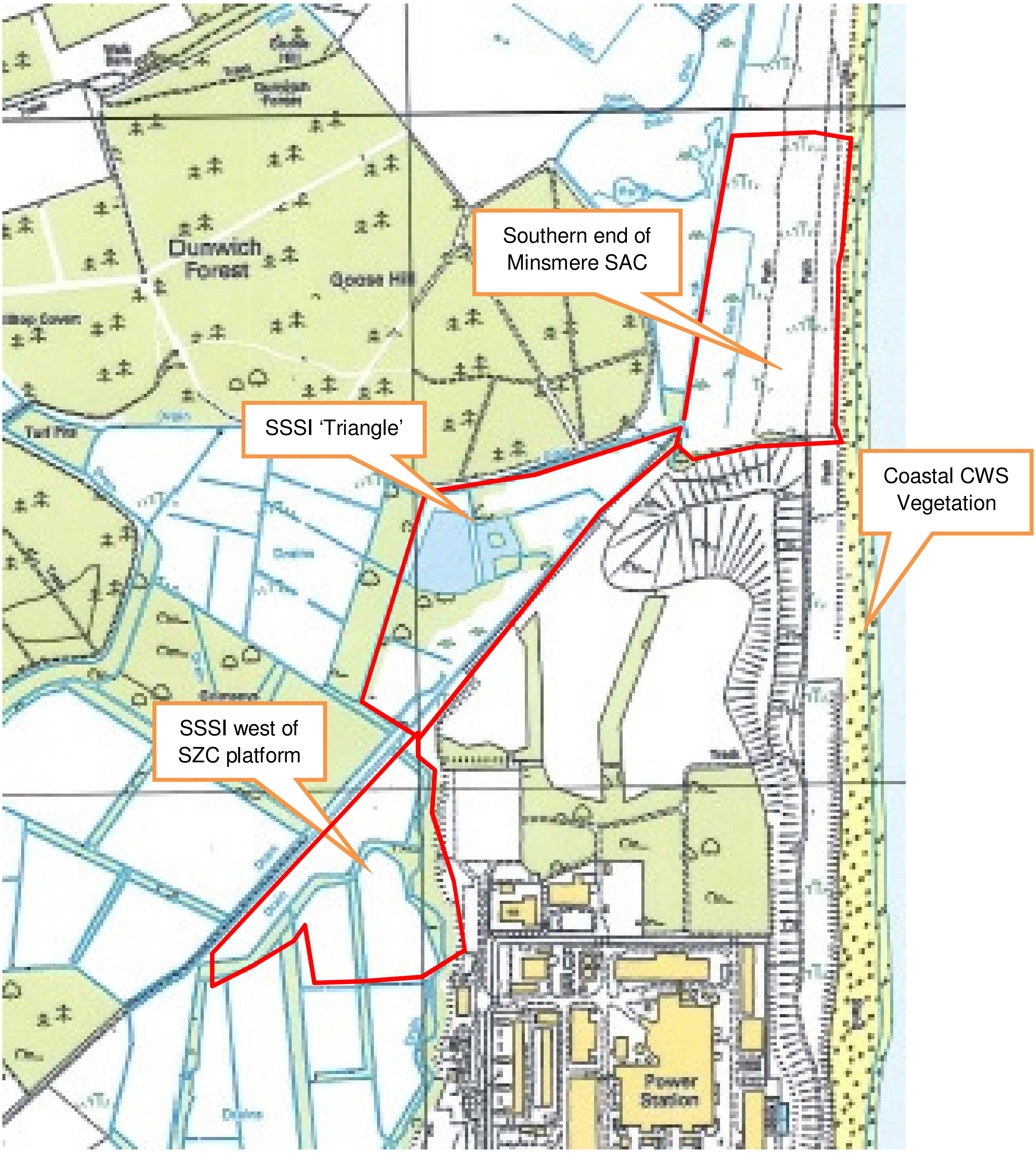
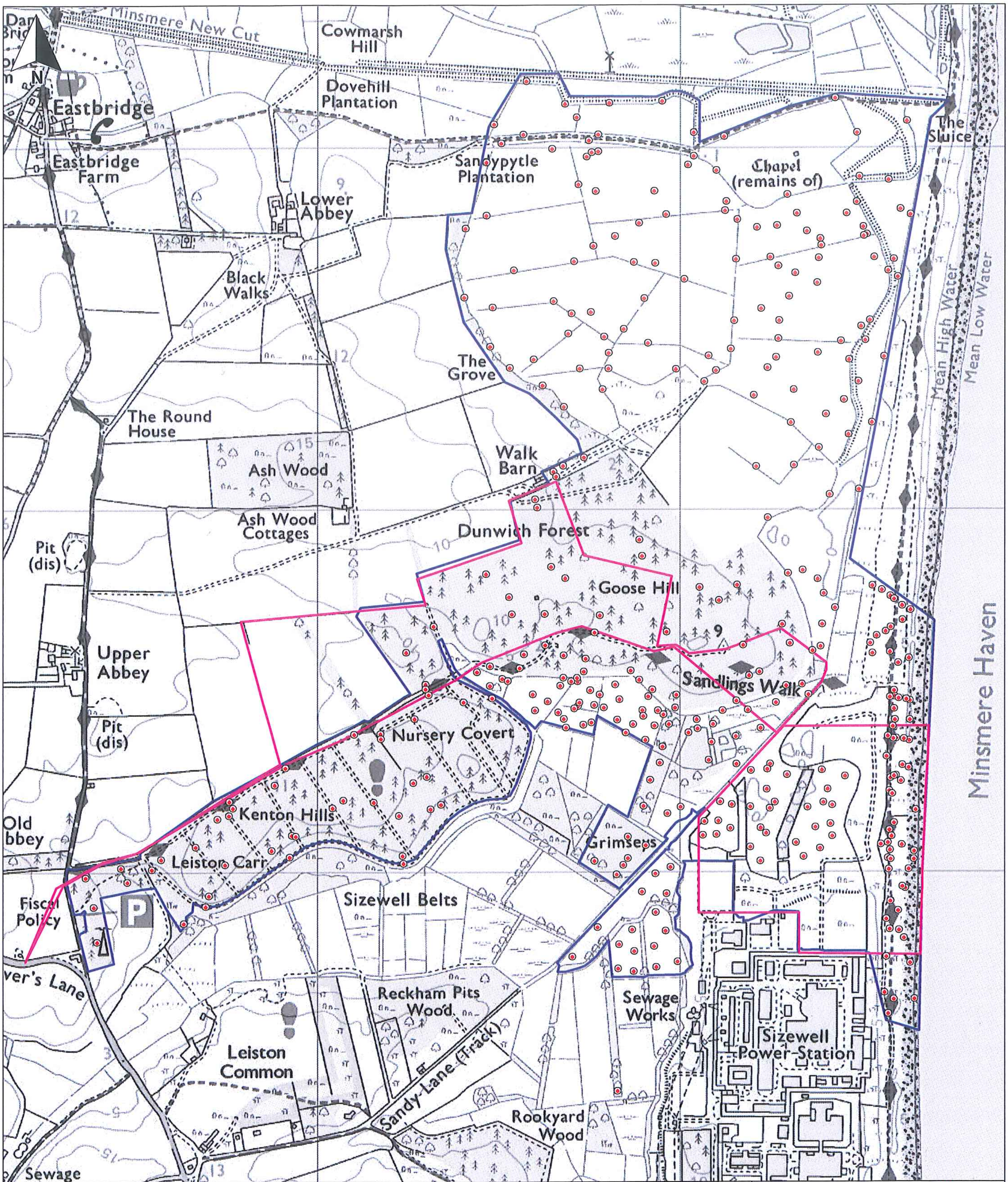


Figure 5. Amec NVC quadrat locations 2007



Key:

Preliminary Works Area

Survey Area

Sizewell Quadrat Locations

0 m

500 m

British Energy

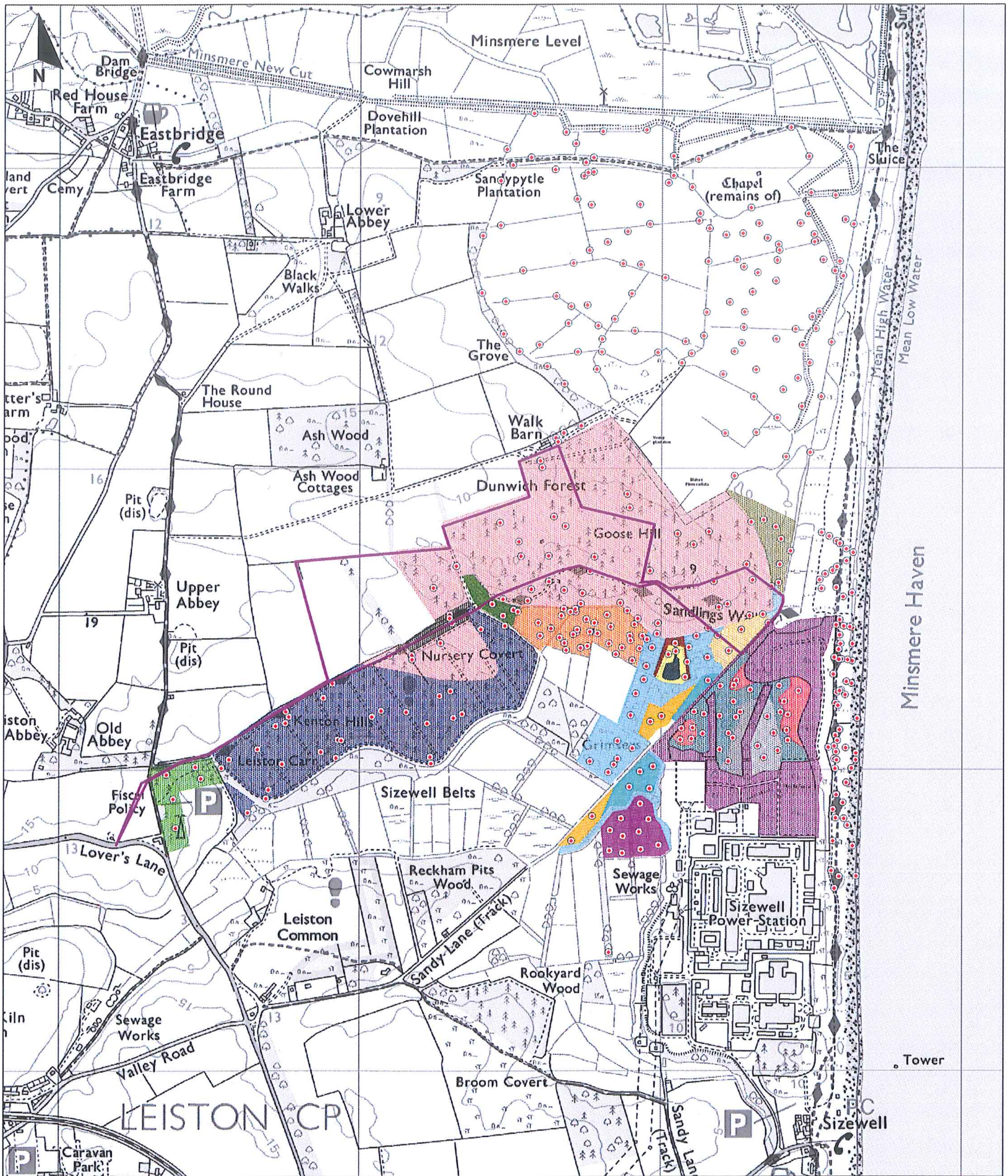
Sizewell NVC Report

Figure 1.2
Site plan showing survey area

April 2008
19801-R138.WOR tugwc

Entec

Figure 6. Amec NVC community mapping 2007



Key:

Community 1	Community 21
Community 2	Community 22
Community 3	Community 23
Community 15	Community 24
Community 16	Community 31a
Community 17	Community 31b
Community 18	Community 32
Community 19	Community 33
Community 20	Young woodland

Sizewell Quadrat Locations

Preliminary Works Area

0 m 500 m

British Energy

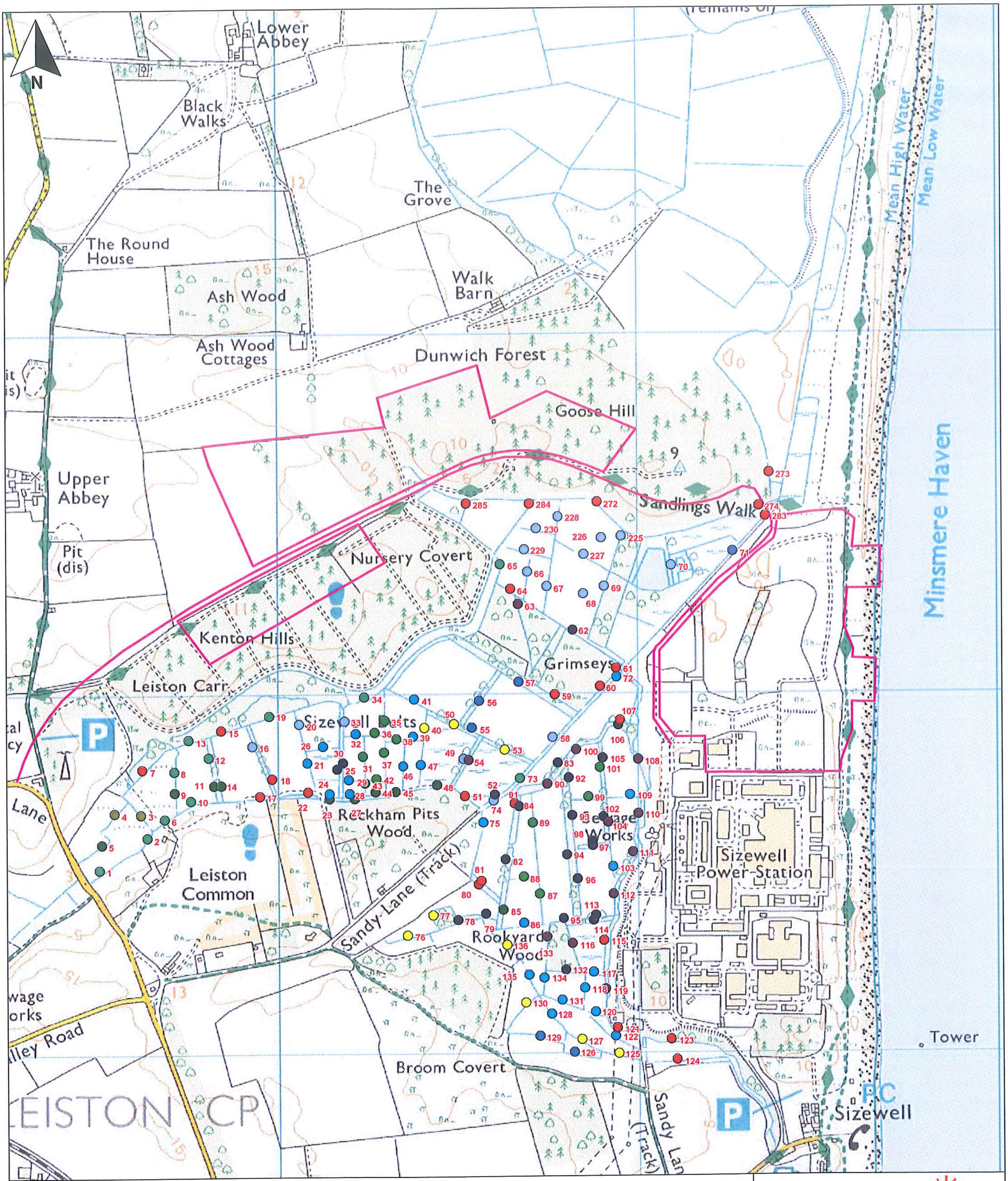
Sizewell NVC Report

Figure 4.1
Location of quadrats and NVC communities

April 2008
19801-R114 tugwc

Entec

Figure 7. Amec dyke vegetation survey locations 2008



Key:

- Preliminary Works Area
- A4 - Full sun variant (DY1a)
- A4 - Light shade variant (DY1bi)
- A4 - Heavy shade variant (DY1bii)
- A4 - stonewort variant (DY1c)
- A4 - Elodea candensis variant (DY1d)
- A2b over A6
- A2c over A16 with S23 (DY3)
- A2a over A16 with S23 (DY4)
- A2a over S23 (DY5)
- A2a with S4a (DY6)
- A2a (DY7)

0 m 500 m

British Energy

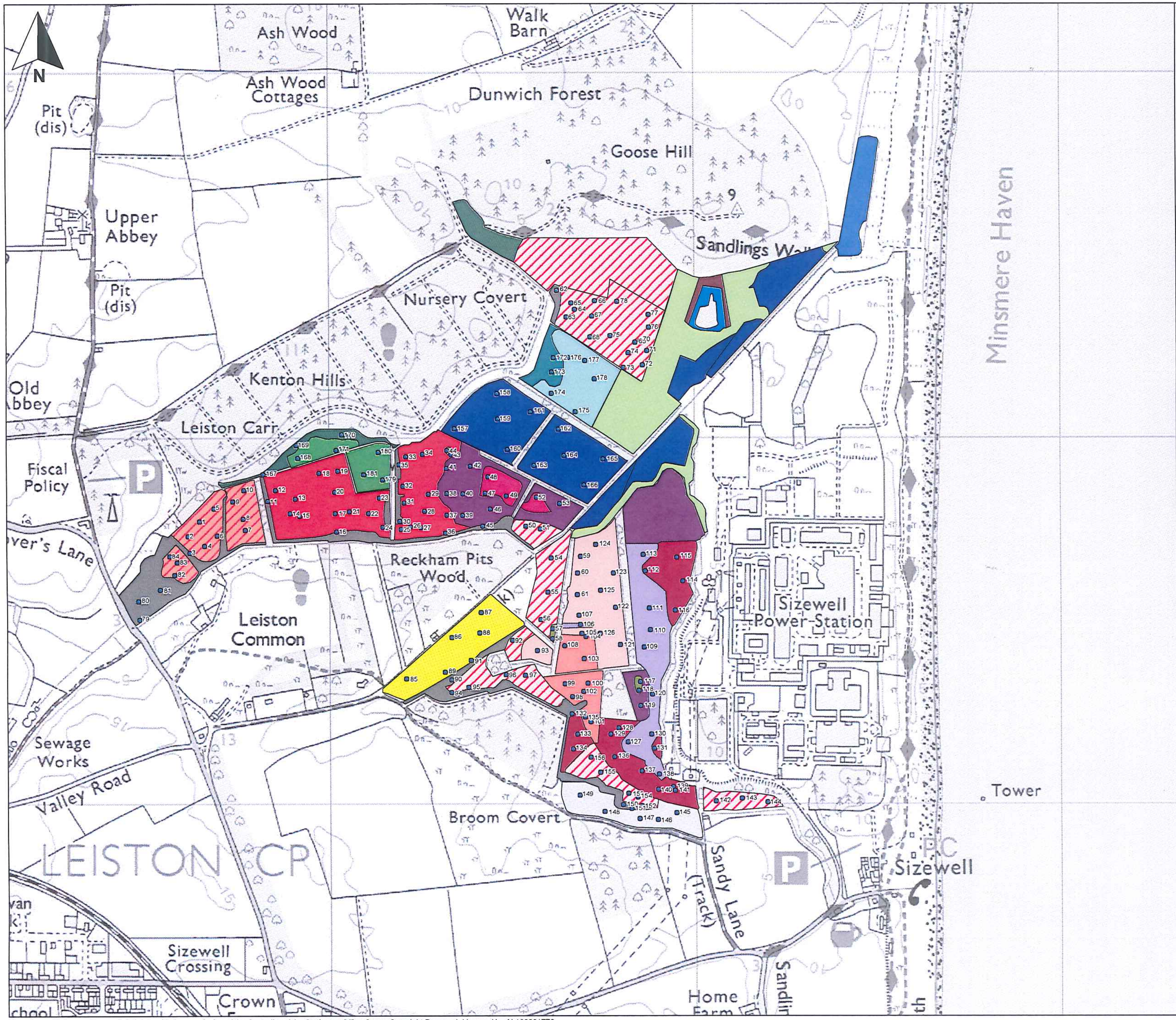
Sizewell NVC Report 2008

Figure 3.1
Sizewell marshes dyke vegetation

April 2009
19801-R277.WOR tugwc

Entec

Figure 8. Amec NVC community mapping and quadrat locations 2008



NVC Code (stand number)

- M22b (FM1a)
- M22b (FM1b)
- M22b - Persicaria amphibia variant (FM1c)
- M22b - Menyanthes trifoliata variant (FM1d)
- M22b (MG8) FM2
- M22b (MG12a) (FM3a)
- M22b (MG12a) (FM3b)
- M22b (MG12a) (FM3c)
- M22d (MG12a) FM4
- M22b / MG10a (FM5)
- MG10a (FM6)
- Holcus lanatus grassland (VG1)
- U1d (VG2)
- S26 RB1
- S26 [RB2] (2007)]
- S4a [RB21) (2007)]
- OV25 [RB22) (2007)]
- W6a WW1
- W2a (WW2)
- W5a (WW3)
- W5a [WW23) (2007)]
- W10d (WW4)
- Location of 2008 samples

0 km 5 km

British Energy

Sizewell NVC Report 2008

Figure 3.2
Sizewell Marshes - Fen meadows

April 2009
19801-R280.WOR tugwc

Entec

1	30/3/15	Jon Mellings	Jon Davies	Draft		
Rev.	**Date**	**Prepared by**	**Checked by**	**Status**	**Reasons for revision**	**Approved by**

DIRECTION PRODUCTION INGENIERIE **Centre National d'Equipement Nucléaire**	1ST PARTNER	2ND PARTNER

CONTRACTOR REF. No	CONTRACTOR WBS CODE
CONTRACTOR COMPANY NAME **HYDER CRESSWELL**	CONTRACT NUMBER **NNB GenCo Ref:** SZC-NNBPEA-XX-000-PAP-000722 - TBA
	SAFETY related **Yes ☐ No ☐**

APPLICABILITY:

- 1: Document related to Unit 1

- 2: Document related to Unit 2

- 9: Document that applies to buildings/systems common to units 1 & 2

- 0: documents that relate exclusively to buildings or systems that are common to the whole site (e.g. OSC building, parkings, ancillary buildings...)

NUCL/REP/EPR/UKEPR							
HPC (doc: HK)				SZC (doc: SZ)			
0	1	2	9	0	1	2	9
				X			

SYSTEM

00

BUILDING

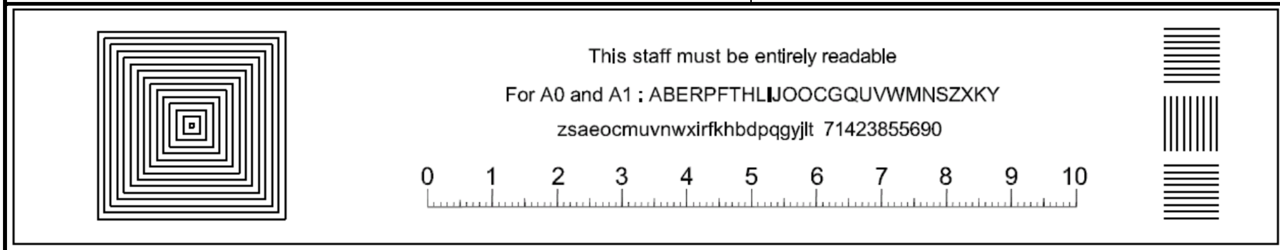
00

SCALE	**DESCRIPTION:** Sizewell C Ecological Support Sizewell C Invertebrate Surveys 2014
SIZE	
PAGE	

DOCUMENT REFERENCE No

Project		Contract No. / Orig. Co		Asset / Zone		System/ building		Doc. Type		Chrono No.

DOCUMENT SUB-TYPE	EDF CLASSIFICATION CODE
REPORT	
SUBCONTRACTOR COMPANY NAME	SUBCONTRACTOR DOCUMENT REF.



EDF MARKING:	**Interne** X	**Restreint** ☐	**Confidentiel** ☐	**PIDU case 3**

NNB Genco

Sizewell C Ecological Support

Sizewell C Invertebrate Surveys 2014

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NNB Genco

Sizewell C Ecological Support

Sizewell C Invertebrate Surveys 2014

Author	Jon Mellings and Jon Davies
Checker	Emma Davis
Approver	Jon Davies

Report No	S-EX140
Date	April 2015

CONTENTS

SUMMARY

Surveys of terrestrial and aquatic invertebrate fauna were undertaken within fenland habitat at Sizewell Marshes SSSI and dry coastal dune, grassland and heath habitat within the Minsmere to Walberswick SAC and SSSI. The work was carried out over three sampling events during June, July and August, 2014. The survey work was undertaken by Jon Mellings for Hyder Consulting, on behalf of EDF Energy/NNB GenCo. The aim was to further inform the impact assessment relating to NNB GenCo's application for a Development Consent Order (DCO) to construct and operate a new nuclear power station, Sizewell C, near the town of Leiston, Suffolk.

The site of the proposed development lies within an area of high ecological sensitivity, being adjacent to and/or within the Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC) and the Sizewell Marshes Site of Special Scientific Interest (SSSI).

All species data recorded during the survey were analysed using the Invertebrate Species-habitats Information System (ISIS), an invertebrate classification software system developed by Natural England. In addition, aquatic sample data, collected primarily from a network of wet ditches within Sizewell Marshes SSSI and the Minsmere to Walberswick Heaths and Marshes SSSI/SAC, were analysed using water quality indices such as Biological Working Party Score (BMWP), Average Score per Taxon (ASPT) and Community Conservation Index (CCI).

The 2014 findings indicated that habitats within the survey area supported both terrestrial and aquatic invertebrate assemblages of high nature conservation value. The assemblages recorded included a number of species of high conservation status, representative of the habitats designated within the Sizewell SSSI as well as two contiguous areas of coastal habitat; one within the Minsmere to Walberswick Heaths and Marshes SAC and SSSI, and the second a non-statutory County Wildlife Site (Suffolk Shingle Beaches CWS) comprising coastal grassland and dune habitat located immediately to the south of the SAC and east of the Sizewell C platform.

Of a total of 796 species were recorded in total during the 2014 surveys, 55 of which were classified as a having a recognised conservation status in the UK/England. Of the species recorded within the survey areas, one species is classed as Nationally Endangered (RDB1) in the UK, one is Nationally Vulnerable (RDB2), four are classed as Nationally Rare (RDB3) and 39 are Nationally Scarce. In addition, 10 species currently classed as NERC (2006) Section 41 'Species of Principal Importance' were recorded.

Whilst the RDB1 and fully-protected Norfolk Hawker *Aeshna isosceles* was not recorded within the survey area in 2014, an adult was recorded flying over wet ditches in a network of fen meadows within the Sizewell Marshes SSSI, approximately 500 metres south of the survey area. Although it is not thought likely that this species breeds within the main 2014 survey areas, the more open, well-vegetated fen meadow ditches within the SSSI may support breeding Norfolk Hawker, and this may warrant further investigation.

Of the key invertebrate assemblages identified from the ISIS analysis, those of highest conservation value within the wetland communities were the 'W3 - Permanent Wet Mire' Broad Assemblage Type and the 'W314 - Reed-fen and Pools' Specific Assemblage Type'. Whilst these two assemblages were not attributed with the largest number of species within the wetland assemblages identified, the highest proportion of rarities were associated with this group. Overall, the sample site called 'SSSI Area 2' (ditch and reedbed habitat west of the proposed Sizewell C platform) was recorded as being of the highest conservation value of the sites surveyed, and analysis of data for the Sizewell SSSI as a whole indicated both the W3 and W314 assemblages as being of National significance.

Of the samples collected from the coastal zone habitats, the non-designated Coastal Strip CWS was found to support an ‘F1 - unshaded early successional mosaic’ Broad Assemblage Type and an ‘F112 - open short sward’ Specific Assemblage Type above the threshold for National significance.

Owing to the high conservation value of the recorded assemblages, and the sensitivities of the habitats and species expected to be lost or indirectly impacted upon, significant mitigation measures are required to offset loss. The report includes habitat creation and restoration recommendations based on knowledge of the ecological requirements of key invertebrate species and habitats, and also considers post habitat creation management issues.

1 Introduction

In June, 2014 Jon Mellings BSc (Hons) MCIEEM was contracted by Hyder Consulting Ltd, on behalf of EDF Energy/NNB GenCo. (hereafter referred to as NNB) to undertake entomological survey work to further inform a study relating to NNB's application for a Development Consent Order (DCO) to construct and operate a new nuclear power station, Sizewell C, near the town of Leiston, Suffolk. The site of the proposed development lies within an area of high landscape and ecological sensitivity, being within an Area of Outstanding Natural Beauty (AONB) and adjacent to and/or within the Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC), the Sandlings Special Protection Area (SPA) and the Outer Thames Estuary SPA. Part of the site lies within the Sizewell Marshes Site of Special Scientific Interest (SSSI).

The aim of the surveys was to add resolution to existing knowledge derived from invertebrate surveys of the entire Sizewell Estate, including the SSSI, conducted by Amec between 2007 and 2010 (a study which informed earlier consultation stages relating to the Sizewell C proposals). In particular, greater resolution in terms of survey effort was considered necessary within targeted areas of the SSSI, SAC and other habitat in and around the site of the proposed development.

The land parcels selected for survey were located adjacent to and within close proximity of the existing Sizewell Nuclear Power Plant. The surveys were targeted primarily within sites of high conservation value, designated variously under UK and European legislation. These included habitat within Units 2 and 4 of the Sizewell Marshes Site of Special Scientific Interest (SSSI); and Unit 112 of the Minsmere to Walberswick Heaths and Marshes SSSI, of which the coastal zone element is also protected under European Law as part of the Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC). The areas forming the basis of the current study are focused primarily on habitat expected to be lost or impacted upon by the development of Sizewell C and its associated infrastructure.

In addition to the designated areas, some habitat not currently subject to statutory designation was also surveyed. These included a strip of coastal habitat comprising shingle beach, sand dune and created sandy grassland habitat located immediately seaward (east) of the Sizewell C Platform; and a strip of secondary wet woodland which currently serves as a buffer between the existing Sizewell Platform and elements of the Sizewell Marshes SSSI complex to the west.

This report will contribute to Environmental Impact Assessment (EIA) and Habitat Regulations Assessment (HRA) to be conducted in relation to the proposed construction of Sizewell C, and seeks to clarify the relative conservation value of invertebrate assemblages occurring within the habitats likely to be lost or impacted by the development.

Importantly, the findings will also be used to inform elements of habitat creation planned to mitigate loss and potential alteration of both statutory and undesignated habitat, feeding into proposals being considered for Aldhurst Farm. For this reason, an element of the 2014 survey effort has been to characterise habitat and identify key landscape features of particular importance to key invertebrate assemblages.

Survey work was completed over a period of three discrete sampling episodes, between mid-June and mid-August 2014, during which time habitat was described and samples collected from a range of terrestrial and aquatic habitats from key areas within the vicinity of the proposed Sizewell c station.

1.1 Aims and objectives

1.1.1 Aim

The main aim of the surveys was to build on the findings of invertebrate surveys described within Amec (2012), and to further consolidate knowledge of the invertebrate assemblages and associated habitat features supporting these assemblages. Habitat and species data derived from the surveys will be subsequently used to inform both the impact assessment process and the sympathetic creation of alternative habitat to the west of the site. This aim will be fulfilled through completion of the following objectives.

1.1.2 Broad Objectives

The broad objectives of the proposed field survey were as follows:

1. To conduct terrestrial and aquatic invertebrate surveys using Common Standards Monitoring (CSM)-compatible techniques, building on, and complementary to, information derived from previous survey and desk study work;

2. To record, delineate and describe key invertebrate habitats present on site in terms of broad vegetation type, habitat structure and current management;

3. To evaluate invertebrate species and assemblages recorded using CSM-compatible indices, including the Invertebrate Species-habitats Information System (ISIS) as well as water quality indices such as the Biological Working Party Score (BMWP), Average Score Per Taxon (ASPT), and the Community Conservation Index (CCI);

4. To set out detailed findings/species lists, and provide an evaluation of key habitat and species assemblages and an appraisal of the conservation value of the site for invertebrates; and

5. To provide recommendations regarding potential development constraints/mitigation options, including site-specific habitat creation advice.

2 Methodology

2.1 Desk Study

Existing information pertaining to the invertebrate fauna of the site has been reviewed to inform this methodology, which was agreed with Natural England in 2014 (see Hyder Consulting, 2014). Reference material, including original SSSI and SAC citations, condition assessment documentation and existing invertebrate-specific studies and species lists (including Suffolk Wildlife Trust data), as well as the Amec reports from 2007, 2009 and 2010, has been consulted and used as a basis to fine-tuning the sampling approach.

2.2 Invertebrate habitat survey

Broad habitats on site were mapped using aerial photographs and ground-truthing (where possible). Plant communities were recorded with sufficient resolution to characterise each individual sampling compartment in terms of habitat type, structure and condition with reference to the invertebrate assemblages supported (the NVC data was collected separately, and is presented within a stand-alone botanical survey report (Hyder 2015)). Features known to be of importance to key invertebrate species recorded historically on site were targeted during the survey.

A total of ten different survey sites (or 'compartments') were assessed in this way during 2014. The locations of all of these compartments are shown on Figure 1, and an overview of the broad habitat recorded in each compartment is provided in Appendix 2, Table 1.

The compartments surveyed were as follows (see Figure 1; centroid grid references in parenthesis):

Compartment No.	Name (Grid ref.)
1	SSSI Triangle (TM47078 64362)
2	SSSI Area 2 (TM6889 63944)
3	SSSI Fen Meadow (TM46948 63819)
4	C-Platform Woodland Strip (TM47014 63902)
5	Coastal strip (Suffolk Shingle Beaches CWS) - dune and coastal grassland (TM47585 64093)
6	Minsmere to Walberswick Heaths and Marshes SSSI/SAC - coastal dune and upper dune grassland/heath (TM47567 64639)
6a	Minsmere to Walberswick Heaths and Marshes SSSI/SAC - dune woodland/scrub, reed-swamp, ditch habitat and scrape (TM47328 64885)
7 and 7a	Leiston Carr and associated wet woodland (TM46054 64018)
8	Grimseys (wet woodland) (TM46637 64195)
9	Turf Pits (W6a woodland) (TM 46467 64547)

10	Reed-swamp (north-west of Sandy Lane Drove) (TM46670 63954)

Compartments 1 to 6 were subsequently subject to detailed sampling for aquatic and terrestrial invertebrates, whilst compartments 7 to 10 were were only subject to the habitat assessment (these areas were included primarily with a view to providing context to the more detailed survey work). In addition to the location map (Figure 1) and the summary habitat descriptions provided in Appendix 2, Table 1, a more detailed description of the sub-habitats within each of the compartments surveyed in detail is provided on a series of annotated habitat maps, as follows:

Figure 2 - SSSI Triangle (Compartment 1);

Figure 3 - SSSI Area 2, SSSI Fen Meadow and C-Platform Woodland Strip (Compartments 2-4);

Figure 4 - Minsmere and Walberswick Heaths and Marshes SAC/SSSI (includes coastal dune and upper dune grassland/heath, upper dune woodland and scrub, reed-swamp, ditch habitat and scrape (Compartments 6 and 6a); and

Figure 5 - Coastal strip County Wildlife Site (dune and coastal grassland)(Compartment 5).

Therefore, the compartments which received a walk-over survey only (Leiston Carr and associated wet woodland; Grimseys (wet woodland); Turf Pits (W6a woodland); and the reed-swamp north-west of Sandy Lane Drove), have been indicated on the location map (Figure 1), but not mapped in detail.

Photographs of the 2014 survey locations are included in Appendix 4, Photographs 1 to 15.

2.3 Aquatic invertebrate sampling

2.3.1 Sample site selection and collection of macroinvertebrate samples

The selection of sampling sites for aquatic invertebrates aimed to reasonably represent the heterogeneity of habitat, and thus the macroinvertebrate fauna of the site as a whole. The initial sampling event was conducted on the 19th June, 2014; the second took place over the 12th and 13th August, 2014. The aquatic invertebrate survey locations (A1 to A32) are indicated by the yellow rectangles on Figures 6 to 9.

A total of 32 aquatic samples were collected from ditches and other freshwater habitats distributed throughout the survey area: 16 samples were collected during mid-June, and a further 16 during mid-August. It was originally envisaged that samples would be collected from repeat locations during the August site visit; however, whilst samples were mainly taken from the same water-bodies as for the June visit, in some instances sample locations were altered to enable a greater representation of the site’s heterogeneity to be recorded.

Each aquatic invertebrate sample was collected in accordance with the Murray Bligh (1999) three-minute sweep method, a standard method for sampling freshwater habitats. Each sample was collected from a sufficient range of representative meso-habitats to adequately cover the main invertebrate niches of the waterbody in question[1]. Each sampling event was timed for three minutes, the sampling time divided proportionately between the different mesohabitats, and the watch stopped after each sweeping to enable the contents of the net to be deposited in the sample tray.

Each sample was then transferred to a sealed plastic sample pot, preserved and transported to the laboratory for washing, sorting and identification.

2.3.2 Washing, sorting and identification of samples

Preserved samples were thoroughly washed and graded by rinsing the content through a series of different sized meshes (standard brass sampling sieves by Endecott were used). Samples were then sorted into a plastic sorting square (as standardly used by the EA) and preserved in readiness for identification.

Samples were subsequently identified to family level (to enable Biological Monitoring Working Party (BMWP) and Average Score per Taxon (ASPT) scores to be calculated) and, where appropriate, to species level (for the requirements of Community Conservation Indices (CCI) methodology (Chadd and Extence, 2004)). Where necessary, specimens were identified using appropriate, up to date taxonomic keys, such as volumes produced by the Freshwater Biological Association and Field Studies Council (FSC).

2.3.3 Data analysis

Aquatic invertebrate data was input directly into spreadsheets set up to calculate BMWP scores using Walley and Hawkes' (1997) revised scoring system, with ASPT calculated by dividing the resultant BMWP score by the number of scoring families. Scores were interpreted in accordance with protocols in EA and Pond Conservation (2002) and Chadd and Extence (2004). Analysis of aquatic sample data was conducted on different scales, as appropriate, including sample site level (individual sample), ditch/waterbody level (e.g. an individual ditch within the SSSI Triangle), survey area level (e.g. SSSI Triangle) and also on a combined site level (e.g. SSSI level – SSSI Triangle, Area 2 and Fen Meadow combined ditches).

Data were also analysed alongside terrestrial invertebrate data using the Invertebrate Species - habitat Information System (ISIS), 2010 version – an analytical package developed by Natural England as a standard method for the conservation evaluation of British invertebrate communities.

2.4 Terrestrial Invertebrate Sampling

In accordance with Drake *et al* (2007), sampling for terrestrial invertebrates was undertaken using a combination of standard capture methods recommended for Common Standards Monitoring (CSM) of different habitat types. In accordance with CSM protocol, data were collected using repeatable techniques enabling subsequent analysis using ISIS, and also allowing data to be reasonably comparable between sampling sites. Sampled habitat included reed-swamp, fen meadow, wet woodland, coastal dune, grassland and grass-heath.

[1] This refers to invertebrates reasonably collected with a pond net, i.e., those occurring within the water column, within and around aquatic vegetation, and on or within the first centimetre or so of the bottom substrate. Specific grab sampling (or similar techniques) for species living at greater depth within the substratum, was not attempted.

The terrestrial invertebrate survey locations (T1 to T30) are indicated by the pink rectangles on Figures 6 to 9.

Sampling was undertaken, for the most part, in suitably dry, sunny weather; however, due to the requirement for survey dates to be confirmed well in advance of the survey (for reasons of access and health & safety), a small amount of sampling during the August visit was undertaken in sub-optimal weather. However, the schedule was revised, where possible, to maximise the sampling effort during periods of dry weather. Terrestrial invertebrate sampling was undertaken over three discrete visits, during mid-June, mid-July and mid-August (the June and August visits in tandem with the aquatic sampling).

The sampling strategy aimed to adequately represent the sites' terrestrial invertebrate fauna, enabling the key sub-assemblages within each defined survey zone to be described. Terrestrial sampling was undertaken with the premise that a minimum of four samples, following a standardised, timed methodology would be collected from each habitat substratum surveyed, within each of the six main sampling areas. This is because a minimum of four samples per substratum is specified in NERR005 (Drake *et al*, 2007) for analysis using ISIS. The sampling was also designed to account for the heterogeneity of habitat within the survey area as a whole, with an overriding aim to account for the sites' more specialised and 'important' habitats, with due consideration for key designated features known to support important invertebrate assemblages.

As the project progressed, decisions were made to increase the survey remit to include additional survey areas. A strip of wet woodland, which screened the habitat areas known as 'SSSI Area 2' and 'SSSI Fen Meadow' from the westernmost aspect of the existing Sizewell B and proposed C Platform areas (the 'C-Platform Woodland Strip'), was added to the survey area prior to the final survey visit. Due to time constraints, survey of this area was undertaken in place of the envisaged third sampling event within the area referred to as the 'SSSI Triangle'.

The precise approach to sampling varied according to habitat. Typically, however, a suite of sampling methods was used within each sampling location, according to habitat layers present. For example, at the interface of reed-swamp and wet woodland/carr habitat, the ground layer was sampled using a vacuum sampler; the field layer (reeds, swamp and low scrub) with a sweep net; and the arboreal and scrub layer (lower portion) with a beating tray.

2.4.1 Sample descriptives

Each sample taken was recorded within a 'sample log' form, which included a tick list of sample methods, with separate fields for 'sample zone', 'sample code', 'sample date', 'grid reference', 'timed duration of sample', 'habitat' and 'weather condition'. Habitat description generally added greater resolution to separately collected habitat descriptions/target notes.

The main sampling methods used were as follows (Note: Sample locations are described in detail within the results section).

2.4.2 Sweep-net

A standard sweep net was used to collect specimens from grassland, ditch edge, swamp and dwarf-scrub habitat. Timed 10-minute sweeps were undertaken in representative habitat, the time being recorded using a kitchen timer in accordance with Drake *et al* (2007). Specimens were extracted from the sweep net using a pooter attached to a glass sampling tube. Following collection, specimens were immediately killed using tissue paper impregnated with acetone-based nail-polish remover in accordance with Drake *et al.* (2007); sample tubes were labelled and cold-stored (at the end of each survey) in a portable electronic cool box. In some instances (i.e. where specimens were readily identifiable in the field), species names were recorded at the time, together with sample details etc., on a recording form.

2.4.3 Beating tray

A beating tray was used to collect specimens from trees and scrub habitat (wet woodland). Samples were timed and species were collected, killed, stored or recorded in accordance with the method described for sweep samples above.

2.4.4 Vacuum Sampling

A petrol/two stroke-powered vacuum sampler was used to collect ground-dwelling specimens not easily retrieved by other sampling methods (pitfall trapping was not appropriate in the boggy conditions at most of the sites). Each vacuum sampling was timed for two minutes, and the contents of the attached sampling net were emptied into a white sampling tray. Specimens were collected using a pooter and processed in accordance with the method described above for sweep sampling.

2.4.5 Direct searching

Direct searching beneath refugia, such as rocks, under bark and in the crevices of standing and fallen trees, was undertaken to complement above methods, and spot sampling using a sweep net and/or pooter was undertaken incidentally to capture species not easily attainable from timed methods.

2.4.6 Mercury Vapour Moth Trapping

On each survey occasion a single standard Robinson mercury vapour moth trap (powered by a 1KVA petrol generator) was deployed for one night. Traps were set at the onset of dusk, left overnight and emptied at around 6.30am the following morning. During the June and July visits (Traps 1 and 2 respectively) the moth trap was located close to the north-west corner of the SSSI Triangle (grid reference: TM 47019 64409)(see the blue rectangle on Figure 6) positioned on a low bund which overlooked the reed-swamp and wet woodland/carr habitat.

In August, the trap (Trap 3) was deployed within the area immediately west of the existing Sizewell C car park (called the C Platform woodland strip)(see the blue rectangle on Figure 7). The trap was located in such a position to be visible to the SSSI Fen Meadow and associated wet woodland and ditches (grid reference: TM47017 63836). Moths were, for the most part, identified on site; however, species not readily identified were retained in sample tubes and placed in an electronic cool box for *ex-situ* examination.

2.4.7 Identification

Where practical, species were identified on site without undue disturbance; however, many species cannot be adequately identified in the field, and it was necessary for samples to be taken for *ex situ* identification using a binocular microscope and appropriate taxonomic keys, as required. Where it was considered necessary, specialist verification of rare or uncommon species was sought from an appropriate county recorder or expert in the relevant species group.

The vast majority of specimens collected were identified to species level; however, certain groups (including, in particular, parasitic Hymenoptera, some Diptera families not currently supported within ISIS analysis, aquatic bivalves and terrestrial molluscs) were not identified to species. The majority of specimens were identified by Jon Mellings. Diptera other than hoverflies (Syrphidae) and soldierflies (Stratiomyidae and their allies) were identified by Andy

Jukes and associated Diptera specialists. Andy Jukes also identified a proportion of the Hymenoptera specimens.

2.4.8 Data analysis using Invertebrate Species-habitats Information System (ISIS)

Terrestrial invertebrate sample data were input into an Excel spreadsheet. Each entry was referenced to sample number, sample site, collected date and OS grid reference of sample location.

ISIS is a computer-based application developed by Natural England for the recognition and scoring of invertebrate assemblage types. ISIS was developed primarily for the purpose of ecological monitoring of sites using Common Standards Monitoring protocols, in order to enable a consistent approach to Condition Assessment of SSSIs and other designated areas. However, the package is also widely used as a standard method enabling the conservation value of invertebrate assemblages to be evaluated for the purposes of Ecological Impact Assessment (EcIA) and general interpretation of entomological assemblages.

Importantly, ISIS is a flexible package which can be used to interpret data collected at different scales (Drake *et al.*, 2007). ISIS interprets species lists by recognising assemblage types within a list and scoring each type according to its conservation value.

The theory and practice of ISIS (2007 version) is explained in greater detail in Lott *et al.* (2007). The workings of the most recent available ISIS version (2010) are largely unchanged; however, explanations of refinements may be obtainable on request from Natural England. There follows a basic summary of ISIS (paraphrased from Lott, 2008) as a means of explaining the terms and interpretation used in the subsequent sections of this report. Terms are explained further in Appendix 1, Reference Table 1.

ISIS recognises invertebrate assemblage types in species lists collected at scales ranging from management compartment to landscape character area. The assemblage types are labelled in terms that relate to their favoured habitats in order to make them accessible to non-specialists. However, they are actually defined by lists of characteristic species that are generally found together in nature.

The output of ISIS produces values relating to different invertebrate assemblage types at two main levels (from Lott, 2008), 'Broad' and 'Specific' assemblage types:

- **Broad Assemblage Types** (BATs) – There are 14 BATs defined for the UK, which are characterised by species that are more widespread across the country. BATs can be found in a wide range of sites. Their classification reflects environmental factors, such as hydrology and disturbance cycles, that have an important effect on invertebrate assemblages.
- **Specific Assemblage Types** (SATs) – There are 28 SATs. These are characterised by stenotypic[2] species, and are considered to have an intrinsic conservation value; such species are generally only found in sites with nature conservation value. SATs are more narrowly-defined than BATs, and each SAT is nested within a parent BAT.

[2] Stenotypic species are specialists which are tolerant of only a very narrow range of environmental conditions.

Since 2008, there has also been a third category of assemblage type that cuts across this classification. These are mainly defined by lists of species dependent on a particular environmental resource, such as flowers as a source of pollen and nectar.

For any set of samples, ISIS scores each recognised assemblage type for representation and conservation value. Some of the scoring systems used in ISIS can be influenced by target group, sampling effort and/or seasonal factors.

In ISIS, a BAT is derived from a defined group of any species, both common and rare, recognised within a species list due to exhibiting a shared affinity for a defined broad habitat. For example, the ‘Arboreal Canopy BAT’ includes species with a greater association with a tree canopy than for any other habitat, such as moths whose larvae feed within the canopy of broadleaved trees.

In addition to attributing a group of species to a given BAT assemblage, or series of BAT assemblages, Rarity Scores, based on the species listed, are also generated for each BAT. Rarity Scores in ISIS are based on the Species Quality Index (SQI), a measure which has been historically used to define the conservation status of an assemblage based on rarity value. In basic terms, an individual BAT with a large number of species attributed to it may achieve a low rarity score if the species making up the community are largely common; conversely, a smaller sample size with a high proportion of rare and uncommon species may register a higher rarity score.

SATs are nested within a parent BAT. For example, the ‘A211 - Heartwood decay’ SAT is a subgroup of the overarching BAT community ‘A2 – Wood decay’, and includes species with more specialised habitat requirements than general deadwood species would exhibit.

SATs thus have intrinsic value for nature conservation, and were designed to be used in setting invertebrate conservation objectives on SSSIs. They can be selected as features of interest, when they are well expressed in existing data. The “% of national species pool” score can be used to do this when a large body of data exists for a SSSI. A score of over 10% for most wetland SATs, and over 6% for most non-wetland SATs, indicates that it is of ‘national significance’ (Lott, 2008).

2.4.9 Use of ISIS within the current report

ISIS analysis was undertaken using bulked terrestrial samples per sample area (e.g. SSSI Triangle) and also on a broader, combined site level. Since aquatic invertebrate sample data as well as terrestrial data can be analysed using ISIS, combinations of both aquatic and terrestrial data for each habitat unit were also analysed using ISIS. The strength of ISIS output can be weakened by analysis of data collected from non-target habitats.

The significant SATs and BATs recorded from the survey data have been used in combination with site-specific habitat types to pinpoint key assemblages and associated habitat within the various survey areas. This information has been subsequently used to define potential impact relating to the development proposals and also to inform habitat creation requirements.

3 Results

3.1 Desk Study

3.1.1 Designations

The majority of the habitat surveyed in 2014 lie within the Sizewell Marshes SSSI. This site is described in the SSSI citation as occupying '*a low-lying basin of deep fen peat; the water table is permanently high, with the area being prone to flooding, there is an extensive network of ditches*'. In terms of invertebrate fauna, the citation states: '*Sizewell marshes are of exceptional interest for their invertebrate fauna, supporting a wide range of taxa and many nationally rare and scarce species. These include terrestrial and aquatic beetles (Coleoptera), flies (Diptera), moths (Lepidoptera), dragonflies (Odonata) and spiders (Araneae)*'.

No particular species are mentioned in the citation; however, to the north of the existing Sizewell power station complex lies the Minsmere to Walberswick Heaths and Marshes SAC, which is designated primarily for supporting Annex 1 habitats, including 'Perennial vegetation on stony banks'. No Annex 2 species are listed as being important. The southern corner of the SAC was within the 2014 survey area. The footprint of the SAC largely corresponds to that of the Minsmere and Walberswick SSSI, which is cited as having '*a rich insect fauna, particularly moths, which include a number of rare species, notably* Archanara neurica *(White-mantled Wainscot),* Photedes brevilinea *(Fenn's Wainscot) and* Senta (Mythimna) flammea *(Flame Wainscot).*' The coastal strip area immediately to the east and north of the existing power station footprint, and south of the SAC, is not subject to statutory designation, but is listed as a non-statutory County Wildlife Site (Suffolk Shingle Beaches CWS).

The survey area also lies within the Suffolk Coasts and Heaths AONB, and within 1km of the south of the site lies the Leiston-Aldeburgh SSSI, noted for its '*breeding and hunting areas for many species of dragonfly and damselfly*' according to the SSSI citation, and the Sandlings SPA, an important site for heathland invertebrates in particular.

3.1.2 Review of site-specific invertebrate reports and records

A number of invertebrate surveys have been undertaken in recent years within the various statutorily designated and non-designated areas in and around the proposed Sizewell C development site. The most recent surveys, conducted in 2007, 2009 and 2010, were commissioned to inform the initial stages of the ongoing Sizewell C development proposals, and have now been consolidated into a single report (Amec, 2014). As part of the Amec (2014) report, a comprehensive desk study and critique was conducted, which summarised findings of previous surveys, highlighted important species records and also, where relevant, identified knowledge gaps with a particular focus on gaps in taxonomic coverage.

The Amec surveys characterised, to a large extent, the invertebrate fauna occupying both the wetland habitats comprising the ditch network, associated fen meadow, reedswamp and carr habitat, and the more xerophile habitats including, coastal dune, grassland, heath and shingle and drier rides and heathland habitats within and around areas of plantation woodland inland. The Amec study area focused on habitat around the centroid grid reference of the Strategic Site Area (TM473640). In compliance with best practice guidelines, the study covered a larger area than was expected to be covered by the development.

The Hyder report '*Sizewell C Ecological Support: Invertebrate and NVC Surveys of SSSI: Review of previous studies and Methodology for further work*' (Hyder 2014) reviewed the findings of Amec's 2007, 2009 and 2010 survey work, and provided the basis for the focus of the 2014 survey work, along with the aims and objectives for the report described herewithin.

This report, and the scope of the proposed survey work, was discussed with Natural England, including invertebrate specialist Jon Webb (one of the authors of the ISIS package). The Amec studies produced a valuable and robust dataset covering a large area; however, further survey requirements, allowing a more targeted, site-specific knowledge of areas most likely to be lost or impacted by the Sizewell C development, were identified.

In order to avoid duplication, a comprehensive review of site-specific survey literature is not provided here. However, both Amec's 2007 – 2010 survey documents, particularly the consolidated report (Amec, 2014) and the review and method statement produced by Hyder (2014) have been consulted, and are referred to at relevant points within this report. However, a brief resume of key species previously recorded within the survey area, and their habitat associations, are considered here.

3.1.3 Previously recorded species of conservation interest

Protected species

Norfolk Hawker *Aeshna isosceles* is the only invertebrate species recorded from the survey area receiving full statutory protection under UK law. This dragonfly is classed as Nationally Endangered (Red Data Book 1/RDB1) and is fully protected under Schedule 5 of the Wildlife and Countryside Act (WCA), 1981. Norfolk Hawker was also listed as a Priority Species in the original UK Biodiversity Action Plan (BAP), and is currently a Section 41 'Species of Principal Importance for Biodiversity' under the NERC Act (2006). In the UK, Norfolk Hawker is restricted to fens and grazing marsh that are relatively isolated from polluted water in the broadlands of Norfolk and northeast Suffolk.

In Amec (2014), it is stated that '*the Norfolk Hawker appeared to be relatively frequent on the ditches of the Sizewell Belts SSSI*' and that '*this may represent the most southerly British population of this restricted species*'. Whilst Norfolk Hawker is known to breed in the ditches of Minsmere, breeding within the Sizewell SSSI has not been confirmed. However, due to the frequency of sightings, and the apparent suitability of ditch habitat in some areas, the insect is suspected to be a breeding species in the SSSI, according to Amec (2014).

During the Amec surveys Norfolk Hawker was frequently recorded flying around the intersecting rides at Goose Hill (called 'Site F' in the 2007 Amec report), approximate grid reference TM46634 64637). In 2009, Norfolk Hawker was also recorded from one of two malaise traps located on the southeast boundary of one of the key areas, known for the purpose of this report as the 'SSSI Triangle'. The dragonfly was also recorded in association with a ditch network within grazing marsh to the west of the SSSI Triangle. However, it is stated in Amec (2014) that '*no specific surveys of Norfolk Hawker have been undertaken at Sizewell or Minsmere*'.

Red Data Book and Nationally Scarce Species

Several species listed in the UK Red Data Book have been recorded consistently within the survey area in recent years. One species, known as the Suffolk Antlion *Euroleon nostras,* was recorded for the first time in the UK as recently as 1994 by Howard Mendel, who recorded the insect at Minsmere. In 2003, the insect was discovered by Suffolk Wildlife Trust at Walk Barn within the EDF Energy Estate (approximate grid reference: TM46568 65073); the larvae of the species (which predate ants falling into their conical burrows in sand) have subsequently been subject to surveillance by Suffolk Wildlife Trust. A peak number of around 900 larvae were recorded in 2004; however, numbers fluctuate on an annual basis.

The conservation status of the Suffolk Antlion has not been classified; however, RDB2 'Nationally Vulnerable' has been suggested. The insect was, however, selected as a priority species within the Suffolk Local Biodiversity Action Plan (LBAP). Suffolk Antlion was also recorded around Walk Barn during the Amec 2007-2010 surveys.

True flies (Diptera) feature strongly amongst the rarer species recorded within the Sizewell SSSI survey area. Red Data Book and Nationally Scarce Diptera recorded within Amec's 2007-2010 surveys with a strong association with the study area's wetland habitats, include the Nationally Vulnerable (RDB2) Ornate Brigadier *Odontomyia ornata* and Silver Colonel *O. argentata*. The Nationally Scarce Black Colonel *O. tigrina* and Barred General *Stratiomys potamida* have also been recorded. These soldierflies (stratiomyidae) all have aquatic larvae, and *O. ornata*, *O. argentata* and *O. tigrina* have a restricted range in the UK, being more or less confined to high quality wetland sites supporting significant networks of drainage ditches, such as coastal grazing marsh, fen and fen meadows.

Another soldierfly, the Orange-horned Green Colonel *Odontomyia angulata* was recorded during the 2009 survey. Classed as RDB1 'Nationally Endangered' in the UK, the insect was recorded alongside *O. argentata* and *O. ornata* (mentioned above) from a fen meadow ditch located immediately southwest of the SSSI Triangle. According to Stubbs and Drake (2001) *O. angulata* was known only from East Anglia and several fens in the Breck and Cambridgeshire. It has been associated with very ancient ponds which support an exceptional fauna. Stubbs and Drake (2001) suggest that the larva of this soldierfly may be amphibious, rather than truly aquatic, being often found in ponds with a tendency to dry out in summer.

Examples of other rare Diptera associated with wetland habitats recorded at Sizewell include: *Parhelophilus consimilis*, an RDB2 'Nationally Vulnerable' hoverfly associated with '*pools in habitats which are transitional between bog and fen, often in association with bulrush*' (Stubbs and Falk, 2002); the RDB2 cranefly *Prionocera subserricornis,* which occurs in ancient fenland, with most records referring to ditches or pools filled with wet, black organic material; *Antichaeta brevipennis*, an RDB2 snail-parasitoid fly, usually associated with lush vegetation beside water bodies in wetlands, with existing Suffolk records referring to ditches in unimproved grazing marshes; and the tiny RDB2 fly *Stenomicra delicatula,* which is generally associated with Carex paniculata tussocks in fens, with the larvae thought to develop in damp decaying vegetation.

The RDB3 'Nationally Rare' Yellow-horned Horsefly *Hybomitra ciureai*, has also been recorded. *H. ciureai* is primarily associated with coastal grazing marshes in the UK. According to Stubbs and Drake (2001) the species is associated with freshwater ditches rather than brackish ones. A Nationally Scarce species of chloropid fly, *Lipara rufitarsis*, a reedbed specialist, has also been recorded. The larvae of this fly forms galls in the stems of Common Reed *Phragmites australis*.

Uncommon water beetles recorded from Sizewell ditch habitats include the RDB2 Nationally Vulnerable diving beetle *Graphoderus cinereus*, which is described as a declining species in the UK in Foster (2010). The species is associated with '*well-vegetated stagnant waters in lowland pools and fenland drainage dykes*' Foster (2011). Foster (2010) argues that for this species '*the greatest threat is posed by drainage of old fen systems*'. *Hydraticus transversalis* is another large aquatic beetle associated with '*rich fen in lowland ponds and fenland drainage ditches*'. Both species were recorded during a Buglife-commissioned ditch survey undertaken Drake in 2009. The Nationally Rare (RDB3) Great Silver Water Beetle *Hydrophilus piceus*, a species also associated with botanically-diverse ditches and ponds, often in coastal fens and grazing marsh, has also been recorded on site. Sutton (2008) argues that *H. piceus* is a species requiring large areas of connected marshland habitat with well-vegetated drainage ditches in order to survive in the long term.

Several species with a strong association with Common Reed swamp habitat have been recorded on site. In particular, a number of species of noctuid moth, generically termed 'wainscots', are dependent on *Phragmites australis* as a larval foodplant, the larvae typically developing within the hollow reed stems. The RDB3 White-mantled Wainscot *Archanara neurica*, is restricted in its UK distribution to reedbeds occupying a stretch of coastline between Thorpeness and Southwold in Suffolk. The larvae develop in old, dead reed stems, and management by frequent cutting or burning is thought to be detrimental to the conservation of this species (Waring and Townsend, 2003). White-mantled Wainscot was recorded from a malaise trap situated in the SSSI Triangle in 2007. The Nationally Scarce Flame Wainscot *Mythimna flammea* has also been recorded within Sizewell SSSI area; the larvae of this species, which also develop in Common Reed, are thought to favour areas of scattered reed, rather than dense stands (Waring and Lewington, 2003).

In 2007, some survey work was undertaken on the dune and shingle habitat, described within this report as the 'Coastal Strip', and these surveys recorded several uncommon species (Amec 2007). The RDB and Nationally Scarce species recorded were mainly beetles (Coleoptera) and true flies (Diptera). Of the beetles, the RDB3 'Rare' weevil *Apion rubiginosum*, a species of apionid associated with disturbed ground, grassland and coastal shingle, was recorded. The larvae of this species (like several closely-related species) form galls on the roots of Sheep's Sorrel *Rumex acetosella*. Another species with an association with sorrel, the leaf beetle *Mantura chrysathemi*, classed as Nationally Scarce (formerly Notable A), was also recorded.

A species of malachite beetle *Clanoptilus marginellus*, associated primarily with coastal shingle, where adults are found on the flowers of Hogweed *Heracleum sphondylium*,Tansy *Tanacetum vulgare* and other herbs (Hyman and Parsons, 1992) has been subject to a revision of conservation status from Nationally Scarce (Notable B) in Hyman and Parsons (1992) to IUCN (2001) 'Lower Risk – Near Threatened' status (equivalent to RDB3 'Rare'). A further species of beetle recorded on the Coastal Strip area in 2007 was *Melanopthalma curticollis*, a species of lathridiid beetle, known from a handful of sites in the UK, which is included in the RDBK (insufficiently known) category.

Of the flies recorded within the Coastal Strip in 2007, one RDB3 'Rare' species of opomyzid fly, *Opomyza punctella*, was recorded.

Several species cited within the reports produced by Amec as Nationally Scarce have been subject to status revision due to recorded range expansion and/or increased recording effort in recent decades. Species frequently cited within the reports and reviews formerly classified as Nationally Scarce in the UK which have been subject to status revision include the Hairy Dragonfly *Brachytron pratense*, which has increased its range in southern UK and is now considered a 'local' species. The Lesser Cockroach *Ectobius panzeri* again has been downgraded to 'local' status due to range expansion/increased recording, whilst the aquatic beetles *Rhantus grapii*, *R. suturalis*, *Ancaena bipustulata*, *Enochrus melanocephalus*, *Hydraena testacea* and *Ochthebius marinus* were all subject to revision to 'local' status by Foster (2010).

NERC (2006) Section 41 'Species of Principal Importance'

The White Admiral, *Limenitis camilla*, a butterfly associated primarily with woodland rides, is well recorded on the site, which is known to support a significant population. Both larvae, which feed on Honeysuckle *Lonicera periclymenum*, and adults have been subject to survey (Amec, 2014).

White Admiral is listed as a 'Species of Principal Importance' under Section 41 of the NERC Act (2006), due to a recorded decline of the species from former habitats in the UK. In addition to the s41 status, White Admiral has also been classed, using post-2001 IUCN criteria, as 'Vulnerable' in the UK. As butterflies are relatively easily monitored, the post-2001 IUCN guidelines are arguably easier to apply to butterflies and some other popular groups than to some of the more obscure taxa. However, confusion can result when a relatively common butterfly is afforded a comparable conservation status to species of true rarity status.

Similarly, the Grayling *Hipparchia semele*, another butterfly which is still locally common, is also classified as 'Vulnerable' using the post-2001 IUCN guidelines, and is also afforded S41 status.

A number of common moth species are also listed under S41 as 'Species of Principal Importance', though for research only. Research by Butterfly Conservation has found that a number of moth species still commonly recorded in the UK have declined considerably in recent decades. Two such species which have been recorded within the survey area are the Cinnabar Moth *Tyria jacobaeae* and Latticed Heath *Chiasmia clathrata*.

3.2 2014 Survey findings

3.2.1 Sample sites

Aquatic Macroinvertebrate sample sites

All aquatic macroinvertebrate sampling sites for both the June and August surveys are described in Appendix 2, Table 2, and corresponding sample sites are indicated (alongside terrestrial sampling locations) on the sample site maps (Appendix 3, Figures 6, 7, 8 and 9).

Terrestrial sample sites

Appendix 2, Table 3, provides descriptions of the terrestrial invertebrate sample locations, and the types of sampling method(s) used during each of the three sampling events (in June, July and August, 2014) are summarised in Appendix 2, Table 4. Sample locations are illustrated alongside the aquatic sampling locations on the sample site maps (Appendix 3, Figures 6, 7, 8 and 9). The total number of terrestrial samples taken per substratum over the three surveys combined within each survey compartment (including the SSSI Triangle, SSSI Area 2, SSSI Fen Meadow, C-Platform Woodland Strip, Coastal Strip and SAC habitat) are summarised in Appendix 2, Table 5.

Mercury Vapour Moth-trapping locations

As for aquatic and terrestrial invertebrate sampling points, moth trap locations are depicted in Appendix 3, Figures 6 and 7.

3.2.2 Species recorded

All species recorded during the survey are listed in Appendix 2, Tables 6 and 7. Table 6 shows species recorded from the aquatic samples only, whilst Table 7 shows species recorded during the terrestrial sampling component of the survey together with incidentally recorded species. Sample locations are indicated for each recorded species. For the purpose of this report, the terms ‘Aquatic’ and ‘Terrestrial’ are defined as: ‘Aquatic’ = species collected from water bodies using a pond net; and ‘Terrestrial’ = species collected from above the surface of the water. This division is somewhat artificial; many species frequenting terrestrial habitats as adults (e.g. dragonflies, soldierflies etc.) develop as larvae in aquatic habitats. There is thus a small amount of overlap between the Aquatic and Terrestrial species lists, with some species occurring in both lists.

The total number of invertebrate species recorded for each taxonomic order from the 2014 terrestrial and aquatic sample data were as follows:

Order	**Species recorded (Total)**	**Species recorded (Terrestrial)**	**Species recorded (Aquatic)**
Coleoptera	250	217	54
Diptera	141	138	17
Lepidoptera	131	131	1
Hemiptera	120	109	24
Araneae	36	36	5
Hymenoptera	26	26	2

Order	Species recorded (Total)	Species recorded (Terrestrial)	Species recorded (Aquatic)
Pulmonata	25	25	25
Orthoptera	15	15	0
Odonata	13	11	8
Opiliones	12	12	0
Isopoda	9	7	3
Hirudinea	4	0	4
Veneroida	3	0	3
Amphipoda	2	0	2
Lithobiomorpha	2	2	0
Neuroptera	2	2	0
Dermaptera	1	1	1
Dictyoptera	1	1	0
Ephemeroptera	1	0	1
Pseudoscorpionida	1	1	0
Symphyta	1	1	1
Total	**796**	**735**	**151**

Uncommon species and s41 Species of Principal Importance

Of a total of 796 species recorded from both terrestrial and aquatic sample data in 2014, 55 are currently listed as having a recognised conservation status in the UK. All species of recognised conservation status recorded from both Aquatic and Terrestrial survey datasets are included in Appendix 2, Table 8. The table incorporates descriptors, including recorded location(s), recorded date(s), recorded habitat, and affiliation to ISIS assemblages (i.e. Broad Assemblage Type (BAT) and Specific Assemblage Type (SAT)).

The following species with a recognised conservation status were recorded for the combined survey areas:

RDB1 (‘Nationally Endangered’) - one species currently classed as RDB1, based on pre-1994 IUCN criteria (two if the record of Norfolk Hawker flying outside of the survey area is counted);

RDB2 (‘Nationally Vulnerable’ - one species classed as ‘Vulnerable’ based on IUCN pre-1994 criteria, and a further two based on post-2001 IUCN criteria;

RDB3 (‘Nationally Rare’) – four species based on pre-1994 IUCN criteria, and a further two classed under post-2001 IUCN criteria in the ‘Lower risk – Near Threatened’ category (equivalent to RDB3);

Nationally Scarce - a total of 39 species classed as Nationally Scarce (comprising Notable A [7 species], Notable B [20 species] Notable [12 species]); and

S41 – ten species currently classed as NERC (2006) Section 41 ‘Species of Principal Importance’.

Species of note recorded outside of the survey area

Norfolk Hawker is classed as Nationally Endangered (RDB1) and is fully protected under Schedule 5 of the Wildlife and Countryside Act (WCA), 1981. The insect was included as a Priority Species in the original UK Biodiversity Action Plan (UKBAP) and is currently a NERC

Act s41 'Species of Principal Importance'). Norfolk Hawker is restricted to fens and grazing marsh that are relatively isolated from polluted water in the broadlands of Norfolk and northeast Suffolk. According to Dragonfly Conservation (2015), optimal breeding conditions appear to be *'unspoilt grazing marsh dyke systems with clean, non-saline water, rushy margins, preferably with an abundance of Water Soldier* Stratiotes aloides *as well as other aquatic plants*'.

During the 2014 survey, whilst Norfolk Hawker larvae or adults were not recorded within any of the survey sites, a single individual was recorded flying over floristically-diverse ditches in Unit 4 of the Sizewell Marshes SSSI during the initial, June visit. This was approximately 500 metres south of the SSSI Fen Meadow survey area.

3.3 BMWP, ASPT and CCI Analysis (Aquatic only)

3.3.1 Biological Monitoring Working Party Score (BMWP) and Average Score Per Taxon (ASPT) - Background

The Biological Monitoring Working Party Score (BMWP), Average Score per Taxon (ASPT) and the Community Conservation Index (CCI) are commonly used metrics in analysis of aquatic macrophyte sample data in freshwater habitats in the UK. BMWP and ASPT are specifically tools for assessing water quality in relation to biological pollution, and are calculated based on values ascribed to different invertebrate families according to the generalised water quality tolerances of these families.

Higher BMWP scores indicate better water quality. Being based simply on the sum of all scoring macroinvertebrates represented within a sample, they tend to result from samples in which several higher scoring macroinvertebrate families are present. However, higher BMWP scores can also result from more diverse samples comprising largely lower-scoring families from habitats of poorer water quality. BMWP scores can be divided by the number of scoring families in a sample to give an ASPT index. An ASPT value therefore controls for the influence of species richness.

BMWP and ASPT are normally conducted alongside a range of chemical analyses for the purpose of water quality analysis. However, BMWP scores are also calculated as they can be used to define the Community Score[3] necessary for the calculation of to CCI analysis (below), and have been calculated mainly for this purpose. Whilst the results of BMWP analysis provide useful additional background information, any reference to water quality based on BMWP and/or ASPT should be seen as incidental to the habitat and species conservation evaluation when carrying out ecological impact assessment (EcIA). Importantly, good water quality does not necessarily correlate with high conservation value. Sites scoring highly for conservation value can occur in poor water conditions, and conversely, good water quality does not necessarily indicate high conservation value (Chalkley, 2008).

For the purpose of this project the BMWP scoring used is based on Walley and Hawkes' (1996) revision of the original BMWP scoring system.

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[3] The CCI Community Score (CoS) can be derived either from the highest Conservation Score (CS) relating to the rarest taxon in a given sample, or from the BMWP score. The highest scoring of the two methods is used to derive the CoS.

3.3.2 Community Conservation Index (CCI) – Background

CCI is a protocol developed by Chadd and Extence (2004) of the Environment Agency to summarize aquatic macroinvertebrate data obtained from inland still and flowing water sites in Great Britain. It provides a means of assessing the conservation value of aquatic macroinvertebrate communities. Unlike BMWP scores, CCI requires species-level identification to be undertaken.

Both BMWP and CCI scores have been calculated for all aquatic samples collected during the 2014 survey. Unlike ISIS (below), CCI output is based primarily on species rarity rather than habitat fidelity. The aquaticinvertebrate data set was also evaluated using ISIS and is discussed in terms of both indices in the following sections of this report.

3.3.3 BMWP, ASPT and CCI – Results

Appendix 2, Tables 9 and 10, provide interpretation of the various scoring categories for BMWP and ASPT and CCI respectively. Analysis of data has been undertaken on different scales[4] to enable evaluation on an individual sample site scale, individual ditch/waterbody scale, sample area level (e.g. SSSI Triangle) and also on a combined site level (e.g. SSSI level – SSSI Triangle, Area 2 and Fen Meadow combined ditches).

Individual Sample level results

Results of BMWP, ASPT and CCI analysis for each Aquatic sample collected during the initial site visit (19/06/2014) are presented in Appendix 2, Table 11, and results from the August (12-13/8/2014) site visit in Table 12. In addition, scoring classifications and interpretation of BMWP, ASPT and CCI scores for individual samples are shown in Appendix 2, Tables 13, 14 and 15 respectively.

Ditch/waterbody level

Results of BMWP, ASPT and CCI analysis for each discrete ditch and waterbody are presented in Appendix 2, Tables 16, 17, 18 and 19. This approach aims to enable evaluation of grouped samples (comprising each ditch) to be considered independently of the overall survey area. In addition, where several samples have been collected from a single waterbody, a greater resolution of data is available for analysis.

Site and combined site level results

Combined results of BMWP, ASPT and CCI analysis for each survey area (SSSI Triangle, SSSI Area 2, SSSI Fen Meadow, SAC (scrape) and SSSI (ditch)) are presented in Appendix 2, Table 20, with scoring classifications and interpretation of CCI scores for combined site data in Appendix 2, Table 21. All samples for each compartment from both sample dates were combined. The Table also shows results of combined SAC sites (SAC - scrape and ditch) and SSSI sites (Triangle, Area 2 and Fen Meadow), with the aim of providing more of a landscape-scale perspective.

The total number of species recorded for all sites ranged from 16 to 56 in the June samples, and from 11 to 36 for the August samples. The highest diversity (56 species) was recorded in June from the SAC Scrape (site A8), the only non-ditch sample site, which occupied more open conditions within coastal grazing marsh habitat. The least diverse aquatic sample was 11

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[4] According to Chadd and Extence (2004), CCI can be used to analyse data collected on different scales; i.e. analysis of an individual sample can be undertaken, or data from a number of amalgamated samples can also be analysed.

species, recorded from a heavily-shaded, partially-vegetated Common Duckweed-dominated section of ditch (site A29 in SSSI Area 2). The average number of species per sample recorded from the June survey was 30, whilst in August a mean of 23 species per sample was recorded.

In terms of BMWP score, the highest score for an individual sample was 107.8, recorded from the SAC scrape (site A8), whilst the lowest was 26.6, recorded from A26, again a relatively well-vegetated ditch section in SSSI Area 2. Results of the BMWP, ASPT and CCI analysis are discussed in relation to each site in the discussion section of this report.

3.4 ISIS Analysis (Terrestrial and Aquatic Invertebrates)

Output tables from ISIS are included in Appendix 2, Tables 22 to 41. Explanatory notes and definitions of ISIS scores are provided in Appendix 1. For an overview of ISIS, and an explanation of its use as a monitoring tool, see Drake *et al*. (2007) and Lott (2008).

The results of the ISIS analysis are set out by survey site/compartment in Section 4, and then the assemblages identified (both BATs and SATs) are discussed in more detail in Section 5.

4 Assessment of survey sites

Each survey site in turn (excluding those where only a habitat survey was carried out) is discussed in relation to the findings of both aquatic and/or terrestrial surveys undertaken, as appropriate. The findings of BMWP, ASPT and CCI analysis (aquatic), as well as ISIS analysis (terrestrial and aquatic), are discussed, and key species recorded during the surveys are considered in relation to ISIS assemblage associations and recorded habitat.

The evaluation of the different survey areas, on the basis of the assemblages and rarities present, is provided in Section 6.

4.1 SSSI Triangle (Compartment 1)

The SSSI Triangle is located to the north-west of the proposed Sizewell C Station platform (Survey Compartment 1, Figure 1). Conclusions of ditch macroinvertebrate surveys conducted in 2009 by Amec within the drains of the SSSI Triangle (2009 sample sites 13,14,15 and 23 – not to be confused with the 2014 numbering used for the sample sites discussed within this report) were as follows: '*Relatively few rare or uncommon species were recorded in these samples, possibly because there are several ditches here that had a complete cover of duckweed (*Lemna *spp) and green algae, and consequently were clearly nutrient-enriched. These types of ditch are often of reduced invertebrate value partly because light penetration is seriously reduced and oxygen levels are reduced. Several ditches in this area were also shaded and this is again likely to have reduced the invertebrate value of these.*'

4.1.1 Water quality

In 2014, more detailed aquatic surveying was undertaken within the ditch network in the SSSI Triangle, with a total of 13 samples being collected. BMWP and ASPT analysis of these data indicated that the water quality within the SSSI Triangle was of overall 'moderate water quality', with some ditches falling into the 'poor water quality' category and some approaching the 'good water quality' classification.

These findings may, therefore, be seen to confirm observations made in Amec (2009). Water quality was generally relatively poor (given that this is within a SSSI), and the probable reasons for this would be nutrient enrichment. In addition, in 2014, shading by overhanging trees and scrub was found to be prevalent, particularly along stretches of the northern drain. Ditches were subject to localised algal bloom, and the coverage of Common Duckweed was extensive in some areas.

However, the ditch sections surveyed varied in terms of shading and vegetation cover, and the diversity of aquatic macrophyte flora thus also varied considerably across the site. Whilst many uncommon macroinvertebrates can only persist in clean, well-oxygenated conditions, and sites that are heavily-polluted rarely support a diverse macroinvertebrate fauna, a number of rare and uncommon species are tolerant of relatively low oxygenation levels, as cautioned in Chalkley (2008).

Interpretation of the 2014 BMWP and ASPT scores indicates that the ditches and open water habitats within the central area and lagoon were generally the best, and that the water quality varied between ditches, being best within the lagoon and associated ditches, and poorest in the main drain traversing the northern boundary of the Triangle.

4.1.2 Uncommon species and CCI analysis

The SSSI Triangle aquatic samples yielded the lowest number of uncommon species of all the sample sites, despite a greater number of samples being collected from the area (13 compared to 12 in SSSI Area 2). The only uncommon species recorded within the SSSI Triangle ditches included a Nationally Scarce (Notable A) soldierfly, the Black Colonel *Odontomyia tigrina* (larva recorded in the southern boundary ditch, sample A5, and adult recorded from terrestrial sample site T1). However, two diving beetles *Rhantus grapii* (samples A5 and A6) and *R. suturalis* (sample A21) were also recorded. Increased recording in recent years of these two species has lead to them being downgraded from Nationally Scarce to Local (Foster, 2010). *R. suturalis,* a cosmopolitan species with a very broad global distribution, is now much more common, the increase in *R. grapii* being less significant.

All three of these species have been well-recorded across the Sizewell SSSI. The Black Colonel is described as being a '*distinctly local species, being mainly confined to the southern half of England*' by Stubbs and Drake (2001). Stubbs and Drake also describe the fly's recorded habitat as '*at the margins of ponds, ditches and more rarely, canals, usually those with a rich flora of both emergent and floating vegetation*'. The aquatic larvae have been more commonly associated with narrow ditches with dense growth of emergent plants, rather than wide, open ditches. *Rhantus suturalis* is described as being found '*usually in lowland stagnant waters, often recently created and polluted*' (Foster and Friday, 2011). Foster and Friday describe the habitat of *R. grapii* as '*shallow waters amongst vegetation, dead leaves or mosses in stagnant water, often partly shaded and usually in lowlands*'.

Despite the general lack of uncommon species recorded within the aquatic ditch samples from the SSSI Triangle, a reasonable diversity of species generally associated with good quality wetlands was recorded in several of the samples. The single sample collected from the shallow margins of the central reedbed lagoon (A21), supported species such as Emerald Damselfly *Lestes sponsa* (larvae), Saucer Bug *Ilyocoris cimicoides*, Larger Noterus *Noterus clavicornis* (a water beetle associated with base-rich habitats), the Flat Ramshorn Snail *Hippeutis complanatus* and the Twisted Ramshorn *Bathyomphalus contortus*. Terrestrial sampling of the emergent swamp vegetation at the same site also included a local species of reed beetle *Donacia semicuprea.* This is one of several species from the same subfamily which has an aquatic larva. An adult Banded General *Stratiomys potamida*, a Nationally Scarce soldierfly, was also recorded incidentally within a few metres of the sample site.

With a CCI score of 15.5, this sample marginally exceeded the threshold of 15 (>15 to 20) for 'High conservation value' in terms of CCI attribution. However, a score of 14.7 was recorded for the combined SSSI Triangle aquatic samples, indicating 'Fairly high conservation value' according to Chadd and Extence (2004). This category is defined as '*sites supporting at least one uncommon species, or several species of restricted distribution and or a community of high taxon richness*'. The presence of the Black Colonel, the two water beetles *Rhantus suturalis* and *R. grapii*, as well as several local species, together with a reasonably high species diversity, would have influenced this score.

The highest CCI score for a single sample in the SSSI Trianle was 16.04 recorded for Sample A5, taken from the southern boundary ditch. This score is towards the low end of the 'High conservation value' category. This site supported both Black Colonel and *Rhantus grapii*.

Other species recorded in the aquatic samples in the Triangle included the local Fen Snout *Nemotelus pantherinus* (recorded in sample A3) and Green Colonel *Oplodontha viridula* (A4). Neither species is listed as scoring in CCI, so such species would not have been included in conservation value calculations.

4.1.3 ISIS analysis of aquatic ditch data

The CCI is a simple index based primarily on taxon richness and rarity; it does not attempt to split recorded species into communities according to their respective habitat affinities. The BAT and SAT assemblages identified using ISIS provide a greater degree of information in relation to the more specific habitat associations of individual species and species groups. On a more powerful level, ISIS can evaluate both aquatic and terrestrial species simultaneously and provide an overall reflection of the relative value of the species assemblages making up the whole.

ISIS analysis of aquatic-only samples identified only one well-represented BAT within the SSSI Triangle, the 'W2 – Mineral marsh and open water' assemblage, with the most prominent SAT being the 'W211 – Open water on disturbed mineral sediments' assemblage. However, no SAT was attributed with more than two species.

Neither assemblage scored highly enough to achieve a score equating to Favourable Condition status. Such a score would indicate, for the purpose of Common Standards Monitoring, that a community of national importance had been identified from the ISIS output. The number of species (48) recruited to the W2 assemblage was large, indicating a robust evaluation. Species attributed to this broad assemblage included mainly common water beetles (Coleoptera), aquatic snails (Pulmonata), water bugs (Hemiptera) and damselflies (Odonata), with the local beetle *Rhantus suturalis* and Lister's River Snail *Viviparus contectus* being arguably the two least common species.

Much of the recorded W2 assemblage was made up of: large and middle-sized diving beetles (Dytiscidae) such as *Dytiscus marginalis*, *Agabus biguttatus, A. sturmii* and *Ilybius fuliginosus;* smaller species such as the Cherrystone Beetle *Hydryphus ovatus* and *Hydroporus palustris;* and aquatic snails including the Common Bithynia *Bithynia tentaculata*, the Valve Snail *Valvata piscinalis,* the Great Pond Snail *Lymnaea stagnalis* and Great Ramshorn *Planorbarius corneus,* as well as a range of other mainly common snails of the families Lymnaeidae and Planoribidae.

Of the remaining BATs identified from the data, the 'W3 - Permanent wet mire' BAT supported the largest number of species (13); however 16 or more species are needed for a BAT to be considered significant in ISIS. However, species attributed to this assemblage arguably included the more interesting from a conservation perspective, with Black Colonel *Odontomyia tigrina* and *Rhantus grapii* both being attributed to this community as well as local soldierflies Fen Snout *Nemotelus pantherinus* and Green Colonel *Oplodontha viridula.* In fact, of the rare and uncommon species recorded for the combined 2014 survey data site as a whole, including species recorded from both aquatic and terrestrial sampling techniques, more rare and uncommon species were categorised within the W3 assemblage than any other BAT.

Whilst BATs, as the name suggests, are broad brushstroke communities and comprise more generalist species as well as less common and more specialised ones, the species comprising the Specific Assemblage Types have more specialised habitat requirements. It follows that SATs of higher species-richness are only found in sites of higher conservation value. From the SSSI Triangle aquatic-only samples, SATs were poorly subscribed to. The 'W211 – Open water on disturbed mineral sediments' SAT was attributed with two species, *Rhantus suturalis* and the rather local Lister's River Snail *Viviparus contectus.* For 'W314 – Reedfen and pools', the two soldierflies *Odontomyia tigrina* and *Oplodontha viridula* were identified, whilst *Rhantus grapii* was the only species attributed to the 'W313 – Moss and tussock fen' SAT from the SSSI Triangle aquatic dataset.

The results broadly agree with the conclusions of Amec (2014) that the ditches within the SSSI Triangle are somewhat eutrophic and would be considered to be of, at best, moderate water quality (although the lagoon and water within the reed bed ditches were generally better than that of the main drain to the north of the site). Whilst it is not necessarily agreed that high water quality equates to high rarity value, analysis of aquatic-only macroinvertebrate data suggested the site's ditches at the time of survey were in suboptimal condition.

The results of the CCI and ISIS analysis together indicate that the assemblages present were reasonably diverse and supporting some uncommon species representative of more important wetland sites, but that overall the aquatic fauna was at best of no more than 'fairly high conservation value' (which is not particularly high for a SSSI).

There was some variation, particularly in terms of botanical diversity, between ditch samples, and generally the better samples were collected from sites which were not heavily shaded. The best sites were generally characterised by a more diverse aquatic macrophyte flora. Macrophytes strongly characteristic of high quality fenland ditch systems (such as Frogbit *Hydrocharis morsus-ranae,* Soft Hornwort *Ceratophyllum submersum,* fine-leaved pondweeds *Potamogeton* spp. and milfoils *Myriophyllum* spp.) were recorded within the Triangle ditches; however, the better sites for these species were patchily distributed.

Due to health and safety constraints, access of the central area of the reedbed, including the open water lagoon area, was not possible. However, access at sample site 21, enabled sampling to take place from some more diverse swamp habitat. The aquatic macrophyte community here included rushes, *Juncus* spp., Sedges *Carex* spp. and a relatively diverse aquatic herb flora not found within the near monoculture *Phragmites australis* swamp. A single aquatic sample was taken from this site, but arguably a greater focus on this area would have produced samples of higher conservation value.

4.1.4 Terrestrial-only data (ISIS)

Thirteen Nationally Scarce species, and five classed as species of Principal Importance under s41 of the NERC Act (2006), were recorded from terrestrial-only data collected for the SSSI Triangle. No Red Data Book species were recorded, with the exception of White Admiral *Limenitis camilla*, which has been classed as 'Vulnerable' (RDB3) under the post-2001 IUCN guidelines.

Results from ISIS analysis of the terrestrial-only data from the SSSI Triangle were split between a number of BATs and SATs, reflecting the diversity of habitat type present. Besides combining all terrestrial data, analysis was also attempted by sample method, i.e. sweep sample, beating sample, vacuum sample, moth trap, etc. However, the results showed little, if any, difference to the ISIS output of combined sample data.

The bulk of the data were split relatively evenly between the four dominant BATs, and none of these achieved a score exceeding the threshold required for Favourable Condition status. Despite a reasonable number of Nationally Scarce species recorded, these were rather diffusely scattered between BATs.

Surprisingly, the most well-represented BAT recorded from the SSSI Triangle terrestrial data was the 'F2 – Grassland and scrub matrix' BAT. This is likely to be because parts of the site surveyed beneath the wooded understorey and at the peripheries of the swamp habitats (particularly between the northern ditch and the northern edge of the reedswamp) supported a Yorkshire Fog *Holcus lanatus* and Rough Meadow Grass *Poa trivialis*-dominated field layer, often with extensive stands of Common Nettle *Urtica dioica.* Thus, the community comprised mainly of common species associated with a range of grassland types. Uncommon invertebrate species ascribed to the F2 BAT in ISIS included *Crudosilis ruficollis* (referred to as *Silis* in Amec reports). This Nationally Scarce soldier beetle, like the local leaf beetle *Phyllobrotica quadrimaculata* which was also recorded, was found far more frequently within the reed swamps than the grassland and scrub habitats. *C. ruficollis* was abundant throughout the reedbeds within both the SSSI Triangle and Area 2.

The two highest-scoring BATs in terms of rarity score were the same two assemblages, W2 and W3, which were prevalent in the ISIS output for the aquatic-only sample data. Whilst these assemblages were attributed with fewer species than the F2 community, the rarity scores in each case approached the Favourable Condition threshold, suggesting assemblages of some conservation value. Three Nationally Scarce species, Black Colonel *Odontomyia tigrina* (also recorded in the ditch samples), Flame Wainscot Moth *Mythimna flammea* and a dolichopid fly *Thrypticus divisus* were ascribed to the 'W3 - Permanent Wet Mire' assemblage, along with several other species regarded as local in the UK.

Flame Wainscot is strongly associated with Common Reed *Phragmites australis,* the larvae developing in the hollow stems, and this species, like *Odontomyia tigrina,* is assigned to the 'W314 - Reedfen and pools' SAT. However, the species is thought to favour scattered reed over more dense stands (Waring and Townsend, 2003). *Thrypticus divisus* is one of a number of flies of the family Dolichopididae recorded during the survey.

The 'W2 - Mineral marsh and open water' BAT included the Nationally Scarce weevil *Notaris scirpi,* a species of fens, marshes and other wetland habitat, where the larvae develop in the rootstocks of sedges *Carex* spp. and Reedmace *Typha* spp., whilst the Nationally Scarce Banded General *Stratiomys potamida,* recorded from the interface between wet woodland and reedswamp in the Triangle, is attributed to the 'W1 - Flowing water' BAT and the 'W126 – Seepage' SAT.

The 'A1 - Arboreal Canopy' assemblage was the second highest scoring BAT in terms of species-richness from the terrestrial dataset, and also supported two Nationally Scarce species. A true weevil associated with birch and other deciduous trees *Curculio betulae*, was recorded from several beating samples, along with another Nationally Scarce weevil *Polydrusus formosus*. Increased recording of the latter of these weevils has suggested it is increasing in the UK. Historically it has been associated with ancient broadleaved woodland. White Admiral *Limenitis camilla*, a well-recorded species in the Sizewell SSSI, is also attributed to A1.

Whilst the 'A2 – Wood decay' BAT was attributed with too few species to be considered significant within the ISIS output, one Nationally Scarce scraptiid beetle *Anaspis thoracica* was attributed to this community from the sample data and to the 'A212 - Bark and sapwood decay' SAT.

Of the moth data collected, micro-lepidoptera are not recognised by ISIS; therefore, the two Nationally Scarce micro-moths recorded from the moth trapping within the SSSI Triangle, the Alder Signal *Stathmopoda pedella* and a gellechiid moth *Monochroa palustrellus,* were not included in the ISIS output. The larvae of *S. pedella* develop in the green fruits of Alder, and the species is found mainly in Alder carr habitat.

Monochroa palustrellus, a very local species, mainly occurring in south-east England, feeds on Curled Dock *Rumex crispus.* Its habitat associations include waste ground, vegetated shingle, sand dunes, dry grassland and fens and marshes. (Sterling and Parsons, 2012). Of the larger moths, the Nationally Scarce Water Ermine *Spilosoma urticae*, also recorded from an MV trap operated in the SSSI Triangle, is not ascribed to an assemblage in ISIS, despite n association with wetland habitats. This is possibly due to the moth being split between several broad assemblages.

As with the BATs, several SATs were represented within the ISIS output for the SSSI Triangle terrestrial data. Whilst none supported sufficient species richness to achieve Favourable Condition status, both the 'A215 - Epiphyte fauna' and 'W314 - Reedfen and pools' SATs equalled (though did not exceed) the threshold scores set in ISIS. The 'A215' assemblage is characterised mainly by moths with lichen-feeding larvae. Such communities can be indicative of old woodland (or hedgerows) occurring in areas relatively free of atmospheric pollution.

Three moths, the Rosy Footman *Miltochrista miniata,* Dingy Footman *Eilema griseola* and Beautiful Hook-tip *Laspeyria flexula* (the latter a local species of southern England), were representative of this assemblage. Of the remaining SATs, seven species were attributed to the 'A212 - Bark and sapwood decay' assemblage and two, including the Nationally Scarce *Anaspis thoracica,* to the 'A211 - Heartwood decay' assemblage. Whilst the latter two assemblages were not well-represented, the presence of wood decay specialists may indicate a greater resource of these species on site than the results suggest.

4.1.5 Combined aquatic and terrestrial data (ISIS)

Whilst combining the aquatic and terrestrial survey data for the SSSI Triangle increased the overall number of species affiliated to each BAT, overall, little change to the rarity scores was registered. The most species-rich assemblage identified was the 'W2 - mineral marsh and open water' BAT, with 77 species being attributed to this group. Nevertheless, the rarity score remained below the Favourable Condition threshold, indicating that whilst a reasonable diversity of species characteristic of mineral marsh and open water habitat were present, the recorded assemblage comprised mainly of fairly common invertebrates, with only a few local or uncommon species. The 'W211 - Open water on disturbed mineral sediments' SAT, a subgroup of the W2 assemblage, was poorly represented, with only two species considered to be habitat specialists.

The rarity score recorded for the 'F2 - Grassland and scrub' assemblage was also speciose, but comprising a generally undistinguished fauna.

The 'W3 - Permanent wet mire' BAT was again below the Favourable Condition threshold, although the score was reasonably high. The species affiliated to this group included some uncommon species with habitat specialisms. The 'W314 - Reedfen and pools' SAT was close to achieving Favourable Condition status, suggesting that the SSSI Triangle included species indicative of higher conservation value. Another assemblage with a reasonably high rarity score, albeit from a smallish dataset, was 'W1 - Flowing water' BAT.

4.2 SSSI Area 2 (Compartment 2)

SSSI Area 2 (see Compartment 2 on Figure 1) is located to the south-west of the SSSI Triangle, and north of the SSSI Fen Meadow site. It comprised a narrow strip of scrubby reedbed habitat, with a ditch on either side.

4.2.1 Water quality

BMWP and ASPT analysis of the 2014 aquatic survey data indicated that the habitat within the SSSI Area 2 was of overall 'moderate water quality', with some ditches falling into the 'poor water quality' category and some approaching the 'good water quality' classification.

In common with the findings discussed for the SSSI Triangle, this may be indicative of nutrient enrichment. Drains both to the west and east of Sandy Lane Drove were subject to shading by overhanging trees and scrub, and, as with the SSSI Triangle sample sites, ditches were subject to localised algal bloom and the coverage of Common Duckweed was extensive in some areas. However, the ditch sections surveyed varied in terms of overshading and vegetation cover, and the diversity of aquatic macrophyte flora also varied considerably, with some sample sites relatively unshaded (A25 for example).

Interpretation of the 2014 BMWP and ASPT scores indicates that the water quality in the ditch to the west of Sandy Lane Drove was marginally better than in the eastern ditch. However, both ditches were in the moderate water category, according to ASPT interpretation.

Whilst overhanging trees, predominantly Alder and willows, shaded both ditches, the eastern ditch was generally more heavily-shaded, with lower macrophyte diversity. For both the SSSI Triangle and the SSSI Area 2 ditches described here, it is uncertain how frequently managed the ditches are in terms of slubbing and clearance of vegetation. Some sample sites were densely vegetated, whilst others were mainly vegetated by a floating mat of *Lemna minor*. The most botanically-diverse sites provided good structural diversity as well as supporting macrophytes consistent with ditches of high conservation value. Frogbit, Soft Hornwort and fine-leaved *Potamogetons* were recorded at such sample sites. However, the non-native invasive plant Nuttall's Waterweed *Elodea nuttallii* was also abundant in some places, although this species may not in itself be detrimental to the macroinvertebrate fauna.

4.2.2 Uncommon species and CCI analysis

In contrast to the findings for the SSSI Triangle, the CCI of the combined SSSI Area 2 samples produced a vey high score (30.45), interpreted as 'Very High Conservation value' according to Chadd and Extence's criteria. Interestingly, combined BMWP scores and ASPT indices were almost identical to those resulting from the SSSI Triangle samples, suggesting that taxon richness and water quality status had little to do with the recorded rarity values from the CCI analysis of combined samples. Samples for both sites were collected in the same timescale, and sampling conditions were more or less identical.

Of the two ditches, the western ditch, which was generally less heavily shaded, scored higher than the eastern ditch. As CCI scoring is influenced by the rarity value of the highest-scoring species, the presence of an RDB2 or RDB1 species in a sample can inflate the score. The presence of the Ornate Brigadier *Odontomyia ornata* in a sample collected from the western ditch will have thus increased the score for this feature. This species is well known from the site, having been recorded in previous surveys, discussed in Amec (2014), and summarised in Section 3.1.3, above. *O. ornata* is a specialist of high quality fen and grazing marsh ditch networks.

However, compared to the aquatic sample data from the SSSI Triangle, markedly more uncommon species were recorded from the SSSI Area 2 samples. Nationally Scarce species included the water beetles *Peltoytes caesus* (larvae) and *Hydraticus seminger,* and the ground beetle *Oodes helopioides.* The Variable Damselfly *Coenagrion pulchellum* was also recorded ('Lower risk, near threatened' – IUCN (2001)), as was a water-scavenger beetle *Enochrus melanocephalus*, recently demoted from Nationally Scarce status (Foster, 2010), and the Smooth Ramshorn *Gyraulis laevis* ('local' status), the least common water snail recorded during the survey. *Peltodytes caesus* is confined to lowland rich fen pools and ditches in the English and Welsh Fens according to (Foster and Friday, 2011), *Hydaticus seminiger* is a species of well-vegetated permanent waters, often coastal but avoiding brackish conditions, *Oodes helopioides* is a fen and marginal wetland species, and the Variable Damselfly breeds in well-vegetated, at most slow-flowing ditches.

4.2.3 ISIS analysis of aquatic data

Whilst the overall CCI score indicated that the SSSI Area 2 aquatic ditch fauna is of 'Very high conservation value', in the results recorded for the ISIS analysis of the SSSI Area 2 aquatic-only samples no BAT or SAT surpassed the Favourable Condition threshold. The main BATs and SATs represented were similar, both in terms of assemblages identified and the number of species attributed to each, to those ascribed to the SSSI Triangle aquatic-only dataset (described above).

As with the SSSI Triangle, the 'W2 -Mineral marsh and open water' BAT was the standout assemblage in terms of species recruitment, and it was the only assemblage represented by a sufficient number of species for a rarity score to be calculated. The score for W2 was, however, higher for Area 2 than the Triangle, being fairly close to the Favourable Condition threshold. Again, the 'W3 - Permanent wet mire' assemblage was the second highest scoring BAT, although the number of species attributed to W3 for Area 2 was 15, just short of being considered significant.

A crawling water beetle *Peltodytes caesus* and a water scavenger beetle *Enochrus melanocephalus* were included in the W2 BAT, together with Variable Damselfly and the 'local' Waterboatman *Notonecta maculata*. As with the SSSI Triangle, the bulk of the uncommon species were attributed to the 'W3 - Permanent wet mire' BAT. However, too few species were recorded to register a rarity score, and the SAT, based on species abundance and habitat affiliation alone, was insufficiently well subscribed to illustrate the value of the species recorded.

Ornate Brigadier *Odontomyia ornata*, the water beetle *Hydaticus seminiger,* the ground beetle *Oodes helopioides* and the Green Colonel *Oplodontha viridula* were all attributed to W3, being split in terms of SAT allegiance between the 'W313 - Moss and tussock fen' and 'W314 - Reedfen and pools' assemblages.

The results suggest that in terms of ISIS assemblages, the SSSI Area 2 and Triangle ditches were broadly similar. However, as CCI attributes a single score to the whole sample, the greater number of rarities recorded from the ditch as a whole is reflected more strongly in CCI. The presence of an RDB2 species in a sample is usually sufficient for the site to be deemed as having a higher conservation value.

4.2.4 Terrestrial-only data (ISIS)

In 2014, two RDB3 Nationally Rare species and 16 Nationally Scarce species were recorded from the terrestrial-only data collected for SSSI Area 2.

Two of the four BATs represented within the dataset produced scores which exceeded the threshold or Favourable Condition status: the 'W3 - Permanent wet mire' and 'W2 – Mineral marsh and open water' assemblages. These two assemblages, together with the 'F2 - grassland and scrub matrix', 'A1 - Arboreal canopy' and 'A2 - Wood decay' BATs were all significantly represented in the dataset. It should be noted that, unlike the SSSI Triangle, no moth traps were operated within Area 2; however, a greater number of samples were collected from SSSI Area 2 over three separate sampling events. Due to a change in survey priority, a third August site visit to the SSSI Triangle was not undertaken.

The BAT to which the largest number of species (56) were attributed, and which comprised the greatest number of rarities, 'F3 – Permanent wet mire' was represented by two RDB3 species as well as four species classed as Nationally Scarce. The RDB3 Nationally Rare species included the Levels Yellow-horned Hoverfly *Hybomitra ciureai*, a species associated predominately with coastal grazing marsh (Stubbs and Drake, 2001) and *Passaloecus clypealis*, a small solitary wasp which is a specialist of reedswamp habitat. The larvae of *P. clypealis* probably develop in hollow reed stems, but it has also been reared from galls of *Lipara lucens* on reed (Richards, 1980). *P. clypealis* was swept from within the Reedbed at sample site T28. It is uncertain whether this species has been previously recorded at Sizewell.

Two Nationally Scarce flies, including *Lonchoptera scutellata* and a snail-killing fly *Pascadina verbekei* are included within the W3 assemblage, as well as the ground beetle *Agonum nigrum* and the rove beetle *Stenus palustris*. The adults of *Lonchoptera* species usually occur in humid places, often near water, and the larvae develop in decaying plant material (Smith, 1969). *P. verbekei* occurs in a range of wetlands, including fens, wet heath, riversides and dune slacks. The larvae are parasitoids of aquatic Lymnaeid snails. Of the Nationally Scarce beetles, *Stenus* *palustris* is associated with high quality wetland sites, such as undisturbed fens, grazing marshes etc. (Lott and Anderson, 2011), whilst *Agonum nigrum* is typically a coastal species associated with vegetated marshes (Luff, 2007).

The 'W2 - Mineral marsh and open water' BAT, an assemblage often found in association with the W3 BAT, comprised 38 species, constituting a significant proportion of the dataset. Four Nationally Scarce species were included: the dolichopid fly *Dolichopus notatus* and three beetles, two Nationally Scarce species of rove beetle *Stenus pusillus* and *Oxytelus fulvipes,* and *Notaris scirpi,* a weevil also recorded from the SSSI Triangle. Dolichopid flies typically develop from carnivorous larvae living in rotting wood, mud, dung, sap-runs etc., whilst *Oxytelus fulvipes* occurs in undisturbed marsh with fluctuating water-levels, such as carr, shaded ditches etc. (Lott, 2009). *Notaris scirpi* is associated with *Carex* and *Typha* spp. in which the larvae develop.

As with the SSSI Triangle, the 'F2 - Grassland and scrub' matrix was well represented in the sample, comprising 55 species. However, again the assemblage comprised mainly common species, and the rarity score was below the Favourable Condition threshold. The Nationally Scarce soldier beetle *Crudosilis ruficollis*, which was abundant throughout the reedbeds of both the Triangle and Area 2, is included in W2. In addition, a Nationally Scarce spider *Tetragnatha pinicola* was recorded. The spider is less of a wetland associate than the similar species *T. extensa,* and adults and juveniles were abundant throughout much of the survey area.

The 'A1 - Arboreal canopy' and 'A2 - Wood decay' BATs were both well represented within the ISIS output for SSSI Area 2. The woodland/carr habitat which followed the southeast margin of Area 2, included some mature, predominately Alder and Grey Willow wet woodland, with some multistemmed trees, suggesting historic coppicing of Alder. Rot holes and other features of standing wood decay habitat were also evident and some mature trees were growing in relatively open situations.

Attributed to the A1 BAT were two Nationally Scarce weevils (also recorded from the SSSI Triangle) *Polydrusus formosus* and *Curculio betulae,* and from the A2 assemblage two Nationally Scarce species not recorded elsewhere on site were recorded. These were the false darkling beetle *Conopalpus testaceus* and a Limoniid cranefly *Gnophomyia viridipennis. Conopalpus testaceus* is a species of ancient woodland, wooded bogs, hedgerows and orchards. Larvae develop in rotting wood (Hyman and Parsons, 1992). *Gnophomyia viridipennis* is associated with poplars, particularly Black Poplar *Populus nigra,* and Aspen *P. tremula*, the larvae developing beneath the bark of recently felled, or dead trees (Hancock, 2008).

Wood decay species were also well represented within the SATs, with 16 species being attributed to the 'A212 - Bark and sapwood decay' assemblage. The national species pool for A212 (as defined in ISIS) is large, and a threshold of 19 is set for an A212 to be considered as nationally important. Both *C. testaceus* and *G. viridipennis* (mentioned above) were attributed to this group, together with several 'local' species, including the sailor beetles *Malthodes mysticus/ guttifer* (females not easily separated morphologically) and *M. dispar*, the Black-clouded Longhorn *Leiopus nebulosus*,[5] an ant *Temnothorax nylanderi,* and a hoverfly *Chalcosyrphus nemorum*.

Other well represented SATs included the 'W314 - Reedfen and pools' assemblage which, whilst not including sufficient species to meet the threshold for national importance, was represented by such afforementioned rarities as the RDB3 *Passaloecus clypealis* and *Hybomitra ciureai* and the Nationally Scarce *Agonum nigrum* and *Lonchoptera scutellata.*

[5] Formerly considered a single species, *L. nebulosus* has been split into two separate species, *L.nebulosus* and *L.linnei* (Wallin *et al,* 2010). Specimens collected were keyed out as *L.nebulosus.*

The Favourable Condition status afforded to the W3 and W2 assemblages underlines the significance of these two broad assemblages within the terrestrial-only ISIS output for the SSSI Area 2 site. In addition, the W314 community included both RDB and Nationally Scarce species. Of the other BATs and SATs, the number and conservation value of species attributed to the 'A212 - Bark and sapwood decay' SAT, suggests that this community may also be important on site. Given that the amount of direct searching of wood decay habitats was limited, and most wood decay species were obtained from beating, sweeping and vacuum sampling rather than from targeted searches, this is likely to be an under-estimation of the importance of this assemblage.

4.2.5 Combined aquatic and terrestrial data (ISIS)

Combining the aquatic and terrestrial survey data for the SSSI Area 2 increased the overall number of species affiliated to each BAT, but overall there was little change to the rarity scores. As with the SSSI Triangle, the most species-rich assemblage identified was the 'W2 - mineral marsh and open water' BAT, with 86 species being attributed to this group. However, whilst the rarity score for terrestrial data only (discussed above) exceeded the Favourable Condition threshold for the W2 community, the rarity score fell marginally below the Favourable Condition threshold when samples were combined. This indicates that the rarity score was depressed or diluted by the larger number of lower-scoring species within the aquatic samples. However, the W2 assemblage would still be considered to be of some importance within the context of the site.

Whilst the 'W3 - Permanent wet mire' BAT was not as well represented within the ISIS output from combined sample data, the sample was nonetheless large, with 67 species attributed, and the recorded score of 204 easily exceeded the threshold of 180 set for Favourable Condition status. This identifies SSSI Area 2 as being of national conservation value for its W3 assemblage. However, species attributed to SATs were distributed between a large number of assemblages (14 in total). Five of these, W211, W221, W313, W125 (in order of representation) are closely allied, representing specialists of a range of habitat nuances. Whilst none exceeded the threshold for Favourable Condition when the SSSI dataset was analysed as a whole, the top three ('W211 - Open water on disturbed mineral sediments', 'W221 - Litter-rich fluctuating marsh' and 'W314 - Reedfen and pools') were all very close to the Favourable Conditions threshold.

The results achieved by the 'A1 - Arboreal canopy' and 'A2 - Wood decay' assemblages were virtually unchanged within the combined SSSI Area 2 dataset compared with the terrestrial-only output. The A2 BAT, and associated 'A212 - bark and sapwood decay' SAT, can be considered as significant assemblages within SSSI Area 2.

4.3 SSSI Fen Meadow (Compartment 3)

The SSSI Fen Meadow is one of a series of botanically-rich meadows occupying the area to the south of SSSI Area 2 and west of the existing Sizewell B Station (see Figure 1). Collectively, the meadows occupy an extensive area, and in terms of macrophyte diversity the ditches surrounding the meadows were of high quality. During the June survey, the protected Norfolk Hawker was recorded flying over ditches to the south of the survey area. The ditches supported aquatic species such as a bladderwort *Utricularia sp.,* not seen elsewhere in the ditches surveyed, as well as Frogbit *Hydrocharis morsus-ranae,* which was well-distributed throughout.

There was some subtle variation in microtopography across the Fen Meadow survey site, and the meadow network as a whole, and the water level was above the soil surface in some areas. The ditches from which samples were taken in the Fen Meadow were botanically-rich, but were partially shaded by adjacent wooded vegetation. No samples were taken from the open ditches which traversed fields further to the south.

4.3.1 Water quality

Like both the SSSI Triangle and SSSI Area 2, BMWP and ASPT analysis of the Fen Meadow ditches indicated overall ‘Moderate Water Quality’. However, the samples collected during June indicated water quality was better than in either of the afforementioned sites, although the August samples produced lower scores. It is possible that lower scoring samples were influenced by changes in taxa due to seasonality, rather than an actual decline in water quality.

4.3.2 Uncommon species and CCI analysis

The high CCI score recorded for sample A31 (>20), indicating ‘a site of very high conservation value’, was evidently inflated due to the presence of the Nationally Rare Great Silver Water Beetle *Hydrophilus piceus*. Collectively, the water beetle fauna recorded from the combined Fen Meadow ditch samples was amongst the most diverse recorded for any of the sample sites, despite the fact that a lower number of samples were collected for the SSSI Fen Meadow. However, other than *H. piceus* the species were mostly relatively common and widespread. Other species of note recorded from the SSSI Fen Meadow ditches included *Hesperocorixa linnaei,* a patchily distributed species of lesser waterboatman (Corixidae), Lister’s River Snail *Vivipara contectus,* a species of ‘local’ status, and larvae of the Common Green Colonel *Oplodontha viridula,* a species associated with a range of wetland habitats.

4.3.3 ISIS analysis – aquatic-only data

The ‘W2 - Mineral marsh and open water’ BAT accounted for the vast majority of the species data recorded from the SSSI Fen Meadow ditch samples, accounting for 66 percent of the data. The assemblage, however, fell far short of attaining a high rarity score in ISIS. Although the sample was characterised by a higher than average diversity of common water snails, water beetles, water bugs and damselflies, the only rarity recorded in any of the aquatic Fen Meadow samples, the Great Silver Water Beetle *H. piceus,* was attributed to a different BAT, the ‘W3 - Permanent wet mire’ assemblage, which was represented by too few species in ISIS to be attributed with a rarity score.

H. piceus is associated with botanically-diverse ditches in extensive fenland and coastal grazing marshes, with aquatic macrophytes such as Frogbit often forming part of the macrophyte community. The beetle particularly favours sites rich in ramshorn snails (Planorbidae). Interestingly, in ISIS the majority of the ramshorn species are attributed to the W2 rather than W3 assemblage. In terms of the Fen Meadow dataset, the Flat Ramshorn *Hippeutis complanatus* and the Ramshorn *Planorbis planorbis* are the exceptions, being attributed to W3 alongside *H. piceus*.

As the samples recorded from the Fen Meadow ditches lacked specialist species in any number, SATs were very poorly represented. *H. piceus* and the Green Colonel (soldierfly) were both ascribed to the ‘W314 - Reedfen and pools’ assemblage, the best represented SAT (in terms of rarities) within the whole Sizewell SSSI dataset, but represented by only these two species in the output for the aquatic-only dataset for the Fen Meadow.

As with some of the other sample area datasets analysed, the splitting of assemblages within ISIS creates a more precise understanding of the habitat affinities of the species recorded. However, the CCI analysis score is based on all species present, and extra weighting is placed on a sample supporting one or more RDB species. The overall score of Very High Conservation Value for the Fen Meadow site thus relates to the presence of Great Silver Water Beetle, combined with a fairly high diversity of species from a wide range of taxa.

4.3.4 ISIS analysis – terrestrial-only data

Whilst several species regarded as 'local' in the UK were recorded from the terrestrial-only samples collected from the SSSI Fen Meadow, no species currently listed as RDB or Nationally Scarce in the UK were identified. All species recorded were collected from four sweep net samples combined; therefore, the dataset was comoprised of the minimum number of samples required for which ISIS analysis can be conducted. No vacuum sampling, beating or water trap sampling was undertaken. Whilst it does qualify for ISIS analysis, the sample data cannot therefore be directly compared with sites receiving greater sampling effort.

In terms of ISIS output, the data were mainly divided between two significantly scoring BATs (the 'F2 - Grassland and scrub matrix' and 'W3 - Permanent wet mire' assemblages), with a third (W2) falling below the assemblage threshold of 15. Both of the two higher scoring assemblages achieved rarity scores approaching the threshold scores set in ISIS. Only one SAT ('W314 - Reedfen and pools), was represented at all, with only two species (the Green Colonel and *Paederis riparius,* one of several similar rove beetles known in the UK), were attributed to the SAT.

Species represented in the sample included mainly true flies (Diptera), beetles (Coleoptera), and bugs (Hemiptera; mainly including leafhoppers and froghoppers (Auchenorrhyncha) and true bugs (Heteroptera)), with smaller groups, including dragonflies and damselflies (Odonata) and grasshoppers and crickets (Orthoptera), being well represented in relation to their respective UK faunas. Two bush-crickets attributed to the 'F2 - grassland and scrub matrix' community, the Long-winged Conehead *Conocephalus discolor* and Roesel's Bush-cricket *Metrioptera roeselii,* were formerly classed as RDB species in the UK, but have undergone considerable range expansions during the 1980s and subsequent decades. Both species are now widespread and common over much of southern England.

Another bush-cricket recorded in the Fen Meadow grassland was the Short-winged Conehead *Conocephalus dorsalis*. This species, historically the more common conehead, is now arguably the more restricted and local of the two species. Despite its classification within F2, the insect is almost always recorded from wetland habitats, often associated with the two afforementioned species as well as the Lesser-marsh Grasshopper *Chorthippus albomarginatus,* also recorded in the Fen Meadow. *C.albomarginatus,* another species long regarded as being of local distribution and of restricted habitat, has increased its UK range significantly in recent decades, and whilst it is predominantly found in wetlands, it may be found in drier habitats too.

Other more locally-distributed species recorded that were attributed to the 'W3 - Permanent wet mire' assemblage included the Fen Snout *Nemotelus pantherinus* (a rather local fenland soldierfly), two local hoverflies *Neoascia tenur* and *Platycheirus occultus*, a snail-killing fly *Sepedon sphegea* and an apionid weevil *Cyanapion spencii* (associated with wet grassland and fen where it feeds on Tufted Vetch *Vicia cracca* and similar species).

Several common dragonflies and damselflies were also recorded within the Fen Meadow. Black-tailed Skimmer *Orthetrum cancellatum,* arguably the most locally distributed of these, was attributed to the 'W2 - Mineral marsh and open water' assemblage.

Whilst the assemblages recorded within the Fen Meadow failed to achieve particularly high conservation scores, and no particular rarities were recorded, the BATs F2 and W3 were well represented, and together with W2 showed consistency with the SSSI Triangle and SSSI Area 2 data, in which these three assemblages were also well represented.

Arguably, more detailed and focused sampling within the Fen Meadow would have revealed a greater range of species, and greater resolution within ISIS would have been gained.

4.3.5 Combined aquatic and terrestrial data (ISIS)

Combining the aquatic and terrestrial data from the Fen Meadow generally reflected the findings of the two datasets. The three BATs (W2, W3 and F2) were significant and well represented within the data, but none exceeded the threshold for Favourable condition, despite the presence of RDB3 Greater Silver Water Beetle *Hydrophilus piceus* within the aquatic samples. Overall, a reasonable diversity of aquatic beetles and other taxa representative of fen and other wetland of conservation value was recorded.

4.4 C-Platform Woodland (Compartment 4)

The C-Platform Woodland is located along the western edge of the Sizewell C platform (see Figure 1). Only terrestrial invertebrate sampling was carried out in this compartment.

Sufficient sampling was undertaken during the August survey to represent the habitat layers present, and some direct searching of wood decay habitat was also carried out. In addition, moth trapping was also undertaken, although this was on a single night only and using only a single trap, and it is likely that the trapping would have drawn moths in from the neighbouring SSSI Fen Meadow habitat.

Unsurprsingly, given that the habitat was woodland, the field layer was subject to shading; however, there were some small gaps in the canopy, enabling patches of sunlight to penetrate to the field and ground layers. Few of the trees comprising the woodland were mature; however, some fallen and standing dead wood habitat was present. The western margin of the woodland graded into Alder and Grey Willow carr, with a fairly broad strip of heavily-silted habitat, interspersed with remnant open water ditches. The silty substrate was sparsely vegetated with Pendulous Sedge *Carex pendula*, False-Fox Sedge *Carex otrubae* and Yellow Flag Iris *Iris pseudacorus,* with Common Reed *Phragmites australis* and Reed Canary Grass *Phalaris arundinacea* represented in patchy stands.

4.4.1 ISIS analysis

The key BATs recorded in the woodland included (in order of representation) the ‘F2 - Grassland and scrub matrix’, ‘A1 - Arboreal canopy’ and ‘W3 - Permanent wet mire’ assemblages. Of these, only the W3 assembalge attained a sufficiently high rarity score for Favourable Condition Status to be achieved, although only one rarity was attributed to it, the White-mantled Wainscot *Archanara neurica.* This species is classed as RDB3 as well as being included under Section 41 of the NERC Act (2006) as a ‘Species of Principal Importance’ for biodiversity. The other species attributed to the W3 assemblage included several local species, such as Fen Wainscot *Arenostola phragmitidis,* a leafhopper *Stroggylocephalus agrestis,* two dolichopterid flies *Dolichopus latelimbatus* and *Teucophorus spinigerellus,* and the ground beetles *Trichocellus placidus* and *Carabus granulatus.*

The larvae of the White-mantled Wainscot and Fen Wainscot both develop in the stems of Common Reed. White-mantled Wainscot shows a particular preference for unmanaged stands, where old, dead reed stems exist; thus, stands managed by regular cutting or burning are thought not to be suitable. It is very locally distributed in the UK, being confined to coastal reedbeds between Thorpeness and Southwold. This species was also recorded during the Amec surveys (Amec, 2007-10).

Many of the moths recorded within this woodland habitat are likely to have been attracted from the nearby Fen Meadow, and possibly the reed swamp within SSSI Area 2, although some stands of Common Reed were present along the ditches and as scattered stands within the carr habitat between the C-Platform Woodland and the Fen Meadow.

The only other uncommon species recorded from the C-Platform Woodland was the Nationally Scarce broad-nosed weevil *Polydrusus formosus.* This species, which has been recorded more frequently in recent years in the UK, has historically been associated with ancient broadleaved woodland. It was recorded from several areas during the survey, and was attributed to the 'A1 - Arboreal canopy' assemblage, which otherwise comprised of mainly common species. A pot beetle *Cryptocephalus pusillus* and the harvestman *Dicranopalpus ramosus* were also attributed to A1; whilst this BAT was well represented in terms of species, it comprised of mainly common woodland invertebrates.

None of the SATs recorded for the C–Platform Woodland were represented by more than one or two species. Whilst Favourable Condition status was attributed to the 'W3 - Permanent wet mire' assemblage, this was largely influenced by the presence of White-mantled Wainscot in the analysed data. Due to the ability of moth traps to attract moths from some distance in the adjacent landscape, the precise origin of this important moth is uncertain; however, given its habitat preferences, it is likely that it originated from either the SSSI Area 2 reed bed or the ditch edge habitat within the Fen Meadow, if not from the immediately adjacent swamp and carr habitat.

The 'F2 - Grassland and scrub matrix' assemblage was the other species-rich assemblage recorded within the C-Platform Woodland (presumably where the canopy was more open); however, the rarity score was low and the sample mainly comprised common generalist grassland species. Whilst not being within the designated boundary of the SSSI, the C-Platform Woodland can be seen as part of the wider Sizewell Marshes habitat matrix. The habitat is contiguous with the Fen Meadow and SSSI Area 2, and provides additional wet woodland and swamp habitat.

On its own merits, however, the quality of wet woodland at the C–Platform Woodland site, in terms of nature conservation value, was below that of the old woodland stands within the SSSI Area 2 or the SSSI Triangle.

4.5 Minsmere to Walberswick Heaths & Marshes SSSI/ SAC (Ditch and Scrape) (Compartment 6a)

Leiston ditch (see A7 and A17 on Figure 8) forms the western, inland boundary of the Minsmere to Walberswick Heaths and Marshes SAC. The scrape sampled for this study (see target note 2 on Figure 4, and A8 on Figure 8) lies outside of the SAC boundary, but is within the Minsmere to Walberswick Heaths and Marshes SSSI. The proximity of the two features (the ditch and the scrape), and general similarity in terms of vegetation and adjacent habitat, led to the two being considered together for the purpose of this report. In addition, whilst these waterbodies pass through more open grazing marsh habitat than the SSSI Triangle and Area 2, the ditch is hydrologically linked to the SSSI Triangle, so collectively the ditches surveyed are considered to be part of the same hydrological and ecological unit.

4.5.1 Water quality

BMWP and ASPT scores indicated moderate water quality within the SAC ditch (Leiston Ditch) and the SSSI scrape, the scores suggesting, on the basis of macroinvertebrates only (no water chemistry samples were taken), that there was little difference in water quality between all sampled waterbodies. The SAC ditch (see target note 1 on Figure 4) is hydrologically linked to and downstream of both northern and southern boundary ditches of the SSSI Triangle;

therefore any nutrient enrichment within the Triangle would be expected to also prevail within the SAC ditch. The more open conditions within the SAC ditch and adjacent scrape would be expected to provide more favourable conditions, and therefore provide a more diverse fauna than in the more shaded areas, although certain species are known to favour sites of partial shade, for example diving beetles such as *Hydaticus seminiger* and *Rhantus grapii*.

4.5.2 Uncommon species and CCI analysis

As individual units, the very high CCI score recorded for the single 'Scrape' sample (see target note 2 on Figure 4) was the second highest scored for an individual sample during the 2014 survey, and the diversity of CCI-scoring species was greater than for any of the other sample sites. This resulted in the scrape being classified within the 'Very high conservation value' category based on CCI interpretation recommendations. The combined SAC Ditch sample CCI was was lower, being afforded 'Fairly high conservation status'. The results are based on far fewer samples than collected for either the SSSI Triangle or SSSI Area 2. As discussed previously, the CCI scores are based on the rarity value for a whole assemblage, whereas the ISIS analysis splits the data into categories according to more precise habitat affinity.

4.5.3 ISIS analysis

Whereas CCI analysis can be undertaken using a single sample (providing a sufficient number of species are present in the sample), a minimum of four samples are usually required for ISIS analysis. The data from the three samples can be seen as of value within the context of analysis of combined ditch and waterbody data from all sample sites, but interpretation of the three samples described here must be considered tentative.

In total, one RDB3 species, the Great Silver Water Beetle *Hydrophilus piceus,* and three Nationally Scarce species (the hydrochid beetle *Hydrochus angustatus*, the weevil *Pelenomus canaliculatus* and a soldierfly the Black Colonel *Odontomyia tigrina*) were recorded. The first three were recorded from the Scrape, the Black Colonel from the ditch only.

The BATs and SATs recorded were consistent with those recorded throughout the survey area. The 'W2 - Mineral marsh and open water' BAT was by far the most well-represented assemblage in terms of number of species. However, the rarities mentioned above were, without exception, affiliated to the 'W3 - permanent wet mire' assemblage; these species were also attributed as specialists of the 'W314 - reedfen and pools' SAT.

As W3 comprised of only 11 species in total, no rarity score was attributed to the assemblage. The rarity score for the W2 assemblage was fairly low, most of the uncommon species from the samples being attributed to W3. However, the 'W211 - Open water on disturbed sediments' SAT was close to the Favourable Condition threshold set within ISIS.

The SATs and BATs represented were consistent with those recorded throughout the survey. Any comparison of conservation value, other than in terms of the ASPT and CCI analysis, is not appropriate due to the small sample size. However, the presence of Greater Silver Water Beetle in the scrape sample can certainly be considered as significant, as this species was also recorded in one of the Fen Meadow samples. *H. piceus* generally occurs in low density and is thought to require large ditch/pond networks. The recording of the species in two of 32 samples suggests the site as a whole may support a strong population of this species.

Both *Hydrochus angustatus* and *Pelenomus canaliculatus* were recorded from only the Scrape during the survey. *H. angustatus* is known to occur in a range of different still water habitats with exposed mud or peat, and is also known from vegetated river margins. The weevil *P. canaliculatus* is also found in a range of habitats, including bogs, marshes and fens, and at the margins of ponds, lakes, turloughs and other waterbodies, a key requirement for this species being the presence of milfoils *Myriophyllum* spp. It is likely, therefore, that these species occur more widely within the survey area as a whole, there presence not being an indication of a particular affinity for ponds or scrapes.

The habitat within Leiston Ditch at this location was comparable to that recorded for the more open sites within the SSSI Triangle, Area 2 and Fen Meadow, both in terms of vegetation composition and structure. The ditch was of a similar width, depth and successional stage to many of the other sample sites, the main difference being the openness. Openness of habitat is one attribute which may also make the ditch more desirable as a breeding habitat for Norfolk Hawker *Aeshna isosceles;* however, this species also requires trees and scrub within close proximity to meadow land (The British Dragonfly Society, 2015).

The degree of brackish influence within the Scrape and SAC ditch, or within the study area as a whole, has not been considered here. Although a number of species with coastal affinities have been recorded, several of the aquatic species are said to avoid brackish waters despite being associated with coastal areas. However, one species which has occurred in samples, a local saldid bug which is more typically recorded from saltmarsh, was recorded from the scrape, although this particular species, *Saldula pilosella*, is also known from non-saltmarsh sites – such as freshwater marshes, especially in parts of the Norfolk Broads (Southwood and Leston, 1959).

4.6 Minsmere to Walberswick Heaths and Marshes SAC and SSSI (dune habitats)(Compartment 6)

The terrestrial samples collected from the Minsmere to Walberswick Heaths and Marshes SAC and SSSI (see T14 to T20 on Figure 8) are considered to be ecologically distinct from the habitat from which the aquatic samples discussed above were taken. Therefore, no attempt has been made to amalgamate or compare the ISIS results from these habitats collectively. It was, however, considered of value for the coastal dune, dune grassland and heathland habitats (see target notes 4-6 on Figure 4) to be considered as a unit, and a combined analysis was undertaken in addition to the habitat-specific analyses.

The habitat surveyed comprised primarily of the more inland component of the upper dune. The sand cliffs adjacent to the shingle upper shore received some direct searching, primarily as spider-hunting wasps (Pompilidae) and other solitary aculeate Hymenoptera were in evidence. However the sweep, vacuum and beating sampling focused mainly on the sandy heath, exposed sand and grassland habitat which abruptly gave way to a strip of broadleaved, (predominantly birch) scrub/woodland inland.

The wooded edge was scalloped, providing sheltered sunny bays supporting dry heath ericoids, such as Common Heather *Calluna vulgaris* and *Erica cinerea,* with Common Gorse *Ulex europaeus*. These areas fromed a mosaic with patches of bare sand and short, rabbit-grazed grassland comprising Red/Sheep’s Fescue *Festuca rubra/ovina,* Sweet Vernal Grass *Anthoxanthum odoratum*, Wavy Hair-grass *Deschampsia flexuosa*, and flowering composites such as Common Cat’s-ear *Hypocharis radicata* and Mouse-eared Hawkweed *Pilosella officinarum.* Areas of scrub, including Pedunculate Oak *Quercus robur*, Silver Birch *Betula pendula* and mature *Ulex europaeus,* formed aggregations within the upper dunes. In addition, lichens, mainly *Cladonia portentosa/ciliata* type, formed patches in places, and Sand Sedge *Carex arenaria,* and to a lesser extent Marram Grass *Ammophila arenaria,* persisted from the dunes inland to the heathland area. Rest Harrow *Ononis repens* also formed extensive patches in places.

The varied microtopography provided niches for thermophilic (heat-loving) invertebrates, while the litter layer beneath the scrub, and at the interface with the wooded strip, provided additional micro-habitats.

4.6.1 ISIS analysis - terrestrial data

The dataset mainly comprised species characteristic of grassland, scrub and early successional mosaic habitats. The best represented orders included bugs (Hemiptera), beetles (Coleoptera) and spiders (Aranae). In proportion to the number of known UK species, Orthoptera (grasshoppers and crickets) were particularly well represented, with 11 species. Species recorded included both generalist grassland and scrub invertebrates and specialists of dry coastal biotypes. Some of the less common species were examples of species found mostly in coastal dune and grassland habitats, such as the Marram Chelifer *Dactylochelifer latreille* (a species of pseudoscorpion confined in the UK to the coasts of eastern England), a beefly (Bombilidae), the Dune Villa moth *Villa modesta* and *Chorosoma schillingi* an elongate species of mirid bug.

Neither Marram Chelifer or Lesser Cockroach *Ectobius panzeri,* a species typical of arid habitats including dry heathland, are attributed to a either a BAT or SAT in ISIS. *E. panzer* is one of several species recorded in previous Amec reports as being Nationally Scarce which have since been downgraded due to an increase in recording. It was abundant throughout the drier coastal habitats surveyed, and also occurred sporadically within the drier parts of fenland areas, such as the SSSI Triangle.

Three species currently classed as Nationally Scarce were recorded in the SAC dune/heathland habitat. These included a jewel beetle *Aphanisticus pusillus*, a wolf spider *Hygrolosa rubrofasciata* and a broad-nosed weevil *Polydrusus formosus*. The latter two species were recorded from the woodland edge habitat and are affiliated to the 'A1 - Arboreal canopy' BAT, whilst the former is included within the 'F112 - Open short sward' SAT.

A. pusillus is a species typically found in dry habitats, including heathland and downland; however the beetle also has an affinity with rushes and sedges in wetland habitats, where the larvae is thought to develop in the stems. *Hygrolosa rubrofsciata*, a species of damp fens and woodlands, is described by Roberts (1995) as '*very uncommon and locally distributed*'. *Polydrusus formosus*, described in previous sections, was recorded in nearly all the sample sites supporting woodland.

Two NERC (2006) Section 41 'Species of Principal Importance', the butterflies Grayling *Hipparchia semele* and Small Heath *Coenonympha pamphilus*, were also recorded. The rather local Grayling is a species of dry sunny sheltered habitats such as heathland and calcareous grassland, whereas Small Heath is something of a generalist. Grayling was abundant throughout the upper dune heath and grassland habitats.

The majority of species recorded for the site were spilt between two main BATs, the 'F2 - Grassland and scrub mosaic' assemblage (with 52 species attributed) and the closely allied 'F1 - Unshaded early successional mosaic, assemblage (29 species). The only other assemblage sufficiently well represented to be credited with a rarity score was the 'A1 - Arboreal canopy' assemblage, with 17 recorded species. These classifications represent a reasonable reflection of sample effort.

Whilst none of the BATs exceeded the Favourable Condition threshold, the F2 and F1 assemblages both achieved reasonably high scores. The F2 assemblage lacked RDB species or current Nationally Scarce species but supported a good range of species typically found in coastal dry grassland habitats and similar habitats inland.

Two ‘local’ orb-web spiders *Agalenatea redii* and *Neoscona adianta* were included within the F2 assemblage. Both species are described in Roberts (1995) as being found on heather, gorse and other low vegetation. Two locally distributed tephritid flies of dry grasslands, *Tephritis leontodonis* and *T. vespertina,* were also attributed to F2. The larvae of these species develop in galls within yellow composites. *T. leontodonis* is associated with Hawksbits *Leontodon* spp. whilst *T. vespertina* is mainly associated with Common Cat’s-ear *Hypocharis radicata.*

Beetles attributed to F2 included an apionid weevil *Apion rubens;* this is a local species in the UK, and has similar habitat preferences to the rarer *A. rubiginosum* recorded previously on site. Both species are associated with Sheep’s Sorrel *Rumex acetosella*, which was abundant within the dry grasslands of both the SAC and the Coastal Strip. One of several species of bush-cricket recorded within the SAC, and attributed to the F2 assemblage, was the Great Green Bush-cricket *Tettigonia viridissima*, mainly a coastal species in the UK.

Whilst none of the SATs recorded exceeded their respective Favourable Condition thresholds, the ‘F112 - open short sward’ assemblage was reasonably well represented, with 10 species being attributed. Species of note included within the F112 assemblage included the Nationally Scarce jewel beetle *Aphanisticus pusillus* and the Stripe-winged Grasshopper *Stenobothrus lineatus*. Stripe-winged Grasshopper has a strong affinity with dry, calcareous grassland, but is also sometimes found in acid grassland and heathland sites.

Local species attributed to both the ‘F1 - Unshaded early successional mosaic’ assemblage and the ‘F111 - Bare sand and chalk’ SAT included: *Chorosoma schillingi* and *Villa modesta*, both coastal specialists (mentioned above); *Notoxus monocerus,* an anthicid beetle typically found in dry heathland and coastal habitat, and characterised by a pronounced thoracic horn; and Fan-bristled Robberfly *Dysimachus trigonus,* a species mainly found in coastal dunes and dry heathland. This insect predates large flies of the genera *Thereva, Pollenia* and *Philonichus* (Stubbs and Drake, 2001).

Whilst the sampling of the SAC habitat covered all main habitat layers and nuances of the upper dune and scrub habitat, few rarities wee recorded. However, a number of local species representative of the habitats and sub-habitats were recorded, and relatively few generalists were included within the dataset. Sampling can also be regarded as a snapshot, and certain important groups will have been missed due to this. Aculeate Hymenoptera were particularly poorly represented; this group, which includes many sand-nesting species typically found in dry heathland paths, dunes etc, was almost absent from the samples.

4.7 Coastal Strip (CWS) (Compartment 5)

The Coastal Strip grassland habitat (see Compartment 5, Figure 1) is not subject to a formal, statutory designation, but is listed as a non-statutory County Wildlife Site (Suffolk Shingle Beaches CWS). The main area surveyed included a broad strip of dry grassland and short herb vegetation over a substrate of sand with occassional shingle exposures (see target notes 1 and 2 on Figure 5). Patches of exposed sand were frequent between the vegetated areas, and some small patches of scrub, mainly Common Gorse *Ulex europaeus,* were present. The area was generally flat and sheltered to the seaward side by a narrow section of dune, and supported a range of herbs and grasses typical of arid and coastal conditions. Although timed sweep and vacuum sampling were conducted exclusively within the grassland area, some direct searching was also undertaken in the adjacent dune.

The minimum of four samples were taken per substrate (see Figure 9), with four vacuum samples and four sweep samples being taken. Direct searching was undertaken during the initial June visit, and timed sweep and vacuum sampling in July.

4.7.1 ISIS analysis

Beetles (Coleoptera) and bugs (Hemiptera) were the most abundant groups in the samples, with two-winged flies (Diptera), butterflies and moths (Lepidoptera), and bees, ants and wasps (aculeate Hymenoptera) also recorded in some numbers. Of the smaller groups, grasshoppers and crickets were well represented in proportion to the total UK fauna, again with 11 species being attributed to this order.

As with the SAC coastal habitats, the two best represented BATs were the 'F2 - Grassland and scrub matrix' BAT (with 64 attributed species) and the 'F1 - Unshaded early successional mosaic' BAT (with 52 species). Although the F2 assemblage comprised the greatest number of species, none of the SATs represented within the output were nested within F2, and the rarity score fell short of the favourable condition threshold.

Two Nationally Scarce species were, nonetheless, attributed to the F2 broad assemblage, these being *Dicraeus raptus,* a chloropid fly mainly associated with woodland rides on calcareous soils (the larvae develop in the seeds of Hairy Brome *Bromus ramosus*), and an apionid weevil *Protapion difforme*. Hyman and Parsons (1992) describe the habitat preferences of *P. difforme* as being '*damp grassland, wetland, disturbed ground, hedgebanks and along ditches*'. Its foodplant is uncertain, but it has been associated with knotgrass *Polgonum* spp. and clovers *Trifolium* spp.

In contrast, whilst the F1 BAT was represented by fewer species than F2, the assemblage achieved a rarity score well above the Favourable Condition threshold set in ISIS. Arguably, the rarest recorded species from the survey was attributed to the F1 BAT. The spider–hunting wasp *Evagetes pectinipes* is classed as RDB1 'Endangered' and is otherwise only known on mainland UK from the Deal and Sandwich sand dunes in Kent. The female specimen was identified using Day (1988) and was subsequently sent to A. Jukes for a second opinion. Whilst males are difficult to distinguish from other *Evagetes* species, females are characterised by four elongate tarsal comb segments, which are much longer than the second tarsal segment.

Unlike the majority of specimens, *E.pectinipes* was recorded from the cliffed interface between the seaward edge of the dune system and the shingle upper shore (target note 3 on Figure 5). Another species of spider-hunting wasp, *Episyron rufipes,* was also recorded at this location. *E.pectinipes* is thought to be a cleptoparasite of this species. The presence of this species must be seen as significant, and may represent a range expansion. Other formerly very rare and restricted aculeates, such as the Beewolf *Philanthus triangulus* (recorded during the Amec surveys) are well known to have undergone significant range increases in recent decades.

In addition to *E. rufipes,* five species currently classed as Nationally Scarce were attributed to the F1 assemblage. These included the Grey Bush-cricket *Platycleis albopunctata*, the Heath Shieldbug *Legnotus picipes*, a jewel beetle *Aphanisticus pusillus* (discussed in SAC section above), a darkling beetle *Crypticus quisquilius,* and an apionid weevil *Protapion dissimile*.

Grey Bush-cricket is restricted almost exclusively to coastal habitats in the southern UK, where it is often associated with patches of Restharrow *Ononis repens.* It was very abundant in some areas of the Coastal Strip.

The Heath Shieldbug is a specialist of dry sandy habitats, such as coastal dunes and dry heathland (such as the Brecks), where it is associated with bedstraws *Galium* spp. The abundance of Lady's Bedstraw *Galium verum* within the Coastal Strip grassland was therefore probably important for this species.

Crypticus quisquilius was recorded in slightly atypical fenland habitat during the Amec surveys; however, it is mostly associated with 'sandy areas on the coast' Brendell (1975). *Protapion dissimile* is known to occur in dry, sandy places, where its only known hostplant is Hare's-foot

Clover *Trifolium arvense* (Morris, 1990). *T. arvense* is itself a local species, confined to sandy grassland sites including coastal habitats; this plant was very abundant within the Coastal Strip grassland.

Whilst *Evagetes pectinipes, Platycleis albopunctata, Legnotus picipes* and *Protapion dissimile,* as well as several other relatively uncommon sandy grassland and dune specialists (including a coreid bug *Alydus calcaratus,* a broad-nosed weevil *Trachyphloeus angustisetulus* and the NERC S41 listed Grayling) were all attributed to the 'F111 - Bare sand and chalk' SAT, the assemblage was insufficiently well represented to achieve Favourable Condition status. However, the 'F112 - open short sward' SAT did exceed the Favourable Condition threshold of 12 species, with 16 species attributed to this assemblage.

Species attributed to F112 did not include as many rarities as were attributed to F111; however, besides the one Nationally Scarce species attributed to this SAT, the jewel beetle *Aphanisticus pusillus* and a range of local species representative of coastal grassland were recorded. Examples included: the mirid bugs *Dicyphus annulatus, Othocephalus saltator* and *Polymeris unifasciatus;* a berytid bug *Gampsocoris punctipes;* and a darkling beetle *Cteniopus sulphureus.* The NERC S41-listed Small Heath was also attributed to F111.

It is worth noting that a number of the dry grassland associates recorded have a documented association with Restharrow *Ononis repens* in sandy conditions.

Besides the species discussed above in association with ISIS assemblages, several uncommon species were recorded that are not attributed to any BAT or SAT, but have a strong association with arid coastal habitats. These included: the Marram Chelifer *Dactylochelifer latreillei* (the pseudoscorpion also recorded within the SAC); Lesser Cockroach *Ectobius panzeri* (also recorded from the SAC and SSSI); Adonis Ladybird *Hippodamia variegate;* and a Nationally Scarce weevil *Orthochaetes setiger*.

According to Hyman and Parsons (1992), *O. setiger* is associated with sand dunes, sand quarries, calcareous grassland and coastal shingle arid grasslands. Another species recorded was the Cinnabar Moth *Tyria jacobaeae.* This species is typical of early successional habitats, where the larvae feed on various ragworts *Senecio* spp.. Whilst it is common and widespread in the UK, it is included as a NERC S41 'Species of Prncipal Importance' for research only.

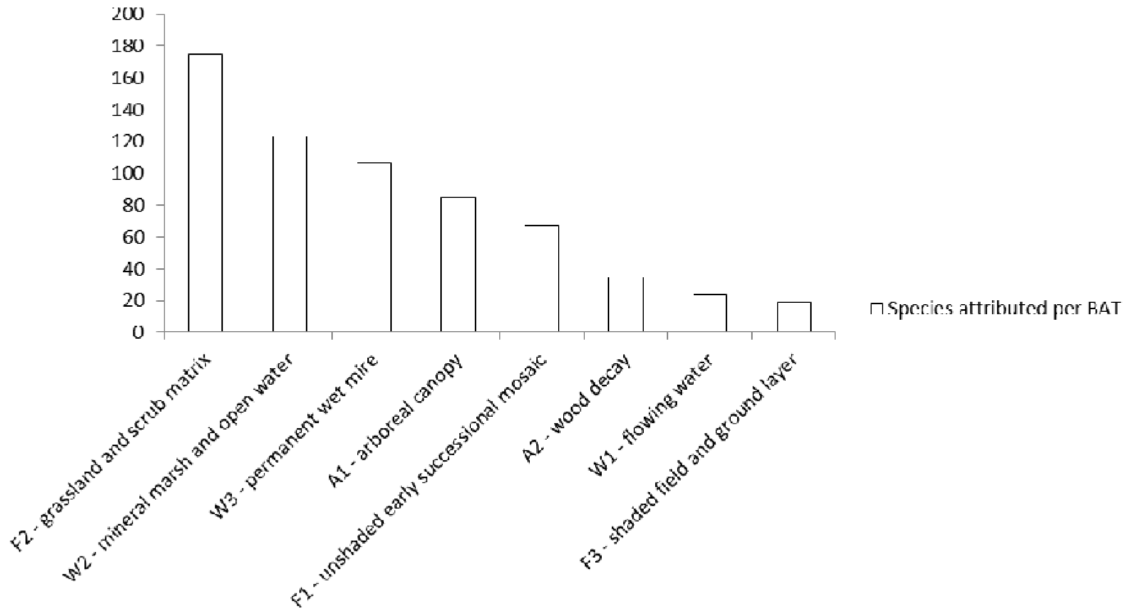
For a site receiving no statutory protection, the Coastal Strip grassland and associated dune habitat was found to support an outstanding invertebrate fauna. The sampling was undertaken during ideal weather; however, whilst a preliminary visit was undertaken in June, when some direct searching was undertaken, the sampling itself was confined to a single sampling event in July. The Favourable Condition status achieved for the F1 BAT and F112 SAT indicates that the invertebrate assemblages recorded are of National Importance, and are of a quality sufficient for them to be considered as a primary feature for SSSI designation. The presence of an RDB1 species adds additonal weight to this argument.

The grassland was itself restoration habitat, created following earlier phases of the Sizewell development, and several of the species recorded are by their nature colonisers of habitats in the early stages of succession. Sandy, free-draining conditions, with structural diversity provided by the various herbs and grasses, as well as occasional aggregations of shingle within the grassland, provide important habitat. This is because they are both botanically diverse and the thermal properties of the sand elevate ground temperatures, enabling some species at the northern edge of their geographical range to persist.

5 Discussion of ISIS assemblages recorded

5.1 BATs – all sample sites combined

A breakdown of the number of species attributed to each Broad Assemblage Type (BAT) identified in the 2014 study, based on the combined aquatic and terrestrial invertebrate survey data, is presented in Text figure 1.



Graph 1 - species representation of all BATs represented by 16 or more species from total 2014 invertebrate sample data

It can be seen that the greatest number of species were recorded from the 'F2 - grassland and scrub matrix', this assemblage being represented within the terrestrial datasets for all sample sites. In total, 175 species were recorded for the F2 BAT, with two wetland-related BATs also being well-represented: the 'W2 - mineral marsh and open water' BAT (123 species) and the 'W3 - permanent wet mire' BAT (107 species) respectively.

Whilst the F2 assemblage was well represented, the population attributed to this BAT was made up of a high proportion of widespread generalist grassland and scrub species, and relatively few rarities were attributed. According to Lott *et al.*, (2007), F2 '*can form mixed assemblages with a wide range of other types, including 'Shaded field and ground layer' and 'Permanent wet mire' assemblages. It can also co-exist with 'Unshaded early successional mosaic' assemblages in a habitat mosaic, but when grazing and other factors sustaining early successional vegetation disappear, this assemblage becomes dominant, at the expense of the early successional invertebrate assemblages*'.

In terms of rarity value, the two highest-scoring assemblages from the dataset as a whole were the 'W3 - permanent wet mire' BAT and the 'F1 - unshaded early successional mosaic' assemblage. The W3 assemblage was well represented alongside the 'W2 - mineral marsh and open water' and 'F2 - grassland and scrub matrix' BATs recorded throughout the SSSI and SAC wetland datasets, whilst F1 was important alongside F2 in the more arid sandy grassland and upper dune habitats of the Coastal Strip and SAC.

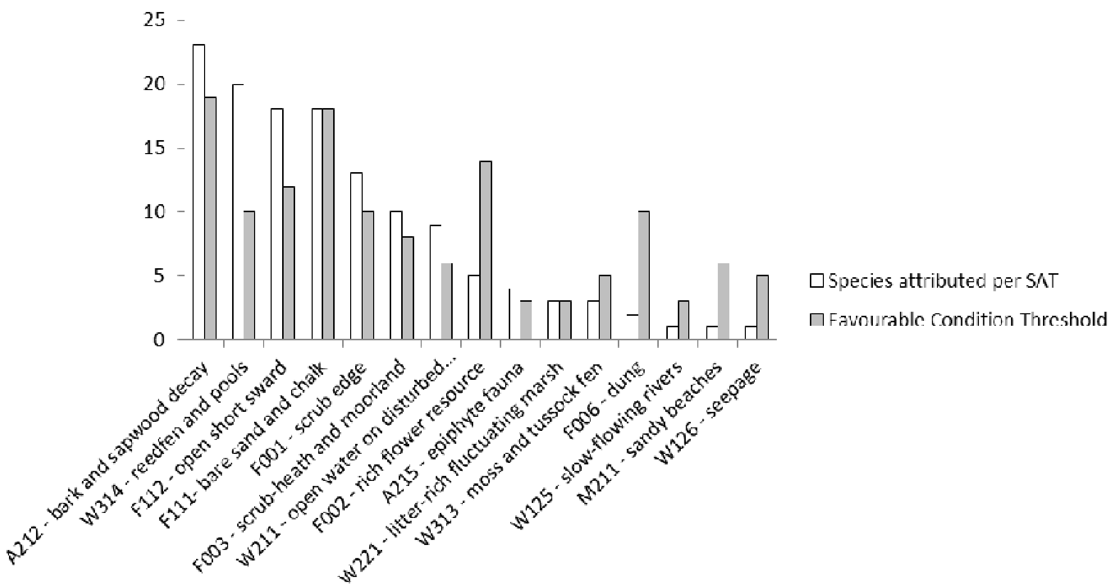
Of the remaining BATs, the 'A1 - Arboreal canopy' community also contributed meaningfully to the overall fauna (it was represented by 85 species), and whilst the 'A2 - wood decay' BAT was distributed relatively diffusely through the dataset, the nested SATs for this assemblage can be seen as significant on a whole-site scale.

5.2 SATs – all sample sites combined

Unlike BATs, SATs comprise of species with more exacting habitat requirements, and are therefore usually composed of a higher proportion of uncommon species than the parent BATs.

Thresholds for Favourable Condition vary considerably between SATs. Thus, for example, for the ‘A215 - epiphyte fauna’ SAT to achieve Favourable Condition it only needs to be represented by four species, whilst the Favourable Condition threshold for the ‘A212 - bark and sapwood decay’ SAT is 19 (i.e. 20 or more species need to be attributed to this group for Favourable Condition status to be achieved).

Graph 2, below, shows the SATs identified from all terrestrial and aquatic data collected in 2014. The white bars represent the total number of species attributed to each SAT, whilst the grey bars indicate the Favourable Condition thresholds set for each assemblage in ISIS.



Graph 2 - species representation between all SATs represented within the total 2014 invertebrate sample data

Favourable Condition status is used here for comparision purposes only, as the use of these thresholds on a large dataset collected from numerous samples may be considered inappropriate. However, the better-represented SATs, and those exceeding the thresholds set, provide a useful basis for assessing which SATs can be considered significant on a whole site level.

From the datasets recorded, the largest number of species attributed to an individual SAT was for the ‘A212 - bark and sapwood’ assemblage. A total of 23 species were attributed to this SAT from all recorded 2014 data. The A212 assemblage is characterised largely by beetles found in and around trees and shrubs, especially older specimens. The assemblage is primarily associated with death and decay of the outer woody tissues of trees and shrubs (i.e. the sapwood and bark), with some of the species associated with fluxes of sap (sap-runs). (Lott *et al.*, 2007a). The A212 assemblage was represented both within the wet woodland habitat of the SSSI Triangle, SSSI Area 2 and the C-Platform Woodland compartments, but also the wooded edge habitat within the SAC. On a site-by-site level, the assemblage was generally of lower importance, falling well below the Favourable Condition threshold. However, the threshold was exceeded when the SSSI and C-Platform terrestrial datasets were combined.

Another assemblage nested within the A2 BAT was the 'A215 - epiphyte fauna' SAT. This community was represented within each of the terrestrial datasets for the SSSI Triangle, SSSI Area 2 and C-Platform Woodland samples, falling just short of, or equalling, the Favourable Condition threshold set for the assemblage. Again, though, in the combined SSSI terrestrial samples the assemblage achieved a score above this threshold. The threshold for the Epiphyte fauna assemblage is low, with only a score of greater than three species needed.

According to Lott *et al.* (2007a), the A215 assemblage '*is found on the surface of trunks and branches of trees and shrubs. It includes grazers of epiphytes such as algae, lichens and mosses, as well as their predators and parasites. Some epiphyte feeders are also found on epiphytes growing on rocks and boulders.*' Species affiliated to this SAT include mainly bugs and moths (Lott et al., 2007a), and species recorded on site included lichen-feeding footman moths recorded from the moth traps, such as the Rosy Footman *Miltochrista miniata*.

The effects of nutrient enrichment by aerial pollution may therefore potentially have an impact on this assemblage.

5.2.1 Wetland assemblages

The 'W314 - reedfen and pools' SAT was represented by the second largest number of species within the overall dataset, and this assemblage was also one of the more strongly represented SATs throughout the wetland sample site datasets. W314 is '*characterised by a number of invertebrate groups, but especially two-winged flies and also beetles*' (Lott *et al*., 2007a), and is mainly restricted to topogenous mires and fens. Many sites are in floodplains or at lake margins subject to water level fluctuations (though the substratum rarely dries out completely). The best examples of this assemblage type are found in the wetter areas of fen meadow and at the margins of ponds and ditches.

Another wetland SAT represented within the overall dataset was the 'W211 - open water on disturbed mineral sediments' SAT. This assemblage is found in open water bodies on mineral sediments, especially those containing clay. It is characteristic of silt ponds, but can also be found in larger water bodies such as lakes and canals, often in coastal areas or associated with floodplains (Lott et al., 2007a). Unlike, the W314 SAT, W211 was exclusively represented within the aquatic data collected in 2014, and despite sometimes being poorly represented, it was the only SAT featured within all the aquatic sample site datasets. This assemblage was also the only SAT to exceed the threshold for Favourable Condition within the aquatic dataset for all ditch samples combined.

Four additional wetland SATs recorded within the dataset were: 'W221 - litter-rich fluctuating marsh', 'W313 - moss and tussock fen', 'W125 - slow-flowing rivers' and 'W126 – seepages'. These assemblages were represented by few species overall. However, the national species pools for each of these assemblages are generally small, and the thresholds for Favourable Condition are set lower than for more well-represented SATs, such as W314. More specialist assemblages may also have been under-recorded; April-May is the recommended time for sampling for the W221 SAT (Drake *et al.,* 2007), whilst spring and summer are recormmended for the W126 and W313 communities.

5.2.2 Coastal grassland and dune assemblages

The 'F111 - bare sand and chalk' and 'F112 - open short sward' SATs were more or less confined to the arid coastal habitats of the Coastal Strip and SAC. These assemblages were well represented within the dataset as a whole, with 18 species attributed to each of these SATs.

F111 is described by Lott *et al.* (2007a) as being '*most frequently found in lowland areas on freely draining soils where repeated disturbance removes vegetation to create areas of bare and sparsely vegetated ground. Good examples of the assemblage type can be found in sand dunes, grazed heathland, chalk pits and sand pits*.' Similarly, F112 '*is found most frequently in lowland habitats where grazing or cutting of vegetation over calcareous soils limits the development of taller vegetation. Soils are also generally nutrient poor, which limits the dominance of grasses and thereby encourages widespread development of broad-leaved herbs. Exposure may also be a key factor in limiting taller growth on coastal sites*.'

F112 achieved Favourable Condition status using both the Coastal Strip-only and the combined site data. However, a greater number of uncommon species contributed to the F111 SAT. Given that far fewer samples were collected within the Coastal Strip and SAC grasslands than in the wetter SSSI and associated sites, this result emphasizes the importance of these dune habitats for invertebrates.

5.2.3 Resource-based SATs

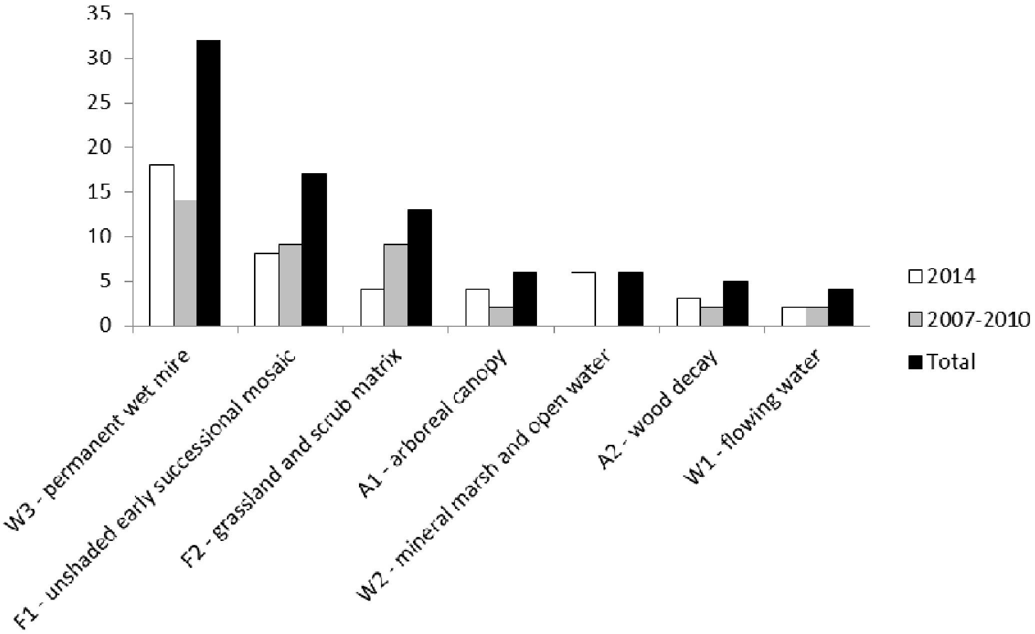
The four 'resource-based SATs' identified within the ISIS output (i.e. those representing habitats of particular value for foraging) were: 'F001 - scrub edge', 'F003 - scrub-heath and moorland', 'F002 - rich flower resource' and 'F006 – dung'. The latter two of these, however, were only poorly represented. F002 is characterised largely by bees due to their foraging association with areas supporting a high diversity of flowering plants.

One of the anomalies within the 2014 dataset was the shortage of aculeates, with both bees and wasps being particularly poorly represented within the samples. The coastal habitat in particular was floristically rich, and also supported plenty of bare earth suitable for ground-nesting representatives of mining-bee genera, such as *Andrena*, *Lasioglossum*, *Halictus* and *Colletes*. Whilst a number of species of such genera, and other related taxa, are spring and late-summer flying or both, many species occur throughout the summer months, so the poor representation of these groups in the samples was surprising.

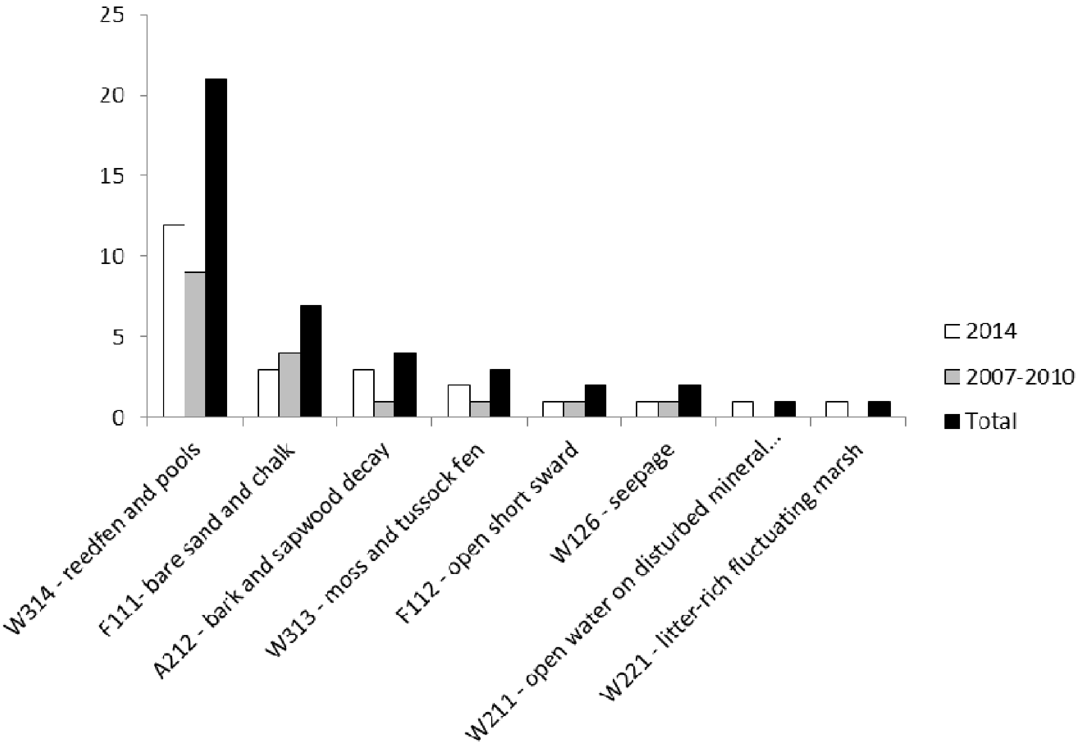
Unsurprisingly, the F001 assemblage was represented within habitats where there were sharp transitions between open habitats and scrub. In the SSSI Triangle and Area 2, this was between reedswamp and carr edge habitat, whilst within the SAC it was at the interface between the grassy heath and scrub woodland habitats. According to Lott *et al*. (2007a), F001 '*is found where scrub or woodland grades into or is interspersed with open areas of grassland, heathland or early successional vegetation types. The juxtaposition of open vegetation with woody development is important to insects with complex life cycles that require different microhabitats at different stages of development.*' The 'F003 - scrub heath and moorland' assemblage was mainly found in the SAC where suitable structural resources were represented. This SAT is found on '*nutrient-poor, acid soils where herbaceous or dwarf shrub vegetation is dominant, although trees and taller shrubs can be an important component of the overall habitat. Semi-natural systems supporting important examples of this assemblage type include mature areas of lowland heath, moorland and montane biotopes. It occurs on both damp and dry soils, but not when they are heavily fertilised*.' (Lott *et al*. 2007a).

5.3 Associations between BATs, SATs and rare species

In order to gain a more complete understanding of the presence of rarities within BATs and SATs at Sizewell, RDB and Nationally Scarce species recorded both during the 2014 Hyder surveys and the 2007-2010 Amec surveys were categorised according to their respective BAT and SAT affinities. The total numbers of RDB and Nationally Scarce species attributed to each are presented in Appendix 2, Table 42, whilst the charts below illustrate the prevalence of these rarities within the different BATs (Graph 3) and SATs (Graph 4). For each BAT and SAT, the white bars represent the number of rarities recorded in 2014, the grey bars the rarities recorded from the Amec surveys (minus those also recorded in 2014 to avoid duplication of records) and the black bars show the total number of rarities (white and grey bars combined).



Graph 3 - Representation of RDB and Nationally Scarce species within BATs recorded within the total 2014 dataset and additional species recorded during Amec (2007-2010) surveys



Graph 4 - Representation of RDB and Nationally Scarce species within SATs recorded within the total 2014 dataset and additional species recorded during AMEC (2007-2010) surveys.

Whilst these figures do not take account of sampling effort, nor how site-specific the records were, the results reveal a strong pattern in the distribution of rarities between the various BATs and SATs.

5.3.1 Wetland assemblages

If the RDB and Nationally Scarce species recorded for the survey as a whole are considered in relation to the greatest number each BAT supports, it can be seen that the clear majority of rare wetland species recorded both during 2014 surveys and in the Amec 2007-2010 studies fall into a single BAT, the 'W3 - Permanent wet mire' assemblage (Graph 3). When these datasets are combined (black bar), the distinction is further exaggerated.

From the 2014-only data, a total of 18 rare species are classified in this Permanent Wet Mire assemblage, comprising: one RDB2 species, the Ornate Brigadier *Odontomyia ornata*; four species classed as RDB3, the White Mantled Wainscot *Archanara neurica*, the Levels Yellow-horned Horsefly *Hybomitra ciureai*, Great Silver Water Beetle *Hydrophilus piceus* and a reed-nesting solitary wasp *Passaloecus clypealis*; and 13 Nationally Scarce species. To this total, a further 14 species can be added from the Amec surveys (one RDB1 species, the Norfolk Hawker *Aeshna isosceles*; seven RDB2 species; and four Nationally Scarce species), giving an overall total of 32 rare and scarce species for the W3 assemblage.

An even more pronounced affiliation is shown for the 'W314 - Reedfen and pools' SAT, which is nested within the W3 assemblage. Twelve rarities are attributed to this one SAT from the 2014 dataset and nine from the Amec dataset, giving a total of 21 rare and uncommon species attributed to one Specific Assemblage Type.

The 12 species attributed to the W314 assemblage from the 2014-only data comprised: one RDB2 species *Odontomyia ornata*; four RDB3 species (as listed for W3 above) and seven Nationally Scarce species (the moths Flame Wainscot *Mythimna flammea* and Black Colonel *Odontomyia tigrina*, a spear-winged fly *Lonchoptera scutellata*, a snail-killing fly *Pherbellia brunnipes*, two ground beetles *Agonum nigrum* and *Oodes helopioides* and an aquatic weevil *Pelenomus canaliculatus*). From the Amec dataset, RDB1 Norfolk Hawker (listed above for the parent BAT), as well as six RDB2 and two Nationally Scarce species were recorded.

The overall total for the W3 BAT (if the two datasets are combined) would comprise one UK protected/RDB1 species (Norfolk hawker), eight RDB2, four RDB3 and 17 Nationally Scarce species, whilst the W314 SAT included one UK protected/RDB1 species, seven RDB2, four RDB3 and nine Nationally Scarce species.

It can therefore be concluded that both W314 and its parent BAT W3 are of very high nature conservation value, easily surpassing the Favourable Condition threshold both on site-specific and combined-site levels. The habitats supporting the W3 communities are distributed primarily within the reedswamp, ditch network and associated habitats within SSSI Area 2 and SSSI Triangle and also the SSSI Fen Meadow, SSSI scrape and SAC ditch.

The other SAT nested within W3, the 'W313 - moss and tussock fen' assemblage, was less well represented, both in terms of rarities and the total number of species recorded. However, the total national species pool for W313 is much smaller than for W314. W313 habitat tends to occur in the middle of fen compartments where water quality is higher due to the buffering effect of the surrounding fen vegetation.

Elements of habitat consistent with the description for W313 were found at the edges of the lagoon within the SSSI Triangle and in more open areas between carr and fen in the midst of reedswamp habitat in SSSI Area 2. However, as the W313 comprises mainly water beetles, and aquatic sampling was largely confined to the ditch networks, it is likely that W313 was under sampled. The two Nationally Scarce species recorded during the survey included a diving beetle

Hydaticus seminiger and a rove beetle *Stenus palustris*. The latter of these was recorded twice where over-mature Grey Willow had formed raised, mossy platforms surrounded by reedbed.

In contrast to the number of rarities attributed to W3, the two closely allied BATs W2 and W1 were relatively poorly represented in the samples. In terms of overall species (total dataset including both common and uncommon species), the 'W2 - mineral marsh and open water' assemblage was the most species-rich wetland BAT; however, far fewer rarities were ascribed to this BAT than to the less species-rich W3 assemblage, and none of the rarities recorded within the Amec surveys have been attributed to W2.

In total, five Nationally Scarce species are attributed to W2 from the 2014 dataset: two rove beetles, *Oxytelus fulvipes* (a species of undisturbed marsh with fluctuating water levels, such as carr and shaded ditches) and *Stenus pusillus* (a species of marshes, ditches and pond margins) (Lott and Anderson, 2011); *Notaris scirpi*, a weevil associated with *Carex* and *Typha* spp. in marshes and wetlands (Morris, 2002); *Peltodytes caesus*, a crawling water beetle '*confined to lowland rich fen pools and ditches*' (Foster, 2011); and the Long-headed fly *Dolichopus notatus,* which is mostly known from dune slacks and coastal marshes (Falk and Crossley, 2005).

Of these, *Peltodytes caesus* was the only Nationally Scarce species attibuted to the 'W211 - open water on disturbed mineral sediments' SAT, and *Oxytelus fulvipes* the only uncommon species representing the 'W221 - litter-rich fluctuating marsh' SAT. W211 was reasonably well represented within the overall species dataset, but it can be concluded that both W211 and W221, and their parent BAT W2, support assemblages of an overall lower conservation value than W3 and W314.

The only remaining wetland assemblage, 'W1 - Flowing water', was very poorly represented in terms of the overall sample data. One Nationally Scarce species, the Banded General *Stratiomys potamida*, was attributed to this BAT, belongng to the 'W126 – seepage' assemblage. Seepage habitat is characteristic of the saturated silt at the edges of waterbodies, and is prevalent at the interface of carr woodland and reedswamp within the SSSI.

5.3.2 Grassland assemblages

The two closely-allied BATs, 'F1 - unshaded early successional mosaic' and 'F2 - grassland and scrub matrix' were, in terms of the number of rarities recorded, the second and third best-represented assemblages recorded from the rarity-only datasets. The F2 assemblage was well represented within the terrestrial sample data for all sample sites, including both wetland and more arid survey areas, and was also the most species-rich assemblage of all recorded during the survey. However, the F1 assemblage is more specialised, being generally restricted to more arid conditions. Within the survey data, F1 was largely restricted to the sandy grassland, heath and dune habitats of the SAC and Coastal Strip.

From the 175 species recorded in total for the F2 assemblage during 2014, only three rarities were recorded. In contrast, for the A1 assemblage, eight rarities from 67 species were recorded. However, nine rarities in total were recorded for both F1 and F2 assemblage during the Amec 2007-2009 surveys. The total number of rarities recorded from both the Hyder and Amec surveys combined for F1 was 17, and for F2 it was 13.

The two nested SATs relating to F1, 'F111 - bare sand and chalk' and 'F112 - open short sward', collectively contributed the majority of rarities recorded within the sandy grassland, heath and dune habitats of the Coastal Strip and SAC survey areas. Within the 2014 survey, the sandy grassland and associated bare ground habitat was found to support a high proportion of habitat specialists, including a number of uncommon species. The RDB1 spider-hunting wasp *Evagetes pectinipes*, attributed to F111, was arguably the most significant find of the entire 2014 survey.

A number of the uncommon species ascribed to the F111 assemblage have specialised habitat requirements. The only recorded foodplant of the weevil *Protapion dissimile*, recorded within the coastal strip grassland, is Hare's-foot Clover *Trifolium arvense*, the species only being recorded from dry, sparsely-vegetated sandy habitats. The Heath Shieldbug *Legnotus picipes* is also a specialist of dry, sandy and sparsely-vegetated habitats, but is associated with bedstraws *Galium* spp. Other uncommon and local species recorded during both the 2014 and Amec surveys were strongly associated with Sheep'sorrel *Rumex acetosella* and Restharrow *Ononis repens*, emphasising the importance of specific herbs within the habitat besides microclimate and structure.

Species ascribed to the F111 assemblage recorded during the Amec surveys included *Clubiona frisia*, an RDB3 spider which is strongly associated with Marram Grass tussocks on coastal dunes. The Marram Chelifer *Dactylochelifer latreillie*, whilst not ascribed to a particular BAT or SAT in ISIS, is associated with similar dune habitat. The Section 41-listed butterflies Grayling *Hippachia semele* and Small Heath *Coenonympha pamphilus* are both attributed to F111, and were well recorded within both the SAC and Coastal Strip.

Fewer rarities were recorded for the 'F112 - open short sward' assemblage than for the F111 assemblage; however, these two assemblages are closely allied in nature, and examples of both specific assemblage types were recorded from the same samples collected within the SAC and Coastal Strip.

The occurrence of the F112 assemblage within a coastal system is the less usual situation for this assemblage. Lott *et al.* (2007a) state that chalk downland and limestone grasslands are the predominant semi-natural systems supporting this assemblage type, although '*elements may also occur on short acid turf, sea cliffs and sand dune systems where shelly wind-blown sand produces similar conditions*.' Examples of significant species ascribed to F112 included the jewel beetle *Aphanisticus pusillus* and a malachite beetle *Clanoptilus marginellus,* recorded during the Amec surveys. *C. marginellus* is a primarily coastal species in the UK, generally associated with coastal and riverside shingle and coastal grasslands.

Specific assemblages nested in the 'F2 - grassland and scrub matrix' BAT were very poorly represented in comparison to those attributed to F1. The majority of species recorded in the surveys are regarded in ISIS as being too generalist to be attributed to particular SATs. Uncommon species, such as the Nationally Scarce soldier beetle *Crudosilis ruficollis* showed no real affinity to grassland and scrub within the survey, the beetle being very well represented throughout the reed beds in the SSSI Triangle and Area 2, but not found in any other habitats.

5.3.3 Woodland and carr assemblages

Collectively, six uncommon species were attributed to the 'A1 - arboreal canopy' and 'A2 - wood decay' woodland-related assemblages during the 2014 survey, with five additional species being recorded during the Amec 2007-2010 surveys (not including 'research only' NERC S41 species).

Six uncommon species in total were attributed to the A1 assemblage: two Nationally Scarce weevils *Curculio betulae* and *Polydrusus formosus*, and the White Admiral *Limenitis camilla* (listed here due to its post-2001 IUCN 'Vulnerable' status) were recorded in 2014, whilst three Nationally Scarce species (the social wasp *Dolichovespula media*, a crabroid wasp *Nysson dimidiatus* and a ladybird beetle *Scymnus limbatus*) were recorded during the Amec surveys.

Three of the five Nationally Scarce species attributed to the A2 BAT (combined 2014 and Amec records) were ascribed to the 'A212 - bark and sapwood decay' assemblage. A false darkling beetle *Conopalpus testaceus* and a cranefly *Gnophomyia viridipennis* were recorded within the 2014 survey, whilst the crabronid wasp *Crossocerus binotatus* was recorded during the Amec studies. By comparing the BATs and SATs with associated rarities it can be concluded that whilst A212 was the most strongly-populated of all the SATs recorded during 2014 in terms of species number (uncommon, local and common species combined), only a moderate number of uncommon species was attributed to this group, even when combined with Amec rarity data.

Of the species attributed to the ‘A211 - heartwood decay’ SAT, only one Nationally Scarce species, *Anaspis thoracica*, was recorded, and few species were attributed to this assemblage overall. The majority of specimens were obtained through beating and sweeping. Some more extensive wood decay habitat was inaccessible, due to health & safety constraints, as areas with deep silt deposits in carr habitat could not be traversed safely.

The ‘A215 - epiphyte fauna’ SAT was recorded as having assemblages of Favourable Condition at both site-specific and combined-site levels. However, no rarities were attributed to this assemblage, which comprised of mainly local and fairly common species despite being habitat specialists.

The A1 BAT has no nested SATs associated with it; instead, the assemblage comprises any species not included within the A2 assemblages or some of the other assemblages relating to woody species, such as ‘F001 - scrub edge’.

Certain species groups of conservation value which are not currently included within ISIS analysis, may nevertheless have a known habitat assemblage. The Micro-lepidoptera are one such group, and one Nationally Scarce species, the Alder Signal moth *Stathmopoda pedella*, was recorded from the SSSI Triangle. The larvae of this moth feed only on the fruits of Alders, including both *Alnus glutinosa* but also the introduced Grey Alder *Alnus incana,* and are strongly associated with Alder carr and wet woodland. Alder Signal should therefore be considered for the purpose of the evaluation as an additional species within the recorded wet woodland fauna, even though it is not listed in ISIS.

Wet woodland, and associated habitats, collectively comprised a large proportion of the survey area as a whole, and a reasonable number of uncommon and local species with a fidelity to wooded habitat and associated wood decay habitats were recorded in the samples. In addition, the structure provided by woodland habitat is important to a number of species associated mainly with other habitats. Norfolk Hawker, for example, is considered to require wooded areas alongside the more open breeding sites (British Dragonfly Society, 2015), and many other species with aquatic larvae require woody vegetation as loafing/hunting sites as adults.

6 Evaluation of 2014 survey sites

The conservation value of the invertebrate habitats and species assemblages recorded within the 2014 survey areas is set out in the following sections. The evaluation of each site is based, as appropriate, upon a combination of the rare species present, the results of the water quality and CCI analysis, and the outputs of the ISIS invertebrate assemblage modelling (in particular the Favourable Condition assessment).

Figures 10 to 13 provide summaries of the key invertebrate habitats present at each sampling location/compartment.

6.1 SSSI Triangle (Compartment 1)

6.1.1 Species of conservation importance

- No UK Protected Species;
- 10 species currently classed as Nationally Scarce (A and B categories);
- One species classed (using post-2001 IUCN guidelines) as ‘Vulnerable’;
- Five species listed within Section 41 of the Nerc Act (2006) as ‘Species of Principal Importance’.

6.1.2 Aquatic communities

- A CCI score of 14.7 was recorded for the SSSI Triangle indicating ‘Fairly high conservation value’;
- No BATs or SATs achieved scores above their Favourable Condition threshold for the SSSI Triangle ditch-only data;
- The most species-rich BATs attributed to the SSSI Triangle ditch-only data were the ‘W2 - mineral marsh and open water’ and ‘W3 - permanent wet mire’ assemblages;
- The most species-rich SATs attributed to the ditch-only data were ‘W211 - open water on disturbed mineral sediments’ and ‘W125 - slow-flowing rivers’.

6.1.3 Terrestrial communities

- No BATs or SATs achieving scores above Favourable Condition threshold were recorded from the SSSI Triangle terrestrial data;
- The most species-rich BATs recorded for the terrestrial-only data were the ‘F2 - grassland and scrub matrix’, ‘A1 - aboreal canopy’ and ‘W3 - Permanent wet mire’ assemblages;
- Most species-rich SATs recorded were ‘W314 - reedfen and pools’, ‘W211 - open water on disturbed mineral sediments’, ‘F001 - scrub edge’ and ‘A215 - epiphyte fauna’.

6.1.4 Combined

- No BATs or SATs achieved scores above their Favourable Condition threshold for the SSSI Triangle combined terrestrial and aquatic data;
- The most species-rich BATs recorded for the combined dataset were the 'W2 - Mineral marsh and open water', 'F2 - Grassland and scrub matrix', 'W3 - Permanent wet mire' and 'A1 - Arboreal canopy' assemblages;
- The most species-rich SATs recorded for the combined data were 'W314 - reedfen and pools', 'F001 - scrub edge' and 'A212 - Bark and sapwood decay'.

6.1.5 Conservation value

Whilst none of the BATs recorded for the SSSI Triangle achieved rarity scores which surpassed the thresholds set in ISIS for Favourable Condition status, both the 'W3 - permanent wet mire' and 'W2 - mineral marsh and open water' assemblages achieved scores approaching the thresholds for their respective BATs. The CCI score indicated that the ditch and open water habitat within the SSSI Triangle as a whole was of 'fairly high conservation value' in terms of the Chadd & Extence interpretation.

In total, 52 species were attributed to 15 different SATs from the combined datasets. This suggests that the site supported elements suitable for a number of specialist species. Two specialist assemblages, 'W314 - reedfens and pools' and 'A215 - epiphyte fauna', equalled the threshold scores set in ISIS and were therefore close to achieving Favourable Condition status.

Whilst ten species classed as Nationally Scarce were recorded during the survey of the SSSI Triangle, no extreme rarities were recorded. However, the majority of Nationally Scarce species recorded were representative of the reedswamp, wet woodland and ditch habitats comprising the site. Black Colonel *Odontomyia tigrina* and the Banded General *Stratiomys potamida* are both strongly associated with fenland habitat (the former being a species of well-vegetated ditches, the latter a seepage specialist), whilst Flame Wainscot *Mythimna flammea* nests in Common Reed. The Alder Signal Moth *Stathmopoda pedella* (not recognised in ISIS) is an Alder carr specialist, and the arboreal beetles *Anaspis thoracica* and the weevil *Curculio betulae* are characteristic of ancient woodland.

Of the habitats recorded, the ditch network, reedbed and wet woodland all contribute to the overall conservation value of the SSSI Triangle. However, it should be noted that the conservation value of the Triangle was lower than that identified for the other main SSSI survey areas (Area 2 and the Fen Meadow), and some management would be required to increase the conservation value of the site to the standard of National Importance for its invertebrate assemblages. It should also be noted that the open water reedbed lagoon within the SSSI Triangle was not surveyed in detail due to accessibility and health & safety constraints.

Finally, it should be noted that whilst Norfolk Hawker *Aeshna isosceles* was not recorded within the SSSI Triangle ditches during the 2014 surveys, it was recorded here during the Amec 2007-2010 surveys. Whilst the more usual breeding sites for this species are richly-vegetated still-water ditches with clean water, the species is not exclusive to ditches, and it is not impossble that it could occur within the reedswamp lagoon.

6.2 SSSI Area 2 (Compartment 2)

6.2.1 Species of conservation importance

- No UK Protected Species;
- One RDB2 'Vulnerable' (pre-2001 IUCN guidelines) species;
- Two RDB3 'Rare' (pre-2001 IUCN guidelines) species;
- 18 species currently classed as Nationally Scarce (A and B categories);
- One species classed (using post-2001 IUCN guidelines) as 'Lower risk – Near threatened'.

6.2.2 Aquatic communities

- CCI score: 30.45 = 'Very high conservation value';
- No BATs or SATs achieved scores above their Favourable Condition threshold for the ditch-only data
- The most species-rich BATs from the ditch-only data were the 'W3 - Permanent wet mire' and 'W2 - Mineral marsh and open water' assemblages;
- The most species-rich SATs for the ditch-only data were 'W211 - Open water on disturbed mineral sediments' and 'W314 - reedfen and pools'.

6.2.3 Terrestrial communities

- BATs achieving scores above Favourable Condition threshold for the terrestrial-only data were the 'W3 - Permanent wet mire' and 'W2 - Mineral marsh and open water' assemblages;
- No SATs achieving scores above the Favourable Condition threshold were recorded from the terrestrial-only data for SSSI Area 2;
- The most species-rich BATs recorded from the terrestrial data were 'W3 - Permanent wet mire' and 'F2 - Grassland and scrub matrix';
- The most species-rich SATs identified from the terrestrial data were 'W211 - open water on disturbed mineral sediments' and 'W314 - reedfen and pools'.

6.2.4 Combined

- One BAT (W3) achieved a score above the Favourable Condition threshold using the combined data;
- No SATs achieved scores above their Favourable Condition threshold;
- The most species-rich BATs in Area 2 were 'W2 - Mineral marsh and open water', 'W3 - Permanent wet mire', 'F2 - Grassland and scrub matrix' and 'A1 - Arboreal canopy';
- The most species-rich SATs were 'A212 - Bark and sapwood decay', 'W314 - reedfen and pools', 'W211 - Open water on disturbed mineral sediments'.

6.2.5 Conservation value

The BAT scores from the 2014 terrestrial data indicate that SSSI Area 2 supports 'permanent wet mire' and 'mineral marsh and open water' assemblage types of National importance. Whilst Favourable Condition status was not achieved when only aquatic data were analysed, the use of the Community Conservation Index (CCI) indicated that the collective rarity and overall diversity of the fauna was of 'very high conservation value'. This classification is interpreted by Chadd and Extence (2004) as '*sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness'.* Such sites are potentially of national significance and may merit statutory protection.

None of the SATs recorded from the ISIS output for Area 2 exceeded the required thresholds for Favourable Condition status to be afforded. However, the closely allied 'W314 - reedfen and pools', 'W211 - open water on disturbed mineral sediments' and 'W221 - litter-rich fluctuating marsh' assemblages were all well represented and close to their respective thresholds, as was the 'A212 - bark and sapwood decay' assemblage.

The three RDB species recorded within SSSI Area 2 were all species with a very strong recorded association with high quality fen and grazing marsh habitats. The larvae of the RDB2 Ornate Brigadier *Odontomyia ornata* only develop in high quality, botanically-diverse old ditches on levels. Similarly, the RDB3 Levels Yellow-horned Horsefly *Hybomita ciureai* is confined to high quality coastal marshes and fens, whilst the crabronid wasp species *Passaloecus clypealis* is found only in Common Reed reed beds.

Of the habitats recorded, the ditch network, reedbed and wet woodland all contribute to the overall very high conservation value of the SSSI Area 2 site, as do the close proximities to other sites within the Sizewell SSSI including, amongst others, the SSSI Triangle and Fen Meadow.

The site can be regarded as being of at least National significance for its invertebrate population.

6.3 SSSI Fen Meadow (Compartment 3)

6.3.1 Species of conservation importance

- No UK Protected Species recorded;
- One RDB3 'Rare' (pre-2001 IUCN guidelines) species recorded.

6.3.2 Aquatic communities

- CCI score: 22.13 = 'Very high conservation value';
- No BATs or SATs achieved scores above their Favourable Condition threshold for the SSSI Fen Meadow ditch-only data;
- The most species-rich BATs for the ditch-only data included the 'W2 - Mineral marsh and open water' and 'W3 - Permanent wet mire' assemblages;
- No SATs were well represented within the aquatic-only dataset - the most species-rich SAT was 'W314 - reedfen and pools'.

6.3.3 Terrestrial communities

- No BATs or SATs achieved scores above their Favourable Condition threshold for the SSSI Fen Meadow terrestrial-only data;
- The most species-rich BATs recorded from the terrestrial data were 'F2 - Grassland and scrub matrix' and 'W3 - Permanent wet mire';
- No SATs were well represented within the terrestrial-only dataset, the most species-rich SAT being the 'W314 - reedfen and pools' assemblage.

6.3.4 Combined

- No BATs or SATs achieved scores above their Favourable Condition threshold for the combined aquatic and terrestrial data for the SSSI Fen Meadow site;
- The most species-rich BATs recorded were 'W2 - Mineral marsh and open water', 'W3 - Permanent wet mire' and 'F2 - Grassland and scrub matrix';
- No SATs were well represented within the combined aquatic and terrestrial dataset - the most species-rich SAT was the 'W314 - reedfen and pools' assemblage.

6.3.5 Conservation value

Whilst none of the BATs identified in the ISIS analysis of the SSSI Fen Meadow samples achieved rarity scores which surpassed the threshold for Favourable Condition status, both the 'F2 - grassland and scrub matrix' and the 'W3 - permanent wet mire' assemblages did achieve scores approaching the appropriate threshold. The CCI score indicates that the combined ditch habitat within the SSSI Fen Meadow was of 'Very high conservation value'. This may at least partly reflect high diversity within a relatively small dataset enhanced by the presence of the RDB3 Greater Silver Water Beetle *Hydrophilus piceus*.

Few SATs were recorded for the SSSI Fen Meadow, and very few species were attibuted to them. Indeed, the 'W314 - reedfens and pools' assemblage was the only SAT represented by more than one species.This may be due to the relatively small number of samples taken and the limited range of sampling techniques used compared to the majority of other sites.

Whilst a good diversity of species were identified from the ditch network, Great Silver Water Beetle was the only Red Data Book species recorded, although several local species characteristic of fen habitat were also collected, such as the Fen Snout moth *Nemotelus pantherinus,* the snail-killing flies *Sepedon sphegea* and *Tetanocera fuscinervis*, and a number of beetles, including *Cymbiodyta marginellus*.

Of the habitats recorded, the ditch network and botanically-diverse fen meadow both contributed to the overall conservation value of the SSSI Fen Meadow compartment. The two ditches sampled were both floristically diverse, with abundant Frogbit, which is typical of habitat from which Great Silver Water Beetle is recorded.

Importantly, whilst not recorded in the Fen Meadow survey area itself, Norfolk Hawker was recorded within approximately 500 metres of the survey area, in habitat which forms part of the same ecological unit. Arguably, the ditch sample sites were too heavily shaded for this species to use them for breeding; however, the ditch forming the southern boundary of the Fen Meadow (which was outside of the survey area for the 2014 study) may be suitable.

The conservation value of the Fen Meadow site is arguably approaching National Importance, with the presence of Great Silver Water Beetle and other fenland species indicating that the habitat is of high conservation value.

6.4 C-Platform Woodland (Compartment 4)

6.4.1 Species of conservation importance

- No UK Protected Species recorded;
- One RDB3 'Rare' (pre-2001 IUCN guidelines) species;
- Two species currently classed as Nationally Scarce (A and B categories);
- Two species listed within Section 41 of the NERC Act (2006) as 'Species of Principal Importance';

6.4.2 Terrestrial communities

- The only BAT achieving a score above Favourable Condition threshold for the C-Platform Woodland terrestrial data (no aquatic samples were collected) was the 'W3 - permanent wet mire' assemblage;
- No SATs achieving scores above Favourable Condition threshold were recorded from the terrestrial data;
- The most species-rich BATs for the C-Platform Woodland data were the 'F2 - grassland and scrub matrix', 'A1 - arboreal canopy' and 'W3 - permanent wet mire' assemblages;
- No SATs were well represented within the C-Platform Woodland dataset - the most species-rich SATs were 'F001 - scrub edge', 'A215 - epiphyte fauna' and 'W314 - reedfen and pools'.

6.4.3 Conservation value

The BAT scores from analysis of 2014 terrestrial data indicate that the C-Platform Woodland supports a 'W3 - permanent wet mire' assemblage type of National Importance. However, the W3 BAT was third in terms of the number of species attributed to the dataset. Both the 'F2 - grassland and scrub matrix' and 'A1 - arboreal canopy' assemblages were better represented; however, they supported assemblages of lower rarity value.

SATs recorded from the ISIS output were generally poorly attributed, suggesting that a somewhat generalist fauna was recorded overall.

The one RDB3 species (also listed as a s41 'Species of Principal Importance') recorded within the C-Platform Woodland was White-mantled Wainscot *Archanara neurica*. This moth is of very restricted range in the UK, being known only from coastal reedbeds between Southwold and Thorpeness. As it was recorded from a mercury vapour moth trap, it is possible that the insect was attracted from habitats within an adjacent habitat compartment, such as the reed-lined ditches of the SSSI Fen Meadow, or the extensive reedbeds within SSSI Area 2. The species is a specialist of dead reed stems, and is thought to be sensitive to over-management of reedbeds.

The woodland habitat within the C-Platform generally comprised secondary growth of birch, Alder and Willow, and the greater conservation interest was arguably the wet carr and seepage habitat which bordered the SSSI. A Nationally Scarce arboreal weevil *Polydrusus formosus*, found throughout many of the study area's wooded habitats, was the only other uncommon species recorded; however, several local woodland and permanent wet mire species were identified.

Overall, a national importance status classification for the W3 assemblage can be considered tenuous due to the probability of the White-mantled Wainscot being attracted from the adjacent SSSI, which arguably supported habitat more consistant with the insect's biology. Also the sample size of 17 attributed to W3 is only marginally above the threshold of robustness set in ISIS.

Despite the C-platform Woodland's lack of designation, the habitat was found to support some representative wet woodland, seepage and wood decay habitat with potential to support specialist invertebrates recorded elsewhere on site. The conservation value is increased by the site's proximity to the SSSI, and with regard to its invertebrate communities it can be considered to be of fairly high conservation value.

6.5 Minsmere to Walberswick Heaths & Marshes SSSI/ SAC (scrape and ditch) (Compartment 6a)

6.5.1 Species of conservation importance

- No UK Protected Species recorded;
- One RDB3 'Rare' (pre-2001 IUCN guidelines) species;
- Two species currently classed as Nationally Scarce (A and B categories).

6.5.2 Aquatic communities

- SAC (ditch) CCI score: 13.83 = 'Fairly high conservation value';
- SSSI (scrape) CCI score: 26.58 = 'Very high conservation value';
- No BATs or SATs achieved scores exceeding the Favourable Condition threshold for the combined SSSI scrape and SAC ditch 2014 data;
- The most species-rich BAT recorded for the combined scrape and ditch data was the 'W2 - mineral marsh and open water' assemblage, with 'W3 - permanent wet mire' being ascribed an insufficient number of species to be considered robust;
- The most species-rich SATs recorded from the dataset were 'W211 - open water on disturbed mineral sediments' and 'W314 - reedfen and pools'.

6.5.3 Conservation value

Both the ditch on the western boundary of the SAC and nearby scrape (situated outside the SAC boundary, but within the Minsmere to Walberswick SSSI), supported reasonably diverse macrophyte assemblages. Both were situated in open conditions within grazing marsh, unlike the components of the ditch network within the SSSI Triangle and Area 2.

CCI analysis from a single sample from the SSSI scrape produced a CCI score of 26.58, well above the threshold of 20 for 'Very high conservation value' (Chadd and Extence, 2004). A lower score was achieved from the two samples collected from the ditch (achieving 'Fairly high conservation value') potentially due to the nutrient inputs that Leiston Ditch receives from Leiston WTW.

The scrape sample was of relatively high diversity, with one RDB3 species (Great Silver Water Beetle) and two Nationally Scarce beetles (*Pelenomus canaliculatus* and *Hydrochus angustatus*), as well as several local species. The SAC ditch produced one of the more diverse datasets from the aquatic samples, and included the Nationally Scarce Black Colonel *Odontomyia tigrina* as well as *Rhantus suturalis* (a species which was recently downgraded to local from Nationally Scarce), as well as several local species.

Whilst the CCI scores were high, BATs and SATs recorded for the combined SAC ditch and SSSI scrape produced a robust score only for the 'W2 - mineral marsh and open water' assemblage, which produced a rather low rarity score. However, all four of the rarities recorded are attributed to 'W3 - permanent wet mire', which was not represented well enough in ISIS for a rarity score to be produced. Three of these species are also attributed to the 'W314 - reedfen and pools' assemblage, which again was too poorly represented to produce a significant score.

Based on visual appearance, the more open character and floristic diversity and structure, as well as the proximity to scrub habitat, suggests that the SAC ditch may have potential to support breeding Norfolk Hawker. However, it was uncertain whether the ditch was subject to saline intrusion. The Norfolk Hawker is intolerant of saline conditions.

Habitat, position in the unit, and recorded fauna all indicate that both the scrape and ditch are integral to the overall network of important habitat and can therefore be considered to be of National significance.

6.6 Minsmere to Walberswick Heaths & Marshes SSSI/ SAC (dune habitats)(Compartment 6)

6.6.1 Species of conservation importance

- No UK Protected Species recorded;
- One species classed (using post-2001 IUCN guidelines) as 'Vulnerable';
- One species classed (using post-2001 IUCN guidelines) as 'Lower risk – Near threatened';
- Three species currently classed as Nationally Scarce (A and B categories);
- Two species listed within Section 41 of the NERC Act (2006) as 'Species of Principal Importance'.

6.6.2 Terrestrial communities

- No BATs or SATs achieved scores exceeding the Favourable Condition threshold for the dune, grassland, heath and scrub data;
- The most species-rich BATs recorded were the 'F2 - grassland and scrub matrix', 'F1 - unshaded early successional mosaic' and 'A1 - arboreal canopy' assemblages.

- The most species-rich SATs recorded from the dune, grassland, heath and scrub dataset were ‘F112 - open short sward mosaic’, ‘F111 - bare sand and chalk’ and ‘F001 - scrub edge’.

6.6.3 Conservation value

The habitat recorded within the SAC coastal zone area was structural varied and also diverse botanically, given the general low botanical diversity associated with dry heathland biotopes. The habitat at the inland extremity of the dune system, including scrub edge habitat with dwarf shrub heath grassland and bare sand in mosaic, was the primary focus of the survey. This heath and acid grassland graded into more typical dune habitat towards the sea.

The varied microtopography and open, yet sheltered sandy habitat, together with an abundance of flowering plants (including yellow composites, legumes such as Restharrow and Common Bird’s-foot Trefoil, as well as heaths and associated Gorse scrub) provided habitat of high invertebrate potential. Species recorded from the samples taken here included a number of local species with a strong affinity to dry grassland and heath habitat. However, no BATs or SATs recorded from the sample data produced scores above the thresholds for Favourable Condition. The two best represented BATs, ‘F2 - grassland and scrub matrix’ and ‘F1 - unshaded early successional mosaic’, did, however, produce rarity scores approaching their respective thresholds for Favourable Condition, as did the third most well represented BAT, ‘A1 - arboreal canopy’. In addition, the ‘F112 - open short sward’ SAT was also well represented, but again not sufficiently populated to achieve the threshold status.

No species classified as RDB under pre-2001 IUCN guidelines were recorded. However, the Grayling Butterfly *Hipparchia Semele,* which is classed as ‘Vulnerable’ (RDB3) under post-2001 IUCN guidelines, was abundant throughout the coastal heath/grassland zone. Similarly, Small Heath *Coenonympha pamphilus*, a widespread but declining species, classed as ‘Lower risk – Near threatened’ under the post-2001 guidelines, was also recorded. These species are also both listed as ‘Species of Principal Importance’ under Section 41 of the NERC Act (2006).

Other species of higher rarity value included the Nationally Scarce wolf spider *Hygrolycosa rubrofasciata*, a fenland species, also associated with wet woodland and carr habitat, that was beaten from the scrub edge habitat which grades into reedswamp further inland. *Aphanisticus pusillus*, a jewel beetle with dual associations with dry, sandy habitats and wetland rushes, was also recorded, together with a number of other characteristic dry heathland and scrub species.

In terms of habitat representativeness, and in a wider landscape context, the SAC survey area is clearly of much higher conservation value than the results of the ISIS analysis show. The sampling was more or less confined to a single site visit, and certain groups almost certainly supported by the habitats, such as ground-nesting Aculeate Hymenoptera, were very poorly represented in the dataset.

6.7 Coastal Strip (CWS) (Compartment 5)

6.7.1 Species of conservation importance

- No UK Protected Species recorded;
- One RDB1 ‘Endangered’ (pre-2001 IUCN guidelines) species;
- Nine species currently classed as Nationally Scarce (A and B categories);

- One species classed using post-2001 IUCN guidelines as 'Vulnerable';
- One species classed using post-2001 IUCN guidelines as 'Lower risk – Near threatened';
- Four species listed under Section 41 of the NERC Act (2006) as 'Species of Principal Importance'.

6.7.2 Terrestrial communities

- One BAT identified from the Coastal Strip CWS data, the 'F1 - unshaded early successional mosaic' assemblage, achieved a score above the Favourable Condition threshold;
- One SAT, 'F112 - open short sward mosaic, achieved a score above the Favourable Condition threshold;
- The most species-rich BATs recorded were 'F2 - grassland and scrub matrix' and 'F1 - unshaded early successional mosaic';
- The most species-rich SATs recorded were 'F112 - open short sward mosaic' and 'F111 - bare sand and chalk'.

6.7.3 Conservation value

BAT scores from ISIS analysis of the 2014 data indicate that the Coastal Strip (CWS) supports an 'F1 - unshaded early successional mosaic' assemblage of National importance, the assemblage being represented by slightly fewer species than the 'F2 - grassland and scrub matrix' assemblage, which itself achieved a rarity score approaching the Favourable Condition threshold.

From the SAT analysis, the 'F112 - open short sward' SAT also achieved a score above the threshold set in ISIS for Favourable Condition status, whilst 'F111 - bare sand and chalk' was also well represented within the ISIS output.

The main survey focussed on a flattish area of created sandy grassland in the lee of the dune system, which provided a partial buffer to excessive wind. Some sampling was also conducted within the dunes. The grassland supported a reasonably high diversity of typical dry grassland and coastal dune plants. Patches of exposed sand and shingle in mosaic created varied structure and habitat niches for invertebrates.

One species recorded from this dune habitat, the spider-hunting wasp *Evagetes pectinipes*, is classed as RDB1 'Nationally Endangered'. This species has rarely been recorded outside of its stronghold in Kent, and represents the most significant record from the 2014 survey. In addition, nine Nationally Scarce species were also recorded from this site, several of which (together with some of the local and common species recorded) were specialists of dry sandy grassland of an open nature. As with the SAC coastal habitats (Compartment 6), Grayling and Small Heath butterflies were also both recorded, together with a third species listed as a S41 'Species of Principal Importance', the Cinnabar Moth *Tyria jacobaeae*.

The Favourable Condition status recorded for both 'F1 - unshaded early successional mosaic' and 'F112 - open short sward' indicate that the Coastal Strip (CWS) site supports invertebrate assemblages above the required threshold to be considered of National Importance. It can therefore be considered to be of SSSI quality for its invertebrate assemblages, thus exceeding its current CWS status.

7 Potential impact of Sizewell C on invertebrates

The proposed Sizewell C landtake will involve considerable loss of, and disturbance to, land and associated habitats and species subject to statutory protection. Of the areas surveyed, it is understood that habitat within the Sizewell SSSI, including areas named for the purpose of this report as the SSSI Triangle, SSSI Area 2, SSSI Fen Meadow will be directly affected by the development and associated infrastructure. Furthermore the area known as the Coastal Strip CWS is also likely to be lost, or significantly disturbed, during and post development.

In addition to habitat loss, sensitive wetland and coastal habitats immediately to the north of the development footprint will potentially be impacted upon during and post development. These include both nationally protected areas within the Minsmere to Walberswick Heaths and Marshes SSSI and areas subject to international protection under the European Habitats Directive, i.e. the Minsmere to Walberswick Heaths and Marshes SAC and SPA.

Collectively, the areas comprising both designated and non-designated habitats surveyed in 2014 substantiated the findings of previous surveys, that is that both wetland areas of the Sizewell SSSI and the dune grassland/heathland coastal habitats support invertebrate assemblages of at least National Importance. Whilst the relative values from the analysis were found to vary between the areas surveyed, from an ecological perspective it is not possible to consider in isolation the component habitats comprising what is a landscape of very high conservation value.

The inland sites, comprising the Sizewell SSSI, are largely interdependent hydrologically and support habitats which are difficult to recreate in the short term. The wetland habitats are, for the large part, formed over a substrate of peat, which is a non-renewable resource. This habitat is integral to the hydrological functionality of the fenland habitat, and many of the rare and uncommon invertebrate species recorded are found predominantly, if not exclusively, within peatland biotopes.

Habitat and species assemblages recorded within the coastal zone, in particular the Coastal Strip CWS, were also found to be of high conservation value. However, coastal zone dune ecosystems are fundamentally dynamic and subject to constant patterns of change. The invertebrate assemblages recorded within the coastal strip include a high proportion of species which are effective colonisers of new habitat, being essentially species of ephemeral and early successional habitats. Successful recreation of the short sward grassland habitats represented within the Coastal Strip CWS should therefore be more straightforward than for the Fenland habitats.

8 Habitat creation and management rationale and recommendations

8.1 General

There is no guarantee that habitat creation, or measures to minimise impact on the hydrology and other elements connected to the habitat, will be entirely successful in protecting all species and species assemblages currently existing on site. However, by replicating habitat features and micro-habitats which mimic the conditions required by key invertebrates and invertebrate assemblages, the chances of these species surviving and colonising the created habitat can be significantly increased.

In addition, habitat creation from scratch provides opportunities for improving conditions favourable to some of the species. For example, increased measures to attenuate water quality at source may provide more favourable conditions for those species sensitive to water quality, such as the Norfolk Hawker. Management objectives can be used to ensure that conditions specific to particular species or assemblages are achieved and subsequently maintained.

8.2 Fenland habitat

8.2.1 Rationale

As discussed in previous sections, the 2014 survey findings strongly indicate that the most ecologically important invertebrate assemblages recorded from habitats within the Sizewell Marshes SSSI, and associated sites, were affiliated to the ‘W3 - Permanent wet mire’ Broad Assemblage Type (BAT). In terms of species-richness, however, the ‘W2 - Mineral marsh and open water’ BAT was the best represented of the wetland assemblages. Whilst the W3 assemblage essentially occurs on substrates that are permanently saturated, the W2 assemblage is associated with more extreme seasonal flooding; essentially, substrates supporting this assemblage may dry out entirely during the summer.

A key feature of permanent wet mire habitat is an underlying peat layer, which has water retention properties and provides conditions important for the associated vegetation and invertebrate assemblages. Lott *et al.* (2007) state that ‘*Water level fluctuations are not usually significant or at least, when they do occur, the substrate rarely dries out completely. Consequently this assemblage type is dominant on wet peat*.’

The generic description of the habitat composition and dynamics on which species within the W3 assemblage depend (described in Lott *et al*., 2007) strongly reflects those described within the SSSI citation for Sizewell Marshes.In the citation, the SSSI is described as occupying ‘*a low-laying basin of deep fen peat. The water table is permanently high, with the area being prone to flooding, and there is an extensive network of ditches across the site*.’ This statement characterises conditions favourable for both the W3 and W2 assemblages.

Owing to the statutory and recorded importance of the invertebrate assemblages supported within the SSSI areas to be directly affected, mitigation strategies need to include adequate measures to replicate habitat permanently lost due to the development process and to ensure the impact on retained habitat is minimised.

As an irreplaceable resource, and one which is fundamental to the functionality of the existing permanent wet mire habitat which characterises the Sizewell Marshes SSSI, it is recommended that peat translocation is considered as a baseline to recreation of wetland as mitigation habitat (unless a similar peat layer is already present at the proposed receptor site, as is the case at Aldhurst Farm).

A second fundamental requirement is that measures are taken to ensure there is sufficient knowledge of the hydrology of the existing ecosystem to enable a comparable hydrological regime to be replicated within the design of recreated habitat. Hydrological controls should enable management sympathetic to the requirements of ditch, reedbed and other invertebrates specialising in wetland habitats characteristic of the exisiting and adjacent sites. Besides water level control to maintain permanently saturated substrates, measures should also be taken to ensure high water quality is maintained, and that inputs and throughputs are suitably buffered to minimise the risk of nutrient enrichment.

Once wetland habitat has been created, it often takes a number of years before the ecosystem has stabilised sufficiently to support target species. Nutrient enrichment is inevitable during the first few years of a habitat being created, and as such water quality will be below the required standard for many of the more sensitive wetland invertebrates. However, this will improve over time. Opinion is divided regarding the planting of newly created habitats. However, by translocating wetland plants from the original site, maintenance of local provenance is ensured. Planting and translocation of habitat should speed up the time it takes for the habitat to become established, therefore theoretically reducing the time period before invertebrates can colonise.

A sufficient overlap in time is therefore essential for species existing in the donor site to colonise (or be translocated to) the receptor site. Certain species with limited powers of mobility may take much longer to colonise than others, and if niche requirements are not met, such species may suffer localised extinction (although in this case it should be noted that only relatively small proportions of the habitats would be lost, and extensive areas of all of the habitat types due to be affected would be retained elsewhere within the SAC, SSSI and CWS).

A number of species recorded from the Sizewell Marshes SSSI habitats are associated with wood decay, and a number of arboreal species, including wet woodland specialists, have also been recorded. Wet woodland, carr and associated scrub-edge, seepage and wood decay habitat, is well represented within the SSSI Triangle and SSSI Area 2. In the case of the latter, in particular, a number of mature Alder, willow and birch trees were recorded, with features conversant with more ancient wet woodland rather than recent scrub encroachment. Whilst excessive scrub encroachment increases management requirements, and also leads to habitat succession away from more open fen habitats, some of the trees present within the sites provided important habitat, beneficial both to arboreal specialists and to fen specialists associated with edge habitats.

Some over-mature willows located within the Area 2 reedbed, in particular, had influenced the habitat topography, creating raised hummocks within open reedbed. These habitats (which are outside the area due to be lost) created conditions suitable for certain species, including ‘moss and tussock fen’ and ‘wood decay’ specialists to persist. The saturated peat overlain with silt and decaying leaves, along with inundated wood decay habitat beneath established wet woodland and carr, also supports specialist species, including several rarities.

Serious consideration should be given to the possibility of translocating wood decay habitat, in particular large logs in varying degrees of decomposition (from dry and hard-baked to moist and rotten). The creation of some wet woodland should also be given due consideration. It should be noted, however, that the majority of the more important wet woodland habitat was recorded within those areas not due to be lost, in particular SSSI Area 2, and the woodland habitat within the areas most likely to be directly affected, the C-Platform Woodland and the SSSI Triangle, was more secondary in nature and less mature.

8.2.2 Habitat restoration opportunities

Another possible mitigation consideration could be to restore some of the existing wet woodland habitat within and adjacent to the existing Sizewell SSSI. Some of the habitats visited, but not surveyed in detail during 2014, would potentially benefit from management sympathetic to wet woodland invertebrates. Sites such as Turf Pits (Compartment 9 on Figure 1), described as W6a *Alnus glutinosa* - *Urtica dioica* woodland, was found to be highly degraded, with extensive non-naïve invasive *Rhododendron ponticum* creating a heavily-shaded understorey. Whilst the woodland supported elements of good potential habitat for wood decay invertebrates, and there were silted ditches and leaf decay habitat suitable for a range of wet woodland craneflies and other species, dense shading from Rhododendron and other woody species was preventing light reaching the ground layer.

Investment in restorative and continued sympathetic management of this site, as well as other somewhat neglected wet woodland areas, such as the blocks at Grimseys and Leiston Carr (Compartments 8 and 7/7a, respectively), could produce valuable results. However, neither of these sites were without interest, therefore, restoration management should only be undertaken following surveys to establish the existing biodiversity value and to ensure restoration efforts produce positive results in the long term. It is certainly important that care should be taken not to damage or destroy habitat that is of conservation value in the name of habitat creation. Where possible, newly created ditches, ponds etc. may be of the most ecological benefit if they are created in relatively ecologically poor areas within the landscape (Kirby, 1994), but where they have potential to provide stepping stones between disjunct areas of high ecological value.

8.2.3 Species requirements

A number of species recorded in both 2014 and in the previous Amec surveys (2007 to 2010), were of high conservation value as well as having strong affinities to historic fenland habitats. The habitat affinities of these species have been used to inform habitat creation and management recommendations/guidance. In particular, rare and uncommon species affiliated to Specific Assemblage Types (SATs) have been selected, since such species have more specialised habitat requirements.

SAT species from both the 2014 and 2007-2010 surveys are listed together, with summaries of their recorded habitat affinities, in Appendix 2, Table 43. Examples of these have also been referred to on the specific invertebrate habitat maps (Appendix 3, Figures 10 to 13). Whilst the detailed design and planning of habitat creation for mitigation of the loss of habitats for the Sizewell C development is not the purpose of this report, recommendations can be used to ensure invertebrate habitat requirements are strongly represented within the mitigation strategy.

Some key considerations relating to specialist invertebrate species of the ‘W314 - Reedfen and pools’ assemblage, and associated fenland and wet woodland SATs, are provided below.

8.2.4 Reedswamp

By far the greatest number of rare and uncommon species recorded within the wetland habitats comprising Sizewell Marshes SSSI have been classified under the ‘W3 - Permanent wet mire’ BAT and, on a more specialised level, within the ‘W314 - Reed-fen and pools’ SAT.

On the whole, these species are adapted to permanently wet habitats, i.e. those which are underlain by a saturated deep peat layer where a permanently high water table is maintained.

Habitat Creation

- A key consideration in habitat creation for invertebrates is that a more varied the microtopography provides niches for a greater range of species. Species living within reed bed and swamp habitats over peat are likely to be predominately specialists. Whilst a number of species are known to be associated with a particular habitat, the precise autecologies of many species are not well known. Furthermore, with climate change, more specialised species can change their habitats. Therefore, by providing sufficient habitat diversity within the broad context of a specialised habitat such a reedswamp, the chances of providing microhabitats favourable to specialist species, or species assemblages, can be increased.

- Topography of created reedswamp should be designed to provide a varied gradient from drier habitat through to permanent, open-water pools. More diverse vegetation structure similar to that recorded at the lagoon edge in the SSSI Triangle (sample sites T3 and A21) can be created at the edges of open-water pools within reedswamp. By providing a greater variation in depth, emergent vegetation such as Branched bur-reed *Sparganium erectum,* floating-leaved aquatics such as Frog-bit *Hydrocharis morsus-ranae,* and submerged species such as milfoils *Myriophyllum* sp., narrow-leaved *Potamogeton* spp. and bladderworts *Utricularia* spp. would develop. These would in turn provide varied habitat for a range of characteristic fenland invertebrates, including diving beetles (Dytiscidae), Reed Beetles (Chrysomelidae: Donacinae), soldierflies (Stratiomyidae), and dragonflies and damselflies (Odonata), potentially even species such as Norfolk Hawker *Aeshna isosceles*.

- Networks of pools and varied swamp and tussock habitats incorporated within the central areas of reedswamps, and buffered from the surrounding landscape by reed habitat, can maintain clean water conditions favourable to species sensitive to nutrient enrichment, as well as supporting more varied habitats such as 'moss and tussock fen'.

- Marginal areas of open water should be designed to include broad marginal habitat planted with more varied swamp communities, including typical wetland macrophytes found within the fenland habitats of the SSSI Triangle Lagoon.

- Species such as White-mantled Wainscot use old, dead reed stems to develop, and are thought to be vulnerable to localised extinction when reedbeds are managed using traditional practices such as cutting and burning. Once reedbeds are established, sympathetic management is likely to be as (if not more) important than the habitat creation for species with such specialisms. Knowledge of the autecology of White-mantled Wainscot suggests that this species would be unlikely to colonise newly-created reedbed for some years after creation, and then only if suitable old-reed habitat is retained through management. Alternatively, such features could be translocated to the new habitat areas, potentially with the larvae already present within the reed stems.

- Some uncommon species, such as Flame Wainscot, are known to favour more scattered stands of reed rather than densely-planted stands; therefore, maintenance of scattered reed along linear features such as ditches may be more beneficial to this species than active management of reedbed itself.

- Some species live in accumulated litter at the bases of stands of reeds, including a number of uncommon ground beetles.

- Species such as the solitary wasp *Passaloecus clypealis* nest within hollow reedstems and may be inquilines in *Lipara* galls (i.e. living within the same space of another species). Therefore, it is possible that *Lipara* species need to be present before *Passaloecus* can colonise.

- Raised platforms created by the splayed boles of over-mature Grey, Crack and White Willows within SSSI Area 2 provided island-like habitats above the level of inundation within some of the wetter parts of the swamp. Such habitats provided specific microhabitats and variation from the monotony of the reedbed. Species such as the Nationally Scarce rove beetle *Stenus palustris* (a tussock and moss fen specialist) and the reedbed solitary wasp *Passaloecus clypealis* were found in close proximity. Such raised structures could be integrated within the habitat design. Ideally, mature trees could be translocated. Alternatively, the creation of more undulating topography, including raised areas, would also be beneficial.

- Elements such as saturated logs could be integrated into parts of a reed swamp or at the peripheries; however, continuity of habitat is a key consideration.

Management

The effective hydrological management of created reed swamp and other wetland habitats is of paramount importance, and will define which species and invertebrate assemblages thrive within the created habitat in the long term. On the basis that the invertebrate assemblages collectively supporting the highest rarity value recorded from the Sizewell Marshes SSSI habitats include the 'W3 - Permanent wet mire' and 'W314 - Reedfen and pools' assemblages, hydrological management should facilitate a hydrological regime which ensures that the larger part of the substrate comprising the reed swamp is permanently saturated. Management of seasonal water level fluctuation should be based on the prevailing regime within the existing Sizewell SSSI and surrounding landscape.

Conservation management of reedswamp habitat usually involves cutting a pre-determined proportion of the entire reedbed on a rotational basis, the management depending to a degree on the specific ecological targets. In general, a longer rotation is better from an ecological perspective, with a small proportion of a large reedbed being cut annually or bi-annually on a rotation of 10 years or so.

Where reedbeds remain unmanaged indefinitely, encroachment by carr habitat can ultimately result in succession to wet woodland. The RDB3 and S41 'Species of Principal Importance' White-mantled Wainscot is considered to be sensitve to over-management of reedbed habitat, the species requiring old dead reed stems, typically at the edges of reedswamp habitat.

The following are therefore recommendations for the management of reedswamp:

- Manage reedswamp habitat with due sensitivity to species which are vulnerable to mechanised management, such as White-mantled Wainscot. Areas of reedswamp, particularly at the peripheries of reedswamp blocks, should be maintained without management for extensive periods, and managed only as part of a very long rotation.

- Ideally, the habitat should be left to develop and settle before any definite management regime is devised. Surveillance (or monitoring) of invertebrate populations becoming estabished within created habitat should provide a feedback loop from which more targeted management can be considered.

- However, if management by cutting is to be instigated within areas of created habitat, the longer the rotation the better. General management should include as long a rotation as is practical, with a small proportion of the whole reedswamp being cut every two or so years on a rotation of at least 10 years. Burning should not be used as a management technique, and short rotation management is negative in terms of managing reedbed for invertebrates.

- Kirby (1994) suggests cutting out a series of pools, over a succession of years, to provide cleared areas of different successional stage.

- A litter layer within the reedswamp accumulates over time and provides habitat for reedbed litter specialists, such as the ground beetle *Demetrias imperialis*. Litter should therefore be allowed to build up in a proportion of the reedbed.

- Invertebrates benefit from reedbeds with a range of successional stages, from young reed in shallow water to old reeds with scrub invasion on almost dry ground over dense litter (Kirby, 1994).

- Management of waterlevels within created fenland or reedswamp habitat should aim to mimic the conditions prevailing within the more entomologically-specialised and diverse comparable habitat within the wider landscape. Ideally, a consistant regime should ensure water level is maintained at or above the surface of the ground over the larger part of the wetland (for permanent wet mire specialists). Some seasonal variation in water level would benefit species more associated with fluctuating water levels.

- Herbicide spraying, for example to control invasive wetland plants and scrub, should be avoided.

8.2.5 Ditch network

The ditch network within the Sizewell SSSI was found to support some of the rarest and most characteristic fenland species recorded during both the 2014 and previous surveys by Amec. Species such as Great Silver Water Beetle *Hydrophilus piceus* and the Ornate Brigadier *Odontomyia ornata* are characteristic of fenlands wth extensive ditch networks, and are sensitive to loss and degradation of fenland habitat. In addition, the RDB1 Norfolk Hawker *Aeshna isosceles,* which receives full protection under UK law, has been recorded here. Whilst breeding has not been confirmed, the species is suspected to breed in some of the ditches within the Sizwell Marshes SSSI.

The existing network of ditches within the Sizewell Marshes is historic, and whilst originally man-made, the ditches now support a diverse fauna of high conservation value. Ditch networks were originally instigated to facilitate land drainage, an activity that acted to the detriment of invertebrate species associated with wetland habitats over peat. There is, however, considerable scope for improving the water quality of existing ditch networks and improving the conservation value of them. Creation of some strategically placed ditches and scrapes, specifically for species such as Norfolk Hawker, the Ornate Brigadier and Greater Silver Water beetle, should be considered. In particular, ditches can be created from a more conservation oriented standpoint than was considered when engineered drainage ditches were originally created.

The following recommendations are made.

Habitat Creation

- Restore ditches currently nutrient-enriched or in poor condition. In general terms, excessively shaded ditches support poorer invertebrate assemblages than more open ones; however, some species, including seepage specialists and wet woodland craneflies, for example, favour shaded and silted habitat of late succession.

- Instigate measures to improve water quality in newly-created and existing ditches, through buffering mechanisms and hydrological management.

- Created ditch networks should aim to connect existing areas of high conservation value, enabling invertebrate species to readily colonise newly created habitat.

- Ditches created should aim to replicate conditions of the existing ditches in terms of structure and general vegetation communities. However, specific requirements of species of high conservation value, such as Norfolk Hawker, Ornate Brigadier, Great Silver Water beetle and other rarities, should also be considered.

- Variation in terms of width, depth and profile should be integrated into the design of new ditches and, where appropriate, enhancement of existing ditches. Habitat creation provides an opportunity to create habitat with more variety and with features beneficial to aquatic invertebrates, such as more extensive shallow marginal ledges.

- Species such as the Black Colonel, for example, favour narrow well-vegetated ditches, whilst the Ornate Brigadier favours ditches of two or more metres wide. A range of ditches of different breadth and depth would provide habitat for a greater range of species.

- Provision of scrapes, ponds and other wetland habitats across the landcape area should also be considered, as many ditch species will also live in ponds, providing habitat conditions are met and these can be deployed in areas where connectivity is an issue.

- Where possible, ditches and other waterbodies should be created only in habitat of relatively poor conservation value.

- Habitat created specifically for Norfolk Hawker would also favour a number of other specialists of fenland habitat. Norfolk Hawker requires clean water free from nutrient enrichment and sources of saline intrusion. Habitat should be disjunct from existing drainage ditches and have no flow. Ditches should provide wide shallow margins with tall marginal vegetation (e.g. Common Reed *Phragmites australis,* Branched Bur-reed *Sparganium erectum* etc.). More open water should support rich aquatic macrophyte flora, with species such as Frogbit *Hydrocharis morsus-ranae* and bladderwort *Utricularia* spp. Water Soldier *Stratiotes aloides* would be preferred, but should not be introduced if not of local provenance.

- Ditches restored or created for species such as Ornate Brigadier and Great Silver Water Beetle, should also aim to support clean water habitat with floating-leaved species, such as Frogbit, and Ivy-leaved Duckweed *Lemna sulcate,* and species such as Water Violet *Hottonia palustris* (again if this species is characteristic of local ditches). Floating rafts of vegetation in ditches of mid-succession are favoured.

Management

- Manual, piecemeal management of ditches managed for conservation is favoured over mechanised, heavy duty management typical of Internal Drainage Board (IDB) management for flood prevention etc.

- Management should aim to provide a range of successional stages at any one time. Larvae of Great Silver Water Beetle, Ornate Brigadier and Norfolk Hawker favour mid-successional stages, whereas adult Great Silver Water Beetle is said to favour open water habitats of early succession.

- Some silted areas under dappled shade, along with habitat with saturated or semi-saturated wood decay and leaf decay habitat, should be maintained.

8.2.6 Wet woodland

The value of the wet woodland (comprising Alder and, to a lesser extent, willow and birch) for specialist invertebrates was apparent in sites such as SSSI Area 2 and the SSSI Triangle. Both sites supported well-established woodland (although the more mature woodland was in Area 2, which is outside the area that would be lost) and margins where reedswamp gave way to black silt substrate charaterisitic of seepage habitat and often sparsely vegetated with a more diverse range of fenland macrophytes. These included Branched Bur-reed *Sparganium erectum*, Greater Reedmace *Typha latifolia*, Greater Pond Sedge *Carex riparia* and occasionally Tussock Sedge *Carex paniculata,* as well as herbs such as Water Mint *Mentha aquatica,* Skullcap *Scutellaria galericulata,* Water Forget-me-not *Myosotis scorpioides,* Wild Angelica *Angelica sylvestris* and other typical plants of fenland marginal habitats.

Standing and fallen wood decay habitat was abudant in some of the marginal habitats, and the more mature trees featured rot holes and other feaures important to carr woodland invertebrates. Branches of older Alder and other trees also often supported lichen assemblages, which gave rise to the significant epiphyte assemblages recorded from some of the datasets. There were also several uncommon species associated with the canopy and foliage of Alder and other wet woodland trees.

Whilst there are evident conflicts in management of wet woodland in relation to swamp habitat, and planting new wet woodland within or adjacent to newly-created wetland habitat is arguably ill-advised, consideration will nevertheless be given to incorporating wood decay habitat into these areas. As mentioned previously, mitigation opportunities may include restoration of degraded blocks of wet woodland, such as Turf Pits, Grimseys and Leiston Carr. However, caution is required, as all these blocks contain some habitat currently of value to invertebrates.

8.3 Coastal habitat

8.3.1 Rationale

The most significant assemblages recorded from ISIS analysis of the dry sandy grassland and dune/heath habitats of the Coastal Strip CWS and the Minsmere and Walberswick SAC and SSSI were ‘F1 - Unshaded early successional mosaic’ and ‘F112 - Open short sward’.

Species associated with the F1 assemblage type are typical of lowland habitats where disturbance removes vegetation to create areas of bare or sparsely vegetated ground. Such conditions are found in a range of situations and for different reasons. In this location, the coastal dune habitat is subject to accretion of blown sand and there was evidence of rabbit grazing on both the Coastal Strip and the SAC dune heath.

Lott *et al.,(*2007) states, in the description for F1, that the ‘*juxtaposition of disturbed areas of bare ground with other structural types of vegetation is often important to insects with complex life cycles that require different microhabitats at different stages of development. This juxtaposition is associated with small-scale dynamic processes driven by cyclical disturbance patterns’* and that *‘many species are efficient at dispersing and colonising newly-formed habitats, but landscapes with some degree of continuity of habitat are more likely to hold assemblages of the highest conservation value*.’

Many characteristic species of these habitats develop in the soil and have thermophilic larvae. Bare ground on south-facing slopes is therefore a particularly valuable microhabitat for this assemblage type. Furthermore, several species of this community are seed eaters that profit from the high seed production of annual plants that share the same habitats.

The ‘F112 - Open short sward’ Specific Assemblage Type, which like F1 attained a ‘Favourable Condition’ score for the Coastal Strip, is an assemblage typical of nutrient-poor soils, where grazing or disturbance limits development of tall sward, thus enabling widespread development of broad-leaved herbs. On sites such as the Coastal Strip and SAC, exposure may be significant. Species associated with these assemblages, and the other well-represented SAT

‘F111 - Bare sand and chalk’ are often strongly thermophilic and a free-draining sandy substrate, such as that recorded within the coastal habitats at Sizewell, provides a microclimate favourable to warmth-loving species.

It is expected that at least a proportion of the sandy grassland and associated habitats of the Coastal Strip will be lost during the Sizewell C development. Whilst the habitat within the SAC dune and heath, and the wetland habitats including reedbed, wet ditches and grazing marsh immediately inland, is not expected to be impacted directly by the footprint of the development, the knock on effects of the development may impact the site’s hydrologcal regime and also, diffuse pollution from the day to day running of the power station may impact upon both fenland and coastal habitats as a potential source of nutrient depositon.

In terms of habitat creation, the recreation of the habitat in mitigation for loss of the coastal strip should, in theory, be more straightforward than for the wetland habitats at Sizewell, not least because much of this area was created as part of the construction phase for Sizewell B. However, finding a location for habitat recreation may be more problematic owing to the finite availability of suitable areas for habitat creation within the coastal zone, although it could be that these habitats are recreated once the sea defences have been constructed, in a similar location.

The recorded assemblages included a number of species with strong affinities to coastal habitat, and a large number of local and Nationally Scarce species were recorded.

8.3.2 Species requirements

Of the species recorded, those such as the Nationally Scarce Grey Bush-cricket *Platycleis albopunctata*, the Lesser Cockroach *Ectobius panzeri* and other Orthopteroids, such as the Stripe-winged Grasshopper *Stenobotrus lineatus,* are well adapted to survival in changing habitats. These species are distributed along the coast and can typically recolonise habitat rapidly, particularly during hotter summers. The same is arguably true of the Grayling and Small Heath Butterflies which require, above all, warm conditions with short sward and bare ground for thermoregulation. The Grayling, whilst of restricted range due to its thermoregulatory requirements, is abundant both within the Coastal Strip, the SAC and within the network of sandy rides inland, and is therefore likely to make a rapid comeback, in areas of temporary disturbance.

However, certain species recorded have more complex or more specific requirements and interdependencies. The apionid weevil *Protapion dissimile,* for example, is found only in sandy habitats where its only foodplant Hare’s-foot Clover *Trifolium arvense* grows. Similarly, the Heath Shieldbug *Legnotus picipes* requires sandy habitats with bedstraws *Galium* spp. These and similar species, whilst being well adapted to the dynamics associated with coastal habitats, may be more localised in their distibution due to requiring several elements to be present in their habitat. Other species, such as the jewel beetle *Aphanisticus pusillus* and the Nationally Scarce snail-killing fly *Pherbellia brunnipes* are associated with wetland habitats as larvae, but favour dry sandy conditions as adults.

A major consideration is the likely impact on the dune assemblages from the Sizewell development. The presence of an RDB1 ‘Nationally Endangered’ species, the spider-hunting wasp *Evagetes pectinipes,* is particularly significant. This is the first Suffolk record and one of very few records outside of its Kent stronghold. Ideally, dune habitat should be protected during the development process, where at all possible. The species was found at the interface between the cliffed, seaward edge of the dune habitat and the shingle upper shore. This habitat received little more than incidental survey attention, and it is not known how well-established this important species is within the coastal area.

Assuming the dune habitat adjacent to the coastal strip can be protected from direct impact, habitat receation for the species recorded within the Coastal Strip CWS sandy grassland would seem relatively achievable, should suitable, coastal mitigation habitat currently of low ecological value be available.

Habitat Creation

If habitat creation is considered as a mitigation option, the following should be considered for the Coastal Strip:

- Creation of habitat would need to occur in a position of similar nature (in terms of geology), proximity to the coast, and ideally within close proximity of the existing site and with comparable wetland habitat to landward. Habitat creation would only be worthwhile in an area which is currently of low ecological value, and care would need to be taken to ensure any habitat created was likely to provide habitat of greater value than that lost.

- The substrate comprising the Coastal Strip grassland was rather flat, and whilst some microtopography was evdent, this was generally subtle. The grassland was diverse and herb-rich, and translocation of turves during winter may be an option (i.e. at such a time that many species would be dormant as pupae, eggs or overwintering adults or larvae).

- The replicaton of a sward with a similar diversity of herbs and grasses would be important. Species such as Hare's-foot Clover *Trifolium arvense*, Lady's Bedstraw *Galium verum*, Common Restharrow *Ononis repens* and Sheep's Sorrel *Rumex acetosella* are all examples of herbs which have one or more associated species recorded during the survey. In the case of Sheep's Sorrel, for example, the RDB3 weevil *Apion rubiginosum,* which is also associated with this plant, was recorded during the Amec 2007-2010 surveys.

- The Coastal Strip grassland was essentially of fairly consistent vegetation composition throughout, and a similar range of species are likely to occur throughout. The possibility of retaining some of this habitat, even a relatively narrow strip adjacent to the dune, should be considered if at all possible, and this strip maintained throughout the development process. This would then act as a reservoir from which created habitat could be colonised.

8.3.3 SAC dune grassland and heath

The dune grassland, heath and scrub habitat within southern end of the Minsmere to Walberswick SAC is not expected to be impacted directly by the development. Some protection of this sensitive habitat and its associated flora and fauna should, however, be considered during the development process.

Potential issues may include drifting of dust from building and land-forming activities, and trampling, and changes in hydrology may impact upon the ditch network, reedbed and wet-woodland forming the landward boundary of the dune heath/ grassland (which is an important element of the habitat complex for some of the rarer species, as discussed above).

In the long-term, if connectivity between coastal habitats to the south of the SAC is compromised, this may adversely affect the integrity of the coastal habitat as a corridor. Consideration should be given to preventing long-term restriction in the mobiity of species.

9 Conclusions

It is clear, from both the 2014 inverterbate survey work and the previous Amec studies between 2007 and 2010, that the fenland and coastal habitats within close proximity of the proposed Sizewell C development are of considerable value for their invertebrate habitats, communities and species.

The surveys carried out in 2014 were designed to focus not only on the habitats most likely to be directly affected, but also areas further afield that could be affected indirectly, such as the southern end of the Minsmere to Wlaberswick Heaths and Marshes SAC/SSSI and parts of Sizewell Marshes SSSI to the west of the proposed development (both of which could potentially be affected by distance effects, such as hydrological change or air pollution).

A total of seven areas were assessed in some detail during the 2014 surveys, and these have been referred to as: the SSSI Triangle; SSSI Area 2; SSSI Fen Meadow; the C-Platform Woodland; Minsmere to Walberswick SAC/SSSI (ditch and scrape); Minsmere to Walberswick SAC/SSSI (dune habitats); and the Coastal Strip CWS. In addition, a further five areas were assessed for their invertebrate habitats in order to provide context to the assessment: Leiston Carr (two locations); Turf Pits; Grimseys woodland; and the large area of reedswamp south of Grimseys.

The locations of all of these sites are shown on Figure 1, with more detailed habitat mapping and invertebrate habitat assessment for the main survey compartments (1 to 6) presented on Figures 2 to 5, and 10 to 13.

Assessment of the relative value of the aquatic habitats (ditches, scrape, lagoons, etc.) has been carried out using standard measures such as BMWP, ASPT and CCI scores, whilst Natural England's invertebrate assemblage computer package ISIS (Invertebrate Species-habitats Information System) has been used to characterise and evaluate both the terrestrial and aquatic invertebrate communities across the sample sites.

Unsurprisingly, given that much of the habitat surveyed was within SAC and/or SSSI designations, the invertebrate species and assemblages recorded in many of the survey compartments were found to be of relatively high nature conservation value. However, even the coastal strip, which is currently afforded only non-statutory protection, was also found to support an invertebrate assemblage of National importance.

It is also important to note, however, that more valuable examples of many of the habitats due to be directly affected (in particular the wet woodland within the C-Platfom site, the fen meadow, and the reedbed and ditches within the SSSI Triangle) were recorded outside the main development footprint. Thus, for example, the invertebrate assemblages identified in the wet woodland within SSSI Area 2 (which is outside the footprint) were found to be of higher value than those in the SSSI Triangle or the C-Platform wet woodland site, whilst the reedbed communities within Area 2 were also found to be more valuable than those in the SSSI Triangle.

It is, nevertheless, clearly a complex picture, and considerable care will need to be exercised to ensure that impacts upon invertebrate communities are kept to a minimum. To this end, the detailed assessment of the invertebrate habitats and species set out in this report (including the specific requirements of some of the more rare species) will be invaluable in informing mitigation proposals. Detailed recommendations with regard to habitat creation and management have been provided, and these will be used to inform the mitigation strategy for the project, including the detailed habitat creation proposals at Aldhurst Farm and any habitat restoration required within the coastal strip dune grassland.

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Appendix 1 - Explanation of ISIS scoring parameters

The ISIS spreadsheet application (from Drake *et al,* 2007).

In order to assess an assemblage, a species list must be pasted into the first column of the ISIS 'data entry' sheet. Only scientific binomial names are accepted. It is important to delete any previous species lists first as contamination of the new list by the old may lead to serious errors. When assessing an assemblage from an SSSI for CSM, this species list would normally be produced by combining four separate samples.

In the data entry sheet, ISIS gives information on each species relating to its BAT, SAT and rarity score. If there is an error message, there could be two reasons. Firstly, the species name may belong to a taxonomic group that is not represented in the species index. In this case, no further action need be taken. Secondly, the species name may have been mistyped or a non-standard name used. In either case, the name should be corrected before proceeding Once a species list has been successfully entered, the results can be viewed in the ISIS 'results' sheet. The SAT table gives the code and the name of any SATs that have been recognised in the species list, together with a series of scores.

Scores used by ISIS - The following scores are generated for SATs:

• The **'weighted species score'** is used for setting CSM targets. ISIS identifies any assemblage type whose score meets the default threshold for assessing assemblage types in favourable condition. The **'weighted species score'** is usually equal to the number of species coded to that SAT, but in some SATs species are weighted for their fidelity to the SAT.

• The **'No. spp.'** score is a simple count of the species coded to that SAT.

• The **'percentage of national species pool'** score is the 'No. spp.' count divided by the total number of species coded to that SAT.

• The **'related BAT rarity score'** is the rarity score of the parent BAT (a score that is also returned in the BAT table).

A different set of scores are generated for BATs - The BAT table returns the code and name of all the BATs that have been recognised in the species list together with a series of scores.

- The **'representation score'** measures the relative importance of the BAT in the species list on a scale of 1 to 100. It is designed as a coarse measure of ecological change at a small scale, for example in management units. The first visibility threshold can usefully be reduced to a lower value for this purpose. At larger scales it is influenced by sample site selection and just reports which habitats have been sampled. The second visibility threshold prevents the expression of BATs whose **'representation score'** might be inflated by closely related BATs.

- The **‘rarity score’** is the average of all the individual species rarity scores in the assemblage.The rarity scores of individual species are often derived from their designated conservation status, but in some groups it is taken from an analysis of the number of 10km squares the species occupies, according to data held in the appropriate national recording scheme. It is therefore a version of the Species Quality Index.
- **‘BAT species richness’** is the number of recorded species that are characteristic of that BAT.
- **‘IEC’** is the Index of Ecological Continuity, a score that is used exclusively for saproxylic assemblages.

It is recommended that SATs rather than BATs should be used as features of interest for CSM. However, some invertebrate assemblages of interest are not found in SATs and these can be covered by the more comprehensive BAT classification (e.g. Arboreal Canopy, has no nested SATs). In these cases the BAT ‘rarity score’ should be used to assess condition. If this score meets the default threshold, ‘fav’ is returned in the ‘Condition‘ column. Over fifteen species must be used in the calculation to produce a robust BAT ‘rarity score’. A score based on a smaller number of species runs the risk of the score being unduly influenced by the presence of just one very rare species.Therefore, it is recommended that the first visibility threshold is set to 15 when interpreting species lists for CSM.

Appendix 2 - Tables

Table 1. Survey compartments broad habitat descriptions (see Figure 1 for locations of the Compartments).

Compartment	Designations	General description
1 SSSI Triangle	Sizewell Marshes SSSI - Unit 2. Fen/Swamp - Favourable Condition (2009)	A large tract of habitat comprising of extensive areas of Common Reed *Phragmites australis* reed-swamp, with Alder *Alnus glutinosa* and Willow *Salix* spp. carr and secondary and more mature wet woodland. An area comprising open water within the central area of the reed-swamp was visible from some aspects, but not surveyed due to access difficulties. However, some more florisitcally diverse swamp communities were accessed and may be further represented towards the margins of the open water areas. A number of wet ditches bordered and striated the Triangle area and were subject to aquatic sampling. These ditches varied in terms of macrophyte diversity and structure due largely to successional stage, but also location in relation to habitat juxtaposition, degree of openness/shade etc. The more open mid successional ditches typically supported a greater macrophyte diversity and structural range. Aquatic plants characteristic of ditch networks of higher conservation value including Frogbit *Hydrocharis morsus-ranae* and Soft Hornwort *Ceratophyllum submersum* for example, may also belie the presence of key aquatic invertebrate assemblages. Besides the aquatic invertebrate assemblages, the juxtaposition of for example, reedswamp and carr habitat and presence of open silt areas and water-logged wood decay habitat, provide niches for more specialised invertebrate species.
2 SSSI Area 2	Sizewell Marshes SSSI - Unit 2. Fen/Swamp - Favourable Condition (2009)	Separated from Sizewell C Platform by 'C Platform woodland strip', SSSI Area 2 comprises extensive areas of Common Reed *Phragmites australis* reed-swamp, with Alder *Alnus glutinosus* and Willow *Salix* spp. carr and mature wet woodland. Reedbed typically very dense with deep litter layer and few associate species besides Nettle *Urtica dioica* and Bramble *Rubus fruticosus*agg. inundated to a depth of between 5 and 30 cm at the time of survey, more diverse swamp communities within the marginal carr with Water-pepper *Persicaria hydropiper*, Water Mint *Mentha aquatica*, Branched Bur-reed *Sparganium erectum* and Water Forget-me-not *Myosotis scorpioides.* Two parallel drains to the south-east and north-west of Sandy Lane Drove ran the entire length of the site's north-west border and were subject to aquatic invertebrate sampling and supported a macrophyte fauna typical of the site as a whole, with more open stretches supporting a reasonably diverse flora including species such as Frogbit *Hydrocharis morsus-ranae* and Hornwort spp. *Ceratophyllum* spp. species often associated with ditches supporting diverse aquatic invertebrate assemblages. Additional drains running between the north-east and south-east corner of the site (adjacent to the wet woodland) were inaccessible and heavily shaded and silted. The extensive reed-swamp has potential to support key species such as Nationally Rare (RDB3), NERC Schedule 41 species, the White Mantled Wainscot *Archanara nurica* and other important reedbed fauna. A number of mature Alder and willow *Salix* spp. were recorded and the site included standing and fallen wood decay habitat, including water-logged branches and stumps favoured for larval development by specialist Diptera ad other taxa.

Compartment	Designations	General description
3 SSSI Fen Meadow	Sizewell Marshes SSSI - Unit 4. Grassland/fen - Favourable Condition (2009)	Fen Meadow contiguous to extensive area of reed-swamp and wet woodland habitat 'SSSI Area 2' and east of secondary wet woodland strip (C Platform Woodland strip), which screens the existing SSSI from Sizewell C Platform. Habitat described in 2008 NVC survey report as - M22d - *Juncus subnodulosus* - *Cirsium palustre* fen meadow - *Iris pseudacorus* subcommunity. Habitat surveyed included the grassland and adjacent wet ditches adjacent to western and eastern field boundaries. On a landscape scale, the Fen Meadow forms part of a network of florisitcally similar, cattle grazed fen meadows and the associated network of field drains and ditches supported habitat with potential to support aquatic and terrestrial invertebrate assemblages of conservation interest. The Nationally Rare (RDB3) Greater Silver Water Beetle *Hydrophilus piceus*recorded from the western ditch is a species associated primarily with coastal grazing marsh habitat of high conservation value. An individual (RDB1) Nationally Endangered (RDB1) Norfolk Hawker Dragonfly *Aeshna isosceles* was recorded over ditches, in similar habitat C500m south of the Fen Meadow during the initial (June) survey visit.
4 Sizewell C Platform woodland strip	Not designated, adjacent to designated SSSI and SAC habitat	Narrow strip of secondary wet woodland screening the habitats to the west from the Sizewell C Platform. The habitat immediately adjacent to the Sizewell site car parks etc. comprises some created habitat with grassland planted with a range of predominately native trees and shrubs together with species of Pine *Pinus* spp. and Holm Oak *Quercus ilex*. Native trees included Pedunculate Oak *Quercus robur,* Silver Birch *Betula pendula,* Hazel *Corylus avellana* and Hawthorn *Crataegus monogyna* amongst others. Down slope a more natural, albeit secondary wet woodland habitat developed with middle -aged stands of Alder *Alnus glutinosa*, Grey Willow *Salix cinerea* and Downy Birch *Betula pubescens.*Downslope, parallel heavily silted and overshaded ditches lead to a surface inundated carr overstanding scattered swamp/wet woodland groundflora towards the interface with the adjacent SSSI Fen Meadow and reed swamp habitat of SSSI Area 2. Patches of Yorkshire Fog *Holcus lanatus,* Rough Meadow Grass *Poa trivialis* and Creepng Bent Grass *Agrostis stolonifera* grassland formed small 'lawns' within some of the more open patches of wet woodland. Low scrub comprising mainly of Bramble *Rubus fruticosus agg.* with Common Dog Rose *Rosa canina*, persisted throughout much of the drier habitat with Common Nettle *Urtica dioica.* The silted ditches and temporarily inundated areas within the more structually open carr habitat supported characteristic wet woodland and marginal species such as Pendulous Sedge *Carex pendula,* False-Fox Sedge *Carex otrubae*, Yellow Flag Iris *Iris pseudacorus* and Common Reed Phragmites australis was represented in patchy stands as was Reed Canary Grass *Phalaris arundinacea*. The habitat was largely somewhat too heavily shaded to support certain wet woodland invertebrate assemblages. Exposed silt habitats with water-logged wood decay habitat provided some potential interest with some fallen Birches with loose bark and superficial rot habitat. The juxtaposition of the woodland strip in relation to the Fen Meadow and Reed-swamp increased the potential value of this habitat, including the canopy. Natonally Rare (RDB3) and NERC Schedule 41 species, White Mantled Wainscot *Archanara nurica* was recorded in a moth trap run within this habitat, however, it is likely that this was attracted from adjacent SSSI reed-swamp.

Compartment	Designations	General description
5 Coastal strip	Not designated, adjacent to designated SSSI and SAC habitat	Strip comprising coastal shingle, vegetated sand dune and created sandy grassland adjacent to the seaward aspect of the Sizewell C Platform. Survey focused primarily on the flattish grassland strip inland of the dune system. This sheltered belt of habitat supported a diverse, albeit rather uniformly planted range of typical sandy grassland species, providing a flower-rich resource, within a predominantly dry, sheltered yet open habitat. Bare sand patches and localised shingle exposures, provided additional feature beneficial to invertebrate species typical of coastal zone habitats. Collectively the dune habitat and grassland strip supported an extensive Orthopteran fauna with approximately half of the native British fauna recorded in this area, including the Nationally Scarce Grey Bush-cricket *Platycleis albopunctata* together with the closely related Lesser Cockroach *Ectobius panzeri*.Two butteflies listed as NERC Section 41 'Species of principal importance' were also recorded including the Grayling *Hipparchia semele* and the Small Heath *Coenonympha pamphilus*.The flower-rich habitat combined with the extent of exposed sand provides potential for a high diversity of ground nesting aculeate Hymenoptera to be recorded as well asa range of other specialist and generalist species.
6 Minsmere SAC and SSSI	Minsmere to Walberswick Heaths and Marshes SAC; Minsmere to Walberswick Heaths and Marshes SSSI Unit 112. Favourable Condition (2012)	Areas from which sampling was undertaken within the SAC included primarily the coastal dune and sandy grassland/heath habitat occupying a zone defined by the line of concrete tank traps at the northern extremity of the area described as the 'Coastal Strip' northwards for approximately 350m. In addition to the dune and sandy grassland/heath habitat a narrow strip of transition scrub/woodland and the strip of coastal reed swamp beyond was also described. The ditch forming the western boundary of this reed-swamp was subject to aquatic sampling as was the shallow scrape occupying the coastal grazing marsh to the west of the ditch. As a whole, the succession of habitats from the upper shore to the vegetated dune habitat, the flatter sandy grassland/heathland habitat and its interface with the scrub woodland belt and subsequent reed-bed habitat, provided a particularly varied transition both in abiotic terms, due to edaphic, geomorphological and hydrological conditions and in terms of florstic diversity. Besides the diversity of the individual habitats, transition zones between for example the upper sandy grassland/heath and the woodland edge are likely to support assemblages requiring elements of both habitat.
7 Leiston Carr & associated wet woodland	**Area x**: Sizewell Marshes SSSI - Unit 2. Fen/Swamp - Favourable Condition (2009). **Area y:** Not designated	**Area x:** Wet woodland identified as W2a *Salix cinerea-Betula pubescens-Phragmites* woodland in 2008 NVC survey. Block to the south, bordered primarily by fen meadow and ditches. Unmanaged woodland habitat. Canopy mainly dense, with small clearings, largely resulting from spaces created by fallen trees. Tree species included predominately Alder *Alnus glutinosa*, Grey Willow *Salix cinerea* and Downy Birch *Betula pendula* and ground flora with Yorkshire Fog *Holcus lanatus and Creeping Soft Grass Holcus mollis* with some Common Reed *Phragmites australis* in wetter areas and Soft Rush *Juncus effusus.* Some old trees including veteran multi-stemmed Alder, but for the most part few mature trees supported. Some layering (regeneration of recumbent Grey Willow from runners) had occurred and a large amount of fallen deadwood was present. However, deadwood mainly comprised twiggy fallen branches rather than large trunks and consequently, the saproxylic value of the site was not likely to be as great, lacking a full range of features characterising more valuable saproxylic habitat and also the field layer was largely heavily shaded. However, some inundated dead wood, rot holes and moss habitat was recorded and layered Grey Willow often eminated from old stools, with some potential. Some mature dead and dying Downy Birch was evident in relatively open areas with Birch Polypore Fungus *Piptoporus betulinus* providing additional potential for fungus eating species. Birch Polypore can support a Nationally Vulnerable RDB2 species of darkling beetle *Diaperis boleti.* Whilst not recorded during the survey *D. boleti* has been recorded within the area around Leiston.

Compartment	Designations	General description
		Area y: Leiston Carr wet woodland mapped in 2008 NVC survey as comprising W2a *Salix cinerea-Betula pubescens-Phragmites australis* woodland to the south grading into W6a *Alnus glutinosa - Urtica dioica* woodland to the north. Habitat viewed from a distance due to access difficulties, but the southern area appeared relatively dry for wet woodland with Pedunculate Oak *Quercus robur* alongside Downy Birch, Alder and Grey Willow.
8 Grimseys	Sizewell Marshes SSSI - Unit 2. Fen/Swamp - Favourable Condition (2009)	Mature Alder *Alnus glutinosa* and Downy Birch *Betula pubescens* with open water bodies. Ditch along western boundary fairly open with a varied age structure of trees. Mature, multistemmed Alder with suckering bases and younger Alder seedlings. Also mixed stands of younger and more mature Downy *B. pubescens* and Silver Birch *B.pendula.*Some wood decay habitat present predominantly standing and fallen birch wood, with rot holes and peeling bark habitat, also sap runs in some of the living trees. Some branches and fallen trunks within water-bodies, providing saturated wood with potential to support specialist Diptera including for example Syrphidae and Tipulidae spp. Ground layer with uneven topography and varing level of surface water; generally wet at time of survey with some inundated areas and also drier areas frequently colonised by grasses, predominately Yorkshire Fog *Holcus lanatus*. Wetter areas variously supported stands of Common Nettle *Urtica dioica* and Water-pepper *Persicaria hydropiper* with more scattered Soft Rush *Juncus effusus,* Hard Rush *J. inflexus,* Yellow Flag Iris *Iris psuedacorus,* Water Mint *Mentha aquatica* and Brooklime *Veronica beccabunga.* Common Reed *Phragmites australis* typically flanked the ditches and water-bodies and weedy margins often included water starwort species *Callitriche* spp. and Lesser Water-parsnip *Berula erecta*. Expanses of exposed, unvegetated silt and leaf litter provided habitat for specialist invertebrates such as saldid bugs, specialist ground beetles, rove beetles and Diptera. Fallen, wind-damaged birches abundant around TM 46614 64253 created more openness and opportunities for saproxylic invertebrates. Evidence of bark-beetles and other saproxylics wood boring beetles in places, however, woodlice (Isopoda), mollusca and centipedes (Chilopoda), were the most evident groups. Drier parts of the woodland featured Pedunculate Oak *Quercus robur* and occasionally Hazel *Corylus avellana* and Holly *Ilex aquilinum*featured in understorey, providing additional potential invertebrate divesity. A low scrub layer of Bramble *Rubus fruticosus* agg. persisted in such areas, groundflora lacking diversity with Herb Robert *Geranium robertianum* being the only abundant herb species.
9 Turf Pits (W6a woodland)	Not designated, adjacent to designated Sizewell Marshes SSSI, Unit 1.	Described as W6a *Alnus glutinosa - Urtica dioica* woodland on NVC map (2008). Visible habitat included, for the most part, dense, unmanaged stands comprising a canopy of mainly mature Alder *Alnus glutinosa* with Crack Willow *Salix fragilis* and Sycamore *Acer psuedoplatanus o*verstanding a dense understorey and scrub layer comprising Grey Willow *Salix cinerea* and abundant non-native invasive Rhododendron *Rhododendron ponticum.* Little light persisted to ground layer except for in some more open areas at the periphery of the wood. Here, open albeit heavily silted and sparsely vegetated ditches provided some potential habitat for breeding diptera and other invertebrate fauna associated with poorly vegetated silt and saturated wood habitat in wet woodland. Some Yellow Flag Iris *Iris pseudacorus* persisted within the ditches. The ground and low scrub layer within the drier edge areas of the woodland included abundant Bracken *Pteridium aquilinum* and Bramble *Rubus fruticosus* agg. Some non-specialist woodland herbs including Herb Robert *Geranium robertianum*, Wood Avens *Geum urbanum* and Germander Speedwell *Veronica chamaedrys*, persisted at the trackside boundary. The woodland was in unfavourable condition due to extent of Rhododendron within the understorey and crowded canopy limited the potential of the site for more thremophilic woodland invertebrates at ground level.

Compartment	Designations	General description
10 Reed-swamp (north-west of Sandy Lane Drove)	Sizewell Marshes SSSI - Unit 2. Fen/Swamp - Favourable Condition (2009)	*Phragmites australis* reed-swamp occupying land adjacent to the ditch northwest of Sandy Lane Drove. Fairly dense structure with water at or a little above the soil surface (0-4cm). More florisitcally diverse than typical reed-swamp, possibly in the process of succession from fen meadow to reed-swamp. Additional macrophytes included Water Mint *Mentha aquatica,* Water-pepper *Persicaria hydropiper,* Gipsywort *Lycopus europaeus,* Fool's Water-cress *Apium nodiflorum,* Greater Bird's-foot Trefoil *Lotus pedunculatus,* Nodding Bur-marigold, *Bidens cernua* and Marsh Thistle *Cirsium palustre.* A water starwort *Callitriche sp.* was also recorded in wetter areas. The habitat lacked a deep litter layer characteristic of more mature reed swamps. Likely to provide habitat for a range of species including the larvae of wainscot moths not associated with mature reed beds and other stem developing species as well as general swamp species associated with flowering plant resource. The presence of Nodding Bur-marigold suggests a seasonally fluctuating water table, species associated with fluctuating water tables in fen habitats may also occur in this habitat.

Table 2. Aquatic sample site locations and descriptions (see Figures 6-9 for locations).

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
A1	SSSI Triangle	19/06/2014	TM46958 64453	Ditch approximately 3m wide x 0.75m at deepest point. Well vegetated, mid-succession, Water-cress *Rorippa nasturtium-aquaticum* dominant in channel emergent vegetation, with abundant Lesser Water-parsnip *Berula erecta* and Common Reed *Phragmites australis*, mainly at margins. Common Duckweed *Lemna minor* and to a lesser extent, Large Duckweed *Spirodela polyrhiza* locally forming dense carpet on surface. Sample site just in field (cattle-grazed pasture) of junction with SSSI Triangle. Partially shaded by Birch *Betula sp*. and Alder *Alnus glutinosa.* Flow direction east; very slow. Water clear.
A2	SSSI Triangle	19/06/2014	TM47044 64443	Ditch approximately 4m wide x 0.75m at deepest point. Open water well vegetated, mid-succession, Water-cress *Rorippa nasturtium-aquaticum* dominant component of in-channel, emergent vegetation, with abundant water starwort *Callitriche* sp. and Common Duckweed *Lemna minor*. Flow directon east; very slow Water clear. Banks with Common Nettle *Urtica dioica* and False Oat Grass *Arrhenatherum elatius.*
A3	SSSI Triangle	19/06/2014	TM47223 64489	Ditch approximately 4m wide x 0.75m at deepest point. Densely vegetated with Sweet-grass *Glyceria plicata/fluitans* forming a dense, surface mat with Water-cress *Rorippa nasturtium-aquaticum* and occasional emergent Greater Reedmace *Typha latifolia*. Floating-leaved aquatics included Common Duckweed *Lemna minor, Large Duckweed Spirodella polyrhiza* and very occasional Frogbit *Hydrocharis morsus-ranae.*a water starwort *Callitriche sp.* also present. Flow direction east, very slow, water clear.
A4	SSSI Triangle	19/06/2014	TM47144 64271	Ditch approximately 3m wide x 0.5m at deepest point. Heavily shaded by riparian Alder *Alnus glutinosa* and Sallow *Salix cinerea/caprea*. Adjacent vegetation dominated by marginal Common Reed *Phragmites australis* with Common Nettle *Urtica dioica*. Flow very slow. Little emergent vegetation but abundant Common Duckweed *Lemna minor* on surface with some Water-cress *Rorippa nasturtium-aquaticum,* Nuttall's Waterweed *Elodea nuttalli* and a water starwort *Callitriche* sp.found in sample. Flow east; very slow, silted. Later succession.
A5	SSSI Triangle	19/06/2014	TM47140 64275	Ditch approximately 3m wide, depth indetermined due to dense covering of Common Duckweed *Lemna minor*. Shaded by riparian willow *Salix* spp. Margins and banks bordered with Common Reed *Phragmites australis.*Flow direction east; very slow
A6	SSSI Triangle	19/06/2014	TM47364 64512	Ditch approximately 3m wide, by 0.7m maximum depth. Shaded by riparian Alder *Alnus glutinosa.* With dense Common Reed *Phragmites australis* and Common Duckweed *Lemna minor*. Flow direction east; very slow.

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
A7	SAC Ditch	19/06/2014	TM47432 64755	Ditch at margin of grazing marsh (north) and reedbed strip (south). Approximately 2-3m wide, maximum depth 1m. With marginal shallows. Flow east, very slow. Water clear. Well vegetated, mid stage of succession, Common Duckweed *Lemna minor* covering surface with in-channel macrophytes including Water-cress *Rorippa nasturtium-aquaticum*, Lesser Water-parsnip *Berula erecta*, and tall emergents including Branched Bur-reed *Sparganium erectum* and marginal Common Reed *Phragmites australis*, Yellow Flag Iris *Iris pseudacorus* and Greater Willowherb *Epilobium hirsutum*.
A8	SAC Scrape	19/06/2014	TM47334 64860	Open, shallow scrape, well vegetated with emegent Spike rushes *Eleocharis palustris/uniglumis* and Common Water Plantain *Alisma plantago-aquaticum* with submerged aquatics including Fennel-leaved Pondweed *Potamogeton pectinatus* and Curled Pondweed *Potamogeton crispus.* Depth gradually increasing to approximately 0.5m. RDB3 Nationally Rare, Great Silver Water Beetle *Hydrophilus piceus* in sample (photographed and released).
A9	SSSI Fen Meadow Ditch	19/06/2014	TM46997 63817	Ditch located at eastern border of cattle-grazed fen meadow; approximately 2m wide by 1m maximum depth. Partially shaded by wet woodland margin to east. With emergent Branched Bur-reed *Sparganium erectum* with False Fox Sedge *Carex otrubae* and surface covering of Common Duckweed *Lemna minor* interspersed with Large Duckweed *Spirodela polyrhiza.*
A10	SSSI Fen Meadow Ditch	19/06/2014	TM46903 63846	Ditch located at western border of cattle-grazed fen meadow; approximately 2m wide by 1m maximum depth. Partially shaded by riparian Alder *Alnus glutinosa* and sallow *Salix cinerea/caprea*. Greater/Lesser Pond Sedge *Carex riparia/acutiformis,* False Fox Sedge *Carex otrubae* at margins with Frogbit *Hydrocharis morsus-ranae,* Common Duckweed *Lemna minor* and Large Duckweed *Spirodela polyrhiza* and submerged aquatics including a water milfoil *Myriophyllum sp.*Flow north, very slow.
A11	SSSI Area 2	19/06/2014	TM46662 63751	Ditch approximately 4m wide, up to 1m deep and of mid-late successional stage. Partial shade from riparian Alder *Alnus glutinosa*. Constant cover of Common Duckweed *Lemna minor* over surface, with emergent Common Reed *Phragmites australis.*
A12	SSSI Area 2	19/06/2014	TM46658 63719	Ditch heavily shaded by overhanging vegetation, with deep silt layer, some Common Duckweed *Lemna minor* and emergent sedge species *Carex* sp. Flow west, very slow.
A13	SSSI Area 2	19/06/2014	TM46727 63841	Well vegetated ditch (west of Sandy Lane Drove) with floating-leaved species including Frogbit *Hydrocharis morsus-ranae* and Common Duckweed *Lemna minor* amongst in-channel Common Reed *Phragmites australis.*with Lesser Water-parsnip *Berula erecta.* Submerged aquatic Soft Hornwort *Ceratophyllum submersum* found in sample. Flow north, very slow.
A14	SSSI Area 2	19/06/2014	TM46765 63871	Ditch located to the east of Sandy Lane Drove. Approximately 4m wide, surface densely covered in Common Duckweed *Lemna minor* with emergent Common Reed *Phragmites australis*. Partial shade from Alder *Alnus glutinosa*. Flow north, very slow.

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
A15	SSSI Area 2	19/06/2014	TM46694 63796	Ditch located to the east of Sandy Lane Drove. Approximately 4m wide, surface densely covered in Common Duckweed *Lemna minor* with Large Duckweed *Spirodela polyrhiza* and some Frogbit *Hydrocharis morsus-ranae,*emergent Common Reed *Phragmites australis* and a water starwort *Callitriche sp.* and Fennel-leaved Pondweed *Potamogeton pectinatus in* sample.Partial shade from Alder *Alnus glutinosa*. Flow north, very slow.
A16	SSSI Area 2	19/06/2014	TM46686 63789	Ditch approximately 4m wide, located to the west of Sandy Lane Drove. Shaded by riparian Alder *Alnus glutinosa,* surface densely covered in Common Duckweed *Lemna minor* with sedge sp. Carex sp, and Branched Bur-reed *Sparganium erectum.* Submerged aquatic vegetation included including a hornwort *Ceratophyllum sp.* Flow north, very slow.
A17	SAC Ditch	12/08/2014	TM47418 64678	Ditch at margin of grazing marsh (north) and reedbed strip (south) approximately 3m wide x up to 1m deep, with marginal shallows. Flow east, very slow. Water clear. Well vegetated, mid stage of succession, Common Duckweed *Lemna minor* covering surface with in-channel macrophytes including Water-cress *Rorippa nasturtium-aquaticum*, Lesser Water-parsnip *Berula erecta*, and tall emergents including Branched Bur-reed *Sparganium erectum* and marginal Common Reed *Phragmites australis,* Yellow Flag Iris *Iris pseudacorus* and Greater Willowherb *Epilobium hirsutum.*
A18	SSSI Triangle	12/08/2014	TM46957 64456	Ditch approximately 3m wide x 0.75m at deepest point. As A1, vegetation cover approximately 70%.Cattle poached marginal habitat with Water-pepper *Persicaria hydropiper* and Soft Rush *Juncus effusus*, channel with Water-cress *Rorippa nasturtium-aquaticum*, Lesser Water-parsnip *Berula erecta* with patches of Common Reed *Phragmites australis*.
A19	SSSI Triangle	12/08/2014	TM47059 64431	Ditch width approxiately 4m, maximum depth 0.5m; flow east, very slow; water clear mostly unshaded. Surface covered with dense Common Duckweed *Lemna minor*; aquatic emergents included Water-cress *Rorippa nasturtium aquaticum* with Lesser Water-parsnip *Berula erecta* and Common Reed *Phragmites australis.*
A20	SSSI Triangle	12/08/2014	TM47129 64459	Ditch width approxiately 4m, maximum depth 0.5m; flow east, very slow; Partially shaded (approximately 20%) by Alder *Alnus glutinosa* and Sallow *Salix cinerea/caprea.* Surface with Common Duckweed *Lemna minor,* in-channel Water-cress *Rorippa nasturtium-aquaticum* and Lesser Water-parsnip *Berula erecta* with a sweet-grass *Glyceria fluitans/plicata,* Common Reed *Phragmites australis* and Branched Bur-reed *Sparganium erectum.* Skullcap *Scutellaria galericulata* also recorded.

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
A21	SSSI Triangle	12/08/2014	TM46986 64319	Tall herb swamp habitat at the margin of open water area. Well vegetated shallows extending gradually outwards into open water, more open than adjacent Common Reed Phragmites australis swamp, partially shaded from wet woodland margin, with encroaching Alder *Alnus glutinosa* and willows *Salix* spp. Water clear, still. litter layer and vegetation structure providing niches for a range of aquatic and hygrophilous invertebrates. Vegetation relatively diverse wih tall emergents including Branched Bur-reed *Sparganium erectum,* Common Reed *Phragmites australis,* False-fox Sedge *Carex otrubae,* Bottle Sedge *Carex rostrata*and Compact Rush *Juncus conglomeratus* with Water Mint *Mentha aquatica*, Gipsywort *Lycopus europaeus*, Water Dock *Rumex hydrolapathi,* Marsh Bedstraw *Galium palustre* and a range of other species.
A22	SSSI Triangle	12/08/2014	TM47255 64454	Ditch approximately 4m wide and 0.5m deep. Still, shade roughly 50%, Common Duckweed *Lemna minor* covering surface. Vegetated mainly with Lesser Water-parsnip *Berula erecta* and Common Reed *Phragmites australis.*
A23	SSSI Triangle	12/08/2014	TM47283 64429	Ditch approximately 4m wide and 0.5m deep. Open water with Common Reed *Phragmites australis* and floating leaved aquatics including Common Duckweed *Lemna minor* and Frogbit *Hydrocharis morsus-ranae.*
A24	SSSI Triangle	12/08/2014	TM47366 64514	Ditch approximately 4m wide and 0.5m deep. Shaded and surface covered with Common Duckweed *Lemna minor*, with marginal/emergent vegetation including Common Reed *Phragmites australis* and Branched Bur-reed *Sparganium erectum* providing some additional structure beneficial to aquatic invertebrates.
A25	SSSI Area 2	12/08/2014	TM46795 63904	Ditch approximately 4m wide and 0.5m deep. Mid-late succession, heavily vegetated and botanically diverse with floating-leaved aquatics including Frogbit *Hydrocharis morsus-ranae,* Common Duckweed *Lemna minor* and Large Duckweed *Spirodela polyrhiza* with Common Reed *Phragmites australis*, Lesser Water-parsnip *Berula erecta,* Marsh Bedstraw *Galium palustre* and a range of other species. Margins of adjacent field indundated at time of survey, included within sample. Habitat with high potential to support diverse invertebrate assemblages and species such as Great Silver Water Beetle *Hydrophilus piceus.*
A26	SSSI Area 2	12/08/2014	TM46772 63877	Ditch approximately 4m wide and 0.5m deep. Mid-late succession, with Common Duckweed *Lemna minor* and Common Reed *Phragmites australis* at borders and aquatic species including a water starwort *Callitriche* sp. providing some structural diversity.
A27	SSSI Area 2	12/08/2014	TM46769 63876	Ditch overshaded by Crack Willow *Salix fragilis* at sample site. Open water habitat with Frogbit *Hydrocharis morsus-ranae* and Common Reed *Phragmites australis.*
A28	SSSI Area 2	12/08/2014	TM46727 63838	Florisically diverse ditch approximately 3m wide by 0.5m maximum depth. Structurally good invertebrate habitat with emergent Lesser Water-parsnip *Berula erecta*, floating-leaved Frogbit *Hydrocharis morsus-ranae* and submerged aquatics including a hornwort *Ceratophyllum sp.*, and non-native Nuttall's Waterweed *Elodea nuttalli.*

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
A29	SSSI Area 2	12/08/2014	TM46698 65798	Ditch appoximately 4m wide, depth undetermined. Heavily shaded by bankside Alder *Alnus glutinosa* Common Duckweed *Lemna minor* covering surface of open water. Margins with Common Reed *Phragmites australis,* Water-pepper *Persicaria hydropiper,* Water Mint *Mentha aquatica* and Creeping Buttercup *Ranunculus repens.*
A30	SSSI Area 2	12/08/2014	TM46950 63672?	Heavily shaded ditch approximately 3m wide by 0.5m deep. With Common Reed *Phragmites australis,* Lesser Water-parsnip *Berula erect*a and Water-pepper *Persicaria hydropiper*.
A31	SSSI Fen Meadow Ditch	13/08/2014	TM46906 63822	Mid-late sucessional ditch at the interface between of a botanically diverse fen meadow and a wooded strip, creating partial shade (approximately 20%) from the westerly aspect. Ditch approximately 4m wide and up to 1m deep. Fairly dense vegetation providing structural diversity. Abundant in-channel Frogbit *Hydrocharis morsus-ranae*, with Common Duckweed *Lemna minor* and Large Duckweed *Spirodela polyrhiza* on surface and submerged aquatics including a hornwort *Ceratophyllum* sp. Marginal vegetation included Common Reed *Phragmites australis,* Greater/Lesser Pond Sedge *Carex riparia/acutiformis*, False Fox Sedge *Carex otrubae, Marsh Bedstraw Galium palustre* and Marsh Woundwort *Stachys palustris*. Overhanging trees including Alder *Alnus glutinosa* and Grey/Goat Willow *Salix cinerea/caprea.* RDB3 nationally rare Great Silver Water Beetle *Hydrophilus piceus* in sample, habitat typical of grazing marsh ditches favoured by this species.
A32	SSSI Fen Meadow Ditch	13/08/2014	TM46953 63897	Ditch approximately 4m wide, up to 1m deep and of mid-late successional stage. Fairly heavily shaded from eastern aspect interface with wet woodland strip (approximately 50% shade) due to overhanging Alder *Alnus glutinosa*, Grey/Goat Willow *Salix cinerea/caprea* and Crack Willow *Salix fragilis*. Marginal habitat with encroaching Greater/Lesser Pond Sedge *Carex riparia/acutiformis*, False Fox Sedge *Carex otrubae* with Common Reed *Phragmites australis*, a sweet grass *Glyceria fluitans/plicata*, Water Mint *Mentha aquatica* and Creeping Bent Grass *Agrostis stolonifera.*Open water surface with dense Common Duckweed *Lemna minor,* Large Duckweed *Spirodela polyrhiza* and Frogbit *Hydrocharis morsus-ranae.* Snail-rich habitat with potential to support Great Silver Water Beetle *Hydrophilus piceus* as found at sample site A31.

Table 3. Terrestrial invertebrate sample locations and habitat descriptions (see Figures 6-9 for locations).

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
T1	SSSI Triangle	17/06/2014	TM47019 64409	Wet woodland with Alder *Alnus glutinosa,* Downy Birch *Betula pubescens,* Grey willow *Salix cinerea* and Crack Willow *S. fragilis*. Species-poor ground flora with Yorkshire Fog *Holcus lanatus* (not *H. mollis*), Rough Meadow Grass *Poa trivialis,* Common Nettle *Urtica dioica* and *Persicaria hydropiper.*Some mature trees and fairly open structure, light persisting to ground layer. Wet silt with dappled shade at margins of ditches and ditch edge vegetation targeted for sampling.
T2	SSSI Triangle	17/06/2014	TM46981 64333	Wet woodland/reed-swamp interface. Wet woodland/carr habitat predominately Alder *Alnus glutinosa* saplings and small trees (secondary woodland). Common Reed *Phragmites australis* reedswamp, margin of dense reedswamp and scattered reed and other vegetation persisting beneath dappled shade of carr. Ground uneven with sparsely vegetated silted channels - seepage habitat. Patches of Rough Meadow Grass *Poa trivialis* and Common Nettle *Urtica dioica* with scattered wetland vegetation including Celery-leaved Buttercup *Ranunculus sceleratus,* Gipsywort *Lycopus europaeus,* Water Dock *Rumex hydrolapathi*, Soft Rush *Juncus effusus* and Water Mint *Mentha aquatica.*
T3	SSSI Triangle	17/06/2014	TM46991 64322	Open, herb-rich fen at the margin of open water area. Well vegetated shallows extending gradually outwards into open water, more open than adjacent Common Reed *Phragmites australis* swamp, partially shaded from wet woodland margin, with encroaching Alder *Alnus glutinosa* and willows *Salix* spp. Water clear, still. Structurally and florisitically diverse wih tall emergents including Branched Bur-reed *Sparganium erectum,* Common Reed *Phragmites australis*, False-fox Sedge *Carex otrubae,*Bottle/Cyperus Sedge *Carex rostrata/pseudocyperus,* Compact Rush *Juncus conglomeratus,* Greater Reednmace *Typha latifolia* and a clubrush *Schoenoplectus lacustris/tabarnaemontari* with Water Mint *Mentha aquatica*, Gipsywort *Lycopus europaeus,* Water Dock *Rumex hydrolapathi*, Marsh Bedstraw *Galium palustre,* Common Water Plantain *Alisma plantago-aquatica* and a range of other species.
T4	SSSI Triangle	17/06/2014	TM47200 64447	Common Reed *Phragmites australis* reedbed, relatively dry with water at or below soil surface. In clearing with mature birch *Betula* spp. Reedbed with Bramble *Rubus fruticosus agg.* and scattered ruderal vegetation including Common Nettle *Urtica dioica*, Rough Meadow Grass *Poa trivialis*, Hedge Bindweed *Calystegia sepium,* Wild Angelica *Angelica sylvestris*, Hemp Agrimony *Eupatorium cannabinum*, Herb Robert *Geranium robertianum,* Tufted Forget-me-not *Myosotis laxa,* Marsh Thistle *Cirsium palustre,* Lesser Stitchwort *Stellaria graminea* and Marsh Bedstraw *Galium palustre.*

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
T5	SSSI Area 2	18/06/2014	TM46691 63773	Wet woodland/Alder *Alnus glutinosa* carr with mature multi-stemmed Alder and Crack Willow *Salix fragilis* persisting into *Phragmites australis* reedswamp. Standing and fallen deadwood and log pile. Ground layer at edge of reedswamp and wet ditches with Rough Meadow Grass *Poa trivialis* dominant with Common Nettle *Urtica dioica* and Cleavers *Galium aparine* and Branched Bur-reed *Sprganium erectum* in ditches. Also typical wet woodland associates including Bittersweet *Solanum dulcamara*, Water Mint *Mentha aquatica*, Skullcap *Scutellaria galericulata,* Water Pepper *Pesicaria hydropiper,* Wavy Bittercress *Cardamine flexuosa and* Wood Dock *Rumex sanguineus.*
T6	SSSI Area 2	18/06/2014	TM46743 63800	*Phragmites australis* reedswamp with *Alnus glutinosa* carr, with mature, multistemmed Alders persisting in open reedswamp. Water table at and slightly above ground level. Other vegetation included Reed Canary Grass *Phalaris arundinacea,* Water Mint *Mentha aquatica*, Wild Angelica *Angelica sylvestris*, Skullcap *Scutellaria galericulata* and Hemp Agrimony *Eupatorium cannabinum*. Both mature and sapling Alder.
T7	SSSI Area 2	18/06/2014	TM46794 63855	*Phragmites australis* reedswamp with with mature, multistemmed Alder *Alnus glutinosa* and Grey Willow *Salix cinerea* scrub persisting in open reedswamp. Also mature Hawthorn *Crataegus monogyna* and Hazel *Corylus avellana*. Water table at and slightly above ground level. Heavily silted wet ditch very sparsely vegetated silt seepage habitat at edge of carr, adjacent to open reedswamp.
T8	SSSI Area 2	18/06/2014	TM46832 63889	*Phragmites australis* reedswamp with mature Alder *Alnus glutinosa* and Grey Willow *Salix cinerea* carr at margins. More open habitat within and at edges of carr/reedswamp with macrophytes including Celery-leaved Buttercup *Ranunculus sceleratus* and Water Pepper *Persicaria hydropiper* and water-starwort spp. *Callitriche* spp. in shallow pools on silt and at bases of reeds. Also Branched Bur-reed *Sparganium erectum*, Brooklime *Veronica beccabunga* and Water Forget-me-not *Myosotis scorpioides.*
T9	SSSI Area 2	18/06/2014	TM46910 63896	Fen meadow, herb-rich and partially inundated wet grassland with: Yorkshire Fog *Holcus lanatus*, Blunt-flowered Rush *Juncus subnodulosus,* Greater Bird's-foot Trefoil *Lotus pedicularis,* Tufted Vetch *Vicia cracca,* Meadow Vetchling *Lathyrus pratensis,* Ragged Robin *Lychnis flos-cuculi,* Water Mint *Mentha aquatica,* Lesser Spearwort *Ranunculus flammula,* Celery-leaved Buttercup *R. sceleratus*and Marsh Bedstraw *Galium palustre,* Marsh Pennywort *Hydrocotyle vulgaris* and False Fox Sedge *Carex otrubae*..Some subtle variation in degree of inundation, vegetation strucure/composition, but largely homogenous,

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
T10, 11, 12, 13	Coastal Strip	T10,11,12 (14/07/2014); T13 (17/07/2014)	TM47570 63814; TM47583 63912; TM47585 64027; TM47602 64384.	Dry, sandy, short sward grassland, frequent bare earth (sand and shingle) patches and sandy path. Occasional tussocky patches. Diverse and herb-rich. Grasses including Red Fescue *Festuca rubra*, Yorkshire Fog *Holcus lanatus*, Sweet Vernal Grass *Anthoxanthum odoratum,*Common Bent Grass *Agrostis capillaris*and Cock's-foot *Dactylis glomerata*. Ribwort Plantain *Plantago lanceolata,* Lady's Bedstraw *Galium verum*, Common Restharrow *Ononis repens,* Common Bird's-foot Trefoil *Lotus corniculatus*, Sheep's-bit *Jasione montana,*Common Cat's-ear *Hypochaeris radicata,*Common Ragwort *Senecio jacobaeae,*Common Stork's-bill *Erodium cicutarium,* Smooth Hawk's-beard *Crepis capillaris,* Sheep's Sorrel *Rumex acetosella,*English Stonecrop *Sedum anglicum,* Hare's-foot Clover *Trifolium arvense,* Common Harebell *Campanula rotundifolia,* Yellow Rattle *Rhinanthus minor,* Hairy Tare *Vicia hirsuta, Sand Sedge Carex arenaria* and a range of other species.
T14	SAC dune grassland	17/07/2014	TM47580 64551	Well vegetated dune grassland with localised scrub patches (Gorse *Ulex europaeus;* Bramble *Rubus fruticosus* agg. Pedunculate Oak *Quercus robur,* Silver Birch *Betula pendula* and Pine *Pinus spp.* saplings). Occasional to locally abundant dwarf shrub heath with Common Heather *Calluna vulgaris,* Bell Heather *Erica cinerea* with Sand Sedge *Carex arenaria,* Red/Sheep's Fescue *Festuca ovina/rubra*, Sweet Vernal Grass *Anthoxanthum odoratum*, Common Cat's-ear *Hypochaeris radicata* and Sheep's-bit *Jasione montana*. Undulating microtopography with dry, sandy bare ground providing varied microhabitat.
T15	SAC dune grassland	17/07/2014	TM47546 64675	As T14 but more tussocky seaward, Marram Grass *Ammophila arenaria* increasingly dominant. With Sand Sedge *Carex arenaria*, frequent patches of Common Restharrow *Ononis repens* and Lady's Bedstraw *Galium verum.* Sandy bare ground mainly around track edges.
T16	SAC dune grassland	17/07/2014	TM47573 64834	Upper dune grassland close to interface with scrub/carr woodland and reedbed. Dry, sheltered scrub heath. Sandy with Sand Sedge *Carex arenaria* and occasional Common Heather *Calluna vulgaris* and Bell Heather *Erica cinerea*. *Cladonia portentosa/ciliata* type lichen abundant forming almost constant cover in places. With Common Cat's-ear *Hypochaeris radicata,* Hairbell *Campanula rotundifolia* and Sheep's-bit *Jasione montana*.
T17	SAC dune grassland	15/08/2014	TM47516 64624	Dune/scrub heath interface with ericoids dry grassland and birch dominated scrub woodland
T18	SAC dune grassland	15/08/2014	TM47509 64699	Scrub woodland /dune heath interface with ericoids dry grassland and birch dominated scrub woodland
T19	SAC dune grassland	15/08/2014	TM47513 64728	Scrub woodland /dune heath interface with ericoids dry grassland and birch dominated scrub woodland
T20	SAC dune grassland	15/08/2014	TM7508 64561	Scrub woodland /dune heath interface with ericoids dry grassland and birch dominated scrub woodland

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
T21	C-Platform Woodland	11/08/2014	TM47013 64103	Mainly secondary Alder *Alnus glutinosa* growth; tall but slender. Fairly dense canopy with Grey Willow *Salix cinerea* and also Hazel *Corylus avellana*. Swamp with varied topography. Heavily silted with ditch lines. Evidence of seasonal inundation during winter months. Sparsely vegetated with Pendulous Sedge *Carex pendula*, Hemp Agrimony *Eupatoria cannabinum*, *Glyceria fluitans* and False Fox Sedge *Carex otrubae.* Also thinly scattered Common Duckweed *Lemna minor,* on pooled water in residual channels and Water Foget-me-not *Myosotis scorpioides*and Reed Canary Grass *Phalaris arundinacea.*
T22	C-Platform Woodland	11/08/2014	TM47026 64011	Alder *Alnus glutinosa* woodland and inundated understorey, with Creeping Bent *Agrostis stolonifera,* Yorkshire Fog *Holcus lanatus* and False Fox Sedge *Carex otrubae*. Survey area also included the planted trees at the slope top forming a buffer to the existing Sizewell complex. Drier habitat with Pedunculate Oak *Quercus robur*, Silver Birch *Betula pendula*, Hawthorn *Crataegus monogyna* and Holly *Ilex aquifolium*.
T23	C-Platform Woodland	11/08/2014	TM47007 63903	Multistemmed Alder *Alnus glutinosa* and fairly mature Downy Birch *Betula pubescens.* Shallow inundated habitat with False Fox Sedge *Carex otrubae,* Herb Robert *Geranium robertianum,* Grassland with Velvet Bent *Agrostis canina*.
T24	C-Platform Woodland	11/08/2014	TM47017 63836	Wet woodland with multistemmed Alder *Alnus glutinosa*, birch *Betula* spp. and Grey Willow *Salix cinerea.*
T25	SSSI Fen Meadow	18/06/2014	TM46937 63812	Fen meadow, herb-rich and partially inundated wet grassland with: Yorkshire Fog *Holcus lanatus*, jointed rushes *Juncus spp.,* Greater Bird's-foot Trefoil *Lotus pedicularis,* Tufted Vetch *Vicia cracca,* Meadow Vetchling *Lathyrus pratensis,* Ragged Robin *Lychnis flos-cuculi,* Water Mint *Mentha aquatica,* Lesser Spearwort *Ranunculus flammula,* Celery-leaved Buttercup *R. sceleratus*and Marsh Bedstraw *Galium palustre,* Marsh Pennywort *Hydrocotyle vulgaris* and False Fox Sedge *Carex otrubae.*Some subtle variation in degree of inundation, vegetation strucure/composition, but largely homogenous,
T26	SSSI Fen Meadow	13/08/2014	TM46937 63838	Fen Meadow, partially inundated with drier areas. Tussocky in places; average sward height 30-40cm, some shorter patches; no scrub. jointed rushes *Juncus* spp (dom.) with Red Fescue *Festuca rubra,* Creeping Bent *Agrostis stolonifera,* Yorkshire Fog *Holcus lanatus*, Silverweed *Potentilla anserina*, Water Mint *Mentha aquatica,* Greater Bird's-foot Trefoil *Lotus pedicularis,* Tufted Vetch *Vicia cracca,* Meadow Vetchling *Lathyrus pratensis,* Strawberry Clover *Trifolium fragiferum,* Red Clover *T.pratense,* White Clover *T. repens,* Parsley-leaved Water Dropwort *Oenanthe lachenalii,* Marsh Bedstraw *Galium palustre,* Marsh Pennywort *Hydrocotyle vulgaris.*

Sample site	Sample zone	Sampling Date	Grid reference	Habitat Description
T27	SSSI Area 2	13/08/2014	TM4955 63947	*Phragmites australis* reedswamp at the edge of *willow* Salix spp. and Alder *Alnus glutinosa* carr. Shade from carr approximately 20 percent in sample area. Reeds inundated at base, with litter layer. Mature willow and Alder with some standing and fallen wood decay habitat. More open swamp beneath carr with Water Pepper *Persicaria hydropiper,* Water Forget-me-not *Myosotis scorpioides,* Gipsywort *Lycopus europaeus*, Water Mint *Mentha aquatica* and Branched Bur-reed *Sparganium erectum*.
T28	SSSI Area 2	13/08/2014	TM46970 63988	*Phragmites australis* reedswamp, with Common Nettle *Urtica dioica*. Reed inundated, with waterlevel approximately 10-20 cm above groundlevel. Some more open patches beneath mature, spreading Crack Willow *Salix fragilis* and Grey Willow *S. cinerea.*Small open water areas over peat; decaying leaf mould. Some wood decay habitat, saturated dead wood and rot holes in standing trees.
T29	SSSI Area 2	13/08/2014	TM46991 64005	Interface between *Phragmites australis* swamp and *Alnus glutinosa* and *Salix cinerea* carr. Ground beneath carr with varied microtopography. Mature, multistemmed *Salix cinerea*, *Alnus glutinosa* and poplar *Populus* sp. Layering branches and some wood decay habitat and rot holes in trees also bryophytes on branches. Patches of standing water with swamp vegetation including scattered *Phragmites australis*, Water Pepper *Persicaria hydropiper, Common* Water Plantain *Alisma plantago-aquatica,* Water Mint *Mentha aquatica,* Greater Pond Sedge *Carex riparia* and *Common Duckweed Lemna minor.*
T30	SSSI Area 2	13/08/2014	TM46950 64017	Dense *Phragmites australis* reedswamp; water level about 15 -25cm above ground level. Raised topography around base of over mature Crack Willow - radial branches flattened against ground and bole forming a 2-3 metre wide platform. Drier vegetation - grasses and moss. Habitat surrounded by reedswamp.

Table 4. Terrestrial invertebrate samples taken per site by survey date (see Figures 6-9 for sample site locations).

		16-20th June 2014				14-17th July 2014				11-16th August 2014			
Sample Site	Sample Zone	Sweep Sample	Vacuum Sample	Water Trap	Beating Sample	Sweep Sample	Vacuum Sample	Water Trap	Beating Sample	Sweep Sample	Vacuum Sample	Water Trap	Beating Sample
T1	SSSI Triangle	x	x	x	x	x	x	x	x				
T2	SSSI Triangle	x	x	x		x	x	x	x				
T3	SSSI Triangle	x	x	x		x	x	x	x				
T4	SSSI Triangle	x	x	x		x	x	x	x				
T5	SSSI Area 2	x	x	x	x	x	x	x	x				
T6	SSSI Area 2	x	x	x	x	x	x	x	x				
T7	SSSI Area 2	x	x	x		x	x	x	x				
T8	SSSI Area 2	x	x	x		x	x	x	x				
T9	SSSI Fen Meadow	x				x							
T10	Coastal Strip					x	x						
T11	Coastal Strip					x	x						
T12	Coastal Strip					x	x						
T13	Coastal Strip					x	x						
T14	SAC Dune/Heath					x	x						
T15	SAC Dune/Heath					x	x						
T16	SAC Dune/Heath					x	x						
T17	SAC Dune/Heath								x	x	x		
T18	SAC Dune/Heath								x				
T19	SAC Dune/Heath								x				
T20	SAC Dune/Heath								x				
T21	Woodland C Platform									x	x	x	x
T22	Woodland C Platform									x	x	x	x
T23	Woodland C Platform									x	x	x	x
T24	Woodland C Platform									x	x	x	x
T25	SSSI Fen Meadow									x			
T26	SSSI Fen Meadow									x			

		16-20th June 2014				14-17th July 2014				11-16th August 2014			
Sample Site	Sample Zone	Sweep Sample	Vacuum Sample	Water Trap	Beating Sample	Sweep Sample	Vacuum Sample	Water Trap	Beating Sample	Sweep Sample	Vacuum Sample	Water Trap	Beating Sample
T27	SSSI Area 2									x	x	x	x
T28	SSSI Area 2									x	x	x	x
T29	SSSI Area 2									x	x	x	x
T30	SSSI Area 2									x	x	x	x

Table 5. Total number of terrestrial samples taken for each survey compartment per sample technique survey dates combined (see Figure 1 for compartment locations).

Sample Zone	Sweep Sample	Vacuum Sample	Water Trap	Beating Sample	Direct Search
SSSI Triangle	8	8	8	5	incidental
SSSI Area 2	12	12	12	10	incidental
SSSI Fen Meadow	4				incidental
Coastal Strip	4	4			incidental
SAC Dune/Heath	4	4		4	incidental
Woodland C Platform	4	4	4	4	incidental

Table 6. Aquatic invertebrates recorded 2014 (see Figures 6-9 for sample site locations).

Common name	Scientific name	Family	Order	UK status	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32
Freshwater shrimps (Amphipoda) - 2 species recorded during aquatic survey																																				
A freshwater shrimp	*Crangonyx pseudogracilis*	Crangonyctidae	Amphipoda	Widespread			x	x			x	x	x	x		x	x			x	x	x	x	x	x	x		x	x		x	x			x	
A freshwater shrimp	*Gammarus pulex*	Gammaridae	Amphipoda	Widespread	x	x	x	x	x	x	x									x	x	x	x	x		x	x	x						x		
Spiders (Araneae) - 5 species recorded during aquatic survey																																				
A tetragnathid spider	*Pachygnatha clercki*	Lycosidae	Araneae	Widespread																														x		x
A lycosid spider	*Pirata hygrophilus*	Lycosidae	Araneae	Widespread												x																				
A lycosid spider	*Pirata piraticus*	Lycosidae	Araneae	Widespread							x	x			x		x									x										x
A tetragnathid spider	*Pachygnatha clercki*	Tetragnathidae	Araneae	Widespread																																
A theridiid spider	*Robertus lividus*	Theridiidae	Araneae	Widespread													x																			
Beetles Coleoptera) - 68 species recorded during aquatic survey																																				
A ground beetle	*Elaphrus cupreus*	Carabidae	Coleoptera	Widespread	x																															
A ground beetle	*Oodes helopioides*	Carabidae	Coleoptera	Nationally Scarce B																												x				
Iris Flea Beetle	*Aphthona nonstriata*	Chrysomelidae	Coleoptera	Widespread												x																x				
A reed beetle	*Donacia semicuprea*	Chrysomelidae	Coleoptera	Local								x																								
A leaf beetle	*Galerucella nymphaeae/sagittariae group*	Chrysomelidae	Coleoptera	Unknown																												x				
Dock Leaf Beetle	*Gastrophysa viridula*	Chrysomelidae	Coleoptera	Widespread																		x														
A ladybird beetle	*Coccidula rufa*	Coccinellidae	Coleoptera	Widespread								x																								
A true weevil	*Euophyrum confine*	Curculionidae	Coleoptera	Introduced (New Zealand)		x																														
A ceutorhynchine weevil	*Nedyus quadrimaculatus*	Curculionidae	Coleoptera	Widespread						x																										
A true weevil	*Pelenomus canaliculatus*	Curculionidae	Coleoptera	Nationally Scarce								x																								
A pea weevil	*Sitona lineatus*	Curculionidae	Coleoptera	Widespread																		x														
A broad-nosed weevil	*Strophosoma melanogrammum*	Curculionidae	Coleoptera	Widespread																														x		
A true weevil	*Thryogenes neresis*	Curculionidae	Coleoptera	Local								x																								
A diving beetle	*Agabus bipustulatus*	Dytiscidae	Coleoptera	Widespread				x					x			x	x									x										
A diving beetle	*Agabus sturmii*	Dytiscidae	Coleoptera	Widespread					x																		x									
A diving beetle	*Agabus/Ilybius sp.*	Dytiscidae	Coleoptera	Unknown						x		x	x	x			x			x																
A diving beetle	*Colymbetes fuscus*	Dytiscidae	Coleoptera	Widespread													x																			
A diving beetle	*Dytiscidae sp.*	Dytiscidae	Coleoptera	Unknown					x																											
A diving beetle	*Dytiscus marginalis*	Dytiscidae	Coleoptera	Widespread		x																														
A diving beetle	*Dytiscus sp.*	Dytiscidae	Coleoptera	Unknown	x	x		x				x															x									
A diving beetle	*Graptodytes pictus*	Dytiscidae	Coleoptera	Widespread												x																				
A diving beetle	*Hydaticus seminiger*	Dytiscidae	Coleoptera	Nationally Scarce											x																					
A diving beetle	*Hydroporus angustatus*	Dytiscidae	Coleoptera	Widespread														x																	x	
A diving beetle	*Hydroporus incognitus*	Dytiscidae	Coleoptera	Widespread												x																				
A diving beetle	*Hydroporus palustris*	Dytiscidae	Coleoptera	Widespread	x					x				x		x											x					x	x			x
A diving beetle	*Hydroporus pubescens*	Dytiscidae	Coleoptera	Widespread									x																					x	x	
A diving beetle	*Hydroporus sp.*	Dytiscidae	Coleoptera	Unknown													x														x					
A diving beetle	*Hydroporus/Hygrotes sp.*	Dytiscidae	Coleoptera	Unknown										x			x			x																
A diving beetle	*Hygrotus inaequalis*	Dytiscidae	Coleoptera	Widespread										x							x															
The Cherrystone Beetle	*Hyphydrus ovatus*	Dytiscidae	Coleoptera	Widespread							x						x		x	x					x		x		x		x		x		x	
A diving beetle	*Hyphydrus sp.*	Dytiscidae	Coleoptera	Unknown									x				x			x																

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The Mud Dweller	*Ilybius ater*	Dytiscidae	Coleoptera	Widespread									x			x																				
A diving beetle	*Ilybius fuliginosus*	Dytiscidae	Coleoptera	Widespread																		x														
A diving beetle	*Rhantus grapii*	Dytiscidae	Coleoptera	Local					x	x																										
The Supertramp	*Rhantus suturalis*	Dytiscidae	Coleoptera	Local							x										x				x											
A rifle beetle	*Elmidae sp.*	Elmidae	Coleoptera	Unknown								x																								
A whirligig beetle	*Gyrinus substriatus*	Gyrinidae	Coleoptera	Widespread							x										x						x									
A crawling water beetle	*Haliplus lineatocollis*	Haliplidae	Coleoptera	Widespread							x			x							x	x	x		x											
A crawling water beetle	*Haliplus ruficollis*	Haliplidae	Coleoptera	Widespread													x					x					x									
A crawling water beetle	*Haliplus ruficollis (group)*	Haliplidae	Coleoptera	Unknown							x			x							x						x								x	
A crawling water beetle	*Haliplus sp.*	Haliplidae	Coleoptera	Unknown													x																			
A crawling water beetle	*Peltodytes caesus*	Haliplidae	Coleoptera	Nationally Scarce (B)													x																			
A helophorid beetle	*Helophorus aequalis*	Helophoridae	Coleoptera	Widespread							x																									
A helophorid beetle	*Helophorus brevipalpis*	Helophoridae	Coleoptera	Widespread						x	x	x					x																			
A helophorid beetle	*Helophorus flavipes/obscurus*	Helophoridae	Coleoptera	Unknown																x																
A helophorid beetle	*Helophorus minutus*	Helophoridae	Coleoptera	Widespread								x																								
A hydraenid beetle	*Hydraena riparia*	Hydraenidae	Coleoptera	Widespread																							x	x								
A hydraenid beetle	*Ochthebius minimus*	Hydraenidae	Coleoptera	Widespread									x								x															
A hydrochid beetle	*Hydrochus angustatus*	Hydrochidae	Coleoptera	Nationally Scarce								x																								
A water scavenger beetle	*Anacaena globulus*	Hydrophilidae	Coleoptera	Widespread			x		x																			x								
A water scavenger beetle	*Anacaena limbata*	Hydrophilidae	Coleoptera	Widespread			x				x		x	x	x	x						x				x				x		x			x	x
A water scavenger beetle	*Anacaena sp.*	Hydrophilidae	Coleoptera	Unknown										x																						
A water scavenger beetle	*Cymbiodyta marginellus*	Hydrophilidae	Coleoptera	Local																															x	
A water scavenger beetle	*Enochrus melanocephalus*	Hydrophilidae	Coleoptera	Local													x												x							
A water scavenger beetle	*Enochrus testaceus*	Hydrophilidae	Coleoptera	Widespread																					x						x				x	
A water scavenger beetle	*Hydrobius fuscipes*	Hydrophilidae	Coleoptera	Widespread						x				x		x	x			x		x														x
A water scavenger beetle	*Hydrophilidae sp*	Hydrophilidae	Coleoptera	Unknown												x																			x	
Great Silver Water Beetle	*Hydrophilus piceus*	Hydrophilidae	Coleoptera	IUCN (2001) - Lower risk - near threatened								x																							x	
A water scavenger beetle	*Laccobius minutus*	Hydrophilidae	Coleoptera	Widespread										x											x							x		x		
A malachite beetle	*Anthocomus rufus*	Malachiidae	Coleoptera	Widespread																									x							
Larger Noterus	*Noterus clavicornis*	Noteridae	Coleoptera	Widespread								x	x												x											
A scirtid beetle	*Scirtidae sp.*	Scirtidae	Coleoptera	Unknown									x	x			x			x												x				
A rove beetle	*Stenus bifoveolatus*	Staphylinidae	Coleoptera	Widespread										x																						
A rove beetle	*Stenus juno*	Staphylinidae	Coleoptera	Widespread		x																														
A rove beetle	*Stenus latifrons*	Staphylinidae	Coleoptera	Local																															x	
A rove beetle	*Stenus sp.*	Staphylinidae	Coleoptera	Unknown																																
A throsciid beetle	*Trixagus dermestoides /carinifrons*	Throsciidae	Coleoptera	Unknown								x																								
Earwigs (Dermaptera) - 1 species recorded from aquatic survey																																				
Common Earwig	*Forficula auricularia*	Forficulidae	Dermaptera	Widespread							x																									
True flies (Diptera) - 17 species recorded from aquatic survey																																				
A phantom midge	*Chaoborus sp*	Chaoboridae	Diptera	Unknown																					x											
A non-biting midge	*Chironomidae sp.*	Chironomidae	Diptera	Unknown		x	x	x	x	x		x		x		x	x		x	x																
A mosquito	*Culicidae sp*	Culicidae	Diptera	Unknown					x			x					x					x										x		x		
A meniscus midge	*Dixella sp.*	Dixidae	Diptera	Unknown								x																								

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A shore fly	*Ephyridae sp*	Ephyridae	Diptera	Unknown									x																							
A marsh fly	*Sciomyzidae sp*	Sciomyzidae	Diptera	Unknown								x		x			x																			
Fen Snout	*Nemotelus pantherinus*	Stratiomyidae	Diptera	Local				x																												
Ornate Brigadier	*Odontomyia ornata*	Stratiomyidae	Diptera	IUCN (pre 1994) - Vulnerable (RDB2)													x																			
Black Colonel	*Odontomyia tigrina*	Stratiomyidae	Diptera	Nationally Scarce (A)					x												x															
Common Green Colonel	*Oplodontha viridula*	Stratiomyidae	Diptera	Widespread			x					x	x			x	x			x																
A soldierfly	*Oxycera/vanoyia sp.*	Stratiomyidae	Diptera	Unknown																																
A soldierfly	*Stratiomyidae sp.*	Stratiomyidae	Diptera	Unknown										x																						
An Eristaline hoverfly	*Eristalini sp*	Syrphidae	Diptera	Unknown												x																				
Notch-horned Cleg	*Haematopota pluvialis*	Tabanidae	Diptera	Widespread																					x										x	
Hairy-legged Horsefly	*Hybomitra bimaculata*	Tabanidae	Diptera	Local		x																														
A horsefly	*Tabanidae sp*	Tabanidae	Diptera	Unknown									x				x																			
A cranefly larva	*Tipulidae sp*	Tipulidae	Diptera	Unknown							x		x			x	x																			
Mayflies (Ephemeroptera) - 1 species recorded from aquatic survey																																				
Pond Olive	*Cloeon dipterum*	Baetidae	Ephemeroptera	Widespread				x	x			x													x				x		x			x		
True bugs (Hemiptera - 24 species recorded from aquatic survey																																				
A leafhopper	*Cicadetta viridis*	Cicadellidae	Hemiptera	Widespread																															x	
A lesser waterboatman	*Corixa panzeri*	Corixidae	Hemiptera	Widespread																	x															
A lesser waterboatman	*Corixa punctata*	Corixidae	Hemiptera	Widespread							x	x									x															
A lesser waterboatman	*Corixidae sp*	Corixidae	Hemiptera	Unknown				x	x		x	x	x	x	x	x	x			x																
A lesser waterboatman	*Hesperocorixa linnaei*	Corixidae	Hemiptera	Widespread																															x	
A lesser waterboatman	*Hesperocorixa sahlbergi*	Corixidae	Hemiptera	Widespread							x	x		x											x				x					x	x	
A lesser waterboatman	*Sigara distincta*	Corixidae	Hemiptera	Widespread								x																								
A lesser waterboatman	*Sigara dorsalis*	Corixidae	Hemiptera	Widespread							x	x									x												x			
A lesser waterboatman	*Sigara falleni*	Corixidae	Hemiptera	Widespread								x																								
A lesser waterboatman	*Sigara venusta*	Corixidae	Hemiptera	Local								x																								
A pond skater	*Gerris sp.*	Gerridae	Hemiptera	Unknown								x																								
A water measurer	*Hydrometra stagnorum*	Hydrometridae	Hemiptera	Widespread								x																								
Birch Catkin Bug	*Kleidocerys resedae*	Lygaeidae	Hemiptera	Widespread																				x												
A mirid bug	*Capsus ater*	Miridae	Hemiptera	Widespread			x																													
A grass bug	*Notostira elongata*	Miridae	Hemiptera	Widespread																			x													
Saucer Bug	*Ilyocoris cimicoides*	Naucoridae	Hemiptera	Widespread				x				x	x	x			x								x				x		x	x				
Water Scorpion	*Nepa cinerea*	Nepidae	Hemiptera	Widespread												x	x								x							x				
Water Stick Insect	*Ranatra linearis*	Nepidae	Hemiptera	Local								x																								
A waterboatman	*Notonecta glauca*	Notonectidae	Hemiptera	Widespread								x					x								x		x				x					
A waterboatman	*Notonecta maculata*	Notonectidae	Hemiptera	Widespread																	x								x							
A waterboatman	*Notonecta sp*	Notonectidae	Hemiptera	Unknown								x								x																
A pygmy backswimmer	*Plea minutissima*	Pleidae	Hemiptera	Widespread								x																								
A shore bug	*Chartoscirta cincta*	Saldidae	Hemiptera	Widespread										x																						
A shore bug	*Saldula pilosella*	Saldidae	Hemiptera	Local								x																								
A water cricket	*Velia caprai*	Velidae	Hemiptera	Widespread		x										x											x									
Leeches (Hirudinea) - 4 species recorded from aquatic survey																																				
A freshwater leech	*Erpobdella octoculata*	Erpobdellidae	Hirudinea	Widespread	x	x	x	x	x				x	x		x	x	x	x		x	x														
A freshwater leech	*Erpobdella testacea*	Erpobdellidae	Hirudinea	Local													x																			

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A freshwater leech	*Glossiphonia complanata*	Glossiphoniidae	Hirudinea	Widespread		x						x																								
A freshwater leech	*Glossiphonia heteroclita*	Glossiphoniidae	Hirudinea	Widespread	x											x																				
Bees, wasps and ants (Aculeate Hymenoptera) - 2 species recorded from aquatic survey																																				
A myrmicine ant	*Myrmica rubra*	Formicidae	Hymenoptera	Widespread																				x												
A myrmicine ant	*Myrmica ruginodis*	Formicidae	Hymenoptera	Widespread		x								x									x													
Woodlice, slaters and hoglice (Isopoda) - 2 species recorded from aquatic survey																																				
A water hoglouse	*Asellus aquaticus*	Asellidae	Isopoda	Widespread	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x		x
A water hoglouse	*Asellus meridianus*	Asellidae	Isopoda	Widespread					x		x						x			x	x	x			x	x		x	x	x			x	x		
Common Striped Woodlouse	*Philoscia muscorum*	Philosciidae	Isopoda	Widespread																					x											
Butterflies and moths (Lepidoptera) - 1 species recorded from aquatic survey																																				
Small China-mark	*Cataclysta lemnata*	Crambidae	Lepidoptera	Widespread																									x		x				x	
A china mark moth	*Crambidae sp.*	Crambidae	Lepidoptera	Unknown													x																		x	
Alderflies (Megaloptera) - 1 species recorded from aquatic survey																																				
An alderfly	*Sialis sp.*	Sialidae	Megaloptera	Unknown								x																								
Dragonflies and damselflies (Odonata) - 8 species recorded from aquatic survey																																				
Southern Hawker	*Aeshna cyanea*	Aeshnidae	Odonata	Widespread	x								x			x	x			x	x						x				x					x
A hawker dragonfly	*Aeshna sp.*	Aeshnidae	Odonata	Unknown	x								x			x				x					x	x		x		x						
A damselfly	*Coenagriidae sp*	Coenagriidae	Odonata	Unknown	x												x																			
Azure Damselfly	*Coenagrion puella*	Coenagriidae	Odonata	Widespread				x				x	x	x		x	x							x	x										x	x
Variable Damselfly	*Coenagrion pulchellum*	Coenagriidae	Odonata	IUCN (2001) - Lower risk - near threatened												x																				
Common Blue Damselfly	*Enallagma cyathigerum*	Coenagriidae	Odonata	Widespread																									x		x					
Common Blue-tailed Damselfly	*Ischnura elegans*	Coenagriidae	Odonata	Widespread				x	x			x	x				x																			
Large Red Damselfly	*Pyrrhosoma nymphula*	Coenagriidae	Odonata	Widespread			x										x	x						x	x	x	x	x		x					x	x
Emerald Damselfly	*Lestes sponsa*	Lestidae	Odonata	Widespread								x		x						x					x		x		x							
Ruddy Darter	*Sympetrum sanguineum*	Libellulidae	Odonata	Widespread								x																								
A darter dragonfly	*Sympetrum sp.*	Libellulidae	Odonata	Unknown									x																							
Freshwater and land snails (Pulmonata)- 25 species recorded from aquatic survey																																				
Lake Limpet	*Acroloxus lacustris*	Ancylidae	Pulmonata	Widespread					x				x		x			x	x	x						x			x							
Leach's Bithynia	*Bithynia leachii*	Bithyniidae	Pulmonata	Local	x	x		x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Common Bithynia	*Bithynia tentaculata*	Bithyniidae	Pulmonata	Widespread	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
A hairy snail	*Helicidae sp.*	Helicidae	Pulmonata	Unknown					x																											
Dwarf Pond Snail	*Galba truncatula*	Lymnaeidae	Pulmonata	Widespread					x	x			x		x						x	x						x			x					
Great Pond Snail	*Lymnaea stagnalis*	Lymnaeidae	Pulmonata	Widespread							x	x					x								x					x	x					
Wandering Snail	*Radix balthica*	Lymnaeidae	Pulmonata	Widespread	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Marsh Pond Snail	*Stagnicola palustris*	Lymnaeidae	Pulmonata	Widespread				x	x		x	x	x								x				x				x			x			x	
Bladder Snail	*Physa fontinalis*	Physidae	Pulmonata	Widespread	x	x	x			x											x		x					x				x				
Whirlpool Ramshorn Snail	*Anisus vortex*	Planorbidae	Pulmonata	Widespread	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x
Twisted Ramshorn	*Bathyomphalus contortus*	Planorbidae	Pulmonata	Widespread				x							x			x	x						x							x		x		
Dwarf Pond Snail	*Galba truncatula*	Planorbidae	Pulmonata	Widespread																												x				
White Ramshorn	*Gyraulus albus*	Planorbidae	Pulmonata	Widespread											x			x	x																	
Nautilus Ramshorn	*Gyraulus crista*	Planorbidae	Pulmonata	Widespread		x			x	x		x																								
Smooth Ramshorn	*Gyraulus laevis*	Planorbidae	Pulmonata	Local													x																			
Flat Ramshorn	*Hippeutis complanatus*	Planorbidae	Pulmonata	Widespread				x	x				x	x	x	x	x		x	x			x		x	x	x		x					x		

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Great Ramshorn	*Planorbarius corneus*	Planorbidae	Pulmonata	Widespread	x	x	x		x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x
Keeled Ramshorn	*Planorbis carinatus*	Planorbidae	Pulmonata	Widespread				x		x	x		x	x	x	x	x	x	x	x	x		x	x	x	x		x	x	x	x			x	x	
Ramshorn Snail	*Planorbis planorbis*	Planorbidae	Pulmonata	Widespread	x		x	x	x		x	x			x	x	x	x		x	x		x		x	x	x	x		x	x	x				x
An amber snail	*Succinea putris*	Succineidae	Pulmonata	Widespread		x	x			x	x	x	x	x	x	x	x			x	x		x		x	x					x	x		x	x	x
Jenkins' Spire Shell	*Potamopyrgus antipodarium*	Tateidae	Pulmonata	Introduced	x	x	x	x		x	x								x		x	x				x		x							x	
Flat Valve Snail	*Valvata cristata*	Valvatidae	Pulmonata	Widespread	x	x	x	x	x	x	x	x	x		x	x	x	x		x		x	x	x	x	x	x	x	x			x		x		x
Valve Snail	*Valvata piscinalis*	Valvatidae	Pulmonata	Widespread	x	x	x	x	x	x	x		x				x		x		x	x		x		x	x	x						x		
Lister's River Snail	*Viviparus conectus*	Viviparidae	Pulmonata	Widespread						x			x			x		x	x														x	x		
A zonitid snail	*Zonitoides nitidus*	Zonitidae	Pulmonata	Local																												x				
Sawflies (Symphyta)- 1 species recorded from aquatic survey																																				
A sawfly	*Symphyta sp.*	Symphyta sp.	Symphyta	Unknown								x	x																							
Caddisflies (Trichoptera)- 2 species recorded from aquatic survey																																				
A cased caddisfly	*Limnephilidae sp.*	Limnephilidae	Trichoptera	Unknown																														x		
A cased caddisfly	*Limnephilus affinis/incisus*	Limnephilidae	Trichoptera	Widespread				x																												
A cased caddisfly	*Limnephilidae marmoratus*	Limnephilidae	Trichoptera	Widespread	x									x	x		x			x																
Pea mussels and orb mussels (Veneroida)- 3 species recorded from aquatic survey																																				
Capped Orb Mussel	*Musculium lacustris*	Sphaeriidae	Veneroida	Widespread								x				x			x										x							
Horny Orb Mussel	*Sphaerium corneum*	Sphaeriidae	Veneroida	Widespread						x			x								x			x	x	x								x		
Caserta Pea Mussel	*Pisidium casertanum*	Sphaeriidae	Veneroida	Widespread													x																			

Table 7. Terrestrial invertebrate survey data 2014 (see Figures 6-9 for sample site locations).

Common name	*Scientific name*	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
An orb-web spider	*Agalenatea redii*	Araneidae	Araneae	Local												x					x													
Garden Spider	*Araneus diadematus*	Araneidae	Araneae	Widespread		x					x							x			x	x	x			x	x	x					x	
An orb-web spider	*Araneus quadratus*	Araneidae	Araneae	Widespread																								x						
An orb-web spider	*Larinioides cornutus*	Araneidae	Araneae	Widespread																									x					x
An orb-web spider	*Neoscona adianta*	Araneidae	Araneae	Local										x	x	x	x	x	x		x								x					
An orb-web spider	*Zygiella atrica*	Araneidae	Araneae	Widespread																	x													
A clubionid spider	*Clubiona lutescens*	Clubionidae	Araneae	Widespread		x						x																						
A clubionid spider	*Clubiona phragmitis*	Clubionidae	Araneae	Widespread						x		x																						
A clubionid spider	*Clubiona sp*	Clubionidae	Araneae	Unknown	x		x	x	x	x	x	x	x											x	x	x		x	x					x
A gnaphosid spider	*Drassodes cupreus*	Gnaphosidae	Araneae	Widespread																													x	
A gnaphosid spider	*Drassodes sp.*	Gnaphosidae	Araneae	Unknown					x													x									x			
A gnaphosid spider	*Haplodrassus signifer*	Gnaphosidae	Araneae	Widespread		x																												
A linyphiid spider	*Erigone atra*	Linyphiidae	Araneae	Widespread																		x												
A linyphiid spider	*Linyphia triangularis*	Linyphiidae	Araneae	Widespread		x			x													x			x	x								
A linyphiid spider	*Microlinyphia pusilla*	Linyphiidae	Araneae	Widespread															x															
A linyphiid spider	*Neriene clathrata*	Linyphiidae	Araneae	Widespread																	x													
A linyphiid spider	*Neriene peltata*	Linyphiidae	Araneae	Widespread																	x	x												
A linyphiid spider	*Tenuiphantes tenuis*	Linyphiidae	Araneae	Widespread										x			x		x		x											x		
A lycosid spider	*Hygrolycosa rubrofasciata*	Lycosidae	Araneae	Nationally Scarce (A)																			x											
A lycosid spider	*Pardosa pullata*	Lycosidae	Araneae	Widespread										x																				
A lycosid spider	*Pardosa sp.*	Lycosidae	Araneae	Unknown																											x		x	
A lycosid spider	*Pirata hygrophilus*	Lycosidae	Araneae	Widespread	x		x			x																								
A lycosid spider	*Pirata piraticus*	Lycosidae	Araneae	Widespread	x	x																												
A lycosid spider	*Pirata sp.*	Lycosidae	Araneae	Unknown		x	x	x																			x	x						
A philodromid spider	*Tibellus oblongus*	Philodromidae	Araneae	Widespread																		x												
Nursery Web Spider	*Pisaura mirabilis*	Pisauridae	Araneae	Widespread											x																			
A jumping spider	*Euophrys frontalis*	Salticidae	Araneae	Widespread												x																		
A jumping spider	*Heliophanus flavipes*	Salticidae	Araneae	Widespread										x	x			x	x			x												
A jumping spider	*Heliophanus flavipes/cupreus*	Salticidae	Araneae	Widespread																	x													
A tetragnathid spider	*Meta segmentata*	Tetragnathidae	Araneae	Widespread	x	x	x		x	x								x			x	x	x		x	x	x	x			x	x	x	
A tetragnathid spider	*Pachygnatha clercki*	Tetragnathidae	Araneae	Widespread			x		x	x																	x				x	x		
A tetragnathid spider	*Tetragnatha extensa*	Tetragnathidae	Araneae	Widespread		x	x	x	x	x	x								x							x			x	x	x		x	x
A tetragnathid spider	*Tetragnatha montana*	Tetragnathidae	Araneae	Widespread		x		x				x																						
A tetragnathid spider	*Tetragnatha pinicola*	Tetragnathidae	Araneae	Local																														x
A tetragnathid spider	*Tetragnatha sp.*	Tetragnathidae	Araneae	Widespread																x														
A theridiid spider	*Enoplognatha ovata*	Theridiidae	Araneae	Widespread	x	x	x		x		x										x	x			x		x							
A theridiid spider	*Robertus lividus*	Theridiidae	Araneae	Widespread		x	x			x	x	x																						
A theridiid spider	*Theridion sisyphium*	Theridiidae	Araneae	Widespread																						x								
A crab spider	*Diaea dorsata*	Thomisidae	Araneae	Local	x																											x		
A crab spider	*Xysticus cristatus*	Thomisidae	Araneae	Widespread										x				x																

Common name	Scientific name	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
A thomisid spider	*Xysticus erraticus*	Thomisidae	Araneae	Widespread															x															
A crab spider	*Xysticus sp.*	Thomisidae	Araneae	Unknown				x						x		x	x				x	x	x	x			x	x						x
An anobiid beetle	*Anobium fulvicornis*	Anobiidae	Coleoptera	Widespread						x																								
An anobiid beetle	*Anobium punctatum*	Anobiidae	Coleoptera	Widespread		x			x																									
An anobiid beetle	*Grynobius planus*	Anobiidae	Coleoptera	Widespread					x																									
An anthicid beetle	*Notoxus monoceros*	Anthicidae	Coleoptera	Local			x									x			x						x	x						x		
An anthocorid bug	*Orius majusculus*	Anthocoridae	Coleoptera	Widespread			x																										x	x
An apionid weevil	*Apion rubens*	Apionidae	Coleoptera	Local														x	x		x													
An apionid weevil	*Aspidapion radiolus*	Apionidae	Coleoptera	Widespread	x																													
An apionid weevil	*Betulapion simile*	Apionidae	Coleoptera	Local															x		x			x										
An apionid weevil	*Ceratapion onopordi*	Apionidae	Coleoptera	Widespread				x											x															
An apionid weevil	*Cyanapion spencii*	Apionidae	Coleoptera	Local																									x					
Gorse Seed Weevil	*Exapion ulcis*	Apionidae	Coleoptera	Widespread																		x	x											
An apionid weevil	*Holotrichapion ononis*	Apionidae	Coleoptera	Local										x	x	x	x																	
An apionid weevil	*Ischnapion loti*	Apionidae	Coleoptera	Widespread												x																		
An apionid weevil	*Oxystoma craccae*	Apionidae	Coleoptera	Local				x																		x								
An apionid weevil	*Oxystoma pomonae*	Apionidae	Coleoptera	Widespread												x	x								x	x								
An apionid weevil	*Perapion marchicum*	Apionidae	Coleoptera	Widespread														x	x															
An apionid weevil	*Protapion dichroum*	Apionidae	Coleoptera	Widespread																												x		
An apionid weevil	*Protapion difforme*	Apionidae	Coleoptera	Nationally Scarce (B)												x																		
An apionid weevil	*Protapion dissimile*	Apionidae	Coleoptera	Nationally Scarce (B)											x	x																		
An apionid weevil	*Protapion nigritarse*	Apionidae	Coleoptera	Widespread																					x									
An apionid weevil	*Protapion trifolii*	Apionidae	Coleoptera	Widespread	x																													
A leaf-rolling weevil	*Deporaus betulae*	Attelabidae	Coleoptera	Widespread																														
A jewel beetle	*Aphanisticus pusillus*	Buprestidae	Coleoptera	Nationally Scarce (B)												x			x															
A soldier beetle	*Cantharis pallida*	Cantharidae	Coleoptera	Widespread					x	x		x																						
A soldier beetle	*Cantharis pellucida*	Cantharidae	Coleoptera	Widespread									x																					
A soldier beetle	*Crudosilis ruficollis*	Cantharidae	Coleoptera	Nationally Scarce (B)	x	x	x	x	x	x	x	x																						
A sailor beetle	*Malthinus flaveolus*	Cantharidae	Coleoptera	Widespread	x																													
A sailor beetle	*Malthodes dispar*	Cantharidae	Coleoptera	Widespread					x																									
A sailor beetle	*Malthodes marginatus*	Cantharidae	Coleoptera	Widespread					x	x																								
A sailor beetle	*Malthodes mysticus/guttifer*	Cantharidae	Coleoptera	Local							x																							
A soldier beetle	*Rhagonycha fulva*	Cantharidae	Coleoptera	Widespread	x			x		x	x		x																					
A soldier beetle	*Rhagonycha testacea*	Cantharidae	Coleoptera	Widespread						x		x																						
A ground beetle	*Agonum fuliginosum*	Carabidae	Coleoptera	Widespread	x																												x	
A ground beetle	*Agonum nigrum*	Carabidae	Coleoptera	Nationally Scarce (B)							x																							
A ground beetle	*Agonum thoreyi*	Carabidae	Coleoptera	Widespread		x				x															x									
A ground beetle	*Amara aenea*	Carabidae	Coleoptera	Widespread													x																	
A ground beetle	*Badister peltatus*	Carabidae	Coleoptera	Nationally Scarce (A)																														
A ground beetle	*Bembidion assimile*	Carabidae	Coleoptera	Local																												x			

Common name	*Scientific name*	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
A ground beetle	*Bembidion fumigatum*	Carabidae	Coleoptera	Local		x																												
A ground beetle	*Calathus cinctus*	Carabidae	Coleoptera	Local										x																				
A ground beetle	*Carabus granulatus*	Carabidae	Coleoptera	Widespread	x					x																x								
A ground beetle	*Dromius quadrimaculatus*	Carabidae	Coleoptera	Widespread		x	x																											
A ground beetle	*Elaphrus cupreus*	Carabidae	Coleoptera	Widespread	x		x		x		x	x																			x			
A ground beetle	*Harpalus rubripes*	Carabidae	Coleoptera	Widespread																														
A ground beetle	*Harpalus rufipes*	Carabidae	Coleoptera	Widespread																														
A ground beetle	*Harpalus tardus*	Carabidae	Coleoptera	Widespread																														
A ground beetle	*Leistus terminatus*	Carabidae	Coleoptera	Widespread						x																								
A ground beetle	*Loricera pilicornis*	Carabidae	Coleoptera	Widespread	x		x																		x			x			x			
A ground beetle	*Notiophilus aquaticus*	Carabidae	Coleoptera	Widespread										x	x	x						x												
A ground beetle	*Notiophilus biguttatus*	Carabidae	Coleoptera	Widespread				x	x	x															x		x	x				x		
A ground beetle	*Notiophilus germinyi*	Carabidae	Coleoptera	Widespread																x		x												
A ground beetle	*Notiophilus substriatus*	Carabidae	Coleoptera	Widespread							x																							
A ground beetle	*Oxypsephalus obscurus*	Carabidae	Coleoptera	Widespread																					x		x	x						
A ground beetle	*Paradromius linearis*	Carabidae	Coleoptera	Widespread	x			x							x		x		x			x	x	x									x	x
A ground beetle	*Philorhizus melanocephalus*	Carabidae	Coleoptera	Widespread																							x							
A ground beetle	*Pterostichus diligens*	Carabidae	Coleoptera	Widespread		x				x																								
A ground beetle	*Pterostichus minor*	Carabidae	Coleoptera	Widespread	x	x	x																											
A ground beetle	*Pterostichus nigrita*	Carabidae	Coleoptera	Widespread		x						x													x	x	x	x				x		
A ground beetle	*Pterostichus strenuus*	Carabidae	Coleoptera	Widespread	x			x				x													x							x		
A ground beetle	*Syntomus foveatus*	Carabidae	Coleoptera	Widespread										x	x	x	x																	
A ground beetle	*Trechus quadristriatus*	Carabidae	Coleoptera	Widespread																							x							x
A ground beetle	*Trichocellus placidus*	Carabidae	Coleoptera	Widespread																								x						
Black-clouded Longhorn Beetle	*Leiopus nebulosus*	Cerambycidae	Coleoptera	Widespread						x		x																						
Black and Yellow Longhorn Beetle	*Rutpela maculata*	Cerambycidae	Coleoptera	Widespread	x				x																									
Black-striped Longhorn Beetle	*Stenurella melanura*	Cerambycidae	Coleoptera	Widespread																														
Iris Flea Beetle	*Aphthona nonstriata*	Chrysomelidae	Coleoptera	Widespread		x	x																		x			x						
Green Tortoise Beetle	*Cassida viridis*	Chrysomelidae	Coleoptera	Widespread																													x	
A flea beetle	*Crepidodera aurata*	Chrysomelidae	Coleoptera	Widespread	x							x																						
A flea beetle	*Crepidodera aurea*	Chrysomelidae	Coleoptera	Widespread				x		x																					x			
A pot beetle	*Cryptocephalus fulvus*	Chrysomelidae	Coleoptera	Widespread												x		x	x															
A pot beetle	*Cryptocephalus pusillus*	Chrysomelidae	Coleoptera	Widespread				x																				x						
A reed beetle	*Donacia semicuprea*	Chrysomelidae	Coleoptera	Local			x																											
Brown Willow Leaf Beetle	*Galerucella lineola*	Chrysomelidae	Coleoptera	Widespread	x	x					x														x	x	x	x						
A leaf beetle	*Galerucella nymphaeae/sagittariae group*	Chrysomelidae	Coleoptera	Unknown																												x		
A leaf beetle	*Galerucella sagittariae*	Chrysomelidae	Coleoptera	Widespread		x																												

Common name	Scientific name	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
Dock Leaf Beetle	*Gastrophysa viridula*	Chrysomelidae	Coleoptera	Widespread																		x												
A flea beetle	*Longitarsus gracilis*	Chrysomelidae	Coleoptera	Widespread													x																	
A flea beetle	*Longitarsus jacobaeae/flavicornis*	Chrysomelidae	Coleoptera	Widespread										x		x	x															x		
Wheat Flea Beetle	*Neocrepidodera ferruginea*	Chrysomelidae	Coleoptera	Widespread										x	x		x																	
A leaf beetle	*Oulema obscura*	Chrysomelidae	Coleoptera	Widespread		x	x			x																								
A leaf beetle	*Phaedon armoraciae*	Chrysomelidae	Coleoptera	Widespread	x																													
Celery Leaf Beetle	*Phaedon tumidulus*	Chrysomelidae	Coleoptera	Widespread		x																												
Blue Willow Beetle	*Phratora vulgatissima*	Chrysomelidae	Coleoptera	Widespread							x																							
A leaf beetle	*Phyllobrotica quadrimaculata*	Chrysomelidae	Coleoptera	Local	x	x			x	x	x	x																						
A reed beetle	*Plateumaris discolor*	Chrysomelidae	Coleoptera	Widespread			x																											
A reed beetle	*Plateumaris sericea*	Chrysomelidae	Coleoptera	Widespread							x																							
A leaf beetle	*Sermylassa halensis*	Chrysomelidae	Coleoptera	Widespread										x		x	x		x															
A flea beetle	*Sphaeroderma testaceum*	Chrysomelidae	Coleoptera	Widespread												x															x			
Two-spot Ladybird	*Adalia bipunctata*	Coccinellidae	Coleoptera	Widespread						x																						x		
10-spot Ladybird	*Adalia decempunctata*	Coccinellidae	Coleoptera	Widespread			x	x			x												x											
Cream-spot Ladybird	*Calvia quattuordecimguttata*	Coccinellidae	Coleoptera	Widespread			x																				x					x		
Kidney-spot Ladybird	*Chilocorus renipustulatus*	Coccinellidae	Coleoptera	Widespread																												x		
A ladybird beetle	*Coccidula rufa*	Coccinellidae	Coleoptera	Widespread									x																					
Seven-spot Ladybird	*Coccinella septempunctata*	Coccinellidae	Coleoptera	Widespread				x	x	x					x				x	x							x						x	
Harlequin Ladybird	*Harmonia axyridis*	Coccinellidae	Coleoptera	Introduced	x		x		x			x										x	x	x	x	x						x	x	x
Adonis' Ladybird	*Hippodamia (Adonia) variegata*	Coccinellidae	Coleoptera	Local											x																			
16-spot Ladybird	*Micraspis 16-punctata*	Coccinellidae	Coleoptera	Widespread															x															
18-spot Ladybird	*Myrrha octodecimguttata*	Coccinellidae	Coleoptera	Widespread																				x										
14-spot Ladybird	*Propylea quattuordecimpunctata*	Coccinellidae	Coleoptera	Widespread																												x		
A ladybird beetle	*Rhyzobius litura*	Coccinellidae	Coleoptera	Widespread										x		x	x		x															
24-spot Ladybird	*Subcoccinella vigintiquattuorpunctata*	Coccinellidae	Coleoptera	Widespread																						x								
A cryptophagid beetle	*Atomaria fuscata*	Cryptophagidae	Coleoptera	Widespread																												x		
A cryptophagid beetle	*Telmatophilus typhae*	Cryptophagidae	Coleoptera	Widespread			x																											
A ceutorhyncine weevil	*Ceutorhynchus erysimi*	Curculionidae	Coleoptera	Widespread																											x			
Cabbage Seed Weevil	*Ceutorhynchus obstrictus*	Curculionidae	Coleoptera	Locally common										x		x																		
A ceutorhyncine weevil	*Ceutorhynchus pallidactylis*	Curculionidae	Coleoptera	Widespread												x																		
A true weevil	*Curculio betulae*	Curculionidae	Coleoptera	Nationally Scarce (B)	x						x	x																						
A true weevil	*Dorytomus taeniatus*	Curculionidae	Coleoptera	Widespread	x																													

Common name	*Scientific name*	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
A true weevil	*Euophyrum confine*	Curculionidae	Coleoptera	Introduced (New Zealand)																														
A true weevil	*Glocianus distinctus*	Curculionidae	Coleoptera	Widespread												x																		
A true weevil	*Hypera nigrirostris*	Curculionidae	Coleoptera	Widespread											x	x			x															
A true weevil	*Mecinus pascuorum*	Curculionidae	Coleoptera	Widespread													x																	
A true weevil	*Mecinus pyraster*	Curculionidae	Coleoptera	Widespread													x																	
A ceutorhyncine weevil	*Nedyus quadrimaculatus*	Curculionidae	Coleoptera	Widespread					x																	x								
A flea weevil	*Orchestes pillosus*	Curculionidae	Coleoptera	Widespread																			x											
A true weevil	*Orthochaetes setiger*	Curculionidae	Coleoptera	Nationally Scarce (B)										x		x																		
A broad-nosed weevil	*Otiorhynchus ovatus*	Curculionidae	Coleoptera	Local										x	x	x				x					x									
A broad-nosed weevil	*Phyllobius argentatus*	Curculionidae	Coleoptera	Widespread	x																													
Common Leaf Weevil	*Phyllobius pyri*	Curculionidae	Coleoptera	Widespread						x																								
Banded Pine Weevil	*Pissodes castaneus*	Curculionidae	Coleoptera	Local																				x										
A broad-nosed weevil	*Polydrusus cervinus*	Curculionidae	Coleoptera	Widespread					x	x																								
A broad-nosed weevil	*Polydrusus formosus*	Curculionidae	Coleoptera	Nationally Scarce (A)	x				x		x											x			x									
A true weevil	*Rhamphus pulicarius*	Curculionidae	Coleoptera	Widespread								x																						
A true weevil	*Rhinonchus perpendicularis*	Curculionidae	Coleoptera	Widespread			x																											
Clover Weevil	*Sitona hispidulus*	Curculionidae	Coleoptera	Widespread													x																	
A pea weevil	*Sitona lineatus*	Curculionidae	Coleoptera	Widespread																	x	x							x	x		x		x
A true weevil	*Trachyphloeus angustisetulus*	Curculionidae	Coleoptera	Local												x	x																	
A true weevil	*Trichosirocalus troglodytes*	Curculionidae	Coleoptera	Widespread												x																		
A diving beetle	*Graptodytes pictus*	Dytiscidae	Coleoptera	Widespread												x																		
A diving beetle	*Ilybius fuliginosus*	Dytiscidae	Coleoptera	Widespread																								x						
The Supertramp	*Rhantus suturalis*	Dytiscidae	Coleoptera	Local																														
A click beetle	*Agrypnus murinus*	Elateridae	Coleoptera	Widespread										x		x																		
A click-beetle	*Athous haemorrhoidalis*	Elateridae	Coleoptera	Widespread	x																													
A click beetle	*Dalopius marginatus*	Elateridae	Coleoptera	Widespread						x	x																							
A click-beetle	*Denticollis linearis*	Elateridae	Coleoptera	Widespread					x	x																								
An erirhinid weevil	*Notaris scirpi*	Erirhinidae	Coleoptera	Nationally Scarce (B)			x				x																				x			
An erirhinid weevil	*Thryogenes nereis*	Erirhinidae	Coleoptera	Local			x																											
A dung beetle	*Geotrupes spiniger*	Geotrupidae	Coleoptera	Widespread	x																													
A water scavenger beetle	*Anacaena globulus*	Hydrophilidae	Coleoptera	Widespread						x																								
A water scavenger beetle	*Anacaena limbata*	Hydrophilidae	Coleoptera	Widespread			x																					x						
A water scavenger beetle	*Anacaena lutescens*	Hydrophilidae	Coleoptera	Widespread																							x							
A water scavenger beetle	*Cercyon impressus*	Hydrophilidae	Coleoptera	Widespread	x																													
A water scavenger beetle	*Cercyon pygmaeus*	Hydrophilidae	Coleoptera	Widespread																					x									
A water scavenger beetle	*Cercyon tristis*	Hydrophilidae	Coleoptera	Widespread						x																								
A latridiid beetle	*Cartodere bifasciata*	Latridiidae	Coleoptera	Widespread																						x								

Common name	Scientific name	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
A latridiid beetle	*Corticaria impressa*	Latridiidae	Coleoptera	Widespread																											x			
A malachite beetle	*Anthocomus rufus*	Malachiidae	Coleoptera	Local		x										x															x			x
A malachite beetle	*Malachius bipustulatus*	Malachiidae	Coleoptera	Widespread										x																				
A false darkling beetle	*Conopalpus testaceus*	Melandryidae	Coleoptera	Nationally Scarce (B)					x																									
A mirid bug	*Deraeocoris flavilinea*	Miridae	Coleoptera	Widespread (south)	x	x		x	x	x	x																x							
Grey Damselbug	*Himacerus major*	Nabidae	Coleoptera	Local												x																		
A sap beetle	*Epuraea biguttata*	Nitidulidae	Coleoptera	Widespread						x																					x			
Lurid Flower Beetle	*Oedemera lurida*	Oedemeridae	Coleoptera	Widespread									x			x	x	x																
Thick-kneed Flower Beetle	*Oedemera nobilis*	Oedemeridae	Coleoptera	Widespread				x																										
A pselaphid beetle	*Rybaxis longicornis*	Pselaphidae	Coleoptera	Widespread				x																										
Brown Chafer	*Serica brunnea*	Scarabaeidae	Coleoptera	Widespread																	x													
A marsh beetle	*Cyphon coarctatus*	Scirtidae	Coleoptera	Widespread	x	x		x	x	x	x	x													x	x	x	x						x
A marsh beetle	*Cyphon ochraceus*	Scirtidae	Coleoptera	Widespread			x	x	x																x						x	x		
A marsh beetle	*Cyphon padi*	Scirtidae	Coleoptera	Widespread	x	x	x	x	x	x	x		x												x	x	x	x			x	x	x	x
A marsh beetle	*Cyphon variabilis*	Scirtidae	Coleoptera	Widespread	x	x	x	x	x		x	x													x						x	x	x	
A marsh beetle	*Microcara testacea*	Scirtidae	Coleoptera	Widespread	x																													
A scirtid beetle	*Scirtes hemisphaericus*	Scirtidae	Coleoptera	Widespread						x																							x	
A scraptiid beetle	*Anaspis frontalis*	Scraptiidae	Coleoptera	Widespread	x																													
A scraptiid beetle	*Anaspis garneysi*	Scraptiidae	Coleoptera	Widespread					x																									
A scraptiid beetle	*Anaspis maculata*	Scraptiidae	Coleoptera	Widespread	x				x																									
A scraptiid beetle	*Anaspis regimbarti*	Scraptiidae	Coleoptera	Widespread					x																									
A scraptiid beetle	*Anaspis thoracica*	Scraptiidae	Coleoptera	Nationally Scarce (A)	x																													
A scydmaenid beetle	*Cephennium gallicum*	Scydmaenidae	Coleoptera	Local	x																													
A carrion beetle	*Silpha atrata*	Silphidae	Coleoptera	Widespread		x		x	x																			x						
A silvan flat bark beetle	*Psammoecus bipunctatus*	Silvanidae	Coleoptera	Widespread							x																							
A rove beetle	*Anotylus rugosus*	Staphylinidae	Coleoptera	Widespread																									x					
A rove beetle	*Brachygluta fossulata*	Staphylinidae	Coleoptera	Widespread							x											x												
A rove beetle	*Drusilla canaliculata*	Staphylinidae	Coleoptera	Widespread																		x												
A rove beetle	*Gabrius splendidulus*	Staphylinidae	Coleoptera	Widespread																													x	
A rove beetle	*Hygronoma dimidiata*	Staphylinidae	Coleoptera	Widespread							x																							
A rove beetle	*Lathrobium brunnipes*	Staphylinidae	Coleoptera	Widespread																							x						x	
A rove beetle	*Lathrobium impressum*	Staphylinidae	Coleoptera	Local	x																											x		
A rove beetle	*Lathrobium terminatum*	Staphylinidae	Coleoptera	Widespread								x																						
A rove beetle	*Lesteva sicula*	Staphylinidae	Coleoptera	Widespread	x	x			x	x																		x						
A rove beetle	*Ocypus aeneocephalus*	Staphylinidae	Coleoptera	Local																														
A rove beetle	*Oxytelus fulvipes*	Staphylinidae	Coleoptera	Nationally Scarce (A)						x																								
A rove beetle	*Paederus riparius*	Staphylinidae	Coleoptera	Widespread	x	x		x	x	x	x	x																	x				x	
A rove beetle	*Phillonthus decorus*	Staphylinidae	Coleoptera	Widespread				x		x																								
A rove beetle	*Philonthus micans/micantoides*	Staphylinidae	Coleoptera	Widespread																													x	
A rove beetle	*Quedius fumatus*	Staphylinidae	Coleoptera	Widespread				x																										

Common name	Scientific name	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
A rove beetle	*Remus sericeus*	Staphylinidae	Coleoptera	Local			x																											
A rove beetle	*Rugilus rufipes*	Staphylinidae	Coleoptera	Widespread																					x									
A rove beetle	*Stenus aceris*	Staphylinidae	Coleoptera	Local															x															
A rove beetle	*Stenus bifoveolatus*	Staphylinidae	Coleoptera	Widespread	x		x		x																						x			x
A rove beetle	*Stenus bimaculatus*	Staphylinidae	Coleoptera	Widespread				x		x	x	x															x				x		x	x
A rove beetle	*Stenus boops*	Staphylinidae	Coleoptera	Widespread	x					x		x																				x		
A rove beetle	*Stenus cicindeloides*	Staphylinidae	Coleoptera	Widespread			x	x	x																									
A rove beetle	*Stenus clavicornis*	Staphylinidae	Coleoptera	Widespread										x	x																			
A rove beetle	*Stenus flavipes*	Staphylinidae	Coleoptera	Widespread				x			x															x	x							
A rove beetle	*Stenus fulvicornis*	Staphylinidae	Coleoptera	Widespread					x																									
A rove beetle	*Stenus juno*	Staphylinidae	Coleoptera	Widespread	x	x	x		x	x	x	x													x			x			x	x	x	x
A rove beetle	*Stenus latifrons*	Staphylinidae	Coleoptera	Widespread			x																											x
A rove beetle	*Stenus lustrator*	Staphylinidae	Coleoptera	Local					x																									
A rove beetle	*Stenus nitidiusculus*	Staphylinidae	Coleoptera	Widespread	x			x	x		x																x							
A rove beetle	*Stenus palustris*	Staphylinidae	Coleoptera	Nationally Scarce (B)								x																					x	
A rove beetle	*Stenus picipes*	Staphylinidae	Coleoptera	Widespread	x																				x	x	x							
A rove beetle	*Stenus providus*	Staphylinidae	Coleoptera	Widespread						x		x																						
A rove beetle	*Stenus pusillus*	Staphylinidae	Coleoptera	Nationally Scarce (B)						x	x																							
A rove beetle	*Stenus solutus*	Staphylinidae	Coleoptera	Local			x																											
A rove beetle	*Tachinus proximus*	Staphylinidae	Coleoptera	Local																														
A rove beetle	*Tachyporus chrysomelinus/dispar*	Staphylinidae	Coleoptera	Widespread				x							x																			
A rove beetle	*Tachyporus hypnorum*	Staphylinidae	Coleoptera	Widespread			x		x					x																				
A rove beetle	*Tachyporus nitidulus*	Staphylinidae	Coleoptera	Widespread										x																				
A rove beetle	*Tachyporus obtusus*	Staphylinidae	Coleoptera	Widespread					x																									
A rove beetle	*Tachyporus pallidus*	Staphylinidae	Coleoptera	Widespread		x	x		x																						x			
A rove beetle	*Tachyporus pusillus*	Staphylinidae	Coleoptera	Widespread					x					x																				
A rove beetle	*Tasgius morsitans*	Staphylinidae	Coleoptera	Local																														
A rove beetle	*Xantholinus linearis*	Staphylinidae	Coleoptera	Widespread												x																		
A darkling beetle	*Crypticus quisquilius*	Tenebrionidae	Coleoptera	Nationally Scarce (B)																														
A darkling beetle	*Cteniopus sulphureus*	Tenebrionidae	Coleoptera	Local												x																		
A darkling beetle	*Lagria hirta*	Tenebrionidae	Coleoptera	Widespread					x	x	x			x	x	x			x															
A throsciid beetle	*Trixagus dermestoides*	Throsciidae	Coleoptera	Widespread					x																									
Common Earwig	*Forficula auricularia*	Forficulidae	Dermaptera	Widespread	x			x						x		x	x	x		x		x	x	x	x	x		x						
Lesser Cockroach	*Ectobius panzeri*	Blattelidae	Dictyoptera	Local				x						x	x	x	x		x	x	x	x	x	x										
Golden-haired Robberfly	*Choerades marginatus*	Asilidae	Diptera	Local	x																													
Fan-bristled Robberfly	*Dysmachus trigonus*	Asilidae	Diptera	Widespread														x																
Striped Slender Robberfly	*Leptogaster cylindrica*	Asilidae	Diptera	Widespread		x												x	x															
Kite-tailed Robberfly	*Machimus atricapillus*	Asilidae	Diptera	Widespread																														
Common Awl Robberfly	*Neoitamus cyanurus*	Asilidae	Diptera	Local																								x						
Dune Villa	*Villa modesta*	Bombyliidae	Diptera	Local													x																	

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Gout Fly	*Chlorops pumilionis*	Chloropidae	Diptera	Widespread																												x		x
A chloropid fly	*Dicraeus raptus*	Chloropidae	Diptera	Nationally Scarce																														
A chloropid fly	*Meromyza ornata*	Chloropidae	Diptera	Local												x																		
A chloropid fly	*Meromyza zachvatkini*	Chloropidae	Diptera	Local												x																		
A chloropid fly	*Platycephala planifrons*	chloropidae	Diptera	Local						x		x																				x	x	x
A frit fly	*Thaumatomyia notata*	Chloropidae	Diptera	Widespread																												x		
A conopid fly	*Sicus ferrugineus*	Conopidae	Diptera	Widespread																														
A dolichopid fly	*Hercostomus aerosus*	Dolichopididae	Diptera	Widespread	x	x	x		x			x																		x				
A dolichopid fly	*Hercostomus plagiatus*	Dolichopididae	Diptera	Nationally Scarce					x																									
A dolichopid fly	*Thrypticus pollinosus*	Dolichopididae	Diptera	Local					x		x																							
A dolichopid fly	*Bathycranium bicolorellum*	Dolichopodidae	Diptera	Local						x		x																						
A dolichopid fly	*Campsicnemus armatus*	Dolichopodidae	Diptera	Local		x																												
A dolichopid fly	*Campsicnemus curvipes*	Dolichopodidae	Diptera	Widespread		x																												
A dolichopid fly	*Campsicnemus loripes*	Dolichopodidae	Diptera	Widespread		x																												
A dolichopid fly	*Campsicnemus pusillus*	Dolichopodidae	Diptera	Nationally Scarce								x																						
A dolichopid fly	*Campsicnemus scambus*	Dolichopodidae	Diptera	Widespread		x						x																						
A dolichopid fly	*Dolichopodidae sp.*	Dolichopodidae	Diptera	Unknown		x																											x	x
A dolichopid fly	*Dolichopus atratus*	Dolichopodidae	Diptera	Widespread		x																												
A dolichopid fly	*Dolichopus discifer*	Dolichopodidae	Diptera	Local			x																											
A dolichopid fly	*Dolichopus latelimbatus*	Dolichopodidae	Diptera	Local																											x			
A dolichopid fly	*Dolichopus longitarsis*	Dolichopodidae	Diptera	Local		x	x		x	x	x	x																					x	
A dolichopid fly	*Dolichopus notatus*	Dolichopodidae	Diptera	Nationally Scarce							x																							
A dolichopid fly	*Dolichopus nubilis*	Dolichopodidae	Diptera	Widespread																									x					x
A dolichopid fly	*Dolichopus pennatus*	Dolichopodidae	Diptera	Local		x	x		x																									
A dolichopid fly	*Dolichopus picipes*	Dolichopodidae	Diptera	Local					x																									
A dolichopid fly	*Dolichopus planitarsis*	Dolichopodidae	Diptera	Local	x																													
A dolichopid fly	*Dolichopus plumipes*	Dolichopodidae	Diptera	Widespread	x	x																										x		
A dolichopid fly	*Dolichopus rupestris*	Dolichopodidae	Diptera	Local	x	x	x	x		x	x	x	x																			x		
A dolichopid fly	*Dolichopus simplex*	Dolichopodidae	Diptera	Widespread	x																													
A dolichopid fly	*Dolichopus sp.*	Dolichopodidae	Diptera	Unknown			x		x	x		x																						
A dolichopid fly	*Dolichopus ungulatus*	Dolichopodidae	Diptera	Widespread	x	x	x	x	x	x	x	x																			x			
A dolichopid fly	*Dolichopus urbanus*	Dolichopodidae	Diptera	Local		x		x	x	x																						x		
A dolichopid fly	*Hercostomus brevicornis*	Dolichopodidae	Diptera	Local		x																												
A dolichopid fly	*Hercostomus chalybeus*	Dolichopodidae	Diptera	Local		x	x	x																								x		
A dolichopid fly	*Hercostomus chrysozygos*	Dolichopodidae	Diptera	Local		x	x				x																							
A dolichopid fly	*Hercostomus germanus*	Dolichopodidae	Diptera	Local	x						x																							

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A dolichopid fly	*Hercostomus metallicus*	Dolichopodidae	Diptera	Local	x	x	x			x	x	x																						
A dolichopid fly	*Hercostomus sp.*	Dolichopodidae	Diptera	Unknown			x		x	x																								
A dolichopid fly	*Hypophylus obscurellus*	Dolichopodidae	Diptera	Widespread																													x	
A dolichopid fly	*Medetera micacea*	Dolichopodidae	Diptera	Local						x	x																							
A dolichopid fly	*Poecilobothrus nobilitatus*	Dolichopodidae	Diptera	Local				x																										
A dolichopid fly	*Rhaphium appendiculatum*	Dolichopodidae	Diptera	Widespread		x																												
A dolichopid fly	*Rhaphium caliginosum*	Dolichopodidae	Diptera	Local								x																						
A dolichopid fly	*Sciapus platypterus*	Dolichopodidae	Diptera	Widespread	x																													
A dolichopid fly	*Sybistroma crinipes*	Dolichopodidae	Diptera	Local																												x		
A dolichopid fly	*Teucophorus spinigerellus*	Dolichopodidae	Diptera	Widespread																							x							
A dolichopid fly	*Thrypticus divisus*	Dolichopodidae	Diptera	Nationally Scarce	x																													
An empid fly	*Empis hyaplipennis*	Empididae	Diptera	Local																	x													
A empid fly	*Empis opaca*	Empididae	Diptera	Local							x																							
An empid fly	*Hilara flavipes*	Empidoidea	Diptera	Widespread		x																												
An empid fly	*Hybos femoratus*	Empidoidea	Diptera	Widespread						x																						x		
An empid fly	*Phyllodromia melanocephala*	Empidoidea	Diptera	Widespread	x																													
A empid fly	*Rhamphomyia culicina*	Empidoidea	Diptera	Local								x																						
An empid fly	*Tachydromia heeri*	Empidoidea	Diptera	Unknown	x																													
An ephydrid fly	*Coenia palustris*	Ephydridae	Diptera	Widespread	x						x																				x			
An ephydrid fly	*Ephydridae sp.*	Ephydridae	Diptera	Unknown			x																											
An ephydrid fly	*Limnellia quadrata*	Ephydridae	Diptera	Local																														x
An ephydrid fly	*Notiphila annulipes*	Ephydridae	Diptera	Local								x																						
A empid fly	*Notiphila aquatica*	Ephydridae	Diptera	Unknown		x					x		x																					
An ephydrid fly	*Notiphila cinerea*	Ephydridae	Diptera	Widespread								x																						
An ephydrid fly	*Notiphila riparia*	Ephydridae	Diptera	Widespread							x																							
An ephydrid fly	*Paracoenia fumosa*	Ephydridae	Diptera	Local	x						x		x																			x	x	x
An ephydrid fly	*Parydra coarctata*	Ephydridae	Diptera	Widespread		x			x																						x		x	
An ephydrid fly	*Parydra hecate*	Ephydridae	Diptera	Local																													x	
An ephydrid fly	*Parydra littoralis*	Ephydridae	Diptera	Local		x				x		x															x				x			
An ephydrid fly	*Parydra sp*	Ephydridae	Diptera	Unknown							x																							
An ephydrid fly	*Pelina nitens*	Ephydridae	Diptera	Local							x																							
An ephydrid fly	*Scatella silacea*	Ephydridae	Diptera	Local			x																									x		
A cranefly	*Eloeophila maculata*	Limoniidae	Diptera	Widespread						x																								
A cranefly	*Gnophomyia viridipennis*	Limoniidae	Diptera	Nationally Scarce (Notable)							x																							
A limonid cranefly	*Helius flavus*	Limoniidae	Diptera	Widespread			x			x																								
A cranefly	*Phylidorea ferruginea*	Limoniidae	Diptera	Widespread			x		x			x													x						x		x	x
A cranefly	*Pseudolimnophila sepium*	Limoniidae	Diptera	Widespread	x				x																									
A lonchopterid fly	*Lochoptera furcata*	Lonchopteridae	Diptera	Widespread																											x			
A lonchopterid fly	*Lonchoptera bifurcata*	Lonchopteridae	Diptera	Widespread	x							x				x			x													x	x	
A lonchopterid fly	*Lonchoptera lutea*	Lonchopteridae	Diptera	Widespread	x	x			x						x	x																x		x

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A lonchopterid fly	*Lonchoptera scutellata*	Lonchopteridae	Diptera	Nationally Scarce								x																						
A ptychopterid cranefly	*Ptychoptera minuta*	Ptychopteridae	Diptera	Widespread		x	x																											
Black Snipefly	*Chrysopilus cristatus*	Rhagionidae	Diptera	Widespread	x	x	x	x	x	x	x		x																					
Downlooker Snipefly	*Rhagio scolopaceus*	Rhagionidae	Diptera	Widespread					x																									
A sciomyzid fly	*Elgiva solicita*	Sciomyzidae	Diptera	Local			x																											
A sciomyzid fly	*Limnia paludicola*	Sciomyzidae	Diptera	Widespread																										x				
A sciomyzid fly	*Limnia unguicornis*	Sciomyzidae	Diptera	Widespread																													x	
A sciomyzid fly	*Pherbellia brunnipes*	Sciomyzidae	Diptera	Nationally Scarce										x	x																			
A sciomyzid fly	*Pherbina coryleti*	Sciomyzidae	Diptera	Widespread									x																x	x				
A sciomyzid fly	*Psacadina verbekei*	Sciomyzidae	Diptera	Nationally Scarce																													x	
A sciomyzid fly	*Sciomyzidae sp.*	Sciomyzidae	Diptera	Unknown																								x						
A sciomyzid fly	*Sepedon sphegea*	Sciomyzidae	Diptera	Widespread																									x					
A sciomyzid fly	*Sepedon spinipes*	Sciomyzidae	Diptera	Widespread			x																											
A sciomyzid fly	*Tetanocera fuscivervis*	Sciomyzidae	Diptera	Widespread																									x					
A sciomyzid fly	*Trypetoptera punctata*	Sciomyzidae	Diptera	Widespread																	x													
Common Orange Legionnaire	*Beris vallata*	Stratiomyidae	Diptera	Widespread	x	x	x		x		x	x																	x					
Broad Centurion	*Chloromyia formosa*	Stratiomyidae	Diptera	Widespread				x				x																						
Fen Snout	*Nemotelus pantherinus*	Stratiomyidae	Diptera	Local									x			x																		
Black Colonel	*Odontomyia tigrina*	Stratiomyidae	Diptera	Nationally Scarce (A)	x																													
Common Green Colonel	*Oplodontha viridula*	Stratiomyidae	Diptera	Local			x						x																					
Four-barred Major	*Oxycera rara*	Stratiomyidae	Diptera	Local							x																							
Banded General	*Stratiomys potamida*	Stratiomyidae	Diptera	Nationally Scarce		x																												
A hoverfly	*Chalcosyrphus nemorum*	Syrphidae	Diptera	Widespread	x		x	x	x			x																x						
A hoverfly	*Cheilosia pagana*	Syrphidae	Diptera	Widespread					x																									
Marmalade Hoverfly	*Episyrphus balteatus*	Syrphidae	Diptera	Widespread	x		x	x		x						x																		
A hoverfly	*Eristalis arbustorum*	Syrphidae	Diptera	Widespread																								x						
A hoverfly	*Eristalis tenax*	Syrphidae	Diptera	Widespread			x																											
A hoverfly	*Eupeodes corollae*	Syrphidae	Diptera	Widespread																														
A hoverfly	*Helophilus pendulus*	Syrphidae	Diptera	Widespread	x		x	x	x	x																	x	x						
A hoverfly	*Melanostoma mellinum*	Syrphidae	Diptera	Widespread	x			x						x	x	x	x												x					
A hoverfly	*Melanostoma scalare*	Syrphidae	Diptera	Widespread					x																									
A hoverfly	*Meliscaeva auricollis*	Syrphidae	Diptera	Widespread	x																													
A hoverfly	*Myrathropa florea*	Syrphidae	Diptera	Widespread			x																											
A hoverfly	*Neoascia podagriga*	Syrphidae	Diptera	Widespread						x																								
A hoverfly	*Neoascia tenur*	Syrphidae	Diptera	Widespread								x	x																x					
A hoverfly	*Platycheirus albimanus*	Syrphidae	Diptera	Widespread	x																													
A hoverfly	*Platycheirus clypeatus*	Syrphidae	Diptera	Widespread																									x					
A hoverfly	*Platycheirus occultus*	Syrphidae	Diptera	Widespread									x																					

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A hoverfly	*Scaeva pyrastri*	Syrphidae	Diptera	Widespread											x																			
A hoverfly	*Sericomyia silentis*	Syrphidae	Diptera	Widespread			x																		x									
A hoverfly	*Sphaerophoria scripta*	Syrphidae	Diptera	Widespread											x																			
A hoverfly	*Sphaerophoria sp.*	Syrphidae	Diptera	Unknown													x																	
A hoverfly	*Syrphidae sp*	Syrphidae	Diptera	Unknown																														x
A hoverfly	*Syrphus ribesii*	Syrphidae	Diptera	Widespread							x																							
A hoverfly	*Syrphus torvus*	Syrphidae	Diptera	Widespread	x																													
A hoverfly	*Xylota sylvarum*	Syrphidae	Diptera	Widespread																														
Twinlobed Deerfly	*Chrysops relictus*	Tabanidae	Diptera	Widespread																														
Square-spot Deerfly	*Chrysops viduatus*	Tabanidae	Diptera	Locally common	x		x					x																						
Notch-horned Cleg	*Haematopota pluvialis*	Tabanidae	Diptera	Widespread			x		x	x			x																x			x		
Hairy-legged Horsefly	*Hybomitra bimaculata*	Tabanidae	Diptera	Local						x		x																						
Levels Yellow Horned Horsefly	*Hybomitra ciureai*	Tabanidae	Diptera	IUCN pre-1994 - Rare (RDB3)						x																								
Bright Horsefly	*Hybomitra distinguenda*	Tabanidae	Diptera	Local																														
Large Marsh Horsefly	*Tabanus autumnalis*	Tabanidae	Diptera	Local																														
Narrow-winged Horsefly	*Tabanus maculicornis*	Tabanidae	Diptera	Local		x																												
A tachinid fly	*Nowickia ferox*	Tachinidae	Diptera	Local																														
A tephritid fly	*Tephritis formosa*	Tephritidae	Diptera	Widespread																														x
A tephritid fly	*Tephritis leontodontis*	Tephritidae	Diptera	Local															x															
A tephritid fly	*Tephritis vespertina*	Tephritidae	Diptera	Widespread													x	x	x	x														
Twin-spot Stiletto	*Thereva bipunctata*	Therevidae	Diptera	Local															x															
A cranefly	*Tipula confusa*	Tipulidae	Diptera	Widespread		x																												
A cranefly	*Tipula oleracea*	Tipulidae	Diptera	Widespread		x	x					x																						
A cranefly	*Tipula unca*	Tipulidae	Diptera	Widespread					x	x																								
A trypetid fly	*Philophyla caesio*	Trypetidae	Diptera	Local																								x						
Parent Bug	*Elasmucha grisea*	Acanthosomatidae	Hemiptera	Widespread																						x								
A flower bug	*Anthocoris confusus*	Anthocoridae	Hemiptera	Widespread			x																x	x	x									
A flower bug	*Anthocoris limbatus*	Anthocoridae	Hemiptera	Widespread								x																			x	x		x
A flower bug	*Anthocoris nemoralis*	Anthocoridae	Hemiptera	Widespread		x																						x				x	x	x
Common Flower Bug	*Anthocoris nemorum*	Anthocoridae	Hemiptera	Widespread	x	x	x	x	x	x	x	x											x		x	x	x	x			x	x	x	
A flower bug	*Orius sp.*	Anthocoridae	Hemiptera	Unknown																											x	x		
Alder Spittlebug	*Aphrophora alni*	Aphrophoridae	Hemiptera	Widespread		x			x		x																	x						
A froghopper	*Neophilaenus campestris*	Aphrophoridae	Hemiptera	Local															x															
A froghopper	*Neophilaenus exclamationis*	Aphrophoridae	Hemiptera	Local											x			x	x		x													
A froghopper	*Neophilaenus lineatus*	Aphrophoridae	Hemiptera	Widespread					x	x	x		x			x											x		x	x	x			
Common Froghopper	*Philaenus spumarius*	Aphrophoridae	Hemiptera	Widespread			x	x	x	x	x		x			x													x		x		x	x
A berytid bug	*Gampsocoris punctipes*	Berytidae	Hemiptera	Local												x	x		x			x												
A leafhopper	*Agallia laevis/ribauti*	Cicadellidae	Hemiptera	Unknown														x	x	x	x	x												
A leafhopper	*Allygus modestus*	Cicadellidae	Hemiptera	Local																					x									

Common name	Scientific name	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
A leafhopper	*Anaceratagallia venosa*	Cicadellidae	Hemiptera	Local										x																				
A leafhopper	*Aphrodes makarovi/bicinctus*	Cicadellidae	Hemiptera	Widespread		x			x	x		x		x		x	x											x						x
A leafhopper	*Aphrodes sp.*	Cicadellidae	Hemiptera	Unknown											x																			
A leafhopper	*Cicadella viridis*	Cicadellidae	Hemiptera	Widespread				x																					x	x				
A leafhopper	*Conosanus obsoletus*	Cicadellidae	Hemiptera	Widespread						x																								
A leafhopper	*Euptercyba jucunda*	Cicadellidae	Hemiptera	Widespread	x		x					x													x									
A leafhopper	*Eupteryx cyclops*	Cicadellidae	Hemiptera	Local																											x			
A leafhopper	*Eupteryx sp.*	Cicadellidae	Hemiptera	Widespread																								x						
A leafhopper	*Eupteryx urticae*	Cicadellidae	Hemiptera	Widespread				x	x																		x							
A leafhopper	*Euscelis incisus*	Cicadellidae	Hemiptera	Widespread				x						x	x												x	x			x			
A leafhopper	*Euscelis lineolatus*	Cicadellidae	Hemiptera	Local																									x	x				
A leafhopper	*Idiocerus stigmaticalis*	Cicadellidae	Hemiptera	Local																												x		
A leafhopper	*Macropsis scotti*	Cicadellidae	Hemiptera	Widespread										x																				
A leafhopper	*Megopthalmus scabripennis*	Cicadellidae	Hemiptera	Widespread										x	x	x		x		x		x												
A leafhopper	*Mocydiopsis attenuata*	Cicadellidae	Hemiptera	Local																	x													
A leafhopper	*Mocydiopsis parvicauda*	Cicadellidae	Hemiptera	Local																		x												
A leafhopper	*Oncopsis alni*	Cicadellidae	Hemiptera	Widespread						x																								
A leafhopper	*Oncopsis flavicollis*	Cicadellidae	Hemiptera	Widespread	x	x																												
A leafhopper	*Oncopsis subangulata*	Cicadellidae	Hemiptera	Widespread	x		x		x			x																				x		
A leafhopper	*Rhytistylis proceps*	Cicadellidae	Hemiptera	Locally common														x		x		x												
A leafhopper	*Stroggylocephalus agrestis*	Cicadellidae	Hemiptera	Local																							x							
A coreid bug	*Alydus calcaratus*	Coreidae	Hemiptera	Local										x	x																			
Heath Shieldbug	*Legnotus picipes*	Cydnidae	Hemiptera	Nationally Scarce (B)										x		x																		
A planthopper	*Conomelus anceps*	Delphacidae	Hemiptera	Widespread	x																								x					
A planthopper	*Javesella pellucida*	Delphacidae	Hemiptera	Widespread							x																		x					
A planthopper	*Kelisia sabulicola*	Delphacidae	Hemiptera	Local										x		x																		
A water measurer	*Hydrometra stagnorum*	Hydrometridae	Hemiptera	Widespread		x			x		x														x	x	x	x						
A ground bug	*Drymus sylvaticus*	Lyaeidae	Hemiptera	Widespread				x																										
A lygaeid bug	*Cymus glandicolor*	Lygaeidae	Hemiptera	Widespread														x	x															
A ground bug	*Cymus melanocephalus*	Lygaeidae	Hemiptera	Widespread															x															
A ground bug	*Drymus brunneus*	Lygaeidae	Hemiptera	Widespread	x	x	x		x	x	x	x													x	x	x	x						
A ground bug	*Kleidocerys ericae*	Lygaeidae	Hemiptera	Local																	x													
Birch Catkin Bug	*Kleidocerys resedae*	Lygaeidae	Hemiptera	Widespread	x	x	x	x	x	x	x	x									x	x	x	x		x	x	x			x		x	
A ground bug	*Plinthisus brevipennis*	Lygaeidae	Hemiptera	Local										x	x																			
A ground bug	*Scolopostethus affinis*	Lygaeidae	Hemiptera	Widespread				x			x																							
A ground bug	*Scolopostethus thomsoni*	Lygaeidae	Hemiptera	Widespread				x	x			x															x	x						
A ground bug	*Stygnocoris fuligineus*	Lygaeidae	Hemiptera	Local																x	x													
Lucerne Bug	*Adelphocoris lineolatus*	Miridae	Hemiptera	Widespread										x		x	x																	
A mirid bug	*Apolygus lucorum*	Miridae	Hemiptera	Widespread						x																								

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Black-kneed Capsid	*Blepharidopterus angulatus*	Miridae	Hemiptera	Widespread	x	x	x			x	x	x									x		x	x	x	x	x	x			x	x	x	
A mirid bug	*Campyloneura virgula*	Miridae	Hemiptera	Widespread					x	x																								
A mirid bug	*Capsus ater*	Miridae	Hemiptera	Widespread	x	x	x																											
Potato Capsid Bug	*Closterotomus norwegicus*	Miridae	Hemiptera	Widespread											x																			
A mirid bug	*Deraeocoris lutescens*	Miridae	Hemiptera	Widespread	x																										x	x		
A mirid bug	*Deraeocoris ruber*	Miridae	Hemiptera	Widespread				x																										
A mirid bug	*Dicyphus annulatus*	Miridae	Hemiptera	Local										x	x	x																		
A mirid bug	*Heterosoma merioptera*	Miridae	Hemiptera	Widespread												x																		
A grass bug	*Leptopterna dolabrata*	Miridae	Hemiptera	Widespread	x			x					x																x					
A mirid bug	*Liocoris tripustulatus*	Miridae	Hemiptera	Widespread			x	x																										
Common Green Capsid	*Lygocoris pabulinus*	Miridae	Hemiptera	Widespread	x	x	x																											
A mirid bug	*Lygocoris rugicollis*	Miridae	Hemiptera	Local					x																									
A mirid bug	*Lygus maritimus*	Miridae	Hemiptera	Local										x		x																		
Tarnished Plant Bug	*Lygus rugilipennis*	Miridae	Hemiptera	Widespread (south)													x																	
A mirid bug	*Mecomma ambulans*	Miridae	Hemiptera	Widespread	x					x																								
A mirid bug	*Neolygus contaminatus*	Miridae	Hemiptera	Widespread						x	x																							
A grass bug	*Notostira elongata*	Miridae	Hemiptera	Widespread									x		x		x												x	x				
A mirid bug	*Orthocephalus saltator*	Miridae	Hemiptera	Local												x			x															
A mirid bug	*Orthonotus rufifrons*	Miridae	Hemiptera	Local				x		x																								
A mirid bug	*Orthotylus marginalis*	Miridae	Hemiptera	Widespread					x			x																						
A mirid bug	*Pantilius tunicatus*	Miridae	Hemiptera	Local																	x													
A mirid bug	*Phytocoris longipennis*	Miridae	Hemiptera	Widespread					x	x		x													x									
A mirid bug	*Phytocoris sp.*	Miridae	Hemiptera	Unknown	x																													
A mirid bug	*Phytocoris varipes*	Miridae	Hemiptera	Widespread													x																	
A mirid bug	*Phytocoris varipes/insignis*	Miridae	Hemiptera	Unknown										x	x	x		x	x		x													
A mirid bug	*Pilophorus perplexus*	Miridae	Hemiptera	Local																	x			x										
A mirid bug	*Pithanus maerkeli*	Miridae	Hemiptera	Widespread				x																										
A mirid bug	*Plagiognathus arbustorum*	Miridae	Hemiptera	Widespread	x																													
A mirid bug	*Plagiognathus chrysanthemi*	Miridae	Hemiptera	Widespread												x																		
A mirid bug	*Polymerus unifasciatus*	Miridae	Hemiptera	Local										x	x																			
A mirid bug	*Psallus ambiguus*	Miridae	Hemiptera	Widespread	x	x																												
A mirid bug	*Psallus flavellus*	Miridae	Hemiptera	Local																								x						
A mirid bug	*Psallus haematodes*	Miridae	Hemiptera	Widespread																						x					x	x		x
A mirid bug	*Psallus sp.*	Miridae	Hemiptera	Unknown								x																						
A grass bug	*Stenodema calcarata*	Miridae	Hemiptera	Widespread	x			x		x						x			x										x	x		x		
A grass bug	*Stenodema laevigata*	Miridae	Hemiptera	Widespread	x			x											x							x		x		x				
Timothy Grassbug	*Stenotus binotatus*	Miridae	Hemiptera	Widespread	x			x	x																									
A mirid bug	*Teratocoris antennatus*	Miridae	Hemiptera	Widespread								x	x																				x	x

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A mirid bug	*Teratocoris saundersi*	Miridae	Hemiptera	Local									x																					
Tree Damselbug	*Himacerus apterus*	Nabidae	Hemiptera	Widespread	x	x	x	x	x	x	x	x									x	x	x	x	x	x	x	x			x		x	
Ant Damselbug	*Himacerus mirmicoides*	Nabidae	Hemiptera	Widespread				x						x		x																		
A damselbug	*Himacerus sp.*	Nabidae	Hemiptera	Unknown																							x							
Heath Damselbug	*Nabis ericetorum*	Nabidae	Hemiptera	Local																		x												
Broad Damselbug	*Nabis flavomarginatus*	Nabidae	Hemiptera	Widespread						x	x		x													x			x	x				
Marsh Damselbug	*Nabis limbatus*	Nabidae	Hemiptera	Widespread		x																			x		x	x			x		x	
Common Damselbug	*Nabis rugosus*	Nabidae	Hemiptera	Widespread																	x	x												
Bishop's-mitre Bug	*Aelia acuminata*	Pentatomidae	Hemiptera	Local										x		x	x	x	x			x												
Hairy Shieldbug	*Dolycoris baccarum*	Pentatomidae	Hemiptera	Widespread	x	x								x	x		x		x			x		x										
Birch Shieldbug	*Elasmostethus interstinctus*	Pentatomidae	Hemiptera	Widespread	x			x													x	x	x	x			x	x						
Common Green Shieldbug	*Palomina prasina*	Pentatomidae	Hemiptera	Widespread																						x								
Forest Bug	*Pentatoma rufipes*	Pentatomidae	Hemiptera	Widespread	x	x	x	x	x																									
Gorse Shieldbug	*Piezodorus lituratus*	Pentatomidae	Hemiptera	Widespread																														
Turtle Shieldbug	*Podops inunctus*	Pentatomidae	Hemiptera	Widespread (south)										x		x																		
A rhopalid bug	*Chorosoma schillingi*	Rhopalidae	Hemiptera	Local													x	x	x	x	x													
A rhopalid bug	*Myrmus miriformis*	Rhopalidae	Hemiptera	Widespread													x		x															
A saldid bug	*Chartoscirta cincta*	Saldidae	Hemiptera	Widespread			x																							x	x	x	x	x
A saldid bug	*Saldula pilosella*	Saldidae	Hemiptera	Local		x																												
A saldid bug	*Saldula saltatoria*	Saldidae	Hemiptera	Widespread		x																												x
A tortoise bug	*Eurygaster testudinaria/maura*	Scutelleridae	Hemiptera	Local														x																
A lacebug	*Acalypta parvula*	Tingidae	Hemiptera	Local												x																		
A lacebug	*Dictyla convergens*	Tingidae	Hemiptera	Local			x																								x			
A lacebug	*Kalama tricornis*	Tingidae	Hemiptera	Local												x																		
A mining bee	*Andrena ovatula*	Apidae	Hymenoptera	Widespread (south)											x																			
Honey Bee	*Apis mellifera*	Apidae	Hymenoptera	Widespread													x																	
Large Red-tailed Bumblebee	*Bombus lapidarius*	Apidae	Hymenoptera	Widespread				x						x																				
White-tailed Bumblebee	*Bombus lucorum*	Apidae	Hymenoptera	Widespread				x																										
Common Carder Bee	*Bombus pascuorum*	Apidae	Hymenoptera	Widespread																								x						
Buff-tailed Bumblebee	*Bombus terrestris*	Apidae	Hymenoptera	Widespread															x															
A mining bee	*Lasioglossum calceatum*	Apidae	Hymenoptera	Widespread			x																											
A cuckoo wasp	*Trichrysis cyanea*	Chrysididae	Hymenoptera	Widespread																					x									
A digger wasp	*Cerceris arenaria*	Crabronidae	Hymenoptera	Widespread																														
A crabronid wasp	*Crossocerus ovatus*	Crabronidae	Hymenoptera	Widespread																	x													
A digger wasp	*Mellinus arvensis*	Crabronidae	Hymenoptera	Widespread																														
A crabronid wasp	*Passaloecus clypealis*	Crabronidae	Hymenoptera	Check																												x		
Club Horned Wood Borer Wasp	*Trypoxylon clavicerum*	Crabronidae	Hymenoptera	Widespread								x																						
Knopper Gall	*Andricus quercuscalicis*	Cynipidae	Hymenoptera	Widespread																	x	x												
A formicine ant	*Formica cunicularia*	Formicidae	Hymenoptera	Local																	x		x											
A formicine ant	*Formica fusca*	Formicidae	Hymenoptera	Widespread	x		x											x		x	x	x		x	x	x		x						

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Yellow Meadow Ant	*Lasius flavus*	Formicidae	Hymenoptera	Widespread										x				x				x												
A black ant	*Lasius niger (group)*	Formicidae	Hymenoptera	Widespread										x		x	x			x	x	x		x										
A myrmicine ant	*Myrmica rubra*	Formicidae	Hymenoptera	Widespread	x			x																	x						x			
A myrmicine ant	*Myrmica ruginodis*	Formicidae	Hymenoptera	Widespread	x	x	x	x		x	x				x			x				x				x	x				x		x	
A myrmicine ant	*Myrmica sabuleti*	Formicidae	Hymenoptera	Widespread (south)											x	x						x												
A myrmicine ant	*Myrmica scabrinodis (group)*	Formicidae	Hymenoptera	Widespread														x																
A myrmicine ant	*Temnothorax nylanderi*	Formicidae	Hymenoptera	Local																													x	
A spider-hunting wasp	*Episyron rufipes*	Pompilidae	Hymenoptera	Widespread																														
A spider-hunting wasp	*Evagetes crassicornis*	Pompilidae	Hymenoptera	Widespread																														
A spider-hunting wasp	*Evagetes pectinipes*	Pompilidae	Hymenoptera	RDB1																														
Common Pill Woodlouse	*Armadillidium vulgare*	Armadillidiidae	Isopoda	Widespread										x	x	x									x	x								
A woodlouse	*Cylisticus convexus*	Cylisticidae	Isopoda	Widespread												x																		
A woodlouse	*Ligidium hypnorum*	Ligiidae	Isopoda	Local	x	x			x	x	x	x													x	x	x	x			x	x		
Common Shiny Woodlouse	*Oniscus asellus*	Oniscidae	Isopoda	Widespread					x		x														x			x						
Common Striped Woodlouse	*Philoscia muscorum*	Philosciidae	Isopoda	Widespread	x		x	x	x	x	x	x										x		x	x	x	x							
Common Rough Woodlouse	*Porcellio scaber*	Porcellionidae	Isopoda	Widespread	x	x	x	x	x	x	x	x		x	x	x	x	x		x	x	x	x	x	x	x	x	x			x		x	
Common Pygmy Woodlouse	*Trichoniscus pusillus*	Trichoniscidae	Isopoda	Widespread	x	x				x	x															x		x					x	
A longhorn moth	*Nemophora degeerella*	Adelidae	Lepidoptera	Widespread	x																													
Scarce Footman	*Eilema complana*	Arctiidae	Lepidoptera	Local	x																							x						
Dingy Footman	*Eilema griseola*	Arctiidae	Lepidoptera	Widespread	x																							x						
Common Footman	*Eilema lurideola*	Arctiidae	Lepidoptera	Widespread	x																													
Rosy Footman	*Miltochrista miniata*	Arctiidae	Lepidoptera	Local	x																													
Ruby Tiger	*Phragmatobia fuliginosa fuliginosa*	Arctiidae	Lepidoptera	Widespread	x																													
Buff Ermine	*Spilosoma luteum*	Arctiidae	Lepidoptera	Widespread	x																													
Water Ermine	*Spilosoma urticae*	Arctiidae	Lepidoptera	Nationally Scarce (B)	x																													
Round-winged Muslin	*Thumatha serex*	Arctiidae	Lepidoptera	Local	x																													
Cinnabar Moth	*Tyria jacobaeae*	Arctiidae	Lepidoptera	Widespread																														
A micro-moth	*Argyresthia brockeella*	Argyresthiidae	Lepidoptera	Widespread	x																													
An argyresthiid moth	*Argyresthia goedartella*	Argyresthiidae	Lepidoptera	Widespread																								x						
A micro-moth	*Argyresthia trifasciata*	Argyresthiidae	Lepidoptera	Local	x																													
Water Veneer	*Acentria ephemerella*	Crambidae	Lepidoptera	Widespread	x																													
A crambid moth	*Agriphila selasella*	Crambidae	Lepidoptera	Local																								x						
A crambid moth	*Agriphila straminella*	Crambidae	Lepidoptera	Widespread	x																													
A micro-moth	*Agriphila straminella*	Crambidae	Lepidoptera	Widespread	x																													
A micro-moth	*Anania coronata*	Crambidae	Lepidoptera	Widespread	x																													
Small Magpie	*Anania hortulata*	Crambidae	Lepidoptera	Widespread	x																													
Small China-mark	*Cataclysta lemnata*	Crambidae	Lepidoptera	Widespread	x																							x						
Pale Water Veneer	*Donacaula forficella*	Crambidae	Lepidoptera	Local	x																													
A crambid moth	*Eudonia sp.*	Crambidae	Lepidoptera	Unknown																								x						

Common name	***Scientific name***	**Family**	**Order**	**UK status**	**T1**	**T2**	**T3**	**T4**	**T5**	**T6**	**T7**	**T8**	**T9**	**T10**	**T11**	**T12**	**T13**	**T14**	**T15**	**T16**	**T17**	**T18**	**T19**	**T20**	**T21**	**T22**	**T23**	**T24**	**T25**	**T26**	**T27**	**T28**	**T29**	**T30**
Mother-of-Pearl	*Pleuroptya ruralis*	Crambidae	Lepidoptera	Widespread	x																													
A crambid moth	*Udea olivalis*	Crambidae	Lepidoptera	Widespread	x																													
Pebble Hook-tip	*Drepana falcataria falcataria*	Drepanidae	Lepidoptera	Widespread	x																													
Scalloped Hook-tip	*Falcaria lacertinaria*	Drepanidae	Lepidoptera	Widespread	x																													
A micro-moth	*Monochroa palustrella*	Gelechiidae	Lepidoptera	Nationally Scarce (B)	x																													
Mottled Beauty	*Alcis repandata repandata*	Geometridae	Lepidoptera	Widespread	x																													
Peppered Moth	*Biston betularia*	Geometridae	Lepidoptera	Widespread	x																													
Bordered White	*Bupalus piniaria*	Geometridae	Lepidoptera	Widespread	x																													
Common White Wave	*Cabera pusaria*	Geometridae	Lepidoptera	Widespread	x																													
Barred Yellow	*Cidaria fulvata*	Geometridae	Lepidoptera	Widespread	x																													
Green Carpet	*Colostygia pectinataria*	Geometridae	Lepidoptera	Widespread																								x						
Scalloped Oak	*Crocallis elinguaria*	Geometridae	Lepidoptera	Widespread	x																													
Common Carpet	*Epirrhoe alternata alternata*	Geometridae	Lepidoptera	Widespread																								x						
Large Emerald	*Geometra papilionaria*	Geometridae	Lepidoptera	Widespread	x																													
Common Emerald	*Hemithea aestivaria*	Geometridae	Lepidoptera	Widespread	x																													
Small Yellow Wave	*Hydrelia flammeolaria*	Geometridae	Lepidoptera	Widespread	x																													
May Highflier	*Hydriomena impluviata*	Geometridae	Lepidoptera	Widespread	x																													
Pale Oak Beauty	*Hypomecis punctinalis*	Geometridae	Lepidoptera	Widespread	x																													
Riband Wave	*Idaea aversata*	Geometridae	Lepidoptera	Widespread	x																													
Small Fan-footed Wave	*Idaea dilutaria*	Geometridae	Lepidoptera	Widespread	x																							x						
Clouded Border	*Lomaspilis marginata*	Geometridae	Lepidoptera	Widespread	x																													
Peacock	*Macaria notata*	Geometridae	Lepidoptera	Local																								x						
Brimstone Moth	*Opisthograptis luteolata*	Geometridae	Lepidoptera	Widespread	x																													
Willow Beauty	*Peribatodes rhomboidaria*	Geometridae	Lepidoptera	Widespread	x																													
Scorched Wing	*Plagodis dolabraria*	Geometridae	Lepidoptera	Local	x																													
Early Thorn	*Selenia dentaria*	Geometridae	Lepidoptera	Widespread	x																													
Garden Carpet	*Xanthorhoe fluctuata*	Geometridae	Lepidoptera	Widespread	x																													
Ghost Moth	*Hepialus humuli humuli*	Hepialidae	Lepidoptera	Widespread	x																													
Common Swift	*Hepialus lupulinus*	Hepialidae	Lepidoptera	Widespread	x																													
Orange Swift	*Hepialus sylvina*	Hepialidae	Lepidoptera	Widespread																								x						
Large Skipper	*Ochlodes venata*	Hesperidae	Lepidoptera	Widespread																														
Small Skipper	*Thymelicus sylvestris*	Hesperidae	Lepidoptera	Widespread				x					x	x			x																	
Drinker	*Euthrix potatoria*	Lasiocampidae	Lepidoptera	Widespread	x																													
Common Blue	*Polyommatus icarus*	Lycaenidae	Lepidoptera	Widespread										x									x											
Yellow-tail	*Euproctis similis*	Lymantriidae	Lepidoptera	Widespread	x																													
White Satin	*Leucoma salcis*	Lymantriidae	Lepidoptera	Local	x																													
Black Arches	*Lymantria monacha*	Lymantriidae	Lepidoptera	Local	x																													
Grey/Dark Dagger	*Acronicta psi/tridens*	Noctuidae	Lepidoptera	Widespread	x																													
Knot Grass	*Acronicta rumicis*	Noctuidae	Lepidoptera	Widespread	x																													

Common name	Scientific name	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
Heart and Dart	*Agrotis exclamationis*	Noctuidae	Lepidoptera	Widespread	x																													
White Mantled Wainscot	*Archanara neurica*	Noctuidae	Lepidoptera	Nationally Rare (RDB3)																								x						
Fen Wainscot	*Arenosteola phragmitidis*	Noctuidae	Lepidoptera	Local	x																							x						
Beautiful Golden Y	*Autographa pulcrina*	Noctuidae	Lepidoptera	Widespread	x																													
Flame	*Axylia putris*	Noctuidae	Lepidoptera	Widespread	x																													
Silky Wainscot	*Chilodes maritimus*	Noctuidae	Lepidoptera	Local	x																													
Small Wainscot	*Chortodes pygmina*	Noctuidae	Lepidoptera	Widespread																								x						
Small Square-spot	*Diarsia rubi*	Noctuidae	Lepidoptera	Widespread																								x						
Uncertain	*Hoplodrina alsines*	Noctuidae	Lepidoptera	Widespread	x																							x						
Beautiful Hook-tip	*Laspeyria flexula*	Noctuidae	Lepidoptera	Local	x																													
Bright Line Brown Eye	*Mythimna conigera*	Noctuidae	Lepidoptera	Widespread	x																													
Flame Wainscot	*Mythimna flammea*	Noctuidae	Lepidoptera	Nationally Scarce (A)	x																													
Smoky Wainscot	*Mythimna impura*	Noctuidae	Lepidoptera	Widespread	x																													
Common Wainscot	*Mythimna pallens*	Noctuidae	Lepidoptera	Widespread	x																							x						
Striped Wainscot	*Mythimna pudorina*	Noctuidae	Lepidoptera	Local	x																													
Least Yellow Underwing	*Noctua interjecta caliginosa*	Noctuidae	Lepidoptera	Widespread																								x						
Lesser Broad-bordered Yellow Underwing	*Noctua janthe*	Noctuidae	Lepidoptera	Widespread																								x						
Large Yellow Underwing	*Noctua pronuba*	Noctuidae	Lepidoptera	Widespread																								x						
Flame Shoulder	*Ochropleura plecta*	Noctuidae	Lepidoptera	Widespread	x																													
Marbled Minor	*Oligia strigilis*	Noctuidae	Lepidoptera	Widespread	x																													
Marbled Minor (agg.)	*Oligia strigilis (agg.)*	Noctuidae	Lepidoptera	Widespread	x																													
Angle Shades	*Phlogophora meticulosa*	Noctuidae	Lepidoptera	Widespread	x																													
Marbled White Spot	*Protodeltote pygarga*	Noctuidae	Lepidoptera	Widespread	x																													
Green Silver Lines	*Pseudoips prasinana*	Noctuidae	Lepidoptera	Widespread	x																													
Straw Dot	*Rivula sericealis*	Noctuidae	Lepidoptera	Widespread	x																							x						
Setaceous Hebrew Character	*Xestia c-nigrum*	Noctuidae	Lepidoptera	Widespread	x																							x						
Double Square Spot	*Xestia triangulum*	Noctuidae	Lepidoptera	Widespread	x																													
Fan-foot	*Zanclognatha tarsipennalis*	Noctuidae	Lepidoptera	Widespread	x																													
Poplar Kitten	*Furcula bifida*	Notodontidae	Lepidoptera	Local	x																													
Iron Prominent	*Notodonta dromedarius*	Notodontidae	Lepidoptera	Widespread																								x						
Pebble Prominent	*Notodonta ziczac*	Notodontidae	Lepidoptera	Widespread	x																													
Buff-tip	*Phalera bucephala*	Notodontidae	Lepidoptera	Widespread	x																x													
Lesser Swallow Prominent	*Pheosia gnoma*	Notodontidae	Lepidoptera	Widespread	x																													
Swallow Prominent	*Pheosia tremula*	Notodontidae	Lepidoptera	Widespread	x																													
Pale Prominent	*Pterostoma palpina*	Notodontidae	Lepidoptera	Widespread	x																													
Coxcomb Prominent	*Ptilodon capucina*	Notodontidae	Lepidoptera	Widespread	x																													
Lobster Moth	*Stauropus fagi*	Notodontidae	Lepidoptera	Widespread	x																													
Small Tortoiseshell	*Aglais urticae*	Nymphalidae	Lepidoptera	Widespread	x																													
Ringlet	*Aphantopus hyperantus*	Nymphalidae	Lepidoptera	Widespread																														
Small Heath	*Coenonympha pamphilus*	Nymphalidae	Lepidoptera	Widespread													x	x																

Common name	Scientific name	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
Grayling	*Hipparchia semele*	Nymphalidae	Lepidoptera	Local													x	x	x	x	x		x											
x	*Inachis io*	Nymphalidae	Lepidoptera	Widespread	x																													
White Admiral	*Limenitis camilla*	Nymphalidae	Lepidoptera	Local																														
Meadow Brown	*Maniola jurtina*	Nymphalidae	Lepidoptera	Widespread					x					x									x											
Speckled Wood	*Pararge aegeria*	Nymphalidae	Lepidoptera	Widespread	x																		x											
Comma	*Polygonia c-album*	Nymphalidae	Lepidoptera	Widespread																														
Gatekeeper	*Pyronia tithonus*	Nymphalidae	Lepidoptera	Widespread										x																				
Red Admiral	*Vanessa atalanta*	Nymphalidae	Lepidoptera	Widespread	x				x																									
Large White	*Pieris brassicae*	Pieridae	Lepidoptera	Widespread						x																								
Green-veined White	*Pieris napi*	Pieridae	Lepidoptera	Widespread						x																								
Common Plume	*Emmelina monodactyla*	Pterophoridae	Lepidoptera	Widespread	x																													
Crescent Plume	*Marasmarcha lunaedactyla*	Pterophoridae	Lepidoptera	Widespread	x																													
White Plume Moth	*Pterophorus pentadactyla*	Pterophoridae	Lepidoptera	Widespread				x																										
A pyralid moth	*Acrobasis advenella*	Pyralidae	Lepidoptera	Widespread																								x						
A micro-moth	*Endotricha flammealis*	Pyralidae	Lepidoptera	Local	x																													
Large Elephant Hawkmoth	*Deilephila elpenor*	Sphingidae	Lepidoptera	Widespread	x																													
Small Elephant Hawkmoth	*Deilephila porcellus*	Sphingidae	Lepidoptera	Widespread										x																				
Poplar Hawkmoth	*Laothoe populi*	Sphingidae	Lepidoptera	Widespread	x																													
Eyed Hawkmoth	*Smerinthus ocellata*	Sphingidae	Lepidoptera	Widespread	x				x																									
A stathmopodid moth	*Stathmopoda pedella*	Stathmopodidae	Lepidoptera	Nationally Scarce (B)	x																													
Buff Arches	*Habrosyne pyritoides*	Thyatiridae	Lepidoptera	Widespread	x																													
a tortricid moth	*Apotomis sp.*	Tortricidae	Lepidoptera	Unknown	x																													
a tortricid moth	*Celypha lacunana*	Tortricidae	Lepidoptera	Widespread																								x						
a tortricid moth	*Cydia splendana*	Tortricidae	Lepidoptera	Widespread																								x						
a tortricid moth	*Epinotia bilunana*	Tortricidae	Lepidoptera	Widespread																								x						
Light Brown Apple Moth	*Epiphyas postvittana*	Tortricidae	Lepidoptera	Widespread																								x						
a tortricid moth	*Hedya salicella*	Tortricidae	Lepidoptera	Local	x																													
Barred Fruit-tree Tortrix	*Pandemis cerasana*	Tortricidae	Lepidoptera	Widespread																								x						
Dark Fruit Tree Tortrix	*Pandemis heparana*	Tortricidae	Lepidoptera	Widespread	x																													
A ypsolophid moth	*Ypsolopha scabrella*	Ypsolophidae	Lepidoptera	Widespread																								x						
Six-spot Burnet	*Zygaena filipendulae*	Zygaenidae	Lepidoptera	Widespread									x	x	x	x	x																	
A centipede	*Lithobius curtipes*	Lithobiidae	Lithobiomorpha	Local	x																													
Common Lithobius	*Lithobius forficatus*	Lithobiidae	Lithobiomorpha	Widespread				x																	x		x					x		
A scorpion fly	*Panorpa sp.*	Panorpidae	Mecoptera	Unknown			x																											
A lacewing	*Chrysoperla carnea*	Chrysopidae	Neuroptera	Widespread																												x		
A sponge fly	*Sisyra nigra*	Sisyridae	Neuroptera	Widespread					x																									
Southern Hawker	*Aeshna cyanea*	Aeshnidae	Odonata	Widespread	x																													
Brown Hawker	*Aeshna grandis*	Aeshnidae	Odonata	Widespread	x		x		x				x					x																
Common Hawker	*Aeshna juncea*	Aeshnidae	Odonata	Widespread																														
Azure Damselfly	*Coenagrion puella*	Coenagriidae	Odonata	Widespread		x				x			x															x						

Common name	*Scientific name*	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
Common Blue-tailed Damselfly	*Ischnura elegans*	Coenagriidae	Odonata	Widespread	x	x	x			x																								
Large Red Damselfly	*Pyrrhosoma nymphula*	Coenagriidae	Odonata	Widespread		x				x																								
Emerald Damselfly	*Lestes sponsa*	Lestidae	Odonata	Widespread																														
Four-spot Chaser	*Libellula quadrimaculata*	Libellulidae	Odonata	Widespread	x								x																					
Black-tailed Skimmer	*Orthetrum cancellatum*	Libellulidae	Odonata	Widespread		x																								x				
Ruddy Darter	*Sympetrum sanguineum*	Libellulidae	Odonata	Widespread						x																								
Common Darter	*Sympetrum striolatum*	Libellulidae	Odonata	Widespread									x																					
A harvestman	*Nemastoma bimaculatum*	Nemastomatidae	Opiliones	Widespread	x	x	x	x	x	x	x	x														x	x	x	x					
A harvestman	*Dicranopalpus ramosus*	Phalangiidae	Opiliones	Widespread	x		x		x	x	x	x												x	x	x	x	x			x	x	x	
A harvestman	*Lacinius ephippatus*	Phalangiidae	Opiliones	Widespread		x		x			x																					x		
A harvestman	*Leiobunum blackwalli*	Phalangiidae	Opiliones	Widespread		x																						x						
A harvestman	*Leiobunum rotundum*	Phalangiidae	Opiliones	Widespread	x	x	x	x	x	x	x															x		x					x	
A harvestman	*Lophopilio palpinalis*	Phalangiidae	Opiliones	Widespread		x	x																											
A harvestman	*Mitopus morio*	Phalangiidae	Opiliones	Widespread		x		x																										
A harvestman	*Nelima gothica*	Phalangiidae	Opiliones	Local					x	x																								
A harvestman	*Oligolophus tridens*	Phalangiidae	Opiliones	Widespread																	x							x						
A harvestman	*Paroligolophus agrestis*	Phalangiidae	Opiliones	Widespread		x		x	x	x	x	x											x	x	x	x	x	x			x	x	x	x
A harvestman	*Phalangium opilio*	Phalangiidae	Opiliones	Widespread				x								x	x	x	x									x						
A harvestman	*Platybunus triangularis*	Phalangiidae	Opiliones	Widespread		x								x	x				x															
Lesser Marsh Grasshopper	*Chorthippus albomarginatus*	Acrididae	Orthoptera	Local									x	x	x	x	x	x	x	x	x								x	x				
Field Grasshopper	*Chorthippus brunneus*	Acrididae	Orthoptera	Widespread	x								x	x	x	x	x	x	x	x	x													
Meadow Grasshopper	*Chorthippus parallelus*	Acrididae	Orthoptera	Widespread									x	x	x		x												x	x				
Mottled Grasshopper	*Myrmeleotettix maculatus*	Acrididae	Orthoptera	Widespread										x	x	x	x	x	x		x													
Common Green Grasshopper	*Omocestus viridulus*	Acrididae	Orthoptera	Widespread									x																x	x				
Stripe-winged Grasshopper	*Stenobothrus lineatus*	Acrididae	Orthoptera	Local										x	x	x	x	x	x	x	x													
Slender Groundhopper	*Tetrix subulata*	Tetrigidae	Orthoptera	Widespread																										x				
Common Groundhopper	*Tetrix undulata*	Tetrigidae	Orthoptera	Widespread																												x		
Long-winged Conehead	*Conocephalus discolor*	Tettigoniidae	Orthoptera	Widespread				x					x	x	x	x	x	x	x		x								x					
Short-winged Conehead	*Conocephalus dorsalis*	Tettigoniidae	Orthoptera	Local									x						x										x					
Speckled Bush-cricket	*Leptophyes punctatissima*	Tettigoniidae	Orthoptera	Widespread		x		x	x							x			x	x				x										
Oak Bush-cricket	*Meconema thalassinum*	Tettigoniidae	Orthoptera	Widespread							x	x									x					x	x				x			
Roesel's Bush-cricket	*Metrioptera roeselii*	Tettigoniidae	Orthoptera	Widespread (south)									x	x	x	x		x	x		x													
Grey Bush-cricket	*Platycleis albopunctata*	Tettigoniidae	Orthoptera	Nationally Scarce (B)										x	x	x	x																	
Great Green Bush-cricket	*Tettigonia viridissima*	Tettigoniidae	Orthoptera	Local				x				x		x				x																
A millipede	*Polydesmus sp*	Polydesmidae	Polydesmida	Unknown								x																						
A pseudoscorpion	*Dactylochelifer latreillei*	Cheliferidae	Pseudoscorpionida	Local												x			x															

Common name	*Scientific name*	Family	Order	UK status	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30
A bark louse	*Psocidae sp.*	Psocidae	Psochoptera	Unknown		x																												
A sawfly	*Pontania pedunculi*	Tenthredinidae	Symphyta	Widespread	x																						x						x	

Table 8. Red data book, Nationally Scarce and Nerc (2006) Section 41 'species of principal importance'.

Common name	Scientific name	Family	Order	UK status	NERC s.41	Date	Recorded grid ref	Sites recorded	BAT affinity	SAT affinity	Recorded habitat
A spider-hunting wasp	*Evagetes pectinipes*	Pompilidae	Hymenoptera	IUCN (pre 1994) - Endangered (RDB1)	n/a	17/07/2014	TM475 639	Coastal Strip	F1	F111	Cliffed dune edge/shingle interface
Ornate Brigadier	*Odontomyia ornata*	Stratiomyidae	Diptera	IUCN (pre 1994) - Vulnerable (RDB2)	n/a	19/06/2014	TM46765 63871	SSSI Area 2	W3	W314	Adult in aquatic sample well vegetated ditch; adjacent to fen and carr habitat
Grayling	*Hipparchia semele*	Nymphalidae	Lepidoptera	IUCN (2001) - Vulnerable	NERC S41 Species of principal importance	17/7/2014;	TM47546 64675; TM47513 64728; TM47580 64551; TM47573 64834; TM47516 64624; TM47602 64384	SAC (dune grassland); Coastal Strip (grassland)	F1	F111	Dunes, dune grassland and heath
White Admiral	*Limenitis camilla*	Nymphalidae	Lepidoptera	IUCN (2001) - Vulnerable	NERC S41 Species of principal importance	15/07/2014	TM47000 64443	SSSI Triangle	A1	0	Track edge adjacent wet woodland
Great Silver Water Beetle	*Hydrophilus piceus*	Hydrophilidae	Coleoptera	IUCN (2001) - Lower risk - near threatened (RDB3)	n/a	19/06/2014; 13/08/2014	TM47334 64860; TM46906 63822	SAC (scrape); Fen Meadow	W3	W314	Grazing marsh vegetated scrape and vegetated wet ditch
Levels Yellow Horned Horsefly	*Hybomitra ciureai*	Tabanidae	Diptera	IUCN (pre-1994) - Rare (RDB3)	n/a	16/07/2014	TM46743 63800	SSSI Area 2	W3	W314	Reed swamp / carr woodland interface
A crabronid wasp	*Passaloecus clypealis*	Crabronidae	Hymenoptera	IUCN (pre-1994) - Rare (RDB3)	n/a	13/08/2014	TM46970 63988	SSSI Area 2	W3	W314	Open reed swamp with scattered carr
White Mantled Wainscot	*Archanara neurica*	Noctuidae	Lepidoptera	IUCN (pre-1994) - Rare (RDB3)	NERC S41 Species of principal importance	14/08/2014	TM47017 63836	C-Platform Woodland	W3	W314	MV trap situated at interface between wet woodland, wet ditch and fen meadow
Small Heath	*Coenonympha pamphilus*	Nymphalidae	Lepidoptera	IUCN (2001) - Lower risk - near threatened	NERC S41 Species of principal importance	20/06/2014; 17/07/2014; 17/07/2014	TM47602 64384; TM47580 64551	Coastal Strip; SAC (dune/grassland)	F1	F112	Dune grassland and heath
Variable Damselfly	*Coenagrion pulchellum*	Coenagrionidae	Odonata	IUCN (2001) - Lower risk - near threatened		19/06/2014	TM46658 63719	SSSI Area 2	W2	0	Larva in vegetated wet ditch with overhanging vegetation
A wolf spider	*Hygrolycosa rubrofasciata*	Lycosidae	Aranae	Nationally Scarce (A)		15/08/2014	TM47513 64728	SAC (scrub woodland)	W3	0	Scrub birch woodland at the interface between reedswamp and dry heath.
A ground beetle	*Badister peltatus*	Carabidae	Coleoptera	Nationally Scarce (A)	n/a	17/07/2014	Unrecorded	Unrecorded	0	0	Unrecorded
A broad-nosed weevil	*Polydrusus formosus*	Curculionidae	Coleoptera	Nationally Scarce (A)	n/a	18/06/2014; 15/07/2014; 16/07/2014; 11/08/2014; 15/08/2014	TM46691 63773; TM47024 64415; TM46794 63855; TM47013 64103; TM47509 64699	SSSI Area 2; C-Platfform Woodland; SAC (scrub edge)	A1	0	Broadleaved woodland edge including wet woodland and dune edge scrub birch/oak woodland
A scraptiid beetle	*Anaspis thoracica*	Scraptiidae	Coleoptera	Nationally Scarce (A)		17/06/2014	TM47024 64415	SSSI Triangle	A2	A212	Wet woodland clearing at edge of reedswamp
A rove beetle	*Oxytelus fulvipes*	Staphylinidae	Coleoptera	Nationally Scarce (A)	n/a	18/06/2014	TM46743 63800	SSSI Area 2	W2	W221	Reed swamp / carr woodland interface

Common name	Scientific name	Family	Order	UK status	NERC s.41	Date	Recorded grid ref	Sites recorded	BAT affinity	SAT affinity	Recorded habitat
Black Colonel	*Odontomyia tigrina*	Stratiomyidae	Diptera	Nationally Scarce (A)	n/a	19/06/2014; 16/07/2014	TM47140 64275; TM46958 64453	SSSI Triangle; SAC (ditch)	W3	W314	1) larva from shaded,Common Duckweed covered wet ditch with Common Reed; 2) in MV trap located at edge of wet woodland clearing adjecent to reed swamp and ditches
Flame Wainscot	*Mythimna flammea*	Noctuidae	Lepidoptera	Nationally Scarce (A)		18/06/2014	TM46958 64453	SSSI Triangle	W3	W314	MV trap located at edge of wet woodland clearing adjecent to reed swamp and ditches
A true weevil	*Pelenomus canaliculatus*	Curculionidae	Coleoptera	Nationally Scarce		19/06/2014	TM47334 64860	SAC (scrape)	W3	W314	Shallow, well vegetatedscrape on coastal grazing marsh
A diving beetle	*Hydaticus seminiger*	Dytiscidae	Coleoptera	Nationally Scarce		19/06/2014	TM46662 63751	SSSI Area 2	W3	W313	Vegetated wet ditch
A hydrochid beetle	*Hydrochus angustatus*	Hydrochidae	Coleoptera	Nationally Scarce		19/06/2014	TM47334 64860	SAC scrape	W3	0	Shallow, well vegetatedscrape on coastal grazing marsh
A chloropid fly	*Dicraeus raptus*	Chloropidae	Diptera	Nationally Scarce		14/07/2014	TM47585 64027	Coastal Strip Grassland	F2	F212	Dune grassland
A dolichopid fly	*Hercostomus plagiatus*	Dolichopididae	Diptera	Nationally Scarce		16/07/2014	TM46691 63773	SSSI Area 2	W1	0	Carr woodland merging into reed swamp
A dolichopid fly	*Campsicnemus pusillus*	Dolichopodidae	Diptera	Nationally Scarce		18/06/2014	TM46832 63889	SSSI Area 2	W3	0	Reedswamp
A dolichopid fly	*Dolichopus notatus*	Dolichopodidae	Diptera	Nationally Scarce		16/07/2014	TM46768 63809	SSSI Area 2	W2	0	Carr woodland merging into reed swamp
A dolichopid fly	*Thrypticus divisus*	Dolichopodidae	Diptera	Nationally Scarce		15/07/2014	TM47024 64415	SSSI Triangle	W3	0	Reed swamp / carr woodland interface
A cranefly	*Gnophomyia viridipennis*	Limoniidae	Diptera	Nationally Scarce		16/07/2014	TM46768 63809	SSSI Area 2	A2	A212	Reed swamp / carr woodland interface
A lonchopterid fly	*Lonchoptera scutellata*	Lonchopteridae	Diptera	Nationally Scarce		16/07/2014	TM46832 63889	SSSI Area 2	W3	W314	Reed swamp / carr woodland interface
A sciomyzid fly	*Pherbellia brunnipes*	Sciomyzidae	Diptera	Nationally Scarce		14/07/2014	TM47570 63814; TM47583 63912	Coastal Strip Grassland	W3	W314	Dune grassland
A sciomyzid fly	*Psacadina verbekei*	Sciomyzidae	Diptera	Nationally Scarce		13/08/2014	TM46991 64005	SSSI Area 2	W3	0	Reed swamp / carr woodland interface
An apionid weevil	*Protapion difforme*	Apionidae	Coleoptera	Nationally Scarce (B)		14/07/2014	TM47585 64027	Coastal Strip Grassland	F2	0	Dune grassland
An apionid weevil	*Protapion dissimile*	Apionidae	Coleoptera	Nationally Scarce (B)		14/07/2014	TM47583 63912; TM47585 64027	Coastal Strip Grassland	F1	F111	Dune grassland
A jewel beetle	*Aphanisticus pusillus*	Buprestidae	Coleoptera	Nationally Scarce (B)		14/07/2014	TM47585 64027; TM47546 64675	Coastal Strip Grassland; SAC dune grassland	F1	F112	Dunes, dune grassland and heath
A soldier beetle	*Crudosilis ruficollis*	Cantharidae	Coleoptera	Nationally Scarce (B)		18/06/2014; 15/07/2014; 16/07/2014	TM46691 63773; TM46743 63800; TM46794 63855; TM46832 63889; TM46981 64333; TM46991 64322; TM47024 64415; TM47200 64447	SSSI Triangle; SSSI Area 2	F2	0	Reed swamp and reed swamp / carr woodland interface
A ground beetle	*Agonum nigrum*	Carabidae	Coleoptera	Nationally Scarce (B)		16/07/2014	TM46794 63855	SSSI Area 2	W3	W314	Reed swamp / carr woodland interface

Common name	Scientific name	Family	Order	UK status	NERC s.41	Date	Recorded grid ref	Sites recorded	BAT affinity	SAT affinity	Recorded habitat
A ground beetle	*Oodes helopioides*	Carabidae	Coleoptera	Nationally Scarce (B)		13/08/2014	TM46727 63838	SSSI Area 2	W3	W314	Densely vegtated and structurally diverse wet ditch
A true weevil	*Curculio betulae*	Curculionidae	Coleoptera	Nationally Scarce (B)		17/06/2014; 18/06/2014; 16/07/2014;	TM46832 63889; TM47024 64415; TM46794 63855	SSSI Area 2; SSSI Triangle	A1	0	Birch and other deciduous trees at reed swamp wet woodland interface
A true weevil	*Orthochaetes setiger*	Curculionidae	Coleoptera	Nationally Scarce (B)		14/07/2014	TM47570 63814; TM47585 64027	Coastal Strip Grassland	0	0	Dune grassland
An erirhinid weevil	*Notaris scirpi*	Erirhinidae	Coleoptera	Nationally Scarce (B)		15/07/2014; 16/07/2014; 15/08/2014	TM46955 63947; TM46794 63855; TM46991 64322	SSSI Area 2; SSSI Triangle	W2	0	Reed swamp; tall herb fen
A crawling water beetle	*Peltodytes caesus*	Haliplidae	Coleoptera	Nationally Scarce (B)		19/06/2014	TM46727 63841	SSSI Area 2	W2	W211	Densely vegtated and structurally diverse wet ditch
A false darkling beetle	*Conopalpus testaceus*	Melandryidae	Coleoptera	Nationally Scarce (B)		16/07/2014	TM46691 63773	SSSI Area 2	A2	A212	Carr woodland merging into reed swamp
A rove beetle	*Stenus palustris*	Staphylinidae	Coleoptera	Nationally Scarce (B)		16/07/2014; 16/08/2014	TM46832 63889; TM46991 64005	SSSI Area 2	W3	W313	Reed swamp / carr woodland interface
A rove beetle	*Stenus pusillus*	Staphylinidae	Coleoptera	Nationally Scarce (B)		16/07/2014; 18/06/2014	TM46743 63800; TM46794 63855	SSSI Area 2	W2	0	Reed swamp / carr woodland interface
A darkling beetle	*Crypticus quisquilius*	Tenebrionidae	Coleoptera	Nationally Scarce (B)		20/06/2014	Unrecorded	Coastal Strip Grassland	F1	0	Dune grassland
Banded General	*Stratiomys potamida*	Stratiomyidae	Diptera	Nationally Scarce (B)		17/06/2014	TM46981 64333	SSSI Triangle	W1	W126	Reed swamp / carr woodland interface
Heath Shieldbug	*Legnotus picipes*	Cydnidae	Hemiptera	Nationally Scarce (B)		14/07/2014	TM47570 63814; TM47585 64027	Coastal Strip Grassland	F1	F111	Dune grassland
Water Ermine	*Spilosoma urticae*	Arctiidae	Lepidoptera	Nationally Scarce (B)		18/06/2014	TM46958 64453	SSSI Triangle	0	0	MV trap located at edge of wet woodland clearing adjecent to reed swamp and ditches
A gelechiid moth	*Monochroa palustrellus*	Gelechiidae	Lepidoptera	Nationally Scarce (B)		17/07/2014	TM46958 64453	SSSI Triangle	n/a	n/a	MV trap located at edge of wet woodland clearing adjecent to reed swamp and ditches
Alder Signal	*Stathmopoda pedella*	Stathmopodidae	Lepidoptera	Nationally Scarce (B)		18/06/2014	TM46958 64453	SSSI Triangle	n/a	n/a	MV trap located at edge of wet woodland clearing adjacent to reed swamp and ditches
Grey Bush-cricket	*Platycleis albopunctata*	Tettigoniidae	Orthoptera	Nationally Scarce (B)		14/07/2014	TM47570 63814; TM47583 63912; TM47585 64027;	Coastal Strip Grassland	F1	F111	Dune grassland
Buff Ermine	*Spilosoma luteum*	Arctiidae	Lepidoptera	Widespread	NERC S41 Species of principal importance (research)	18/06/2014	TM46958 64453	SSSI Triangle	0	0	MV trap located at edge of wet woodland clearing adjecent to reed swamp and ditches
Cinnabar	*Tyria jacobaeae*	Arctiidae	Lepidoptera	Widespread	NERC S41 Species of principal importance	20/06/2014		Coastal Strip Grassland	0	0	Dune grassland
Ghost Moth	*Hepialus humuli*	Hepialidae	Lepidoptera	Widespread	NERC S41 Species of principal importance (research)	16/07/2014	TM46958 64453	SSSI Triangle	F2	0	MV trap located at edge of wet woodland clearing adjecent to reed swamp and ditches

Common name	Scientific name	Family	Order	UK status	NERC s.41	Date	Recorded grid ref	Sites recorded	BAT affinity	SAT affinity	Recorded habitat
Grey Dagger	*Acronicta psi*	Noctuidae	Lepidoptera	Widespread	NERC S41 Species of principal importance (research)	16/07/2014	TM46958 64453	SSSI Triangle	A1	0	MV trap located at edge of wet woodland clearing adjecent to reed swamp and ditches
Knot Grass	*Acronicta rumicis*	Noctuidae	Lepidoptera	Widespread	NERC S41 Species of principal importance (research)	18/06/2014	TM46958 64453	SSSI Triangle	0	0	MV trap located at edge of wet woodland clearing adjecent to reed swamp and ditches
Small Square-spot	*Diarsia rubi*	Noctuidae	Lepidoptera	Widespread	NERC S41 Species of principal importance (research)	14/08/2014	TM47017 63836	C-Plattform Woodland	0	0	MV trap situated at interface between wet woodland, wet ditch and fen meadow

Table 9. Interpretation of Biological Working Party Score (BMWP) and Average Score Per Taxon (ASPT)

BMWP and ASPT score interpretration		
BMWP score	**ASPT score**	**Category**
>150	>6	Very Good
101-150	>5	Good
51 - 100	>4	Moderate
16-50	<4	Poor
0-15		Very Poor

Table 10. Interpretation of Community Conservation Index (CCI) scoring categories (Chadd and Extence, 2004)

CCI Score	Conservation Category	Interpretation
0.0 – 5.0	*Low conservation value*	Sites supporting only common species and/or a community of low taxon richness
>5.0 – 10.0	*Moderate conservation value*	Sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness
>10.0 – 15.0	*Fairly high conservation value*	Sites supporting at least one uncommon species, or several species of restricted distribution, and /or a community of high taxon richness
>15.0 – 20.0	*High conservation value*	Site supporting several uncommon species, at least one of which may be nationally rare and/or a community of high taxon richness
>20.0	*Very high conservation value*	Sites supporting several rarities, including species of national importance, or at last one extreme rarity(e.g. taxa included in the British RDBs) and/or a community of very high taxon richness

Table 11. Results of BMWP, ASPT and CCI analysis of June 2014 aquatic sample data (see Figures 6-9 for sample site locations).

	Aquatic invertebrate samples collected 19/06/2014															
	SSSI Triangle						SAC (ditch)	SAC (scrape)	SSSI Fen Meadow		SSSI Area 2					
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16
Total no. species in sample	21	24	21	27	29	25	32	56	40	34	18	37	53	16	20	30
Total scoring BMWP families	13	13	12	14	15	14	13	26	20	16	1	20	20	10	12	16
Total scoring CCI species	17	18	18	23	24	22	28	38	30	22	16	28	36	16	19	21
BMWP Score	48.2	46.3	43	52.9	60.6	55.4	57	107.8	88.9	67.1	40.8	82.8	84.1	37.7	48.4	70.8
ASPT Score	3.71	3.56	3.58	3.78	4.04	3.96	4.38	4.15	4.45	4.19	4.08	4.14	4.2	3.77	4.03	4.42
Highest CoS in sample	5	5	4	5	7	7	7	10	5	4	7	5	12	5	5	5
CCI Score	9.12	8.33	5.78	8.7	16.04	14.32	11.5	26.58	9.8	7.09	13.56	10.71	29.67	10.31	10.53	10

Table 12. Results of BMWP, ASPT and CCI analysis of August 2014 aquatic sample data (see Figures 6-9 for sample site locations).

	Aquatic invertebrate samples collected 12-13/08/2014															
	SAC (ditch)	SSSI Triangle							SSSI Area 2						SSSI Fen Meadow	
	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32
Total no. species in sample	32	24	18	17	36	24	25	20	25	12	22	25	11	24	28	17
Total scoring BMWP families	16	11	9	9	14	13	13	11	17	7	13	13	7	13	9	9
Total scoring CCI species	21	20	16	15	32	22	23	19	23	11	20	20	11	20	22	15
BMWP Score	66.1	42.8	31.9	33.2	58	54.8	55.4	42.6	69.6	26.6	56.2	52.9	26.7	54.9	35.4	34.4
ASPT Score	4.13	3.89	3.54	3.69	4.14	4.22	4.26	3.87	4.09	3.8	4.32	4.06	3.81	4.22	3.93	3.81
Highest CoS in sample	7	5	5	5	7	5	5	5	7	5	5	5	5	5	10	5
CCI Score	14.87	8.5	8.75	9.33	15.53	8.86	9.35	8.42	18.26	10	9.75	10.75	11.36	9.5	24.09	9

Table 13. BMWP score interpretation – sample site level (see Figures 6-9 for sample site locations).

Sample number	Sample zone	BMWP Score	Category	Classification
A1	SSSI Triangle	48.2	16-50	Poor water quality
A2	SSSI Triangle	46.3	16-50	Poor water quality
A3	SSSI Triangle	43	16-50	Poor water quality
A4	SSSI Triangle	52.9	51-100	Moderate water quality
A5	SSSI Triangle	60.6	51-100	Moderate water quality
A6	SSSI Triangle	55.4	51-100	Moderate water quality
A18	SSSI Triangle	42.8	16-50	Poor water quality
A19	SSSI Triangle	31.9	16-50	Poor water quality
A20	SSSI Triangle	33.2	16-50	Poor water quality
A21	SSSI Triangle	58	51-100	Moderate water quality
A22	SSSI Triangle	54.8	51-100	Moderate water quality
A23	SSSI Triangle	55.4	51-100	Moderate water quality
A24	SSSI Triangle	42.6	16-50	Poor water quality
A11	SSSI Area 2	40.8	16-50	Poor water quality
A12	SSSI Area 2	82.8	51-100	Moderate water quality
A13	SSSI Area 2	84.1	51-100	Moderate water quality
A14	SSSI Area 2	37.7	16-50	Poor water quality
A15	SSSI Area 2	48.4	16-50	Poor water quality
A16	SSSI Area 2	70.8	51-100	Moderate water quality
A25	SSSI Area 2	69.6	51-100	Moderate water quality
A26	SSSI Area 2	26.6	16-50	Poor water quality
A27	SSSI Area 2	56.2	51-100	Moderate water quality
A28	SSSI Area 2	52.9	51-100	Moderate water quality
A29	SSSI Area 2	26.7	16-50	Moderate water quality
A30	SSSI Area 2	54.9	51-100	Moderate water quality
A9	SSSI Fen Meadow	88.9	51-100	Moderate water quality
A10	SSSI Fen Meadow	67.1	51-100	Moderate water quality
A31	SSSI Fen Meadow	35.4	16-50	Poor water quality
A32	SSSI Fen Meadow	34.4	16-50	Poor water quality
A7	SAC (ditch)	57	51-100	Moderate water quality
A17	SAC (ditch)	66.1	51-100	Moderate water quality
A8	SAC (scrape)	107.8	101-150	Good water quality

Table 14. ASPT interpretation – sample site level (see Figures 6-9 for sample site locations).

Sample number	Sample zone	ASPT	Category	Classification
A1	SSSI Triangle	3.71	<4	Poor water quality
A2	SSSI Triangle	3.56	<4	Poor water quality
A3	SSSI Triangle	3.58	<4	Poor water quality
A4	SSSI Triangle	3.78	<4	Poor water quality
A5	SSSI Triangle	4.04	>4<5	Moderate water quality
A6	SSSI Triangle	3.96	<4	Poor water quality
A18	SSSI Triangle	3.89	<4	Poor water quality
A19	SSSI Triangle	3.54	<4	Very poor water quality
A20	SSSI Triangle	3.69	<4	Poor water quality
A21	SSSI Triangle	4.14	>4<5	Moderate water quality
A22	SSSI Triangle	4.22	>4<5	Moderate water quality
A23	SSSI Triangle	4.26	>4<5	Moderate water quality
A24	SSSI Triangle	3.87	<4	Poor water quality
A11	SSSI Area 2	4.08	>4<5	Moderate water quality
A12	SSSI Area 2	4.14	>4<5	Moderate water quality
A13	SSSI Area 2	4.2	>4<5	Moderate water quality
A14	SSSI Area 2	3.77	>4<5	Poor water quality
A15	SSSI Area 2	4.03	<4	Moderate water quality
A16	SSSI Area 2	4.42	>4<5	Moderate water quality
A25	SSSI Area 2	4.09	>4<5	Moderate water quality
A26	SSSI Area 2	3.8	<4	Poor water quality
A27	SSSI Area 2	4.32	>4<5	Moderate water quality
A28	SSSI Area 2	4.06	>4<5	Moderate water quality
A29	SSSI Area 2	3.81	<4	Poor water quality
A30	SSSI Area 2	4.22	>4<5	Moderate water quality
A9	SSSI Fen Meadow	4.45	>4<5	Moderate water quality
A10	SSSI Fen Meadow	4.19	>4<5	Moderate water quality
A31	SSSI Fen Meadow	3.93	<4	Poor water quality
A32	SSSI Fen Meadow	3.81	<4	Poor water quality
A7	SAC (ditch)	4.38	>4<5	Moderate water quality
A17	SAC (ditch)	4.13	>4<5	Moderate water quality
A8	SAC (scrape)	4.15	>4<5	Moderate water quality

Table 15. CCI score interpretation – sample site level (see Figures 6-9 for sample site locations).

Interpretation of CCI scores (Chadd and Extence, 2004) for each sample site				
Sample number	**Sample zone**	**CCI score**	**Category**	**Classification**
A1	SSSI Triangle	9.12	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A2	SSSI Triangle	8.33	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A3	SSSI Triangle	5.78	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A4	SSSI Triangle	8.7	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A5	SSSI Triangle	16.04	>15.0 to 20.0 - sites supporting several uncommon species, at least one of which may be nationally rare and/or a community of high taxon richness	*High conservation value*
A6	SSSI Triangle	14.32	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	*Fairly high conservation value*
A18	SSSI Triangle	8.5	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A19	SSSI Triangle	8.75	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A20	SSSI Triangle	9.33	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A21	SSSI Triangle	15.53	>15.0 to 20.0 - sites supporting several uncommon species, at least one of which may be nationally rare and/or a community of high taxon richness	*High conservation value*
A22	SSSI Triangle	8.86	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A23	SSSI Triangle	19.96	>15.0 to 20.0 - sites supporting several uncommon species, at least one of which may be nationally rare and/or a community of high taxon richness	*High conservation value*
A24	SSSI Triangle	8.42	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A11	SSSI Area 2	13.56	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	*Fairly high conservation value*

Interpretation of CCI scores (Chadd and Extence, 2004) for each sample site				
Sample number	**Sample zone**	**CCI score**	**Category**	**Classification**
A12	SSSI Area 2	10.71	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	*Fairly high conservation value*
A13	SSSI Area 2	29.67	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	*Very high conservation value*
A14	SSSI Area 2	10.31	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	*Fairly high conservation value*
A15	SSSI Area 2	10.53	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	*Fairly high conservation value*
A16	SSSI Area 2	10	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A25	SSSI Area 2	18.26	>15.0 to 20.0 - sites supporting several uncommon species, at least one of which may be nationally rare and/or a community of high taxon richness	*High conservation value*
A26	SSSI Area 2	10	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A27	SSSI Area 2	9.75	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A28	SSSI Area 2	10.75	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	*Fairly high conservation value*
A29	SSSI Area 2	11.36	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	*Fairly high conservation value*
A30	SSSI Area 2	9.5	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	*Moderate conservation value*
A9	SSSI Fen Meadow	9.8	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	Moderate conservation value
A10	SSSI Fen Meadow	7.09	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	Moderate conservation value
A31	SSSI Fen Meadow	24.09	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	Very high conservation value

Interpretation of CCI scores (Chadd and Extence, 2004) for each sample site				
Sample number	**Sample zone**	**CCI score**	**Category**	**Classification**
A32	SSSI Fen Meadow	9	>5.0 to 10.0 - sites supporting at least one species of restricted distribution and/or a community of moderate taxon richness	Moderate conservation value
A7	SAC (ditch)	11.5	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	Fairly high conservation value
A17	SAC (ditch)	22.67	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	Very high conservation value
A8	SAC (scrape)	26.58	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	Very high conservation value

Table 16. **SSSI Triangle** - BMWP, ASPT and CCI scores per discrete waterbody/ditch (see Figures 6-9 for sample site locations).

	Aquatic invertebrate samples collected 19/6/2014 and 12-13/08/2014 - SSSI Triangle combined samples per ditch				
	Field edge drain NW corner of Triangle	**Main drain northern border of Triangle**	**Southern boundary ditch**	**Reedswamp ditch connected to Lagoon**	**Tall herb fen - reedswamp lagoon**
Samples combined	**A1, A18**	**A2, A3, A19, A20**	**A4, A5, A6, A24**	**A22, A23**	**A21**
Total no. species in sample	33	38	51	36	36
Total scoring BMWP families	15	17	21	17	14
Total scoring CCI species	25	28	40	32	32
BMWP Score	57.3	62.5	86.7	75.8	58
ASPT Score	3.82	3.68	4.13	4.46	4.15
Highest CoS in sample	5	5	7	5	7
CCI Score	8.6 (Moderate conservation value)	8.04 (Moderate conservation value)	14.88 (Fairly high conservation value)	8.49 (Moderate conservation value)	15.5 (High conservation value)

Table 17. **SSSI Area 2** - BMWP, ASPT and CCI scores per discrete waterbody/ditch (see Figures 6-9 for sample site locations).

	Aquatic invertebrate samples collected 19/6/2014 and 12-13/08/2014 - SSSI Area 2 combined samples per ditch		
	Ditch east of Sandy Lane Drove	**Ditch west of Sandy Lane Drove**	**Ditch at southwest corner of SSSI Area 2**
Samples combined	**A11, A14, A15, A26, A28, A30**	**A13, A16, A25, A27, A29**	**A12**
Total no. species in sample	46	72	37
Total scoring BMWP families	21	26	20
Total scoring CCI species	37	51	28
BMWP Score	88.2 (Moderate water quality)	112.4 (Good water quality)	82.8 (Moderate water quality)
ASPT Score	4.2 (Modrate water quality)	4.32 (Moderate water quality)	4.14 (Moderate water quality)
Highest CoS in sample	7	12	5
CCI Score	15.7 (High conservation value)	29.65 (very high conservation value)	10.71 (fairly high conservation value)

Table 18. SSSI Fen Meadow - BMWP, ASPT and CCI scores per discrete waterbody/ditch (see Figures 6-9 for sample site locations).

	Aquatic invertebrate samples collected 19/6/2014 and 12-13/08/2014 - SSSI Fen Meadow combined samples per ditch	
	Ditch bordering Fen Meadow east field margin	**Ditch bordering Fen Meadow west field margin**
Samples combined	**A9, A32**	**A10, A31**
Total no. species in sample	46	51
Total scoring BMWP families	20	16
Total scoring CCI species	34	33
BMWP Score	88.9	67.1
ASPT Score	4.45	4.19
Highest CoS in sample	5	10
CCI Score	9.56 (Moderate conservation value)	23.03 (Very high conservation value)

Table 19. Minsmere and Walberswick SSSI (scrape) and SAC (ditch) - BMWP, ASPT and CCI scores per discrete waterbody/ditch

	Aquatic invertebrate samples collected 19/6/2014 and 12-13/08/2014 SAC/SSSI combined samples per ditch	
	SSSI(scrape)	**SAC (ditch)**
Total no. species in sample	56	44
Total scoring BMWP families	26	19
Total scoring CCI species	37	40
BMWP Score	107.8 (Good water quality)	78.8 (Moderate water quality)
ASPT Score	4.15 (Moderate water quality)	4.15 (Moderate water quality)
Highest CoS in sample	10	7
CCI Score	26.58 (Very high conservation value)	13.83 (Fairly high conservation value)

Table 20. BMWP, ASPT and CCI scores for combined sample sites

	Aquatic invertebrate samples collected 19/6/2014 and 12-13/08/2014 sample sites combined							
	SSSI Triangle	**SSSI Area 2**	**SSSI Fen Meadow**	**SSSI Total**	**SAC (scrape)**	**SAC (ditch)**	**SAC (total)**	**Total (All sites)**
Total no. species in sample	90	99	74	128	56	44	83	172
Total scoring BMWP families	26	26	23	31	26	19	34	36
Total scoring CCI species	60	67	47	87	37	40	63	100
BMWP Score	111.1	111.7	102	131.4	107.8	78.8	146.4	159.8
ASPT Score	4.27	4.3	4.43	4.24	4.14	4.15	4.31	4.44
Highest CoS in sample	7	12	10	12	10	7	10	12
CCI Score	14.7	30.45	22.13	31.03	26.58	13.83	24.6	32.64

Table 21. Interpretation of combined sample site CCI data

Interpretation of CCI scores (Chadd and Extence, 2004) for combined sample sites			
Sample zone	**CCI score (combined samples)**	**Category**	**Classification**
SSSI Triangle	14.7	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	*Fairly high conservation value*
SSSI Area 2	30.45	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	*Very high conservation value*
SSSI Fen Meadow	22.13	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	*Very high conservation value*
SSSI Total	31.03	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	*Very high conservation value*
SAC (scrape)	26.58	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	*Very high conservation value*
SAC (ditch)	13.83	>10 to 15.0 - sites supporting at least one uncommon species, or several species of restricted distribution and/or a community of high taxon richness	*Fairly high conservation value*
SAC (total)	24.6	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	*Very high conservation value*
Total aquatic survey	32.64	>20.0 - sites supporting several rarities, including species of national importance, or at least one extreme rarity (e.g. taxa included in the British RDBs) and/or a community of very high taxon richness.	*Very high conservation value*

Table 22. **SSSI Triangle – ISIS output** – Total **aquatic** sample data (terrestrial data excluded)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W211	open water on disturbed mineral sediments	2		5	115
W125	slow-flowing rivers	1		4	
W313	moss and tussock fen	1		2	
W314	reedfen and pools	2		2	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	56	115		48	
W3	permanent wet mire	13			11	
F2	grassland & scrub matrix	7			6	
W1	flowing water	6			5	
F3	shaded field & ground layer	1			1	
A1	arboreal canopy	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	90
Number of errors in species list	4

Table 23. **SSSI Triangle – ISIS output** – Total **terrestrial** sample data (aquatic excluded)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
A215	epiphyte fauna	3		15	
W314	reedfen and pools	10		9	161
F001	scrub edge	7		4	
W221	litter-rich fluctuating marsh	1		3	143
W211	open water on disturbed mineral sediments	1		3	143
M211	sandy beaches	1		2	
W126	seepage	1		2	
F002	rich flower resource	4		2	
A212	bark & sapwood decay	7		1	
A211	heartwood decay	2		1	
F221	montane & upland	1		1	
M311	saltmarsh	1		1	
W312	Sphagnum bog	1		1	161
F112	open short sward	1		1	
F111	bare sand & chalk	2		0	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	21	117		71	
A1	arboreal canopy	17	126		58	
W3	permanent wet mire	16	161		54	
W2	mineral marsh & open water	11	143		37	
A2	wood decay	4			13	0
F3	shaded field & ground layer	3			12	
W1	flowing water	3			12	
F1	unshaded early successional mosaic	3			9	
M3	saltmarsh, estuary & mud flat	1			2	
M2	sandy shore	0			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	372
Number of errors in species list	28

Table 24. SSSI Triangle – ISIS output – All sample data (**terrestrial and aquatic** combined)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
A215	epiphyte fauna	3		15	
W314	reedfen and pools	10		9	162
W211	open water on disturbed mineral sediments	2		5	129
W125	slow-flowing rivers	1		4	138
F001	scrub edge	7		4	
W221	litter-rich fluctuating marsh	1		3	129
M211	sandy beaches	1		2	
W313	moss and tussock fen	1		2	162
W126	seepage	1		2	138
A212	bark & sapwood decay	7		1	
F002	rich flower resource	3		1	
A211	heartwood decay	2		1	
F221	montane & upland	1		1	
M311	saltmarsh	1		1	
W312	Sphagnum bog	1		1	162

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	19	129		77	
F2	grassland & scrub matrix	18	116		75	
W3	permanent wet mire	15	162		60	
A1	arboreal canopy	14	126		58	
W1	flowing water	4	138		16	
A2	wood decay	3			14	0
F3	shaded field & ground layer	3			12	
F1	unshaded early successional mosaic	2			8	
M3	saltmarsh, estuary & mud flat	0			2	
M2	sandy shore	0			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	444
Number of errors in species list	35

Table 25. SSSI Area 2 – ISIS output – **aquatic** only data

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W211	open water on disturbed mineral sediments	5		13	134
W125	slow-flowing rivers	1		4	
W314	reedfen and pools	4		4	
W221	litter-rich fluctuating marsh	1		3	134
W313	moss and tussock fen	1		2	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	68	134		50	
W3	permanent wet mire	21			15	
W1	flowing water	5			4	
A1	arboreal canopy	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	80
Number of errors in species list	7

Table 26. **SSSI Area 2 – ISIS output** – **terrestrial** only data

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W221	litter-rich fluctuating marsh	2		5	157
W314	reedfen and pools	6		5	182
A215	epiphyte fauna	1		5	175
A212	bark & sapwood decay	16		3	175
W313	moss and tussock fen	1		2	182
F001	scrub edge	3		2	
F006	dung	1		1	
F221	montane & upland	1		1	
A211	heartwood decay	1		1	175
F112	open short sward	1		1	
F111	bare sand & chalk	1		0	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	20	131		55	
W3	permanent wet mire	20	182	fav	55	
W2	mineral marsh & open water	14	157	fav	38	
A1	arboreal canopy	12	133		33	
A2	wood decay	8	175		21	1
W1	flowing water	5			14	
F3	shaded field & ground layer	3			9	
F1	unshaded early successional mosaic	2			5	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	284
Number of errors in species list	7

Table 27. SSSI Area 2 – ISIS output – total data (**aquatic and terrestrial** combined)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W211	open water on disturbed mineral sediments	5		13	145
W221	litter-rich fluctuating marsh	3		8	145
W314	reedfen and pools	9		8	204
A215	epiphyte fauna	1		5	175
W313	moss and tussock fen	2		4	204
W125	slow-flowing rivers	1		4	144
A212	bark & sapwood decay	16		3	175
F001	scrub edge	4		2	
F006	dung	2		2	
F221	montane & upland	1		1	
A211	heartwood decay	1		1	175
F112	open short sward	1		1	
F003	scrub-heath & moorland	1		0	
F111	bare sand & chalk	1		0	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	25	145		86	
W3	permanent wet mire	19	204	fav	67	
F2	grassland & scrub matrix	16	126		54	
A1	arboreal canopy	10	132		34	
A2	wood decay	6	175		21	1
W1	flowing water	5	144		18	
F3	shaded field & ground layer	3			9	
F1	unshaded early successional mosaic	1			5	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	357
Number of errors in species list	12

Table 28. **SSSI Fen Meadow – ISIS output** – Total (**Aquatic** only)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W125	slow-flowing rivers	1		4	
W211	open water on disturbed mineral sediments	1		3	111
W314	reedfen and pools	2		2	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	66	111		35	
W3	permanent wet mire	26			14	
W1	flowing water	6			3	
F3	shaded field & ground layer	2			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	56
Number of errors in species list	3

Table 29. SSSI Fen Meadow – ISIS output – Total (**Terrestrial** only)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W314	reedfen and pools	2		2	150

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	39	141		22	
W3	permanent wet mire	32	150		18	
W2	mineral marsh & open water	19			11	
F3	shaded field & ground layer	2			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	58
Number of errors in species list	1

Table 30. SSSI Fen Meadow – ISIS output – Total (**Terrestrial & Aquatic**)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W125	slow-flowing rivers	1		4	
W314	reedfen and pools	3		3	152
W211	open water on disturbed mineral sediments	1		3	116

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	41	116		44	
W3	permanent wet mire	27	152		29	
F2	grassland & scrub matrix	21	141		22	
W1	flowing water	3			3	
F3	shaded field & ground layer	2			2	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	111
Number of errors in species list	4

Table 31. C-Platform Woodland Strip – ISIS output – Total (**Terrestrial**)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
A215	epiphyte fauna	2		10	
F001	scrub edge	4		2	
W314	reedfen and pools	2		2	182
F002	rich flower resource	1		0	
A212	bark & sapwood decay	2		0	
F111	bare sand & chalk	1		0	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	22	107		29	
A1	arboreal canopy	16	129		21	
W3	permanent wet mire	13	182	fav	17	
W2	mineral marsh & open water	9			12	
F3	shaded field & ground layer	5			7	
F1	unshaded early successional mosaic	3			4	
A2	wood decay	3			4	0
W1	flowing water	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	144
Number of errors in species list	13

Table 32. Minsmere and Walberswick Heath and Marshes SSSI (scrape) and SSSI and SAC (ditch) – **ISIS output** - **Aquatic** data

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W211	open water on disturbed mineral sediments	5		13	120
W125	slow-flowing rivers	1		4	
W314	reedfen and pools	4		4	
M311	saltmarsh	1		1	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	59	120		46	
W3	permanent wet mire	14			11	
W1	flowing water	5			4	
F2	grassland & scrub matrix	1			1	
M3	saltmarsh, estuary & mud flat	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	82
Number of errors in species list	4

Table 33. **SAC dune grassland/scrub – ISIS output** – **terrestrial** only data

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F112	open short sward	10		5	144
F001	scrub edge	6		3	
F111	bare sand & chalk	7		2	144
F002	rich flower resource	2		1	
F003	scrub-heath & moorland	2		1	
A212	bark & sapwood decay	1		0	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	41	148		52	
F1	unshaded early successional mosaic	21	144		27	
A1	arboreal canopy	13	147		17	
F3	shaded field & ground layer	2			3	
W2	mineral marsh & open water	2			2	
W3	permanent wet mire	2			2	
A2	wood decay	1			1	0

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	127
Number of errors in species list	1

Table 34. Coastal Strip – ISIS output – All sample data (**terrestrial**)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F112	open short sward	16	fav	8	200
F111	bare sand & chalk	14		3	200
W314	reedfen and pools	2		2	
F001	scrub edge	3		2	
F002	rich flower resource	3		1	
A212	bark & sapwood decay	2		0	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	42	136		64	
F1	unshaded early successional mosaic	34	200	fav	52	
W3	permanent wet mire	2			3	
A2	wood decay	1			2	0
W2	mineral marsh & open water	1			2	
F3	shaded field & ground layer	1			1	
A1	arboreal canopy	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	151
Number of errors in species list	0

Table 35. Combined **Aquatic** data – **all sites** (SSSI Triangle, SSSI Area 2, SSSI Fen Meadow, SAC ditch & scrape)

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W211	open water on disturbed mineral sediments	9	fav	23	132
W314	reedfen and pools	8		7	241
W313	moss and tussock fen	2		4	241
W125	slow-flowing rivers	1		4	
W221	litter-rich fluctuating marsh	1		3	132
M311	saltmarsh	1		1	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	46	132		76	
W3	permanent wet mire	19	241	fav	32	
F2	grassland & scrub matrix	4			7	
W1	flowing water	3			5	
A1	arboreal canopy	1			2	
F3	shaded field & ground layer	1			1	
M3	saltmarsh, estuary & mud flat	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	175
Number of errors in species list	9

Table 36. **Combined SSSI Aquatic** data – (SSSI Triangle, SSSI Area 2, SSSI Fen Meadow)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W211	open water on disturbed mineral sediments	6		15	129
W314	reedfen and pools	6		5	236
W313	moss and tussock fen	2		4	236
W125	slow-flowing rivers	1		4	
W221	litter-rich fluctuating marsh	1		3	129

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	54	129		66	
W3	permanent wet mire	20	236	fav	25	
F2	grassland & scrub matrix	5			6	
W1	flowing water	4			5	
A1	arboreal canopy	2			2	
F3	shaded field & ground layer	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	129
Number of errors in species list	7

Table 37. Combined SAC and Coastal Strip (**Terrestrial** data)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F112	open short sward	17	fav	9	195
F001	scrub edge	8		4	
F111	bare sand & chalk	17		4	195
F003	scrub-heath & moorland	7		2	
W314	reedfen and pools	2		2	
A212	bark & sapwood decay	3		1	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	42	135		92	
F1	unshaded early successional mosaic	27	195	fav	59	
A1	arboreal canopy	8	144		18	
W3	permanent wet mire	2			5	
W2	mineral marsh & open water	2			4	
A2	wood decay	1			3	0
F3	shaded field & ground layer	1			3	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	220
Number of errors in species list	1

Table 38. **Combined SSSI** - **Terrestrial** data only (SSSI Triangle, Area 2, Fen Meadow)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
A215	epiphyte fauna	4	fav	20	179
W314	reedfen and pools	14	fav	13	187
W221	litter-rich fluctuating marsh	2		5	152
F001	scrub edge	8		4	
A212	bark & sapwood decay	19		4	179
W211	open water on disturbed mineral sediments	1		3	152
M211	sandy beaches	1		2	
W313	moss and tussock fen	1		2	187
F006	dung	2		2	
W126	seepage	1		2	156
A211	heartwood decay	3		2	179
F221	montane & upland	1		1	
M311	saltmarsh	1		1	
W312	Sphagnum bog	1		1	187
F003	scrub-heath & moorland	3		1	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representa-tion (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	23	124		109	
W3	permanent wet mire	18	187	fav	86	
A1	arboreal canopy	15	124		72	
W2	mineral marsh & open water	11	152	fav	55	
A2	wood decay	6	179		30	1
W1	flowing water	4	156	fav	18	
F3	shaded field & ground layer	3	131		16	
F1	unshaded early successional mosaic	2			11	
M3	saltmarsh, estuary & mud flat	0			2	
M2	sandy shore	0			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	509
Number of errors in species list	29

Table 39. **Combined SSSI** - **Terrestrial** data only including C-Platform data (SSSI Triangle, Area 2, Fen Meadow, C-Platform)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
A215	epiphyte fauna	4	fav	20	177
W314	reedfen and pools	15	fav	13	193
W221	litter-rich fluctuating marsh	2		5	151
F001	scrub edge	9		5	
A212	bark & sapwood decay	20	fav	4	177
W211	open water on disturbed mineral sediments	1		3	151
M211	sandy beaches	1		2	
W313	moss and tussock fen	1		2	193
F006	dung	2		2	
W126	seepage	1		2	156
A211	heartwood decay	3		2	177
F221	montane & upland	1		1	
M311	saltmarsh	1		1	
W312	Sphagnum bog	1		1	193
F003	scrub-heath & moorland	3		1	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	23	122		122	
W3	permanent wet mire	18	193	fav	92	
A1	arboreal canopy	15	123		78	
W2	mineral marsh & open water	11	151	fav	58	
A2	wood decay	6	177		31	1
F3	shaded field & ground layer	3	133		18	
W1	flowing water	3	156	fav	18	
F1	unshaded early successional mosaic	2			13	
M3	saltmarsh, estuary & mud flat	0			2	
M2	sandy shore	0			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	562
Number of errors in species list	39

Table 40. **Combined SSSI - Aquatic and Terrestrial** data for **all SSSI Sites and C-Platform** (SSSI Triangle, SSSI Area 2, SSSI Fen Meadow, C-Platform)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
A215	epiphyte fauna	4	fav	20	177
W314	reedfen and pools	18	fav	16	209
W211	open water on disturbed mineral sediments	6		15	143
W221	litter-rich fluctuating marsh	3		8	143
W313	moss and tussock fen	3		7	209
F001	scrub edge	9		5	
W125	slow-flowing rivers	1		4	148
A212	bark & sapwood decay	20	fav	4	177
M211	sandy beaches	1		2	
F006	dung	2		2	
W126	seepage	1		2	148
A211	heartwood decay	3		2	177
F221	montane & upland	1		1	
M311	saltmarsh	1		1	
W312	Sphagnum bog	1		1	209

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	20	123		120	
W2	mineral marsh & open water	19	143		111	
W3	permanent wet mire	17	209	fav	102	
A1	arboreal canopy	13	123		79	
A2	wood decay	5	177		32	1
W1	flowing water	4	148		23	
F3	shaded field & ground layer	3	133		18	
F1	unshaded early successional mosaic	2			13	
M3	saltmarsh, estuary & mud flat	0			2	
M2	sandy shore	0			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	634
Number of errors in species list	45

Table 41. Combined SSSI Aquatic and Terrestrial data for **all SSSI Sites** (SSSI Triangle, SSSI Area 2, SSSI Fen Meadow)

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
A215	epiphyte fauna	4	fav	20	179
W211	open water on disturbed mineral sediments	6		15	141
W314	reedfen and pools	17	fav	15	205
W221	litter-rich fluctuating marsh	3		8	141
W313	moss and tussock fen	3		7	205
F001	scrub edge	8		4	
W125	slow-flowing rivers	1		4	148
A212	bark & sapwood decay	19		4	179
M211	sandy beaches	1		2	
F006	dung	2		2	
W126	seepage	1		2	148
A211	heartwood decay	3		2	179
F221	montane & upland	1		1	
M311	saltmarsh	1		1	
W312	Sphagnum bog	1		1	205

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	20	141		112	
F2	grassland & scrub matrix	20	124		110	
W3	permanent wet mire	17	205	fav	95	
A1	arboreal canopy	13	123		74	
A2	wood decay	6	179		31	1
W1	flowing water	4	148		23	
F3	shaded field & ground layer	3	131		16	
F1	unshaded early successional mosaic	2			11	
M3	saltmarsh, estuary & mud flat	0			2	
M2	sandy shore	0			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	590
Number of errors in species list	35

Table 42. Red Data Book and Nationally Scarce species attributed to key BATs and SATs (2014 data and Amec 2007-10 data)

BAT	2014	2007-2010	Total	SAT	2014	2007-2010	Total
W3 - permanent wet mire	18	14	32	W313 - moss and tussock fen	2	1	3
				W314 - reedfen and pools	12	9	21
F1 - unshaded early successional mosaic	8	9	17	F111- bare sand and chalk	3	4	7
				F112 - open short sward	1	1	2
F2 - grassland and scrub matrix	4	9	13	no rarities attributed			0
A1 - arboreal canopy	4	2	6	n/a			0
W2 - mineral marsh and open water	6	0	6	W211 - open water on disturbed mineral sediments	1	0	1
				W221 - litter-rich fluctuating marsh	1	0	1
A2 - wood decay	3	2	5	A212 - bark and sapwood decay	3	1	4
W1 - flowing water	2	2	4	W126 - seepage	1	1	2

Table 43. Habitat affinities of RDB and Nationally Scarce species recorded during 2014 and Amec 2007-2010 surveys (NB: species recorded by Amec-only highlighted in bold)

Species	Description	BAT	SAT
Aeshna isosceles	Grazing marsh dyke systems with clean, still, non-saline water. Favours dykes branched from main drains or with dead-ends; Specific vegetation requirements including primarily Water Soldier *Stratiotes aloides* and/or Frogbit *Hydrocharis morsus-ranae;* bladderworts *Utricularia* sp. Also emergent marginal vegetation including rushes *Juncus* spp. and Yellow Iris *Iris pseudacorus.*Adults need trees/ scrub for resting wooded areas near breeding sites. Larvae thought to take two years to develop. Threats: Loss/degradation of grazing marsh ditch systems; inappropriate management (mechanised ditch management); eutrophication through nutrient enrichment; saltwater penetration, due to changes in sealevel/coastal / hydrological management.	W3 - permanent wet mire	W314 - reed-fen and pools
Agonum nigrum	River banks, reedbeds, marshes in dune slacks. Found around lush vegetation, sedges, grasses, reeds on soft soil and mud. Threats: Drainage of fens, development, agriculture, falling watertables due to abstraction and engineering.	W3 - permanent wet mire	W314 - reed-fen and pools
Archanara neurica	Virtually confined in the UK to a '15km stretch of coastal reedbeds in Suffolk, between Thorpeness and Southwold'; larvae develop in dead stems of Common Reed *Phragmites australis* 'at edges of reed-beds and reed-lined ditches on or near the coast, with abundant dead stems. Frequently cut or burned sites ar thought to be unsuitable' (Waring *et al.,* 2004).	W3 - permanent wet mire	W314 - reed-fen and pools
Demetrias imperialis	Found in reedbeds (litter) and amongst reed-mace in flood litter. Hibernate in dead Typha stems. Threats: Drainage and habitat loss due to development and engineering leading to falling water levels.	W3 - permanent wet mire	W314 - reed-fen and pools
Graphoderus cinereus	Richly vegetated permanent ditches. Good water quality important, threats include drainage of old fen systems, seasonal drying of previously pemanent waterbodies (Foster, 2010).	W3 - permanent wet mire	W314 - reed-fen and pools
Hybomitra ciureai	Primarily associated with coastal grazing marshes in the UK. According to Stubbs and Drake (2001) *H. ciureai* is associated with freshwater ditches rather than brackish ones.	W3 - permanent wet mire	W314 - reed-fen and pools
Hydaticus transvalis	Associated with rich fen and fenland drainage ditches, more open habitat than *H. seminiger*	W3 - permanent wet mire	W314 - reed-fen and pools
Hydrophilus piceus	Richly vegetated, permanent wet ditches and pools within reedbeds; needs large network of linked ditches. Associated with *Lemna trisulca*, Frogbit *Hydrocharis morsus-ranae*, ditches often *Phragmites australis* lined.	W3 - permanent wet mire	W314 - reed-fen and pools
Lipara rufitarsus	A reedbed specialist, the larvae form galls in the stems of Common Reed *Phragmites australis.*	W3 - permanent wet mire	W314 - reed-fen and pools
Lonchoptera scutellata	Associated with sedges including *Carex riparia* and *C. acutiformis* at water margins of fens and damp woodland. Also *Carex paniculata.* Larvae probably develop in leaf litter or decaying vegetable matter. Threats: Loss of wetland habitat through drainage. Mis-management of water levels resulting in loss of marginal vegetation.	W3 - permanent wet mire	W314 - reed-fen and pools

Species	Description	BAT	SAT
Mythimna flammea	Larvae develop in stems of Common Reed in fens and marshes with scattered reed rather than dense stands (Waring *et al.,* 2004).	W3 - permanent wet mire	W314 - reed-fen and pools
Odontomyia ornata	Richly vegetated, permanent wet ditches and pools within grazing marshes reedswamps; favours wider ditches for breeding which feature structurally diverse, floating mats of vegetation. Frogbit *Hydrocharis morsus-ranae* and Ivy-leaved Duckweed *Lemna trisulca* are cited plants in breeding habitat. the 'key to survival' of this species 'is the presence of extensive areas with ditches that are cleared out on a cycle of about five years' Considered 'good flagship species' for grazing marshes, due to its strong dependency on this habitat.	W3 - permanent wet mire	W314 - reed-fen and pools
Odontomyia tigrina	Richly vegetated, permanent wet ditches and pools within grazing marshes reedswamps; favours wider ditches for breeding which feature structurally diverse, floating mats of vegetation. Frogbit *Hydrocharis morsus-ranae* and Ivy-leaved Duckweed *Lemna trisulca* are cited plants in breeding habitat. the 'key to survival' of this species 'is the presence of extensive areas with ditches that are cleared out on a cycle of about five years' Considered 'good flagship species' for grazing marshes, due to its strong dependency on this habitat.	W3 - permanent wet mire	W314 - reed-fen and pools
Oodes helopioides	Found in fens, grazing levels, marshes and marginal habitat. Semi-aquatic adults forage under water. Found in soft mud, amidst lush vegetation and under loose bark at the base of willows. Threats: Drainage of fens, development, agriculture, falling watertables due to abstraction and engineering.	W3 - permanent wet mire	W314 - reed-fen and pools
Passaloecus clypealis	A reedswamp habitat, the larvae probably developing in hollow reed stems, but has been reared from galls of *Lipara lucens* from Common Reed *Phragmites australis* (Richards, 1980).	W3 - permanent wet mire	W314 - reed-fen and pools
Pelenomus canaliculatus	Associated with water milfoils *Myriophyllum* sp. in marshes and fens, margins of ponds etc.	W3 - permanent wet mire	W314 - reed-fen and pools
Pherbellia brunnipes	Occurs in fen, coastal levels, dune slacks, damp woods. Larvae thought to develop as parasitoids in aquatic snails. Seasonal waterlevel fluctuation may be important for lifecycle.	W3 - permanent wet mire	W314 - reed-fen and pools
Prionocera subserricornis	Occurs in black, peaty mud under shaded conditions. Ditch lines under *Alnus glutinosa* important for this species. Saturated ground organically rich with decomposing leaf litter	W3 - permanent wet mire	W314 - reed-fen and pools
Psacadina zernyi	Fen species, larvae feed on aquatic snails. Fluctuating water level may be important.	W3 - permanent wet mire	W314 - reed-fen and pools
Hydaticus seminiger	Occurs in well vegetated permanent waters, usually amongst dense vegetation or debris in partly shaded sites. Often coastal but avoiding brackish conditions (Foster and Friday, 2011).	W3 - permanent wet mire	W313 - moss and tussock fen
Parhelophilus consimilis	Occurs in pools that are transitional between bog and fen. Often in association with reedmace. Larvae (rat-tailed maggots) of *Parhelophilus* are thought to develop between the leaf sheaths of reed-mace or plants with similar growth form.	W3 - permanent wet mire	W313 - moss and tussock fen
Stenus palustris	High quality wetlands such as undisturbed fens, grazing marshes etc. (Lott and Anderson, 2011).	W3 - permanent wet mire	W313 - moss and tussock fen

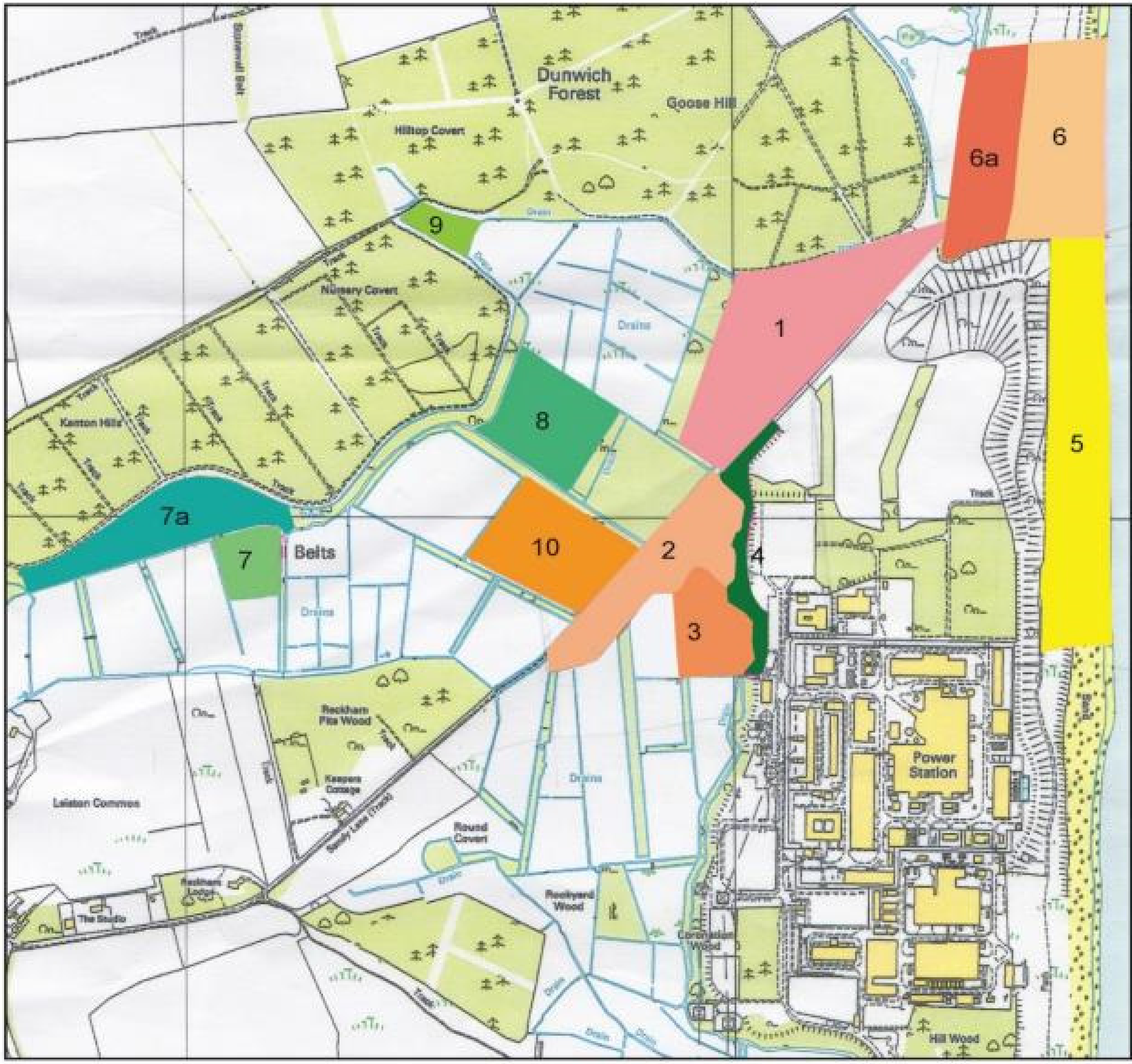
Species	**Description**	**BAT**	**SAT**
Oxytelus fulvipes	A species of ‘undisturbed marsh with fluctuating water levels such as carr and shaded ditches’ (Lott, 2009)	W2 - mineral marsh and open water	W211 - open water on disturbed sediments
Peltodytes caesus	A crawling water beetle confined to lowland rich fen pools and ditches in the English and Welsh Fens ’(Foster, 2011)	W2 - mineral marsh and open water	W211 - open water on disturbed sediments
Molophilus bihamatus	A swamp specialist cranefly associated with Alder carr seepage habitat	W1 - flowing water	W126 - seepage
Stratiomys potamida	Wetland associated soldierfly with an aquatic larval stage. Banded General is found in wet meadows with ditches and streams, seepages and springs especially in fens or lightly wooded places; boggy pond and pool margins and carr woodland. Larvae are tolerant of seasonal waterlevel fluctuation (Drake and Stubbs, 2001).	W1 - flowing water	W126 - seepage
Aphanisticus pusillus	‘Often recorded in dry places, particularly downland or heathland. This species has also been noted in wetland’ (Hyman and Parsons, 1992) who also state that the species is ‘associated with members of the Juncaceae and Cyperaceae’.	F1 - unshaded early successional mosaic	F112 - open short sward
Clanoptilus marginellus	Primarily a coastal species in the UK associated with coastal and riverside shingle and coastal grasslands.	F1 - unshaded early successional mosaic	F112 - open short sward
Coenonympha pamphilus	A species of open, sunny habitats including grassland, heaths, meadows, sand dunes etc. Adults favour areas with short sward. Larvae feed on various grasses including bent grasses *Agrostis* spp.,fescues *Festuca* spp. and meadow gasses *Poa* spp.	F1 - unshaded early successional mosaic	F112 - open short sward
Clubiona frisa	Found at the base of Marram Grass *Ammophila arenaria* tussocks on coastal dunes (Roberts, 1995)	F1 - unshaded early successional mosaic	F111 - bare sand and chalk
Evagetes pectinipes	UK records almost exclusively from sand dune habitat in Kent in the UK prior to current survey. Species thought to be a cleptoparasite of *Episyron rufipes*, another spider-hunting wasp. Both species were recorded on the cliffed, seaward edge of the dune habitat within the Coastal Strip. Spider-hunting wasps stock burrows in sand with spiders (*Episyron rufipes* collects orb-web spiders (Araneidae) and wolf spiders (Lycosidae)).	F1 - unshaded early successional mosaic	F111 - bare sand and chalk
Hipparchia semele	Sheltered and sunny sites where the vegetation is sparse. Species requires bare ground. Typically found in heathland, sand dunes, coastal grassland etc. Larvae feed on various grasses including Red Fescue *Festuca rubra,* Sheep's Fescue *F. ovina,* Marram Grass *Ammophila arenaria* and various others. Adults nectar on Common Bird's-foot Trefoil *Lotus corniculatus,* Bramble *Rubus fruticosus* agg., Common Heath *Calluna vulgaris,* Bell Heather *Erica cinerea* and various other herbs.	F1 - unshaded early successional mosaic	F111 - bare sand and chalk

Species	Description	BAT	SAT
Legnotus picipes	Associated with bedstraws *Galium* spp. (including *G. verum* and *G. saxatile*). Usually found on dry and well drained sandy substrates. Mainly sand dunes, also shingle and edges of dry heath. Burrows in sand, Adults hibernate. Threats include habitat succession, due to diminishing rabbit populations (myxamotosis); habitat loss through afforestation and development. (Kirby, 1992)	F1 - unshaded early successional mosaic	F111 - bare sand and chalk
Platycleis albopunctata	An almost exclusively coastal species in the UK (Haes and Harding, 1997). Benton (2012) stated that the Suffolk coastal population had been considered extinct, but that it was currently on the increase, where it occurred within several dune systems. It is frequently observed in patches of Common Restharrow *Ononis repens* in coastal grassland and dune habtats.	F1 - unshaded early successional mosaic	F111 - bare sand and chalk
Protapion dissimile	Favours distrubed ground and sand dunes and dry, sparsley vegetated sandy places on acid or neutral soils. Its only known hostplant is Hare's-foot Clover *Trifolium arvense*. (Morris, 1990). *T. arvense* is itself a local species confined to sandy grassland sites including coastal habitats. Threats include habitat loss through afforestation and coastal development. Also succession to scrub due to lack of grazing.	F1 - unshaded early successional mosaic	F111 - bare sand and chalk
Anaspis thoracica	Woodland and wood margins. Larvae develop in half-dry, red rotten oak wood. Adults have also been reared from other broadleaved trees including birch and alder. (Levey, 2009). Adults found on blossom. Threats include: Loss of broad-leaved woodland through clear-felling or coniferisation; also removal of wood decay habitat through over zealous woodland management, health and safety etc.	A2 - wood decay	A212 - bark an sapwood decay
Conopalpus testaceus	Ancient woodland, wooded bogs, hedgerows and orchards. Larvae develop in rotting wood (Hyman and Parsons, 1992).	A2 - wood decay	A212 - bark an sapwood decay
Crossocerus binotatus	Females nest in dead-wood, provisioning their cells with snipeflies (Rhagionidae) and other diptera.(Baldock, 2010)	A2 - wood decay	A212 - bark an sapwood decay
Gnophomyia viridipennis	Associated with poplars particularly Black Poplar *Populus nigra* and Aspen *P. tremula,* the larvae developing beneath the bark of recently felled, or dead trees (Hancock, 2008).	A2 - wood decay	A212 - bark an sapwood decay
Crudosilis ruficollis	Associated with 'river and lake margins, fens, marshes and other wetland habitat' (Hyman and Parsons, 1992). Adults typically have been recorded from lush marginal vegetation including Common Reed. During the survey *S. ruficollis* was found to be abundant in the reed-swamp habitat of both the SSSI Triangle and SSSI Area 2 during July, 2014	F2 - grassland and scrub matrix	0
Crypticus quisquilius	Described by Hyman and Parsons (1992) as being 'Almost exclusively coastal' where it is found mainly in 'dunes, heatlands and sandpits'.	F1 - unshaded early successional mosaic	0
Curculio betulae	Broadleaved woodland, drier parts of fens and heaths. Associated with birch *Betula* spp. (also Alder). Larvae develop on fruit or catkins. Threats include: Loss of broad-leaved woodland through clear-felling or coniferisation; also management neglect leading to high forest succession.	A1 - arboreal canopy	0
Dicraeus raptus	A chloropid fly, mainly associated with woodland rides on calcareous soils, the larvae developing in the seeds of Hairy Brome *Bromus ramosus*	F2 - grassland and scrub matrix	0

Species	Description	BAT	SAT
Hygrolycosa rubrofasciata	Generally found in damp habitats at ground level. Mostly in fens but sometime at the edge of carr woodland and by the sides of rides. Threats include drainage/loss of fen habitat. Scrub encroachment less of an issue due to the species being tolerant of wooded habitats. Maintenance of water table important. (Harvey *et al.*, 2002)	W3 - permanent wet mire	0
Limenitis camilla	Broadleaved and mixed woodland, also conifer plantations where the larval foodplant Honeysuckle *Lonicera periclymenum* is available. Favours mature fairly shaded woodland with clearings and rides. Adults feed on honeydew and are strongly associated with Bramble *Rubus fruticosus* agg. in sunny, sheltered clearings.	A1 - arboreal canopy	0
Polydrusus formosus	Broadleaved woodland rides, clearings and wood edge. 'Recorded from hazel, oak, alder, birch, cherry and wild rose'. Threats include: Loss of broad-leaved woodland through clear-felling or coniferisation; also management neglect leading to high forest succession.	A1 - arboreal canopy	0
Rhagio strigosus	Mainly associated with chalk downland in the UK	F2 - grassland and scrub matrix	0

Appendix 3 - Figures

Figure 1- Survey compartment location map

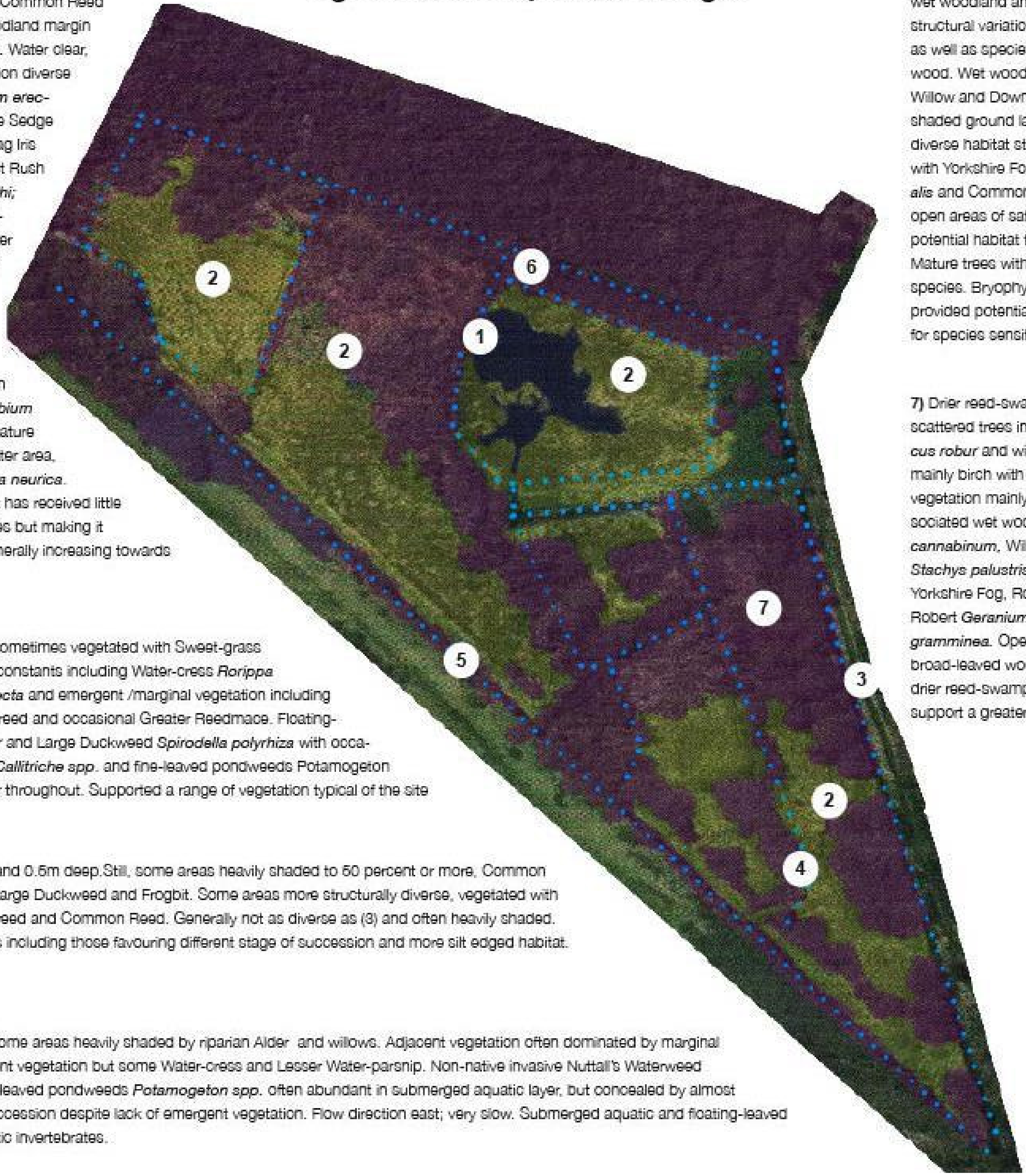


Sizewell survey compartments

1) SSSI Triangle
2) SSSI Area 2
3) SSSI Fen Meadow
4) C-Platform Woodland Strip
5) Coastal Strip
6) SAC Dune
6a) Minsmere & Walberswick Heath and Marshes SSSI Reed-swamp
7) Leiston Carr
7a) Lesiton Carr
8) Grimleys - Wet Woodland
9) Turf Pits - Wet Woodland
10) Reed-swamp

General habitat descriptions corresponding to compartments in Appendix 1, Table 1.

Fig 2 Habitat map: SSSI Triangle



1) Tall herb swamp habitat at the margin of open water area. Well vegetated shallows grading into open water. More open than adjacent Common Reed ***Phragmites australis*** swamp, partially shaded from wet woodland margin by encroaching Alder ***Alnus glutinosa*** and willows ***Salix spp.*** Water clear, still. Structurally diverse with pronounced litter layer. Vegetation diverse with tall emergents including Branched Bur-reed ***Sparganium erectum***, Common Reed, False-fox Sedge ***Carex otrubae***, Bottle Sedge ***Carex rostrata***, Greater Reedmace ***Typha latifolia***, Yellow Flag Iris ***Iris pseudacorus***, a clubrush ***Schoenoplectus sp.***, Compact Rush ***Juncus conglomeratus*** and Water Dock ***Rumex hydrolapathi;*** with Water Mint ***Mentha aquatica***, Gipsywort ***Lycopus europaeus***, Marsh Bedstraw ***Galium palustre*** and Common Water Plantain ***Alisma plantago-aquatica***. Similar habitat may also occur at the inaccessible margins of the lagoon.

2) ***Phragmites australis*** reed-swamp general habitat dominated by Common Reed with few associates other than Common Nettle ***Urtica dioica*** and Greater Willowherb ***Epilobium hirsutum***. Despite lacking floristic diversity. Dead stems in mature reedbed margins, such as at the peripheries of the open water area, could potentially support White-mantled Wainscot ***Archanara neurica***.
The condition of the SSSI Triangle reed-swamp suggested it has received little recent management, increasing the potential for such species but making it vulnerable to scrub succession. Inundation levels varied, generally increasing towards central lagoon. Some dry areas with deep litter layer.

3) Ditch approximately 4m wide x 0.75m at deepest point. sometimes vegetated with Sweet-grass ***Glyceria plicata/fluitans*** forming a dense, surface mat with constants including Water-cress ***Rorippa nasturtium-aquaticum*** and Lesser Water-parsnip ***Berula erecta*** and emergent /marginal vegetation including frequent small stands of Common Reed and Branched Bur-reed and occasional Greater Reedmace. Floating-leaved aquatics included Common Duckweed ***Lemna minor*** and Large Duckweed ***Spirodella polyrhiza*** with occasional Frogbit ***Hydrocharis morsus-ranae***. Water starworts ***Callitriche spp***. and fine-leaved pondweeds Potamogeton spp. also present. Flow direction east, very slow, water clear throughout. Supported a range of vegetation typical of the site as a whole, often shaded by Alder and Willow.

4) Ditch further within reed-swamp approximately 4m wide and 0.6m deep.Still, some areas heavily shaded to 60 percent or more. Common Duckweed covering surface occasionally accompanied by Large Duckweed and Frogbit. Some areas more structurally diverse, vegetated with macrophytes such as Lesser Water-parsnip, Branched Bur-reed and Common Reed. Generally not as diverse as (3) and often heavily shaded. However, with potential to support a similar range of species including those favouring different stage of succession and more silt edged habitat.

5) Ditch approximately 3m wide x 0.5m at deepest point. Some areas heavily shaded by riparian Alder and willows. Adjacent vegetation often dominated by marginal Common Reed with Common Nettle. Generally little emergent vegetation but some Water-cress and Lesser Water-parsnip. Non-native invasive Nuttall's Waterweed ***Elodea nuttalli*** with water starwort ***Callitriche spp***. and fine-leaved pondweeds ***Potamogeton spp***. often abundant in submerged aquatic layer, but concealed by almost constant Common Duckweed on surface. Probably later succession despite lack of emergent vegetation. Flow direction east; very slow. Submerged aquatic and floating-leaved vegetation providing structure and a food resource for aquatic invertebrates.

6) Reed-swamp wet woodland edge habitat: The interface between wet woodland and carr habitat and open reedbed provides structural variation beneficial to scrub edge invertebrate species as well as species associated with exposed mud and waterlogged wood. Wet woodland predominately Alder with Grey and Crack Willow and Downy Birch ***Betula pubescens*** overstanding a partially shaded ground layer. With varied microtopography giving rise to diverse habitat structure and hydrological variation. Drier raised areas with Yorkshire Fog ***Holcus lanatus***, Rough Meadow Grass ***Poa trivialis*** and Common Nettle. Water Pepper in wetter depressions and open areas of saturated silt at and around the water table provide potential habitat for seepage and inundated wood decay specialists. Mature trees with rot holes and other features favoured by saproxylic species. Bryophyte and lichen assemblages on more mature trees provided potential habitat for epiphyte invertebrate fauna and niches for species sensitive to water-level fluctuation.

7) Drier reed-swamp habitat and woodland edge with mature scattered trees including mature birch, Alder, Pedunculate Oak ***Quercus robur*** and willow. Some fallen and standing wood decay habitat, mainly birch with peeling bark and sapwood decay. Ground vegetation mainly tall herb with Common Nettle, Bramble and associated wet woodland species including Hemp Agrimony ***Eupatoria cannabinum***, Wild Angelica ***Angelica sylvestris***, Marsh Woundwort ***Stachys palustris*** and more open, shorter sward and areas with Yorkshire Fog, Rough Meadow Grass and herbs including Herb Robert ***Geranium robertianum*** and Lesser Stitchwort ***Stellaria gramminea***. Open planting creating clearings characteristic of typical broad-leaved woodland. Whilst not botanically rich, juxtaposition with drier reed-swamp increased diversity potential. Reed-swamp likely to support a greater range of dry litter species than wetter areas.

Fig 3 Habitat map: SSSI Area 2; Fen Meadow and C-Platform Woodland Strip

1) Mid-late sucessional ditch between the botanically diverse fen meadow and a wooded strip, creating partial shade. Ditch approximately 4m wide and up to 1m deep. Fairly dense, structurally diverse vegetation. Abundant in-channel Frogbit *Hydrocharis morsus-ranae*, with Common Duckweed *Lemna minor* and Large Duckweed *Spirodela polyrhiza* on surface and submerged aquatics including a hornwort *Ceratophyllum sp*. Marginal vegetation included Common Reed *Phragmites australis*, Greater/Lesser Pond Sedge *Carex riparia/acuti-formis*, False Fox Sedge *Carex otrubae*, Marsh Bedstraw *Galium palustre* and Marsh Woundwort *Stachys palustris*. Overhanging Alder *Alnus glutinosa* and Grey/Goat Willow *Salix cinerea/caprea*.

2) SSSI Fen Meadow – floristically diverse, partially inundated meadow forming part of a network of similar meadows bordered and traversed by floristically diverse wet ditches. The proximity to wet woodland and reed swamp habitat further increases its ecological potential. The diverse sward provided a resource for both polyphagous and monophagous herbivorous invertebrates as well as a nectar resource. Despite its diversity, the sward was fairly homogeneous, with limited topographical, hydrological or floristic variation save at the slightly cattle poached margins and interfaces. The wet ditches bordering the meadow provided potential hunting habitat for dragonflies.

3) SSSI Area 2: Open Phragmites australis reed-bed with few associates other than Common Nettle *Urtica dioica*, Greater Willowherb *Epilobium hirsutum* and occasional Hemp Agrimony *Eupatorium cannabinum*. The condition of the reed-swamp within SSSI Area 2 suggested it received little active management, which may make it favourable breeding habitat for the RDB3 White-mantled Wainscot but vulnerable to scrub succession. Ground layer largely inundated at the time of survey.

4) Reed-swamp wet woodland edge habitat: The interface between wet woodland and carr and open reed bed provides structural variation beneficial to scrub edge invertebrates and species associated with exposed mud and waterlogged wood. Some mature Alder and Grey Willow creating dappled shade within the ground layer. Varied microtopography giving rise to diverse habitat structure with patches of shallow, open water often partially silted over a peat substrate. Open, bare silt exposures at and around the water table provide habitat for seepage invertebrates. Mature trees here featured rot holes, providing saproxylic habitat. Bryophyte and lichen assem-blages on more mature trees favouring epiphyte invertebrates and niches for species sensitive to water-level fluctuation. Mature trees frequently layered, providing drier platforms within otherwise inundated habitat.

5) Mature, multi-stemmed Alder dominated wet woodland towards the southern end of SSSI Area 2.

6) C-Platform Woodland Strip. Largely secondary wet woodland with Alder, willows and birch. The habitat was generally shaded, however the silted carr edge habitat extending towards the SSSI Fen Meadow contained water-logged wood decay habitat, swamp macrophyte species such as Yellow Flag Iris and Branched Bur-reed as well as Common Reed and Reed Canary Grass. Exposed silt and wood decay habitat provided potential for seepage habitat associates and water-logged wood decay specialists. The canopy supporting typical wet woodland arboreal species.

7) Swamp communities on exposed silt. More diverse range of macrophytes away from the Common Reed dominated swamp. Stands of species such as Water Pepper *Persicaria hydropiper*, and scattered Water Mint *Mentha aquatica*, Celery-leaved Buttercup *Ranunculus sceleratus*, Greater Pond Sedge *Carex riparia*, Water Forget-me-not *Myosotis scorpioides*, Branched Bur-reed *Sparganium erectum*, Yellow Flag Iris *Iris pseudacorus* and Common Water Plantain *Alisma plantago-aquatica* provided potential food-plants for both generalist and specialist fen invertebrates as well as additional nectar resources.

8) Wet ditch 4m wide x 0.5m deep. Mid-late succession, heavily vegetated and botanically diverse with floating-leaved aquatics including Frogbit, Common Duckweed and Large Duckweed with Common Reed, Lesser Water-parsnip, Marsh Bedstraw *Galium palustre* and a range of other species. Margins of adjacent field indundated at time of survey.

Key

- Reed swamp
- Wet woodland/carr
- Fen meadow
- Wet ditch

Fig 4 Habitat map: Includes habitat within both Minsmere and Walberswick Heath SAC (Coastal dune habitat) and reed-swamp and scrape within SSSI only.

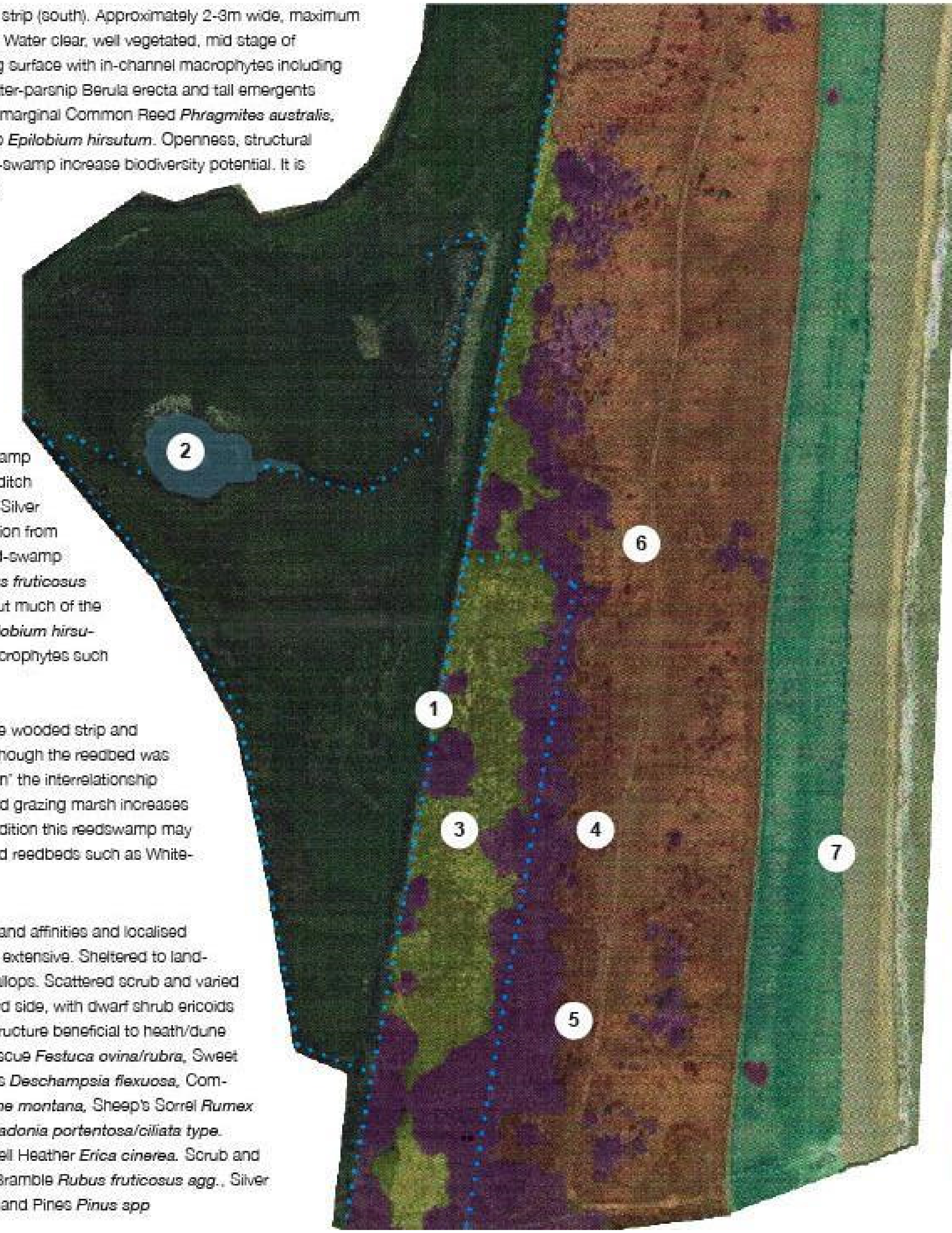
1) Ditch at margin of grazing marsh (north) and reedbed strip (south). Approximately 2-3m wide, maximum depth 1m. With marginal shallows. Flow east, very slow. Water clear, well vegetated, mid stage of succession, Common Duckweed ***Lemna minor*** covering surface with in-channel macrophytes including Water-cress ***Rorippa nasturtium-aquaticum***, Lesser Water-parsnip Berula erecta and tall emergents including Branched Bur-reed ***Sparganium erectum*** and marginal Common Reed ***Phragmites australis***, Yellow Flag Iris ***Iris pseudacorus*** and Greater Willowherb ***Epilobium hirsutum***. Openness, structural variety and proximity to adjacent grazing marsh and red-swamp increase biodiversity potential. It is not known whether the ditch is subject to saline ingress.

2) Open, shallow scrape, well vegetated with emegent Spike rushes ***Eleocharis palustris/uniglumis*** and Common Water Plantain ***Alisma plantago-aquaticum*** with submerged aquatics including Fennel-leaved Pondweed ***Potamogeton pectinatus*** and Curled Pondweed ***Potamogeton crispus***. Depth gradually increasing to approximately 0.5m. The scrape provides habitat complementary to the grazing meadow ditch and fen habitat.

3) Dense, Common Reed ***Phragmites australis*** reed-swamp strip occupying a zone bounded inland by a freshwater ditch (aquatic sample sites A9 and A17) and a narrow strip of Silver Birch ***Betula pendula*** woodland forming part of a transition from the sandy, upper dune grass/heath to the east. The reed-swamp was somewhat dry at time of survey with Bramble ***Rubus fruticosus agg.*** forming an impenetrable, low scrub layer throughout much of the reed-swamp. Tall herbs such as Greater Willowherb ***Epilobium hirsutum*** also persisted, alongside occasional patches of macrophytes such as Yellow Flag ***Iris Iris pseudacorus***.

The habitat was heavily shaded at its confluence with the wooded strip and Grey Willow ***Salix cinerea*** was scattered throughout. Although the reedbed was somewhat dense and arguably in 'unfavourable condition' the interrelationship between this habitat and adjacent coastal, woodland and grazing marsh increases the potential value in landscape terms. In its current condition this reedswamp may provide suitable habitat for species favouring unmanaged reedbeds such as White-mantled Wainscot ***Archanara neurica***.

4) Well vegetated, upper dune grassland with dry heathland affinities and localised scrub. Sandy soil with bare ground patches, sometimes extensive. Sheltered to landward by mixed-woodland gradating into scrub-edge scallops. Scattered scrub and varied microtopography of dunes provided shelter from seaward side, with dwarf shrub ericoids and associated grassland, herbs and lichen providing structure beneficial to heath/dune specialist invertebrates. Grassland with Red/Sheep's Fescue ***Festuca ovina/rubra***, Sweet Vernal Grass ***Anthoxanthum odoratum***, Wavy Hair-grass ***Deschampsia flexuosa***, Common Cat's-ear ***Hypochaeris radicata***, Sheep's-bit ***Jasione montana***, Sheep's Sorrel ***Rumex acetosella*** and locally abundant lichen predominately ***Cladonia portentosa/ciliata type***. Ericoids, mainly Common Heath ***Calluna vulgaris*** and Bell Heather ***Erica cinerea***. Scrub and small trees including Common Gorse ***Ulex europaeus***, Bramble ***Rubus fruticosus agg.***, Silver Birch ***Betula pendula***, Pedunculate Oak ***Quercus robur*** and Pines ***Pinus spp***



5) Upper dune grassland close to interface with scrub/carr habitat. Habitat dry with sheltered microhabitats. Common Heath ***Calluna vulgaris*** and Bell Heather ***Erica cinerea*** abundant throughout with extensive areas characterised by ***Cladonia portentosa/ciliata*** type lichen, sandy patches and flowering herbs including Commmon Cat's-ear ***Hypochaeris radicata***, Mouse-ear-hawkweed ***Pilosella officinarum*** and Harebell ***Campanula rotundifolia***. Habitat exhibits a range of structural and compositional features beneficial to specialist coastal and heath dwelling invertebrates.

6) Dry dune grassland, including vegetated strip adjacent to cliffed edge at interface with shingle upper shore. Grass/heath habitat with short sward Red/Sheep's ***Fescue Festuca rubra/ovina***, and Sweet Vernal Grass ***Anthoxanthum odoratum*** grassland, gradating into tussocky Marram Grass ***Ammophila arenaria*** with Sand Sedge ***Carex arenaria*** and herbs including Common Restharrow ***Ononis repens*** and Lady's Bedstraw ***Galium verum***. Bare sand on tracks providing habitat for ground nesting aculeates and other typical thermophilic taxa which also benefit from the structural diversity provided by vegetation and micro-topography.

7) Shallow, partially vegetated interface between dune and shingle provides microclimate supporting sand dwelling aculeates including pompilidae and crabronidae species. Shingle vegetated with representative upper shore specialists including Sea-kale ***Crambe maritima***, Sea Pea ***Lathyrus japonicus***, Sea Holly ***Eryngium maritimum***, Sea Campion ***Silene maritima*** and Sea Sandwort ***Honckenya peploides***. Refugia including flotsum and strandline debris provide potential habitat for a range of specialist invertebrates.

Key

- Reed swamp
- Wet woodland/carr
- Wet ditch
- Dunes
- Grass/heath
- Water

Fig 5 Habitat map: Coastal Strip (CWS)

1) Flattish area of dry, sandy grassland partially sheltered to east by vegetated dunes and to west by scrub woodland shelter belt and the bunds of the existing Sizewell complex. Sward generally short (height <20cm) interspersed with small patches of exposed sand and occasional shingle, more extensive around tracks and at dune interface. Grassland floristically diverse with Red Fescue ***Festuca rubra***, Yorkshire Fog ***Holcus lanatus***, Sweet Vernal Grass ***Anthoxanthum odoratum*** Cock's-foot ***Dactylis glomerata*** and Smooth Oat Grass ***Helictotrichon pratensis***. Abundant herbs including Common Restharrow ***Ononis repens***, Common Bird's-foot Trefoil ***Lotus corniculatus***, Lady's Bedstraw ***Galium verum***, Sheep's Sorrel ***Rumex acetosella***, Common Cat's-ear ***Hypochaeris radicata***, Mouse-ear-hawkweed ***Pilosella officinarum***, Hare's-foot Clover ***Trifolium arvense***, Red Clover ***Trifolium pratense***, Sheep's-bit ***Jasione montana***,Common Stork's-bill ***Erodium cicutarium*** and Common Ragwort ***Senecio jacobaea***, provided a rich nectaring resource.

2) Strip of dune habitat with bare sand and partially vegetated areas offering a range of microtopograpy and structural features beneficial to specialist and generalist invertebrates. The western (inland face) in particular afforded a greater degree of shelter as well as supporting a diversity of representative plant species and provided an important resource for nectaring, phytophagus and associated invertebrate communities. Dominant plants included Marram Grass ***Ammophila arenaria*** and Sand Sedge ***Carex arenaria***, with locally abundant Sand Couch ***Elymus arenarius*** and abundant herbs including Common Restharrow ***Ononis repens***, Common Bird's-foot Trefoil ***Lotus corniculatus***,Lady's Bedstraw ***Galium verum***, Common Cat's-ear ***Hypochaeris radicata***, Yellow-wort ***Blackstonia perfoliata*** and Sea Holly ***Eryngium maritimum***.

3) The Shallow, partially vegetated interface between the shingle upper shore and the cliffed dune edge provided a microclimate supporting sand dwelling aculeates including pompilidae and crabronidae species. Upper shingle with potential to support specialists associated with strandline habitat. Shingle vegetated with representative upper shore flora including Sea-kale ***Crambe maritima***, Sea Pea ***Lathyrus japonicus***, Sea Holly ***Eryngium maritimum***, Sea Campion ***Silene maritima*** and Sea Sandwort ***Honckenya peploides***.

Key

Figure 6. SSSI Triangle - aquatic and terrestrial invertebrate sampling sites 2014

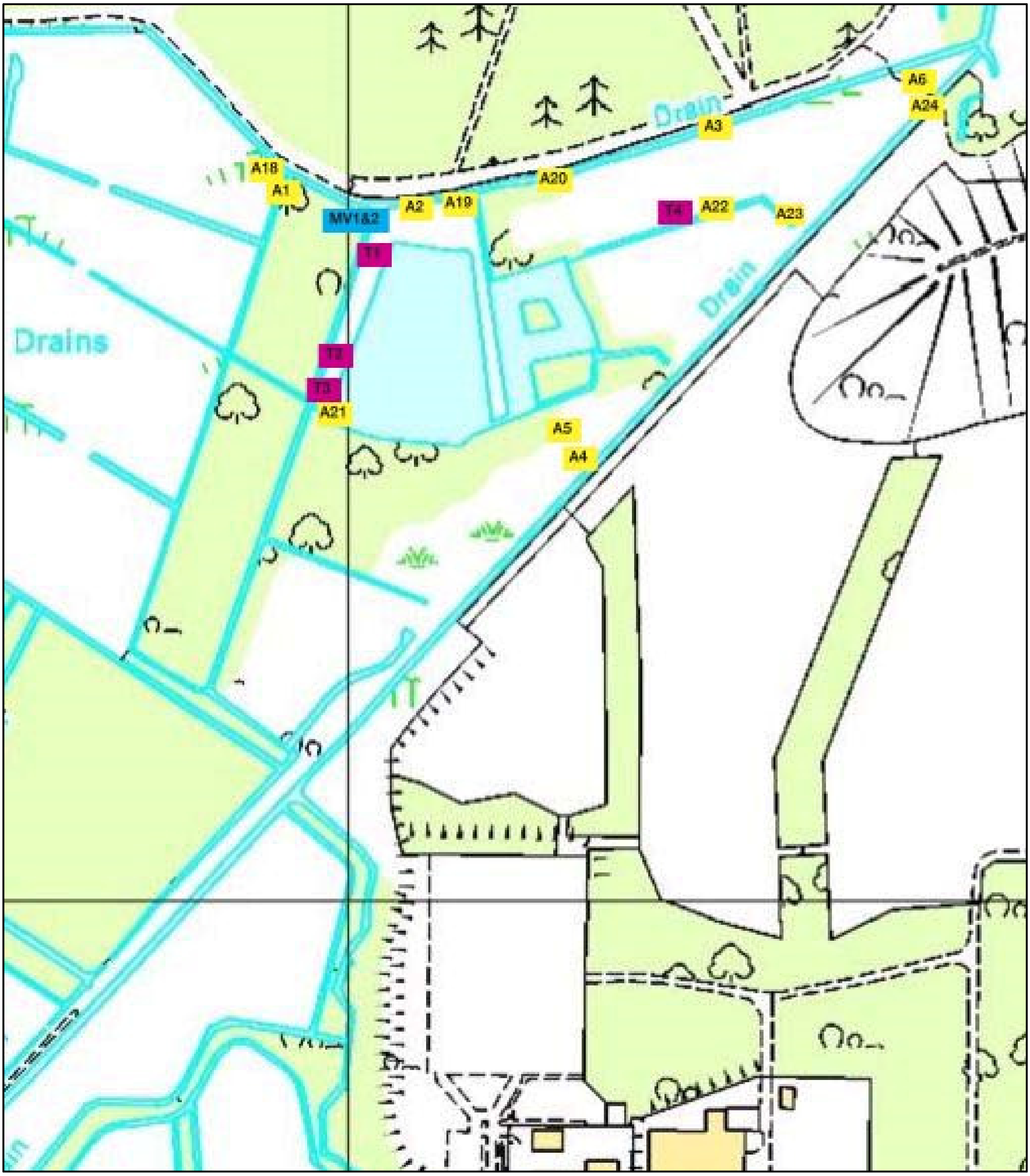


Figure 7. SSSI Area 2, Fen Meadow and C-Platform Woodland - aquatic and terrestrial invertebrate sampling sites 2014

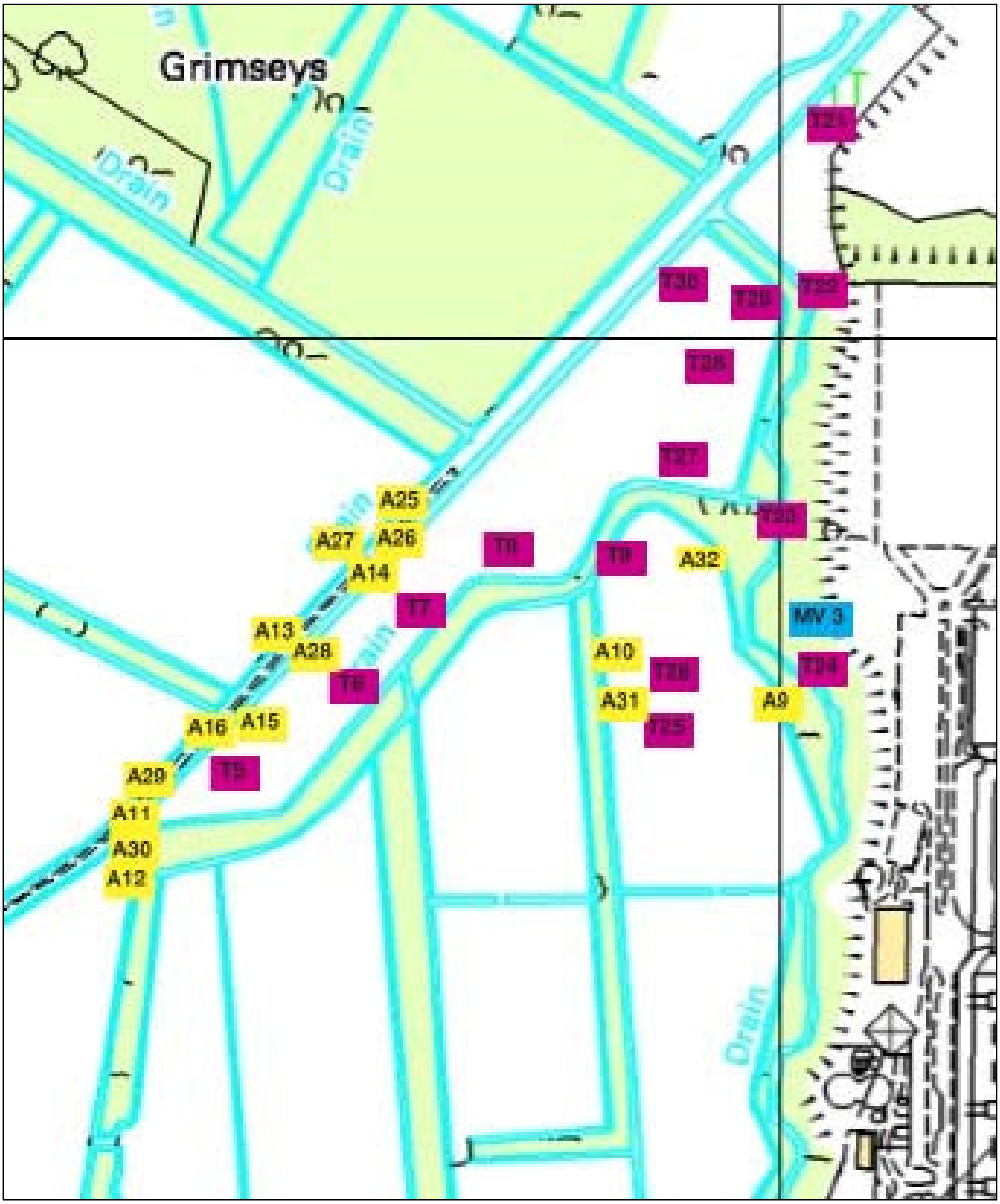


Figure 8. Minsmere and Walberswick SAC and SSSI - aquatic and terrestrial invertebrate sampling sites 2014

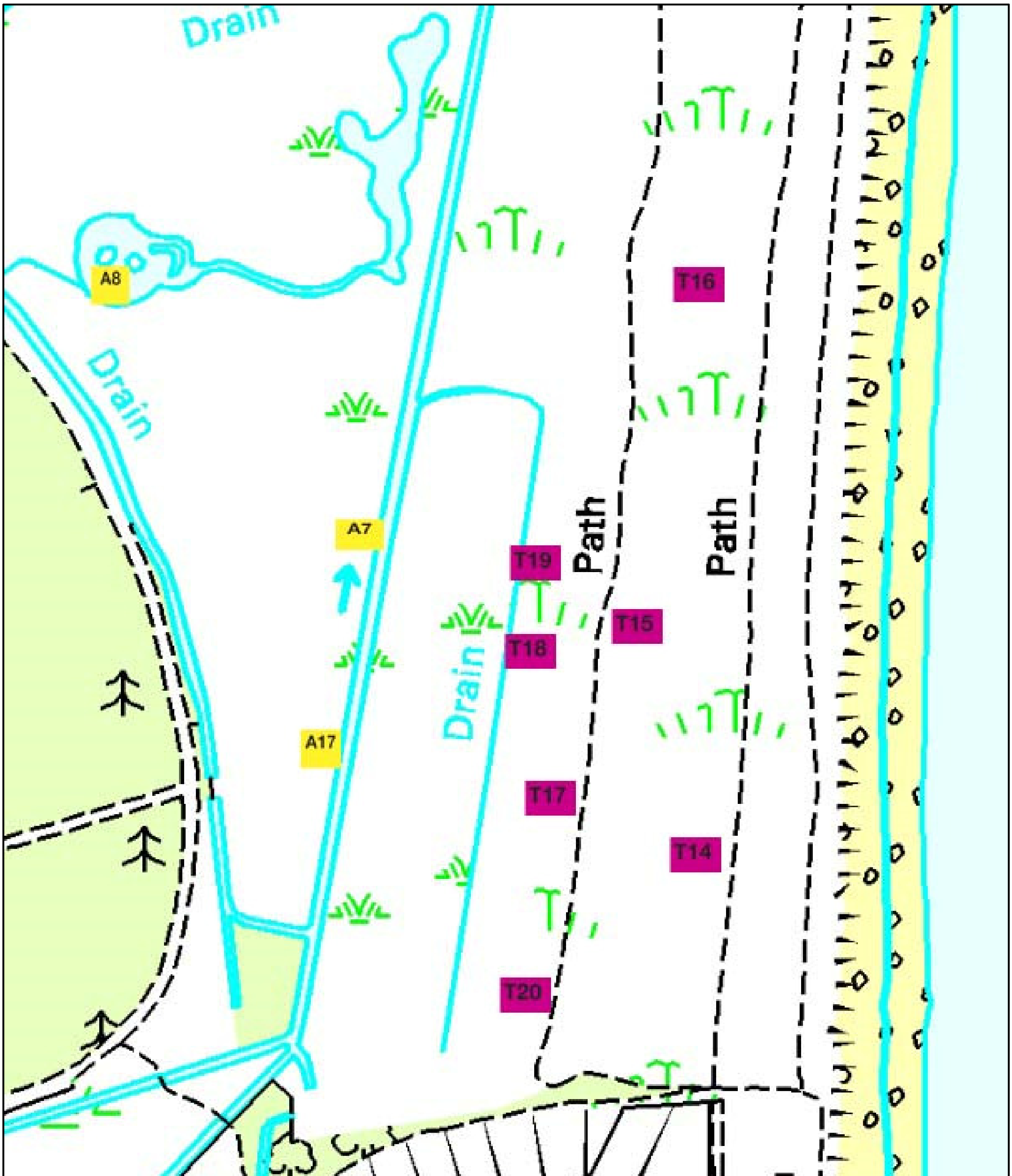


Figure 9. Coastal Strip (CWS) - terrestrial invertebrate sampling sites 2014

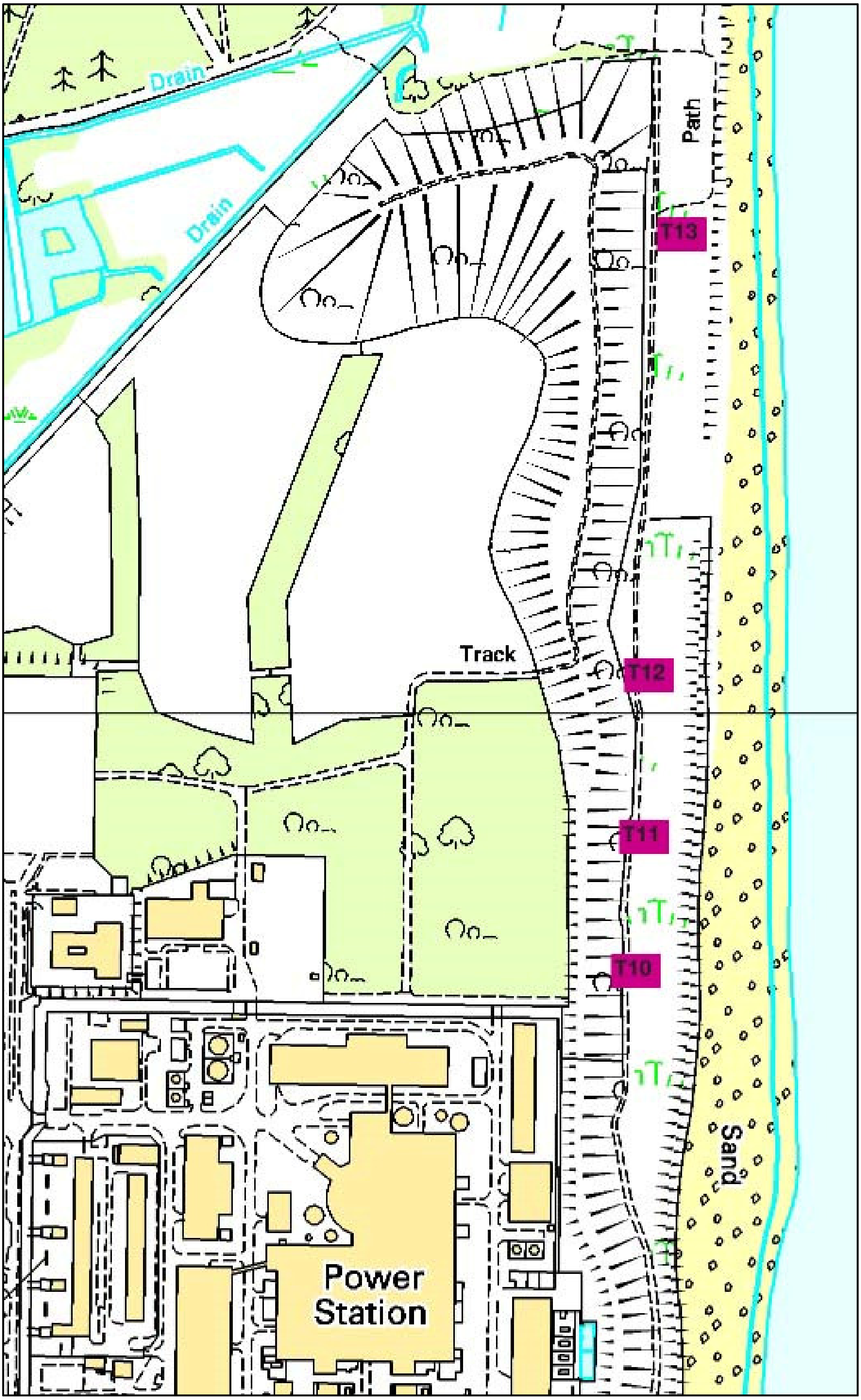
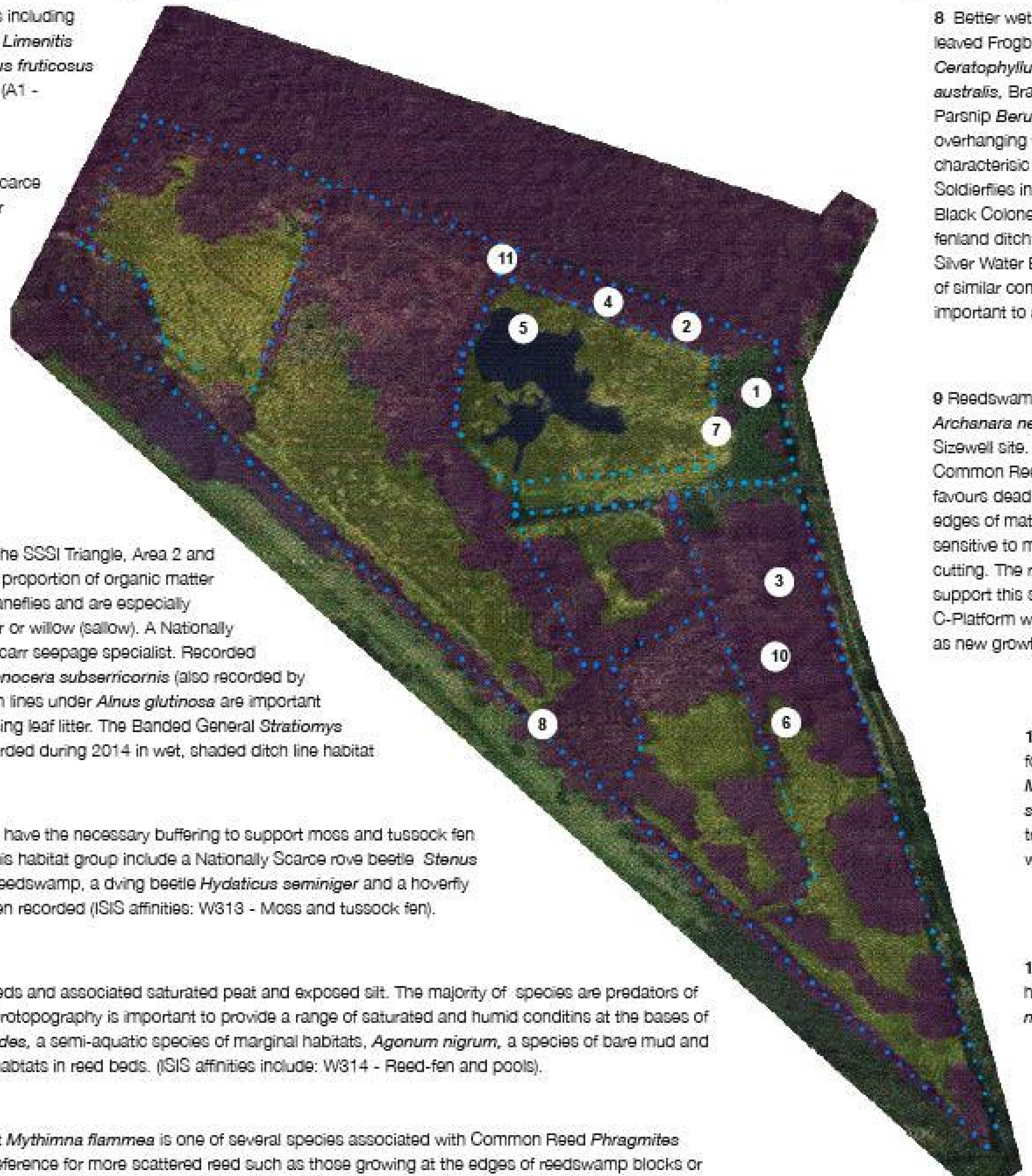


Fig 10 Significant invertebrate habitat map: SSSI Triangle



1 Broad-leaved woodland edge with ancient woodland associates including Nationally Scarce weevil *Polydrusus formosus* and White Admiral *Limenitis camilla* also associated, especially in clearings with Bramble *Rubus fruticosus* agg. and Honeysuckle *Lonicera periclymenum*. ISIS assemblage (A1 - Arboreal canopy)

2 Wet woodland edge/Alder carr. *Curculio betulae*, a Nationally Scarce weevil, associated with wet woodland *Betula* and *Alnus* and Alder Signal moth *Stathmopoda pedella* feeds on fruit of Alder. Assemblage (A1 - Arboreal canopy)

3 Wood decay habitat with red rot required by saproxylic species such as a scraptiid beetle *Anaspis thoracica*. The beetle's larvae develop in half-dry, red rotten oak wood. Adults have also been reared from other broadleaved trees including birch and alder. (Levey, 2009). Adult *A. thoracica* are found on foliage and blossom of broad-leaved trees. Continuity of trees of varied age structure required to ensure a continued supply of wood decay habitat. ((ISIS affinities: A212 - Bark and sapwood decay)

4 Seepage habitat beneath and at the edges of Alder carr within the SSSI Triangle, Area 2 and C-Platform. Soil constantly saturated and usually contains a large proportion of organic matter giving rise to deep ooze. Shaded seepages are dominated by craneflies and are especially species-rich in wet woodlands, especially in seepages under alder or willow (sallow). A Nationally Scarce cranefly *Molophilus bihamatus* is an example of an Alder carr seepage specialist. Recorded during the Amec surveys 2007-2010. And the RDB2 cranefly *Prionocera subserricornis* (also recorded by Amec) occurs in black, peaty mud under shaded conditions. Ditch lines under *Alnus glutinosa* are important for this species. Saturated ground organically rich with decomposing leaf litter. The Banded General *Stratiomys potamida*, another Nationally Scarce seepage specialist was recorded during 2014 in wet, shaded ditch line habitat in the SSSI Triangle. (ISIS affinities: W126 - Seepage)

5 The margins of the lagoon within the SSSI Trangle reedbed may have the necessary buffering to support moss and tussock fen assemblages. Uncommon species recorded that are afiliated to this habitat group include a Nationally Scarce rove beetle *Stenus palustris*, recorded around one of the willow oases in the Area 2 reedswamp, a dving beetle *Hydaticus seminiger* and a hoverfly *Parhelophilus consimilis* also affiliated to this group have also been recorded (ISIS affinities: W313 - Moss and tussock fen).

6 A number of species of ground beetles (Carabidae) and rove beetles (Staphylinidae) are associated with the litter layer of reedbeds and associated saturated peat and exposed silt. The majority of species are predators of other invertebrates associated with these habitats. Variation in microtopography is important to provide a range of saturated and humid conditins at the bases of reeds. Nationally Scarce species reorded include *Ooedes helopiodes*, a semi-aquatic species of marginal habitats, *Agonum nigrum*, a species of bare mud and marginal habitats and *Demetrias imperialis* associated with litter habtats in reed beds. (ISIS affinities include: W314 - Reed-fen and pools).

7 Scattered reed specialist. The Nationally Scarce Flame Wainscot *Mythimna flammea* is one of several species associated with Common Reed *Phragmites australis*. Unlike some other species, Flame Wainscot shows a preference for more scattered reed such as those growing at the edges of reedswamp blocks or along ditches. The larvae develop in the stems. Flame Wainscot was recorded from a MV trap set in SSSI Triangle and is likely to have been attracted from the periphery of the reedbed. (ISIS affinities: W313 - Moss and tussock fen).

8 Better wet ditch sample sites were typically characterised by floating leaved Frogbit *Hydrocharis morsus-ranae*, submerged Soft Hornwort *Ceratophyllum submersum*,with emergent Common Reed *Phragmites australis*, Branched Bur-reed *Sparganium erectum* and Lesser Water Parsnip *Berula erecta*. Very slow-flowing with little shade from overhanging vegetation. Several RDB and Nationally Scarce species characterisic of high quality ditch networks were recorded during 2014. Soldierflies including the RDB2 Ornate Brigadier *Odontmyia ornata* and Black Colonel *O. tigrina* are both strongly associated with high quality fenland ditch systems in which their larvae breed and the RDB3 Great Silver Water Beetle *Hydrophilus piceus* requires extensive ditch systems of similar composition in which to breed. Rotational ditch management is important to all these species.(ISIS affinities: W314 - Reed-fen and pools)

9 Reedswamp specialist the RDB3 White-Mantled Wainscot *Archanara neurica* is a species of particular local importance to the Sizewell site. Like other wainscot moths its larvae develop in the stems of Common Reed *Phragmites australis*. White-mantled Wainscot favours dead reed stems for laral development and is associated with the edges of mature reedbeds close to the coast. The insect is thought to be sensitive to more strident management such as burning and short-rotation cutting. The reedbeds within the SSSI Area 2 and SSSI Area 2 may support this species which was recorded from a moth trap in the C-Platform woodland. These reedbeds include old stands of reed as well as new growth. (ISIS affinities: W314 - Reed-fen and pools).

10 Lichen on mature trees in woodland clearing important for epiphyte fauna. Larvae of species such as Rosy Footman *Miltochrista miniata* and Round-winged Muslin *Thumatha senex* moths feed on lichen growing on the branches of trees. Strong assemblages are usually associated with historic woodlands. (ISIS affinities: A215 – Epiphyte fauna).

11 Saturated logs habitat at the margins of seepage and ditch habitats. Larvae of hoverflies such as *Chalcosyrphus nemorum*.

Key

- Reed swamp
- Wet woodland/carr
- Open water
- Wet ditch

Fig 11 Significant invertebrate habitat map: SSSI Area 2; Fen Meadow and C-Platform Woodland Strip

1 Wet woodland edge/Alder carr. Nationally Scarce arboreal weevils ***Curculio betulae*** and ***Polydrusus formosus*** and ***Alder Signal*** moth ***Stathmopoda pedella*** which feeds on fruit of Alder. Assemblage (A1 - Arboreal canopy)

2 Bark and sapwood decay habitat specialist a limoniid cranefly ***Gnophomyia viridipennis***, the larva of which develop under the bark of recently felled or dead poplar ***Populus*** spp. Several standing dead poplars recorded on site (ISIS affinities: A212 - Bark and sapwood decay

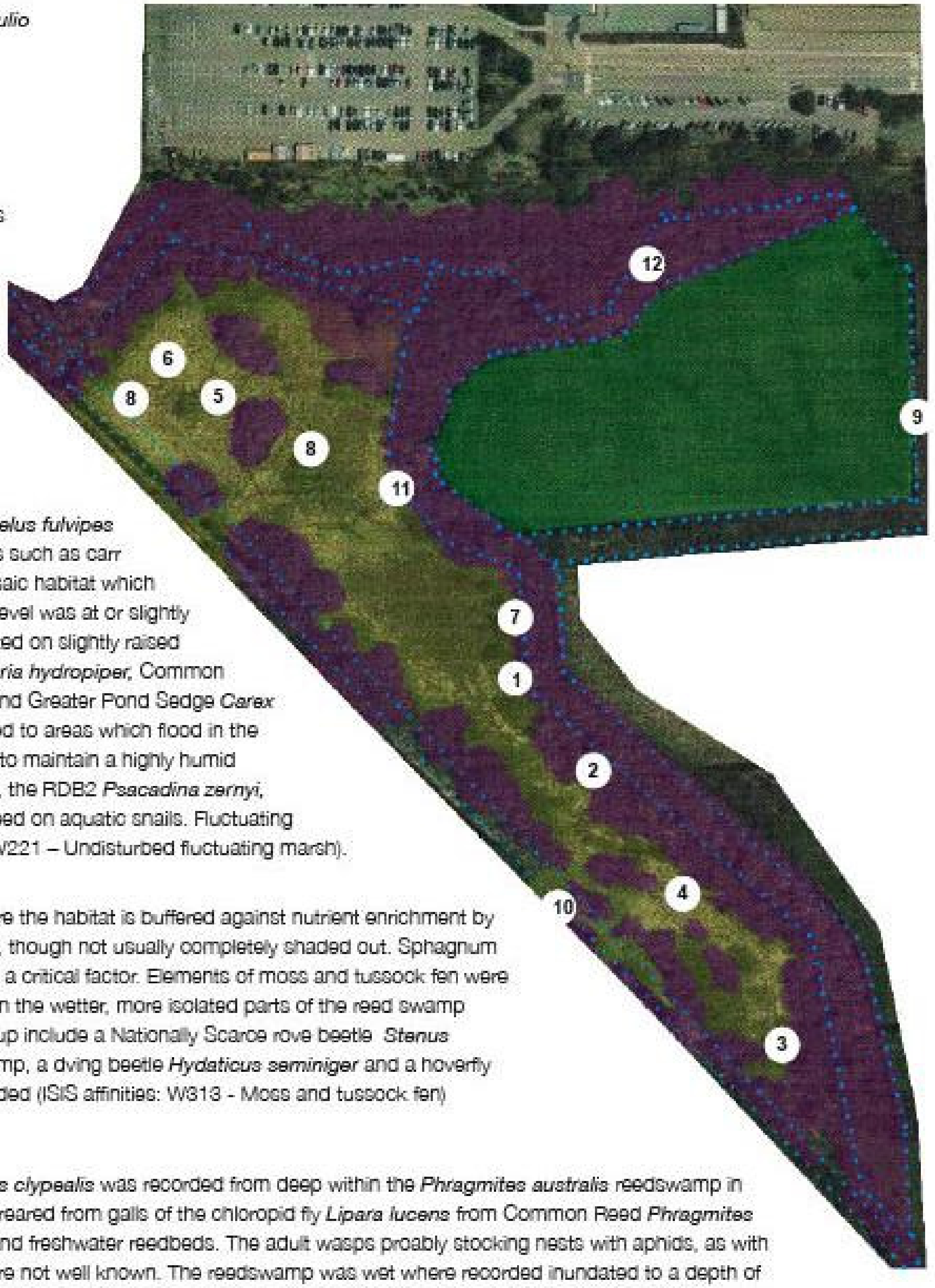
3 Mature multi-stemmed ***Alnus glutinosa*** and Crack Willow ***Salix fragilis*** with standing and fallen wood decay habitat at inteface between wet woodland and reed swamp. A Nationally Scarce saproxylic false darkling beetle ***Conopalpus testaceus*** recorded. ***C. testaceus*** is often assocated with ancient woodland and hisoric hedgerows. The larvae develop in rotting wood. (ISIS affinities: A212 - Bark and sapwood decay)

4 Fluctuating water-level associates. A Nationally Scarce rove beetle ***Oxytelus fulvipes*** described as a species of 'undisturbed marsh with fluctuating water levels such as carr and shaded ditches' by Lott (2009) was recorded in reedswamp carr mosaic habitat which was slightly drier than more open reedbed within SSSI Area 2. The water level was at or slightly above the soil surface, and mature Alder and other trees were often situated on slightly raised areas. Standing water, beneath carr in swamp with Water Pepper ***Persicaria hydropiper***, Common Water Plantain ***Alisma plantago-aquatica***, Water Mint ***Mentha aquatica*** and Greater Pond Sedge ***Carex riparia***. The W221 - undisturbed fluctuating marsh assemblage is restricted to areas which flood in the winter, but dry out in summer to expose coarse litter of sufficient quantity to maintain a highly humid environment. One of a number of snail-killing flies (Sciomyzidae) recorded, the RDB2 ***Psacadina zernyi***, recorded during the Amec surveys, is a fen species, the larvae of which feed on aquatic snails. Fluctuating water level is considered to be important for this species. (ISIS affinities: W221 – Undisturbed fluctuating marsh).

5 Moss and tussock fen is found in the middle of fen compartments, where the habitat is buffered against nutrient enrichment by river water. The habitat is often somewhat neglected with incipient shrubs, though not usually completely shaded out. Sphagnum is invariably present often with tussocks of ***Carex*** species. Water quality is a critical factor. Elements of moss and tussock fen were found in the more open microhabitats created by degenerate old willows in the wetter, more isolated parts of the reed swamp habitat. Uncommon species recorded that are affiliated to this habitat group include a Nationally Scarce rove beetle ***Stenus palustris***, recorded around one of the willow oases in the Area 2 reedswamp, a dving beetle ***Hydaticus seminiger*** and a hoverfly ***Parhelophilus consimilis*** also affiliated to this group have also been recorded (ISIS affinities: W313 - Moss and tussock fen)

6 Reedswamp specialists. An RDB3 species of solitary wasp ***Passaloecus clypealis*** was recorded from deep within the ***Phragmites australis*** reedswamp in SSSI Area 2, the larvae develop both in hollow reed stems, but has been reared from galls of the chloropid fly ***Lipara lucens*** from Common Reed ***Phragmites australis*** (Richards, 1980). The species is said to occur in both brackish and freshwater reedbeds. The adult wasps proably stocking nests with aphids, as with other ***Passaloecus*** spp. The precise conditions required for the species are not well known. The reedswamp was wet where recorded inundated to a depth of about 20cm. In close proximity to an isolated degenerate willow with prostrate radial branches an a central raised mossy platform. (ISIS affinities: W314 - Reed-fen and pools).

10 Better wet ditch sample sites were typically characterised by floating leaved Frogbit ***Hydrocharis morsus-ranae***, submerged Soft Hornwort ***Ceratophyllum submersum***,with emergent Common Reed ***Phragmites australis***, Branched Bur-reed ***Sparganium erectum*** and Lesser Water Parsnip ***Berula erecta***. Very slow flowing with little shade from overhanging vegetation. Several RDB and Nationally Scarce species characterisic of high quality ditch networks were recorded during 2014. Soldierflies including the RDB2 Ornate Brigadier ***Odontmyia ornata*** and Black Colonel ***O. tigrina*** are both strongly associated with high quality fenland ditch systems in which their larvae breed and the RDB3 Great Silver Water Beetle ***Hydrophilus piceus*** requires extensive ditch systems of similar composition in which to breed. Rotational ditch management is important to all these species.(ISIS afinities: W314 - Reed-fen and pools)



7 Marginal vegetation at the interface between wet Alder carr and reedswamp habitat. more open and diverse swamp commnities on bare silt. A Nationally Scarce lonchopterid fly ***Lonchoptera scutellata*** was recorded from this marginal habitat. The species is associated with sedges including ***Carex riparia*** and ***C. acutiformis*** at water margins of fens and damp woodland. Also ***Carex paniculata*** (all three recorded within this carr/reedswamp interface. Larvae thought to develop in leaf litter or decaying vegetable matter. Threats to ***L. scutellata*** include loss of wetland habitat through drainage and mis-management of water levels resulting in loss of marginal vegetation. (ISIS affinities: Grouped under W314 - Reed-fen and pools..

8 A number of species of ground beetles (Carabidae) and rove beetles (Staphylinidae) are associated with the litter layer of reedbeds and associated saturated peat and exposed silt. The majority of species are predators of other invertebrates associated wit these habitats. Variation in microtopography is important to provide a range of saturated and humid conditins at the bases of reeds. Nationally Scarce species recorded include ***Ooedes helopiodes***, a semi-aquatic species of marginal habitats, ***Agonum nigrum***, a species of bare mud and marginal habitats and ***Demetrias imperialis*** associated with litter habtats in reed beds. (ISIS affinities include: W314 - Reed-fen and pools).

9 Branched and truncated ditches within fen meadow habitat with clean water and no flow are favoured by the legally protected Norfolk Hawker ***Aeshna isosceles***. This species was recorded during the 2014 survey from Fen Meadow south of the survey area. It is thought possible, but not proved that the species may breed within the ditch network, whilst Water Soldier ***Sratiotes aloides***, with which the dragonfly has been associated elsewhere in its range is thought to be absent from the ditches, recent records suggest it can occur in ditches with bladderwort ***Utricularia*** spp and or Frogbit ***Hydrocharis morsus-ranae***.It is possble that the species may breed in habitat of suitable water quality on site.

11 Reed swamp specialist the RDB3 White-Mantled Wainscot ***Archanara neurica*** is a species of particular local importance to the Sizewell site. Like other wainscot moths its larvae develop in the stems of Common Reed ***Phragmites australis***. White-mantled Wainscot favours dead reed stems for laral development and is associated with the edges of mature reedbeds close to the coast. The insect is thought to be sensitive to more strident management such as burning and short-rotation cutting. The reedbeds within the SSSI Area 2 and SSSI Area 2 may support this species which was recorded from a moth trap in the C-Platform woodland. These reedbeds include old stands of reed as well as new growth. (ISIS affinities: W314 - Reed-fen and pools).

12 Saturated logs habitat at the margins of seepage and ditch habitats. Larvae of hoverflies such as ***Chalcosyrphus nemorum***.

Key

- Reed swamp
- Wet woodland/carr
- Fen meadow
- Wet ditch

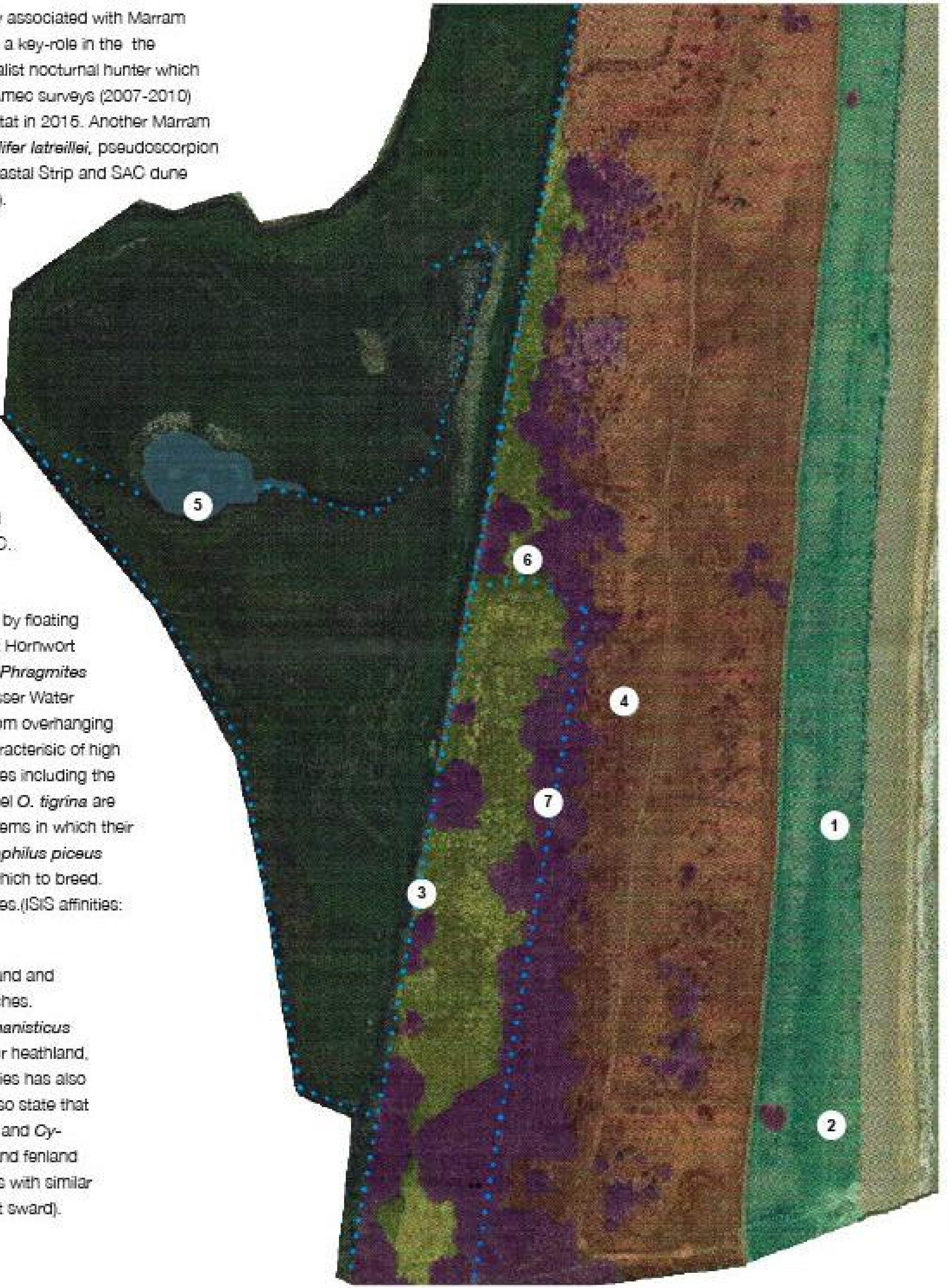
Fig 12 Significant invertebrate habitat map: Includes habitat within both Minsmere and Walberswick Heath SAC (Coastal dune habitat) and reed-swamp and scrape within SSSI only.

1 A number of species of coastal dune systems are strongly associated with Marram Grass ***Ammophila arenaria***, the root systems of which form a key-role in the the creation of dunes. A RDB3 spider ***Clubiona frisia*** is a specialist nocturnal hunter which lives at the bases of Marram Grass. Recorded only during Amec surveys (2007-2010) only immature clubionids were recorded from the dune habitat in 2015. Another Marram Grass associate, the very local Marram Chelifer ***Dactylochelifer latreillei***, pseudoscorpion associated with dune systems was recorded in both the Coastal Strip and SAC dune habitat in 2014. (ISIS affinities: F111 - Bare sand and chalk).

2 Two *nymphalid* (formerly *satyrid)* butterflies listed as S41 'Species of Principal Importance' were recorded in both the SAC and Coastal Strip grassland habitats. The Grayling ***Hipparchia semele***, requires habitats with dry bare ground on which to bask and is confined to dry grassland heathland, coastal dunes and grasslands and similarly free-draining arid situations. The Small Heath ***Coenonympha pamphilus*** is less specialised, but favours short sward habitat. The larvae of both species feed on grasses including fescues ***Festuca*** spp and various others. Grayling was abundant throughout the upper dune and coastalgrassland habitats of both the Coastal Strip and SAC. (ISIS affinities: F111 - Bare sand and chalk).

3 Better wet ditch sample sites were typically characterised by floating leaved Frogbit ***Hydrocharis morsus-ranae***, submerged Soft Hornwort ***Ceratophyllum submersum***, with emergent Common Reed ***Phragmites australis***, Branched Bur-reed ***Sparganium erectum*** and Lesser Water Parsnip ***Berula erecta***. Very slow-flowing with little shade from overhanging vegetation. Several RDB and Nationally Scarce species characterisic of high quality ditch networks were recorded during 2014. Soldierflies including the RDB2 Ornate Brigadier ***Odontmyia ornata*** and Black Colonel ***O. tigrina*** are both strongly associated with high quality fenland ditch systems in which their larvae breed and the RDB3 Great Silver Water Beetle ***Hydrophilus piceus*** requires extensive ditch systems of similar composition in which to breed. Rotational ditch management is important to all these species.(ISIS affinities: W314 - Reed-fen and pools)

4 Dry, sandy, short sward grassland, frequent bare earth (sand and shingle) patches and sandy path. Occasional tussocky patches. Diverse and herb-rich. A Nationally Scarce jewel Beetle ***Aphanisticus pusillus*** associated with dry places, particularly downland or heathland, was recorded both in the Coastal Strip and SAC. This species has also been noted in wetland' (Hyman and Parsons, 1992) who also state that the species is 'associated with members of the ***Juncaceae*** and ***Cyperaceae***'. The proximity between the arid coastal and inland fenland habitat may benefit ***Aphanisticus pusillus*** and other species with similar dual habitat requirements. (ISIS affinities: F112 - Open short sward).



5 Open, shallow scrape, well vegetated with emergent Spike rushes ***Eleocharis palustris/uniglumis*** and Common Water Plantain ***Alisma plantago-aquatica*** with submerged aquatics including Fennel-leaved Pondweed ***Potamogeton pectinatus*** and Curled Pondweed ***Potamogeton crispus***. Depth gradually increasing to approximately 0.5m. RDB3 Nationally Rare, Great Silver Water Beetle ***Hydrophilus piceus*** recorded within scrape, which also supported a Nationally Scarce hygrophilous weevil ***Pelenomus canaliculatus*** which is associated with water milfoils ***Myriophyllum*** spp. (This plant was recorded extensively on site and is likely to be also in the scrape). Another Nationally Scarce water beetle ***Hydrochus angstatus***, a bare mud species was recorded too. The extensive and well vegetated shallows supported a very diverse macroinvertebrate fauna. (ISIS affinities include: W314 - Reed-fen and pools).

6 A Nationally Scarce wolf spider ***Hygrolycosa rubrofasciata*** was recorded from the edge of birch scrub/ woodland strip, which formed a transition from the upper dry dune heath from the reedswamp and wetland habitat beyond. ***H.rubrofasciata*** is generally a fenland species, but is sometimesfoud in wet woodland/carr habitat (ISIS affinities: W3 - Permanent wet mire.

7 Branched and truncated ditches within fen meadow habitat with clean water and no flow are favoured by the legally protected Norfolk Hawker ***Aeshna isosceles***. This species was recorded during the 2014 survey from Fen Meadow south of the survey area. It is thought possible, but not proved that the species may breed within the ditch network, whilst Water Soldier ***Sratiotes aloides***, with which the dragonfly has been associated elsewhere in its range is thought to be absent from the ditches, recent records suggest it can occur in ditches with bladderwort ***Utricularia*** spp and or Frogbit ***Hydrocharis morsus-ranae***.It is possble that the species may breed in habitat of suitable water quality on site.

Key

Reed swamp

Wet woodland/carr

Wet ditch

Dunes

Grass/heath

Water

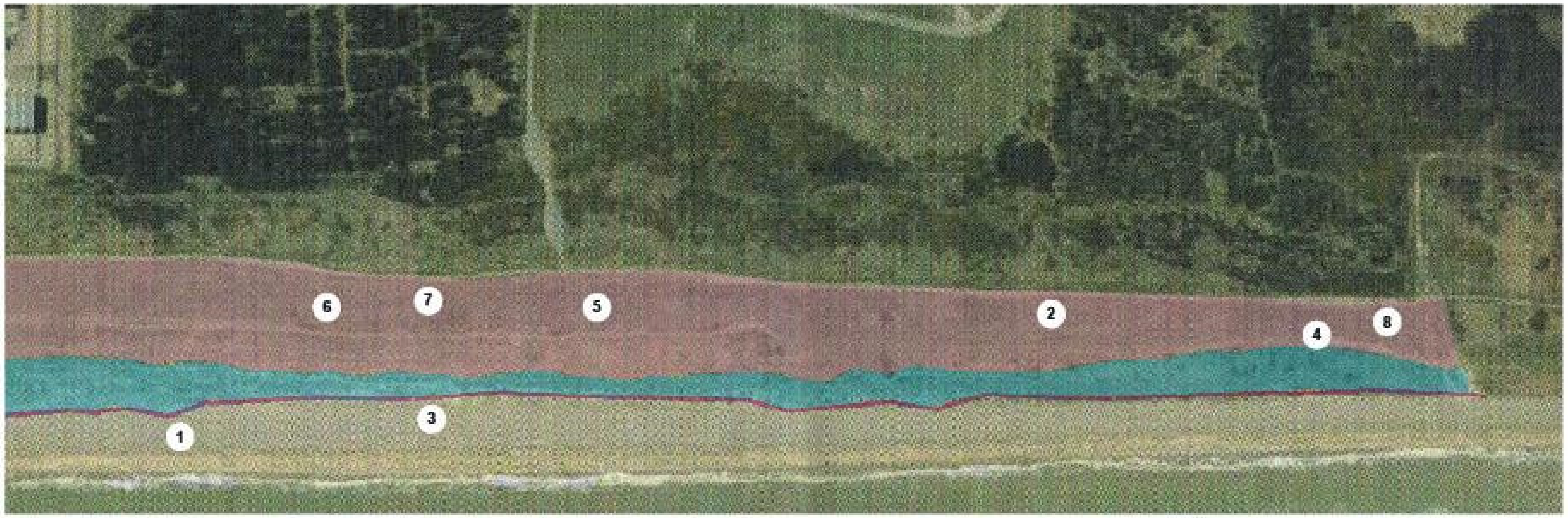
Fig 13 Significant invertebrate habitat map: Coastal Strip (CWS)

1 A number of species of coastal dune systems are strongly associated with Marram Grass *Ammophila arenaria*, the root systems of which form a key-role in the the creation of dunes. A RDB3 spider *Clubiona frisia* is a specialist nocturnal hunter which lives at the bases of Marram Grass. Recorded only during Amec surveys (2007-2010) only immature clubionids were recorded from the dune habitat in 2015. Another Marram Grass associate, the very local Marram Chelifer *Dactylochelifer latreillei*, pseudoscorpion associated with dune systems was recorded in both the Coastal Strip and SAC dune habitat in 2014. (ISIS affinities: F111 - Bare sand and chalk).

2 Lady's-bedstraw *Galium verum* was a constant component of the low growing herb layer within the coastal strip grassland. This species is an important foodplant of the Nationally Scarce Heath Shieldbug *Legnotus picipes*, a specialist of dry, well drained sandy and also shingle habitats in which it burrows. It is most associated with coastal dune grasslands and inland heaths. The species is vulnerable to loss of habitat through succession, benefitting from rabbit grazing on coastal habitats. A larva of another bedstraw feeding insect, the Small Elephant Hawkmoth *Deilephila porcellus* was also recorded on Lady's bedstraw (ISIS affinities: F111 - Bare sand and chalk).

3 Cliffed dune habitat at interface with upper shore shingle. Soft sand cliffs, one or two metres high marked the seaward extremity of the dunes throughout much of the coastal strip and SSSI. Several species of ground nesting *aculeate hymenoptera* were recorded. An RDB1 spider-hunting wasp *Evagetes pectinipes* was recorded in this habitat within the Coastal Strip in 2014. The species only known from Kent in the UK prior to current survey. *E. pectinipes* is thought to be a cleptoparasite of another spider-hunting wasp *Episyron rufipes*,(also recorded) . Spider-hunting wasps stock burrows in sand with spiders (*Episyron rufipes* collects orb-web spiders (*Araneidae*) and wolf spiders (*Lycosidae*)).(ISIS affinities: F111 - Bare sand and chalk).

4 Dry, sandy, short sward grassland, frequent bare earth (sand and shingle) patches and sandy path. Occasional tussocky patches. Diverse and herb-rich. A Nationally Scarce jewel Beetle *Aphanisticus pusillus* associated with dry places, particularly downland or heathland, weas recorded both in the Coastal Strip and SAC. This species has also been noted in wetland' (Hyman and Parsons, 1992) who also state that the species is 'associated with members of the *Juncaceae* and *Cyperaceae*'. The proximity between the arid coastal and inland fenland habitat may benefit *Aphanisticus pusillus* and other species with similar dual habitat requirements. (ISIS affinities: F112 - Open short sward).



8 Two *nymphalid* (formerly *satyrid*) butterflies listed as S41 'Species of Principal Importance' were recorded in both the SAC and Coastal Strip grassland habitats. The Grayling *Hipparchia semele*, requires habitats with dry bare ground on which to bask and is confined to dry grassland heathland, coastal dunes and grasslands and similarly free-draining arid situations. The Small Heath *Coenonympha pamphilus* is less specialised, but favours short sward habitat. The larvae of both species feed on grasses including fescues *Festuca* spp and various others. Grayling was abundant throughout the upper dune and coastalgrassland habitats of both the Coastal Strip and SAC. (ISIS affinities: F111 - Bare sand and chalk).

5 Numerous lush patches of Restharrow *Ononis repens* on and around dunes provides shelter and a food resource for a variety of specialists of dry coastal habitats. The Grey Bush-cricket *Platycleis albopunctata* a specialist coastal species was abundant in Restharrow, particularly on the tops and sides of the seaward dunes. (ISIS affinities: F111 - Bare sand and chalk)

6 A Nationally Scarce snail-killing fly *Pherbellia brunnipes* was recorded on two samples within the dry Coastal Strip grassland. The species is generally associated with fen, coastal levels, dune slacks and damp woods. The adults may benefit from the flower-rich resource of the Coastal Strip, whilst the larvae are thought to develop as parasitoids in aquatic snails. In common with other Snail-killing flies, *P. brunnipes* may benefit from seasonal waterlevel fluctuation may be important for lifecycle. (ISIS affinities include: W314 - Reed-fen and pools).

7 Hare's-foot Clover *Trifolium arvense*, recorded throughout much of the Coastal Strip grassland is the only known foodplant of a Nationally Scarce apionid weevil *Protapion dissimile* recorded from the coastal strip grassland. This species avours distrubed ground and sand dunes and dry, sparsley vegetated sandy places on acid or neutral soils. Threats to *P. dissimile* include habitat loss through afforestation and coastal development. Also succession to scrub due to lack of grazing. (ISIS affinities: F111 - Bare sand and chalk).

Key

- Short sward/ sandy grassland
- Dune
- Dune/shingle interface

Appendix 4 - Photographs

Photograph 1: SSSI Triangle T4 sample site

Photograph 2: SSSI Triangle T4 sample site

Photograph 3: SSSI shaded ditch with *Lemna minor*

Photograph 4: SSSI partially shaded ditch

Photograph 5: SSSI Area 2 T5 sample site

Photograph 6: SSSI Area 2 T6 sample site

Photograph 7: SSSI Area 2 T7 sample site

Photograph 8: SSSI Area 2 wet ditch with Frogbit

Photograph 9: SSSI Fen Meadow

Photograph 10: Minsmere & Walberswick SSSI (scrape)

Photograph 11: Minsmere & Walberswick SAC reedbed

Photograph 12: SAC vegetated dune

Photograph 10: SAC: Dune/shingle interface

Photograph 13: Coastal Strip vegetated shingle

Photograph 14: Coastal Strip grassland

Photograph 15: Coastal Strip grassland shingle

Sizewell C Invertebrate Surveys 2016

Methods

2016 Fieldwork
In 2016, invertebrate fieldwork was undertaken using an identical range of sampling methods as used during the Arcadis 2014 Sizewell survey. These comprised terrestrial sampling methods including timed sweeping, vacuum sampling and beating. As in 2014, water traps were also deployed at most survey sites. Within one survey compartment, Goosehill Rides (Compartment 13), Flight interception Traps (FITs) were deployed instead of water traps and beat sampling. This method had not been used during the 2014 survey; however, a number of pan or water trap samples had been collected within the Goosehill Rides during the 2015 field season.
Flight interception traps were suspended from tree branches and flying insects and other captured invertebrates were preserved in an ethylene glycol (antifreeze) solution. Traps were run for approximately two weeks on each of three sampling events.
Collected FIT samples were strained and preserved in IMS in labelled and dated tubes (as for all sample methods).
In addition to the terrestrial sampling methods, two aquatic samples were collected from field drains forming the southern boundary of the Fen Meadow SSSI (Compartment 3) to complement aquatic samples collected during 2014.
All samples were labelled and sample sites were recorded using a handheld Garmin Global Positioning System (GPS) device. A brief description of habitat present at each sample site was made and more detailed habitat descriptives were added (for sites not surveyed during 2014) in the form of geo-referenced target notes.
The number of samples collected per method and compartment are presented in Table 1. Details of sample timings are also indicated. For a more comprehensive account of the methods used see Arcadis 2014.

Antlion *Euroleon nostras* survey
Besides the general sampling and habitat recording undertaken. Searches for larval evidence in the form of burrows of the antlion *Euroleon nostras* were undertaken. The searches focused on rides at Goosehill as far north as Walk Barn and were undertaken during all three (May, Jun and July) surveys.

Ex situ identification
Note: Identification of 45 pitfall and 45 water trap samples collected by Arcadis during 2015 as part of a separate reptile prey study was also undertaken as part of the current project and data subsequently analysed alongside Arcadis 2016 data and existing 2014 and compartment-specific Amec 2007 to 2011 data.
All preserved samples collected during both 2015 and 2016 fieldwork were systematically identified using a stereo dissecting microscope and where required, appropriate, taxon-specific keys. These included primarily volumes produced by the Royal Entomological Society and/or the Field Studies Council as well as standard references such as recently published volumes e.g. Beetles Volumes 1 and 4 published by Andrew Duff and the Field Guide to Bees of Great Britain and Ireland by Steven Falk.
The majority of species were identified by Jon Mellings; however, some diptera (two-winged flies) were outsourced to specialist dipterists P.A. Ward and M.W.J. Paskin subcontracted by Andy Jukes.
In certain instances specimen verification was sought. Examples include the weevils *Procras granulicollis* and *Sitona waterhousei* specimens, verified by M.G. Morris. Both records may constitute county firsts for Suffolk.

Data analysis
As with the fieldwork data was recorded in accordance with methods used for the 2014 survey. Each individual record per sample was entered into an Excel spreadsheet together with metadata relating to recorded date, collection method, species status and (in most cases) the approximate number of specimens of a particular species within a sample.
Data was processed to provide lists per survey compartment and combined with data derived from the Arcadis 2014 survey data, together with and additional data collected within the survey compartments between 2007 and 2011 by Amec. These datasets were subsequently transferred to the ISIS spreadsheet for analysis. Once imported to ISIS, lists were meticulously screened for nomenclature errors. ISIS output was then interpreted and presented with commentary relating to uncommon/designated species recorded for each sample site.

TABLE 1 – SUMMARY OF SAMPLES AND SAMPLING LOCATIONS

Survey Component	**Survey Location**	**Activity**	**Timing**
Main Site Invertebrate Surveys	SSSI Triangle (Compartment 1)	• Complete terrestrial Terrestrial sample (Beating/sweep/vacuum/water traps) ensuring sufficient samples taken from wet woodland of western edge of SSSI Triangle	• 1 beating sample per month – May (5/5/2016) • and June (22/6/2016) • 4 samples per method (beating/sweep/ vacuum /water traps) (28/7/2016)
	Goose Hill (Compartment 13)	• Walkover / habitat description • Terrestrial sample (Sweep/vacuum/set up flight interception traps (FITs) • Antlion walkover	• 5/5/2016 • Four samples per method per visit on 5/5/2016, 26/6/2016 and 28/7/2016 • During terrestrial sampling (5/5/2016, 26/6/2016 and 28/7/2016)
	C station Platform Woodland (Area 4a)	• Terrestrial sample (Sweep/vacuum /water traps/ beating)	• 5-6/5/2016 and 22/6/2016
	Fen meadow (Area 3)	• 2 aquatic samples ditch running E – W for Norfolk Hawker and general aquatic invertebrates • 2 sweep and 2 suction samples	• 3/5/2016 • 3/5/2016, 21/6/2016 • 25/7/2016
	Arable margins (Area 15)	• Walkover to identify the best arable margins then sample the best examples • Sampling best examples – trapping methods to include: Sweeping, vacuum, beating and water traps as required	• 4/5/2016 • Four samples per method 4-6/5/2016, 21-25/6/2016 and 28/7/2016

ISIS Results from analysis of combined data collected within compartments at Sizewell

The species lists used were derived from both terrestrial and (where available) aquatic samples. Lists included representatives from all the main insect orders recognised within ISIS as well as other arthropods including spiders (Araneae), harvestmen (Opiliones), woodlice (Isopoda), Pseudoscorpions (Pseudoscorpiones) and some centipedes (Chilopoda). No molluscs were recorded during the terrestrial sampling, however, aquatic molluscs, being part of standard aquatic invertebrate assessment methods were included. ISIS does not (currently) recognise certain families, for example, micromoths, certain true fly families such as Muscidae and Tachnidae and certain beetle families e.g. Leiodidae. Parasitic hymenoptera (Parasitica) is another large group not serviced by ISIS.

Errors identified within the ISIS output (displayed at the bottom of the data output tables) either comprised species not represented within ISIS, or those not recorded to species. Prior to running ISIS, each site list was subject to a rigorous check to ensure the nomenclature used for target species was recognisable within ISIS.

The following interpretation relates to sites within recognised Sizewell compartments to which new datasets have been added post 2014. Two main sources of data were used for this purpose as follows:

1. Data collected in 2016 survey in order to fill gaps in existing Arcadis (2014) and Amec (2007-2011) datasets;
2. Data derived from identification of pitfall trap and water trap samples collected as part of a reptile prey monitoring project conducted by Arcadis in 2015.

For some sites the new (2015 and 2016) data has been added to existing data collected between 2007 and 2011 by Amec, and/or 2014 by Arcadis. A total of 976 species were recorded from the 2015 and 2016 data combined and all data including combined 2014, 2015 and 2016 Arcadis and Amec 2007 to 2011 data gives a total species list for the Sizewell project of 2,068 invertebrate species.

In some cases, datasets are derived only from the 2015 reptile prey monitoring samples, from sites not targeted strategically for the purpose of invertebrate survey. Whilst these datasets have been analysed, they are represented by relatively few samples. However, in such cases at least 10 samples were collected from each site, providing sufficient resolution, if minimal, for meaningful analysis using ISIS.

The datasets for sites such as 'SZC – Studio' and 'SZC – St James' for example, are based on samples collected primarily for the purpose of reptile prey studies.

Specific Assemblage Types (SATs) are considered to give a better indication of conservation value and may be better suited to targeted monitoring when used in a conservation context, i.e. for undertaking condition assessments of SSSI features for statutory nature conservation purposes. However, for the purpose of the following interpretation, it was considered more useful to consider BATs in greater detail followed by the SATs. This was partly to facilitate discussion relating to species recognised as being of higher conservation status in relation to their associated assemblages. However, SATs are also discussed and their conservation value emphasised where required.

SSSI Triangle

Combined data collected by Arcadis (2014 and 2016) and Amec (2009)

The following designated species have been recorded from the combined SSSI Triangle sample data:

Protected species:

- Norfolk Hawker *Anaciaeschna* (*Aeshna) isosceles* (Odonata: Aeshnidae) UK Protected Species under Sch. 1,5 and 8 of WCA (1981); Also included as a Species of Principal Importance in S41 of the NERC Act (2006) and classed under IUCN post-2001 guidelines as 'Endangered' in the UK.

RDB species:

- A sciomyzid fly *Antichaeta brevipennis* (Diptera: Sciomyzidae) RDB2 – Vulnerable
- White-mantled Wainscot *Archanara neurica* (Lepidoptera: Noctuidae) RDB3–Rare; S41 NERC (2006)
- Levels Yellow-horned Horsefly *Hybomitra ciureai* (Diptera: Tabanidae) RDB3 – Rare
- A cranefly *Prionocera subserricornis* (Diptera: Tipulidae) RDB2 – Vulnerable
- Yellow Downlooker Snipefly *Rhagio strigosus* (Diptera: Rhagionidae) RDB3
- A periscelid fly *Stenomicra delicata* (Diptera: Periscelididae) RDB2
- A fanniid fly *Piezura graminicola* (Diptera: Fanniidae) RDB – insufficiently known

Nationally scarce species:

- An anthomyzid fly *Anagnota bicolor* (Diptera: Anthomyzidae) NS
- A scraptiid beetle *Anaspis thoracica* (Coleoptera: Scraptiidae) NS (Na)
- A ground beetle *Bembidion fumigatum* (Coleoptera: Carabidae) NS (Nb)
- Scarce Orange Legionnaire *Beris clavipes* (Diptera: Stratiomyidae) NS
- A sciomyzid fly *Colobaea bifasciella* (Diptera: Sciomyzidae) NS
- A true weevil *Curculio betulae* (Coleoptera: Curculionidae) NS (Nb)
- A cranefly *Dicranomyia lucida* (Diptera: Limoniidae) NS
- A cylindrotomid fly *Diogma glabrata* (Diptera: Cylindrotomidae) NS
- Lesser Cockroach *Ectobius panzeri* (Dictyoptera: Blattelliidae) NS
- A chloropid fly *Elachiptera uniseta* (Diprtera: Chloropidae) NS
- A chloropid fly *Lipara rufitarsis* (Diprtera: Chloropidae) NS
- An erirhinid weevil *Notaris scirpi* (Coleoptera: Erirhinidae) NS (Nb)
- Black Colonel *Odontomyia tigrina* (Diptera: Stratiomyidae) NS
- Ornate Brigadier *Odontomyia ornata* (Diptera: Stratiomyidae) NS
- A leafhopper *Paralimnus phragmitis* (Hemiptera: Cicadellidae) NS (Nb)
- A sciomyzid fly *Pherbellia dorsata* (Diptera: Sciomyzidae) NS
- A sciomyzid fly *Pherbellia griseola* (Diptera: Sciomyzidae) NS
- A leaf weevil *Polydrusus formosus* (Coleoptera: Curculionidae) NS (Na)
- Drab Wood-soldierfly *Solva marginata* (Diptera: Xylomyidae) NS
- Banded General *Stratiomys potamida* (Diptera: Stratiomyidae) NS
- A dolichopodid fly *Thrypticus divisus* (Diptera: Dolichopodidae) NS
- A dolichopodid fly *Thrypticus nigricauda* (Diptera: Dolichopodidae) NS

ISIS analysis

Results

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W314	reedfen and pools	23	fav	21	242
W211	open water on disturbed mineral sediments	3		8	130
F001	scrub edge	9		5	
W125	slow-flowing rivers	1		4	150
W126	seepage	2		4	150
W221	litter-rich fluctuating marsh	1		3	130
F002	rich flower resource	6		2	
A212	bark & sapwood decay	12		2	175
M211	sandy beaches	1		2	
W313	moss and tussock fen	1		2	242
M311	saltmarsh	2		2	
A211	heartwood decay	2		1	175

F221	montane & upland	1	1	
W312	Sphagnum bog	1	1	242
F111	bare sand & chalk	4	1	141

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	20	128		131	
W3	permanent wet mire	19	242	fav	128	
W2	mineral marsh & open water	16	130		104	
A1	arboreal canopy	7	135		49	
W1	flowing water	7	150		46	
A2	wood decay	4	175		29	0
F3	shaded field & ground layer	4	133		28	
F1	unshaded early successional mosaic	3	141		18	
M3	saltmarsh, estuary & mud flat	1			5	
M2	sandy shore	0			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	765
Number of errors in species list	105

Interpretation of SSSI Triangle ISIS analysis

The following interpretation is based on all available data collected within the SSSI Triangle (Compartment 1) from surveys of terrestrial and aquatic invertebrates conducted between 2007 and 2016. The interpretation should be considered alongside previous analysis and interpretation of SSSI Triangle samples using ISIS, conducted by Arcadis (2015) and Webb (2015?) 2016 samples were collected mainly as a gap filling exercise. This covered in particular, a later summer sampling event not undertaken during the initial round of 2014 sampling by Arcadis and supplementary beating samples collected within a similar time frame to the additional survey. 2016 sampling within the SSSI Triangle was undertaken using exactly the same methods as in 2014 and by the same operative.

For the purpose of this analysis, data was collated from the following sources:

Amec (2007) terrestrial surveys
Amec (2009) aquatic surveys
Amec (2010) terrestrial surveys (malaise traps)
Arcadis (2014) terrestrial and aquatic surveys
Arcadis (2016) terrestrial surveys
Samples collected during the 2016 Arcadis

In total, 769 species recorded during the combined surveys were analysed using ISIS, the list includes both terrestrial and aquatic samples, with representatives from all the main insect orders recognised within ISIS as well as other arthropods including spiders (Araneae), harvestmen (Opiliones), woodlice (Isopoda), Pseudoscorpions (Pseudoscorpiones) and some centipedes (Chilopoda). No molluscs were recorded during the terrestrial sampling, however, aquatic molluscs, being part of standard aquatic invertebrate assessment methods were included.

Of the species input, 105 errors were identified within ISIS, these errors comprised either of species not represented within ISIS, or those not recorded to species. The list was subject to rigorous check to ensure nomenclature used for target species was recognisable within ISIS.

Significant Broad Assemblage Types (BATs) recognised within ISIS

In total, 10 Broad Assemblage Types (BATs) were recognised from the analysed SSSI Triangle dataset. Of these, eight comprised a sufficient number of species to be considered robust, i.e. being made up of more than 15 species.

In terms of species deployment, the largest number of species attributed to a single BAT was 131, attributed to the F2 – Grassland and scrub matrix assemblage. However, the two other most well represented BATs were wetland assemblages, the W3 – Permanent wet mire and the W2 – Mineral marsh and open water. These two assemblages, supporting 128 and104 species respectively, are closely allied. Whilst the current version of ISIS is unable to attribute species to more than one BAT, there will inevitably be some crossover in terms of habitat affinity between species attributed to closely allied assemblages.

Of the remaining BATs represented, the W1 – Flowing water assemblage, represented by 46 species in total, further contributes to a significant body of wetland and wetland-related species.

Other broad assemblages with a significant presence within the ISIS analysis included the two woodland related assemblages A1 – Arboreal Canopy with 49 attributed species and A2 – Wood decay with 29 species. Allied to these assemblages, the F3 – Shaded field and ground layer assemblage, which comprises species associated with woodland and scrub ground-layers, comprised 28 species. Collectively, these three BATs constituted just over 100 species, a significant, though not dominant proportion of the recognised fauna as a whole.

In terms of conservation significance, one broad assemblage, the W3 – Permanent wet mire achieved a Rarity Score (RS) of 242. This score easily exceeded the Favourable Condition Target (FCT) of 180 specified within ISIS for the W3 assemblage. This indicates that the site supports a W3 – Permanent wet mire assemblage of National Importance. Whilst other recorded BATs were attributed with a similar number of species to the W3 assemblage, none exhibited scores exceeding the assemblage-specific FCTs set within ISIS. However, in some instances Rarity Scores attained were close to these thresholds. The W1 – Flowing water BAT, whilst being represented by relatively few (46) species, attained a RS of 150; this equalled but did not exceed the FCT of 150 specified in ISIS. The W1 assemblage can, therefore, be said to be on the cusp of achieving National significance.

The remaining wetland specific BAT, W2 – Mineral marsh and open water, was relatively well-represented in terms of species-richness, but scored a RS of 130, compared to a threshold of 150. Whilst this score does not indicate National significance, it is relatively close to the threshold and therefore can be said to be of conservation value. Two nationally scarce species, a ground beetle *Bembidion fumigatum* and a weevil *Notaris scirpi* which is associated with Reedmaces *Typha* sp. and club-rushes *Scirpus* sp.(*Schoenoplectus*) were attributed to W2.

Whilst the F2 – Grassland and scrub matrix assemblage was the most species-rich assemblage recorded within the SSSI Triangle, the RS for this assemblage fell short of its FCT of 160, scoring 128. The assemblage did, however, include two Red Data Book species, the nationally rare (RDB3) Yellow Downlooker Snipefly *Rhagio strigosus*; a species associated with scrub and woodland edge habitats (recorded by Amec, 2007). A fanniid fly *Piezura graminicola* (recorded by Amec, 2010), classed as RDBK (unknown) in the UK was also attributed to the F2 assemblage.

The woodland associated BATs including A1 – Arboreal canopy, A2 – Wood decay and F3 – Shaded field and ground layer, all achieved Rarity Scores below their respective favourable condition targets. However, the RS of 175 for the A2 – Wood decay BAT came relatively close to the FCT of 190 set in ISIS. Two nationally scarce species associated with wood decay habitat in the SSSI Triangle included the Drab Wood-soldierfly *Solva marginata* and a scraptiid beetle *Anaspis thoracica*, both recorded from 2016 Arcadis data. And two Nationally Scarce beetles; the weevils *Curculio betulae* (recorded in 2014) and Polydrusus formosus (recorded in 2014 and 2016), are attributed to the A1 – Arboreal canopy BAT.

Of the Specific Assemblage Types (SATs) recorded within the SSSI Triangle, one the W314 – Reedfen and pools SAT achieved a Number of Species Score (No. spp) of 23 more than doubling the FCT of 10 set within ISIS for this SAT. The W314 assemblage can be seen as being clearly of at least national significance, and of SSSI standard. This score reflects the score registered by the parent W3 – Permanent wet mire BAT. However SATs are considered better indicators of high conservation value, as they are composed entirely of species with exacting habitat requirements. The recorded W314 SAT species collectively represent 21 percent or approximately one fifth) of the total UK fauna attributed to this SAT.

Species of a higher conservation status listed within the W314 SAT included six Red Data Book species and five species classed as nationally scarce in the UK. Three of the true flies (Diptera) including a sciomyzid *Antichaeta brevipennis,* a cranefly *Prionocera subserricornis* and a perscelid fly *Stenomicra delicata* are currently classed as nationally vulnerable (RDB2). Nationally rare (RDB3) species included a moth, the White-Mantled Wainscot *Archanara neurica* and the Levels Yellow-horned Horsefly *Hybomitra ciureai.*

The other RDB species classed within the W314 assemblage recorded from the SSSI Triangle was the Norfolk Hawker *Anaciaeshna isoceles*. This species was recorded in a malaise trap during the 2010 Amec surveys. Norfolk Hawker is fully protected under Schedules 1,5 and 8 of WCA (1981), is listed as a ‘Species of Principal Importance’ under the S41 of the NERC Act (2006) and is classed as nationally endangered using post-2001 IUCN critera. In both 2014 and 2016, the insect was recorded towards the northern end of the complex of Fen Meadows (compartment 12) and whilst, at least seven insects were recorded in 2016 flying around a well-vegetated drain in this area, no adults or larvae were recorded in the SSSI Triangle, during either 2014 or 2016 surveys. Habitat within the SSSI Triangle drains is generally considered to be unsuitable for this dragonfly as a breeding species; however, it may benefit from the habitat for hunting and perching, furthermore, the suitability of the reedbed lagoon for supporting the insect has not been assessed due to access issues.

Nationally scarce species attributed to the W314 – Reedbed and pools SAT recorded within the SSSI Triangle included two species of soldierfly (Diptera: Stratiomyidae) the Black Colonel *Odontomyia tigrina* and the Ornate Brigadier *Odontomyia ornata*. Both species have a strong fidelity to fenland biotopes. The Ornate Brigadier was until recently classed as nationally vulnerable (RDB2) in the UK, but has been subject to a recent status revision due to an increase in records. Other nationally scarce species attributed to W314 included two sciomyzid flies, *Colobaea bifasciella* and *Pherbellia dorsata* and a chloropid fly Lipara rufitarsis the larvae of which form galls within the stems of Common Reed *Phragmites australis*.

Whilst none of the remaining 13 SATs recognised from the SSSI Triangle dataset exceeded their respective FCTs, the F001 – Scrub edge and A212 – Bark and sapwood decay SATs were both well represented. Nine species were attributed to the F001 assemblage, this being very close to the FCT of 10 set within ISIS for this assemblage. F001 is one of the cross-cutting ‘resource based’ SATs added to ISIS during a 2008 revision. None of the species attributed to the F001 assemblage is currently classed as rare or scarce in the UK. The A212 – Bark and sapwood decay assemblage was represented by 12 species, compared to a FCT score of 19 set in ISIS. The nationally scarce Wood-soldierfly *Solva marginata* and a scraptiid beetle *Anaspis thoracica,* both mentioned in relation to the overarching A2 – Wood decay BAT (above), are both specialists attributed to the A212 assemblage.

The representation within these two SATs illustrates the importance of woodland edge habitat within the SSSI Triangle. These SATs should also be considered in combination with the A1 – Arboreal canopy BAT (which has no associated SATs in ISIS).

SZC – Studio

Specimens identified from 5 x pitfall traps and 5 x pan traps collected on 2/6/2015.

The following designated species have been recorded from the combined SZC - Studio sample data:

- Short-horned Furrow Bee *Lasioglossum brevicorne* (Hymenoptera: Halictidae) RDB3 Rare
- Red-girdled Mining Bee *Andrena labiata* (Hymenoptera: Andrenidae) NS (Na)
- Grey-gastered Furrow Bee *Lasioglossum prasinum* (Hymenoptera: Halictidae) NS (Na)
- A ground beetle *Panagaeus bipustulatus* (Coleoptera: Carabidae) NS (Nb)

Results

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F111	bare sand & chalk	7		2	156
A212	bark & sapwood decay	2		0	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F1	unshaded early successional mosaic	39	156		27	
F2	grassland & scrub matrix	33	132		23	
A2	wood decay	3			2	0
W2	mineral marsh & open water	1			1	
W3	permanent wet mire	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	70
Number of errors in species list	0

Interpretation of SZC – Studio ISIS analysis

The following interpretation is based on all available data collected within the SZC – Studio site (as named in Arcadis 2015 samples) from surveys of terrestrial invertebrates collected during a single episode of pitfall and pan trapping collected on 2/6/2015. The data was collected primarily as part of a study of reptile prey, rather than as a strategic assessment of invertebrate conservation value per se. The data is, however, useful in adding resolution to the existing body of data collected for the purposes of the current project.

Importantly, the samples were collected from a single point in time (within a one or two week operational period) and therefore do not provide evidence of species occurring at other times of year. With five samples being collected from each sample method, the data is technically of sufficiently high resolution to provide a valid analysis using ISIS. However, the results should be seen as indicative rather than comprehensive and should not be used for direct comparison with sites that have received more comprehensive sampling.

In total, 70 species recorded during the single 2015 sampling event were analysed using ISIS, the list includes terrestrial samples only.

Significant Broad Assemblage Types (BATs) recognised within ISIS

In total, five Broad Assemblage Types (BATs) were recognised from the analysed SZC - Studio dataset. Of these, two comprised a sufficient number of species to be considered robust, i.e. being made up of more than 15 species.

In terms of species deployment, the largest number of species attributed to a single BAT was 27, attributed to the F1 – Unshaded early successional mosaic assemblage. F1 includes species characteristic of relatively dry, sparsely vegetated habitats including sites subject to some disturbance. The other relatively well-represented BAT was the F2 – Grassland and scrub matrix assemblage to which 23 species were attributed. Other BATs resulting from the ISIS analysis of the SZC – Studio data were represented by only one or two species. These included A2 – Wood decay (2 species), and W2 – Mineral marsh and open water and W3 – Permanent wet mire (1 species each).

In terms of conservation significance, none of the assemblages achieved a Rarity Score exceeding the Favourable Condition Target set within ISIS. However, the F1 – Unshaded early successional mosaic assemblage attained an RS of 156. This score was very close to the corresponding FCT of 160, furthermore, all four species of a recognised UK conservation status recorded within the SZC – Studio dataset were attributed to the F1 BAT. These included three species of ground-nesting bee including the nationally rare (RDB3) Short-horned Furrow Bee *Lasioglossum brevicorne*, and two nationally scarce species, the Grey-gastered Furrow Bee *L. prasinum* and the Red-girdled Mining Bee *Andrena labiata*. In addition, a ground beetle *Panagaeus bipustulatus* classed as Nationally Scarce was also attributed to the F1 assemblage.

The RS recorded for the other main BAT recorded within the SZC – Studio, the F2 – Grassland and scrub matrix assemblage was 132. Whilst this was not particularly close to exceeding the FCT of 160 set in ISIS for this assemblage, the score can be said to reflect an assemblage of potential conservation value. The assemblage is also closely allied in terms of composition and succession to the F1 assemblage and there is undoubtedly some crossover in terms of habitat usage between species ascribed to these assemblages.

Whilst no RDB or Nationally Scarce species were attributed to the F2 assemblage, several species of local distribution attributed to F2 were recorded within the SZC – Studio sample site. These included ground dwelling spiders of the family Gnaphosidae including *Drassyllus pusillus* described by Harvey *et al* (2002) as ‘local and not common’ and *Haplodrassus signifer* a local species. Both species are associated with sandy heathland as well as dry grassland habitats. Local beetle species attributed to F2 included an ant-like beetle *Notoxus monoceros* also associated primarily with dry sandy grassland and heathland biotopes, which was recorded widely throughout the Sizewell compartments, a ground beetle *Notiophilus aquaticus* and *Quedius (Raphirus) schatzmayri,* a rove beetle associated with generally damper grassland habitats.

Only two Specific Assemblage Types (SATs) were recorded from the SZC – Studio sample data. These included the F111 – Bare sand and chalk assemblage, to which seven species were attributed and A212 – Bark and sapwood decay, to which two species were attributed.

Whilst the representation of seven species attributed to the F111 assemblage fell far short of achieving the FCT of 18 set within ISIS for this assemblage, the three species of higher conservation value also recorded for the overarching F1 – Unshaded early successional mosaic BAT, including the RDB3 Short-horned Furrow Bee *Lasioglossum brevicorne*, and the nationally scarce Grey-gastered Furrow Bee *L. prasinum* and the ground beetle *Panagaeus bipustulatus.* Additional species considered to be sufficiently stenoecious to justify inclusion within a SAT level assemblage included the Green Tiger Beetle *Cicindela campestris*, essentially a species of sandy heathland and *Alopecosa cuneata,* one of the more local lycosid spiders recorded across the survey area.

The Short-horned Furrow Bee is of very restricted range in the UK and is associated primarily with dry heathland habitats and like the Grey-gastered Mining Bee, also recorded is thought to nest in sand. Both species are recorded in Suffolk, with most records being from the Brecks. The ground beetle *Panagaeus bipustulatus* is, according to Luff (2007) associated primarily with open, well-drained grasslands, dunes as well chalk and gravel pits.

The data collected from the SZC – Studio site adds resolution to the overall knowledge of the fauna occurring within the Sizewell survey area. In particular adding species associated with dry heathland and other unshaded early successional mosaic and drier grassland habitats. Neither furrow bee *Lasioglossum brevicorne* or *L. prasinum* nor the ground beetle *Panagaeus bipustulatus* were recorded within other compartments within the Sizewell survey area.

SZC – St James

Specimens identified from 5 x pitfall traps and 5 x pan traps collected on 6/5/2015.

The following designated species have been recorded from the combined SZC – St James sample data:

- A flea beetle *Longitarsus dorsalis* (Coleoptera: Chrysomelidae) NS (Nb)
- A ground bug *Megalonotus praetextatus* (Hemiptera: Lygaeidae) NS
- A hoverfly *Platycheirus immarginatus* (Diptera: Syrphidae) NS

Results

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F112	open short sward	3		2	154
F111	bare sand & chalk	6		1	154
M311	saltmarsh	1		1	
A211	heartwood decay	1		1	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F1	unshaded early successional mosaic	33	154		28	
F2	grassland & scrub matrix	31	148		26	
W3	permanent wet mire	11			9	
F3	shaded field & ground layer	2			2	
A1	arboreal canopy	1			1	
A2	wood decay	1			1	0
W1	flowing water	1			1	
W2	mineral marsh & open water	1			1	
M3	saltmarsh, estuary & mud flat	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	85
Number of errors in species list	1

Interpretation of SZC – St James ISIS analysis

The following interpretation is based on all available data collected within the SZC – St James site (as named in Arcadis 2015 samples) from surveys of terrestrial invertebrates collected during a single episode of pitfall and pan trapping collected on 6/5/2015. The data was collected primarily as part of a study of reptile prey, rather than as a strategic assessment of invertebrate conservation value per se. The data is, however, useful in adding resolution to the existing body of data collected for the purposes of the current project.

Importantly, the samples were collected from a single point in time (within a one or two week operational period) and therefore do not provide evidence of species occurring at other times of year. With five samples being collected from each sample method, the data is technically of sufficiently high resolution to provide a valid analysis using ISIS. However, the results should be seen as indicative rather than comprehensive and should not be used for direct comparison with sites that have received more comprehensive sampling.

For the SZC – St James site, 85 species recorded during the single 2015 sampling event were analysed using ISIS, the list includes terrestrial samples only.

Significant Broad Assemblage Types (BATs) recognised within ISIS

In total, nine Broad Assemblage Types (BATs) were recognised from the analysed SZC – St James dataset. Of these, only two comprised a sufficient number of species to be considered robust, i.e. being made up of more than 15 species.

In terms of species deployment, the largest number of species attributed to a single BAT was 28, attributed to the F1 – Unshaded early successional mosaic assemblage. F1 includes species characteristic of relatively dry, sparsely vegetated habitats including sites subject to some disturbance. The other relatively well-represented BAT was the F2

– Grassland and scrub matrix assemblage to which 26 species were attributed. Other BATs resulting from the ISIS analysis of the SZC – St James data were, apart from the W3 – Permanent wet mire, to which nine species were attributed, generally represented by only one or two species. Of these F3 – Shaded field and ground layer was represented by two species and A1 – Arboreal canopy, A2 – Wood decay, W1 – Flowing water, W2 – Mineral marsh and open water and M3 – Saltmarsh, estuary and mud-flat, were each represented by a single species.

In terms of conservation significance, none of the assemblages achieved a Rarity Score exceeding the Favourable Condition Target set within ISIS. However, the F1 – Unshaded early successional mosaic assemblage attained an RS of 154. This score approaching the corresponding FCT of 160.

Two of the three species classed as nationally scarce in the UK, recorded within the SZC – St James dataset were attributed to the F1 BAT. These included *Megalonotus praetextatus*, a species of ground bug (Lygaeidae) and a flea beetle *Longitarsus dorsalis* (Chrysomelidae). Both species are associated with dry and well-drained substrates on both calcareous and sandy soils and both species, are also associated with coastal biotopes. The ground dwelling *Megalonotus praetextatus* is thought to feed on the seeds of Common Storksbill *Erodium cicutarium* (Kirby, 1992), whilst *Longitarsus dorsalis* is associated with ragworts *Senecio* spp (Hyman and Parsons, 1992).

The RS recorded for the other main BAT recorded within the SZC – St James site, the F2 – Grassland and scrub matrix assemblage, was 148. This score again can be said to be reasonably close the FCT of 160 specified in ISIS. Whilst FCT status is not achieved in the case of either the F1 or F2 assemblages, the scores for both can be said to indicate conservation value. The F1 and F2 assemblages are closely allied in terms of composition and succession and there is undoubtedly some habitat usage crossover between species ascribed to these assemblages.

Whilst no RDB or Nationally Scarce species were attributed to the F2 assemblage, several species of local distribution attributed to F2 were recorded at SZC – St James. These included ground dwelling spiders of the family Gnaphosidae including *Drassyllus pusillus and Haplodrassus signifer* described in relation to the SZC – Studio (above) and *Steatoda phalerata* (Theridiidae) a free-living specialist ant predator associated with dry grassland, heathland and dunes. *S. phalerata* was described in Harvey *et al* (2002) as being ‘generally uncommon throughout its range’. Other recorded local species attributed to F2 included a dung beetle *Onthophagus coenobita* associated with unimproved grassland habitats and a tephritid fly *Tephritis vespertina*, the larvae of which develop in galls formed in the seed heads of Common Cat’s-ear *Hypochaeris radicata* (White, 1998).

Four Specific Assemblage Types (SATs) were recorded from the SZC – St James sample data. None of these achieved sufficiently high ‘No. spp.’ scores to exceed the thresholds set in ISIS for favourable condition. The best-represented assemblages were F111 – Bare sand and chalk (six species attributed compared to a threshold of 18) and F112 – Open short sward (three species compared to a threshold of 12). The two remaining SATs, M311 – Saltmarsh and A211 – Heartwood decay were each represented by a single species.

Whilst the representation of six species attributed to the F111 assemblage fell far short of achieving the FCT of 18 set within ISIS for this assemblage, two of the three species of higher conservation value also recorded for the overarching F1 – Unshaded early successional mosaic BAT, including the previously discussed ground bug *Megalonotus praetextatus*, and flea beetle *Longitarsus dorsalis*. Other habitat specialist attributed to F111 recorded from the SZC – St James site included two species of hunting spider (Lycosidae); *Alopecosa cuneata* and *Pardosa palustris*, a ground beetle *Amara eurynota* and the Marram Beetle *Philopedon plagiatum*. These species are all associated with dry, open and often sandy habitats such as dry grassland, heaths and coastal dunes. *Philopedon plagiatum* is a predominately coastal dune species in the UK. It was found in a number of the more coastal compartments during the wider survey.

The third nationally scarce species recorded was a hoverfly *Platycheirus immarginatus*. This species was the only species attributed to the M311 – Saltmarsh assemblage. According to Stubbs and Falk (2002), *P. immarginatus* is associated primarily with brackish marsh, either on the coast or tidal reaches of rivers and the larvae are known to feed on the aphid *Trichocallus cyperi* on sedges in wetlands. There is no shortage of potential habitat for this hoverfly in the broader habitat and several records exist within the Suffolk coastal zone.

The data collected from the SZC – St James site adds resolution to the overall knowledge of the fauna occurring within the Sizewell survey area. Whilst the other uncommon species and most of the commoner species recorded within the wider Sizewell survey area, the hoverfly *Platycheirus immarginatus* was recorded only at this site within the context of the current project. The prevailing F1 and F2 assemblages and associated SATs including F111 in particular, supported comparable assemblages to those recorded from other sites characterised by patches of dry heathland, sandy acid grassland and other plagioclimax or early successional habitats recorded within the broader survey.

SZC – Kenton

Specimens identified from 5 x pitfall traps and 5 x pan traps collected on 5/5/2015 and survey data derived from samples collected in 2007 by Amec.

The following designated species have been recorded from the combined SZC – Kenton survey data:

- A weevil *Procas granulicollis* (Coleoptera: Curculionidae) RDB Indeterminate (Arcadis, 2015) Verified by M.G. Morris
- Ornate Brigadier *Odontomyia argentata* (Diptera: Stratiomyidae) NS (revised from RDB2) (Arcadis, 2015)
- A ladybird beetle *Scymnus limbatus* (Coleoptera: Coccinelidae) NS (nb) (Amec, 2007)

Results

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F111	bare sand & chalk	7		2	145
F001	scrub edge	2		1	
A212	bark & sapwood decay	5		1	
W314	reedfen and pools	1		1	
F002	rich flower resource	2		1	
F003	scrub-heath & moorland	1		0	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	36	148		52	
F1	unshaded early successional mosaic	23	145		33	
W3	permanent wet mire	5			8	
F3	shaded field & ground layer	4			6	
A2	wood decay	3			5	0
A1	arboreal canopy	3			4	
W2	mineral marsh & open water	1			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	161
Number of errors in species list	15

Interpretation of SZC – Kenton ISIS analysis

The following interpretation is based on all available data collected within the SZC – Kenton site (as named in Arcadis 2015 samples) from data derived from surveys of terrestrial invertebrates conducted by Amec (2007) and results of a single episode of pitfall and pan trapping by Arcadis (collected 6/5/2015). The Arcadis data was collected primarily as part of a study of reptile prey, rather than as a strategic assessment of invertebrate conservation value *per se*.

Being derived from two separate sets of sample data, the number of species available for analysis was greater than for the SZC – Studio and SZC – St James sites discussed above, however, the two sources provided relatively small species lists reflecting survey effort. The total number of species available for analysis was 161, with 15 errors identified in the species list attributed to non-target species.

As with the SZC – Studio and SZC – St James analysis, the finding should not be compared directly with findings from sites where analysis has been based on more comprehensive datasets.

Significant Broad Assemblage Types (BATs) recognised within ISIS

In total, seven Broad Assemblage Types (BATs) were recognised from the analysed SZC - Kenton dataset. Of these, only two were represented by a sufficient number of species to be considered robust, i.e. being made up of more than 15 species.

In terms of species deployment, the largest number of species attributed to a single BAT was 52, attributed to the F2 – Grassland and scrub matrix assemblage. F2 includes species characteristic of areas of dense herbage or partial shade where a humid microclimate is maintained at ground level. Semi-natural systems supporting important examples of this assemblage type include heath grassland, moorland, hay meadows, scattered scrub and woodland. The other BAT represented by sufficient number of species to be considered robust, was the F1 – Unshaded early successional mosaic assemblage. However, unlike within the SZC - Studio and SZC – St James sites, where F1 was the dominant assemblage, only 23 species were attributed to this assemblage, less than half the number attributed to the F2 BAT.

The remaining 26 species attributed to BATs were distributed between the non-significant BATs. These were registered in descending order of abundance as follows: W3 – Permanent wet mire (8 species), F3 – Shaded field and ground layer (6 species); A2 – Wood decay (5 species), A1 – Arboreal canopy (4 species) and W2 – Mineral marsh and open water (1 species).

In terms of conservation significance, none of the assemblages achieved a Rarity Score exceeding the Favourable Condition Target set within ISIS. The highest scoring of the two sites for which Rarity Scores were attributed, was F2 - Grassland and scrub matrix assemblage which achieved a RS of 148. This score approaches the FCT set within ISIS for this assemblage and equals the score achieved for F2 resulting from the analysis of the SZC – St James data, however, the species contributing to the Kenton dataset was twice that attributed to the same assemblage at that site.

A rare species of weevil *Procas granulicollis* classed as an RDBK Indeterminate endemic species in Hymen and Parsons (1992) was the only species of recognised conservation status attributed to the F2 assemblage for SZC – Kenton site. *Procas granulicollis* is mainly known from specimens recorded from Wales, northern England and southern Scotland. All known Suffolk records are for a sibling species *Procas armillatus*, which is also uncommon in the UK. Due to potential confusion with this species, verification was sought from M.G. Morris, author of the five RES keys of the British weevil fauna, who confirmed the specimen as *P. granulicollis.* The species has been associated with Climbing Corydalis *Ceratocapnos claviculata* and Bracken *Pteridium aquilinum* and habitats supporting both of these species may be required by the species.

Other than *P. granulicollis*, several species regarded as local were attributed to the F2 assemblage recorded for SZC – Kenton. The species composition showed a marked similarity to that recorded for SZC – St James. Local spider species *Drassylus pusillus, Haplodrassus signifer* and *Steatoda phalerata,* were also recorded at St James as were the local F2 beetles *Onthophagus coenobita* and *Ocypus aeneocephalus*. Additional local species not recorded at the St James or Studio sites included the spider Zelotes latreillei (Gnaphosidae) a species strongly associated with heathland.

The RS recorded for the other main BAT recorded within the SZC – St James site, the F1 – Unshaded early successional mosaic assemblage, was 145. This score again can be said to be reasonably close the FCT of 160 specified in ISIS, but was less well represented within the Kenton samples as at either the St James or Studio sites desipite the larger sample site. Whilst FCT status is not achieved in the case of either the F2 or F1 assemblages, the scores for both can be said to indicate conservation value.

Whilst no RDB or Nationally Scarce species were attributed to the F1 assemblage, a number of species of local distribution attributed to F1 were recorded at SZC – Kenton. These included *Anoplius viaticus*, a spider-hunting wasp which typically occurs in sandy heathland sites and the Orange-horned Nomad Bee *Nomada fulvicornis*, a cleptoparasite of mining bees including *Andrena bimaculata, A. pilipes* and *A. tibialis,* which is associated with heathland and other sandy biotopes. Other local species attributed to F1 recorded from SZC – Kenton included the Minotaur Beetle *Typhaeus typhoeus*, ground beetles such as *Amara convexior* and *Harpalus rufipalpis*, the Green Tiger Beetle *Cicindela campestris*, a weevil *Rhinoncus castor* and the lycosid spiders *Alopecosa cuneata*, *Arctosa perita*. These species are all specialists of sandy heathland and/or coastal dune habitats.

Five of these species are considered sufficiently specialised to be attributed to the F111 – Bare sand and chalk SAT, these included: *Alopecosa cuneata*, *Arctosa perita, Cicindela campestris* and *Harpalus rufipalpis*. Whilst none of the SATs recorded from the SZC – Kenton site achieved scores approaching their corresponding FCTs, the F111 assemblage was the best represented in terms of species number. However, with seven attributed species (including the five listed above), the score fell far below the FCT threshold score of 18 species.

Other represented SATs included A212 – Bark and sapwood decay, to which 5 species compared to a FCT threshold of 19 were recorded, F001 – scrub edge (two species against a FCT threshold of 10), F002 – Rich flower resource (two species against a threshold of 14) and F003 – Scrub-heath and moorland (one species against a threshold of eight).

Despite being habitat specialists, no species of particular rarity value populated these SATs from the sample data; however, a former RDB2 species (now classed as nationally scarce) with a strong association with fenland and grazing meadows, the Ornate Brigadier *Odontomyia ornata* was the only species attributed to the remaining W314 – Reedfen and pools SAT. This species is strongly associated with high quality grazing marsh and fen and has been recorded in several of the Sizewell compartments conducted for the purpose of this project.

One other nationally scarce species was also recorded within the Kenton samples. *Scymnus limbatus*, one of the brown ladybird beetles (Coccinelidae) was recorded in the Amec (2007) survey. This species was one of four species attributed to the A1 – Arboreal canopy BAT. Despite being arboreal, *S. limbatus* is essentially a wetland insect associated with wet woodland, especially trees including willows and poplars.

The data collected from the SZC – Kenton site adds resolution to the overall knowledge of the fauna occurring within the Sizewell survey area. Whilst none of the BATs or associated SATs recorded achieved scores exceeding the FCTs set for them in ISIS, the ISIS analysis identified the site as supporting distinct F2 – Grassland and scrub matrix and allied F1 – Unshaded early successional mosaic assemblages and the attributed fauna associated with these BATs. Importantly the associated F111 – bare sand and chalk SAT supported species with a strong heathland association, the fauna overall was typical of that recorded in comparable habitat throughout the Sizewell survey area. However, the stand out species recorded with the SZC – Kenton site was *Procas granulicollis*, a rare species of weevil apparently unknown from Suffolk. It is possible that this species has been confused with the closely related and equally uncommon *P. armillatus (P. picipes)*, which has been recorded in Suffolk.

C-Platform and C-Platform Wet Woodland (Compartments 4 and 4a)

Specimens identified from 2016 C-Platform Woodland samples; 5 x pitfall traps and 5 x pan traps collected on 5/5/2015 and samples collected by Amec in 2007.

The following designated species have been recorded from the combined C-Platform data:

Red data book (pre-1994) species:

- Silver Colonel *Odontomyia argentata* (Diptera: Stratiomyidae) (RDB2 Vulnerable) (Arcadis, 2015)
- Grayling *Hipparchia semele* (Lepidoptera: Nymphalidae) IUCN (2001) Vulnerable; NERC (2006) S41

Nationally Scarce species (including former Notable A and B categories):

- A ground beetle *Amara lucida* (Coleoptera: Carabidae) NS (Nb)
- Cryptic Leatherbug *Bathysolen nubilus* (Hemiptera: Coreidae) NS (Nb)
- An apionid weevil *Catapion pubescens* (Coleoptera: Apionidae) NS (Nb)
- A hoverfly *Cheilosia mutabilis* (Diptera: Syrphidae) NS
- A darkling beetle *Crypticus quisquilius* (Coleoptera: Tenebrionidae) NS (Nb)
- A weevil *Glocianus punctiger* (Coleoptera: Curculionidae) NS (Nb)
- A weevil *Hypera dauci* (Coleoptera: Curculionidae) NS (Nb)
- A limoniid cranefly *Limonia trivittata* (Diptera: Limoniidae) NS
- A muscid fly *Lispe uliginosa* (Diptera: Muscidae) NS
- A rove beetle *Lomechusa emarginata* (Coleoptera: Staphylinidae) NS
- A flea beetle *Longitarsus dorsalis* (Coleoptera: Chrysomelidae) NS (Nb)
- A snail-killing fly *Pherbellia griseola* (Diptera: Sciomyzidae) NS
- A leaf weevil *Polydrusus formosus* (Coleoptera: Curculionidae) NS (Na)
- A ground beetle *Pterostichus quadrifoveolatus* (Coleoptera: Carabidae) NS (Nb)
- An empid fly *Rhamphomyia caliginosa* (Diptera: Empidae) NS
- A pea weevil *Sitona waterhousei* (Coleoptera: Curculionidae) NS (Nb)
- A rove beetle *Stenus carbonarius* (Coleoptera: Staphylinidae) NS (Nb)
- A gnaphosid spider *Trachyzelotes pedestris* (Araneae: Gnaphosidae) NS (Nb)
- A weevil *Trichosirocalus barnevillei* (Coleoptera: Curculionidae) NS (Nb)

Results

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
A215	epiphyte fauna	2		10	144
W314	reedfen and pools	7		6	183
F001	scrub edge	11	fav	6	
F111	bare sand & chalk	25	fav	6	168
F002	rich flower resource	10		4	
F112	open short sward	8		4	168
A212	bark & sapwood decay	13		3	144
W211	open water on disturbed mineral sediments	1		3	127
F003	scrub-heath & moorland	7		2	
W312	Sphagnum bog	1		1	183

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	29	130		166	
F1	unshaded early successional mosaic	15	168	fav	89	
W3	permanent wet mire	10	183	fav	60	
A1	arboreal canopy	7	119		42	
W2	mineral marsh & open water	7	127		41	
F3	shaded field & ground layer	3	122		18	
A2	wood decay	3	144		19	0
W1	flowing water	2			12	
M3	saltmarsh, estuary & mud flat	0			1	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	621
Number of errors in species list	43

Interpretation of C-Platform (compartment 4 including the C-Platform Woodland – 4a) ISIS analysis

The following interpretation is based on all available data collected within the C-Platform area from surveys of terrestrial invertebrates collected for Arcadis during targeted surveys in 2014 and 2016, together with pitfall and pan trapping data collected for a reptile prey study in May 2015 and data collected by Amec in 2007. The data analysed includes the 2014 and 2016 survey data collected in the C–Platform Woodland (compatment 4a), analysed separately for the purpose of the 2014 survey. The 2015 survey data was collected as part of a reptile prey study conducted by Arcadis and comprises pitfall and pan trap data collected at two sites on the C-Platform. These were called the SZC – Platform Conifer (TM47348 63995) and SZC – Platform Grassland (TM47348 63995). Habitats from which data was collected included both wet Alder Alnus glutinosa woodland and sandy coastal grassland with stands of planted conifers immediately north of the existing Sizewell Powerstation.

For the C-Platform site, 624 species recorded during the (above listed) combined surveys were analysed using ISIS, the list includes terrestrial samples only. 43 errors were recorded within the list due to non-target species, not used in ISIS analysis.

Significant Broad Assemblage Types (BATs) recognised within ISIS

In total, nine Broad Assemblage Types (BATs) were recognised from the analysed C-Platform dataset. Of these, seven BATs comprised a sufficient number of species to be considered robust, i.e. being made up of more than 15 species.

In terms of species deployment, the largest number of species attributed to a single BAT was 166, for the F2 – Grassland and scrub matrix assemblage; by far the greatest number of species attributed to a single BAT from the C-Platform data. The second most species-rich BAT recognised was the F1 – Unshaded early successional mosaic assemblage to which 89 species were attributed. Three other BATs were all well populated. These included in decsending order: W3 – Permanent wet mire (60 species), A1 – Arboreal canopy (42 species) and W2 – Mineral marsh and open water (41 species).

The two remaining significant BATs recorded included F3 – Shaded field and ground layer (18 species) and A2 – Wood decay (19 species).

In terms of conservation significance, two of the recognised BATs, the F1 – Unshaded early successional mosaic and W3 - Permanent wet mire assemblages achieved Rarity Scores exceeding the corresponding Favourable Condition Targets set within ISIS. The RS achieved for F1 was 168 compared to the threshold of 160 specified for F1 in ISIS and for W3, the RS achieved was 183 compared to a threshold of 180. These scores indicate that the site supported nationally significant assemblages for both F1 and W3 BATs.

The F1 – Unshaded early successional mosaic is likely to reflect most strongly the data collected from the sandy grassland habitat to the north of the C-Platform. This area is more or less connected to the sandy, dune grassland of the Coastal Strip (Compartment 5), for which the F1 BAT achieved nationally significant scores resulting from analysis of the 2014 sample data. Elements of this assemblage are also likely to be expressed from samples collected from the upper grassland and scrub buffer surveyed as part of the C-Platform Woodland strip (forms a strip contiguous with the the eastern slope top of the wet woodland zone and the C-Platform access road).

The W3 - Permanent wet mire BAT almost certainly reflects the data collected from the wet woodland understorey, especially adjacent to the more open carr habitat. This habitat supported a combination of wet pools, open silt, raised grassy area and stands of macrophytes including most evidently; *Carex otrubae*, *C. riparia/acutiformis*, *Iris pseudacorus, Phragmites australis, Sparganium erectum* and *Juncus* spp.

Despite being the most species-rich BAT, the RS of 130 attributed to the F2 – Grassland and scrub matrix assemblage fell somewhat short of the threshold and this was the case for the remaining BATs represented by 15 or more species, the RS and associated FCTs for each was as follows: A1 – Arboreal canopy (RS: 119; FCT: 170); W2 – Mineral marsh and open water (RS: 127; FCT: 150); F3 – Shaded field and ground layer (RS: 122; FCT: 150) and A2 – Wood decay (RS: 144; FCT: 190).

These SATs, with the possible exception of A1 – Arboreal canopy, all produced Rarity Scores approaching their corresponding FCT thresholds and can be considered to be of some conservation value.

23 species with a recognised conservation status were recorded from the Combined C-Platform dataset. Eight of these were attributed to the F1 – Unshaded early successional mosaic BAT, four to F2 – Grassland and scrub mosaic, four to W3 – Permanent wet mire and one each for A1 – Arboreal canopy, W1 – Flowing water and W2 – Mineral marsh and open water. An additional three nationally scarce species not assigned to any category were recorded. These included an apionid weevil *Catapion pubescens*, a species of grassland, willow carr and sand dunes (Hyman and Parsons, 1992); a hoverfly *Cheilosia mutabilis*, associated with heaths, open spaces in conifer plantations and heathy rides in deciduous woodlands, according to Stubbs and Falk (2001); and an empid fly *Rhamphomyia caliginosa*, which occurs in a wide range of wetland habitats including fens and dune slacks.

Species attributed to the F1 assemblage recorded from the combined C-Platform dataset included the Grayling *Hipparchia semele*, a butterfly classed as ‘vulnerable’ based on post-2001 IUCN criteria, which is also afforded ‘Species of Principal Importance’ status under S41 of the NERC Act (2006). The Grayling has been recorded from a number of the drier, more sandy compartments including the coastal dune grasslands adjacent to the C-Platform, heathlands within the SAC (Compartment 6) and plantation rides of Goosehill. The species is associated with arid, sparsely vegetated habitats. The Grayling’s conservation status is based on a significant decline over recent decades; however it is still relatively common in suitable habitats.

The remaining species of a recognised conservation classification attributed to the F1 assemblage were all nationally scarce and included six species of beetle and a true bug.

Arguably the most significant species recorded from the combined C-Platform samples was Sitona waterhousei, a species of pea weevil. *S. waterhousei* has according to records, not previously been recorded from Suffolk and Hyman and Parsons (1992) state ‘not recorded in East Anglia’. Whilst the species is of distinctive appearance in comparision to other more commonly recorded members of the genus, the specimen was authenticated M.G. Morris, author of the RES keys to the British weevil fauna.

Hyman and Parsons (1992) describe the favoured habitat of *S. waterhousei* as ‘coastal undercliffs, calcareous grasslands and possibly coastal shingle and quarries near the coast’. The adult beetles have been associated with Common Bird’s-foot Trefoil *Lotus corniculatus*. *S. waterhousei* was recorded from a single specimen found in the SZC-Platform conifer pitfall sample 1, collected on 5/5/2015. The sample site is very close to the sandy grassland habitat of the Coastal Strip (Compartment 5) this area supporting abundant *Lotus corniculatus*.

In common with *S. waterhousei*, the other nationally scarce beetles attributed to the F1 BAT recorded from the combined C-Platform samples were all species with a strong association with arid, sparsely vegetated habitats. Invariably, descriptions in Hymen and Parson (1992) cited sandy coastal grasslands, dunes and shingle habitats. Species included a ground beetle *Amara lucida* and darkling beetle *Crypticus quisquilius*, both of which are almost exclusively coastal species associated with dunes and heathland; the weevil *Hypera dauci,* a sandy grassland, dune and disturbed ground specialist associated with Common Storksbill *Erodium cicutarium*; the weevil *Trichosirocalus barnevillei,* a Yarrow *Achillea millefolium* feeding species with similar habitat preferences to *H. dauci* as well as occurring on grasslands within the Brecks; and *Longitarsus dorsalis*, a flea beetle associated with ragworts *Senecio* spp., growing on dry sandy or calcareous soils.

The Cryptic Leatherbug *Bathysolen nubilis*, is also associated with dry, sparsely vegetated conditions including coastal shingle and disturbance habitats such as gravel and chalk pits. The Cryptic Leatherbug is a ground dweller that feeds on leguminaceous plants, particularly Meddicks *Medicago* spp. (Kirby, 1992).

Nationally scarce species affiliated to the F2 – Grassland and scrub matrix BAT included three beetles: *Pterostichus quadrifoveolata,* a ground beetle species which has fairly recently become established in Britain. It is primarily found in eastern England where it occurs in heathland and woodland habitats; *Lomechusa emarginata,* a distinctive species of rove beetle that live in association with ants. According to Harde (1998), the larvae of *Lomechusa* species live in the nests of ants of the genus *Formica*, whilst the adults are associated with *Myrmica* spp*;* and a Dandelion *Taraxacum officinale* agg feeding weevil *Glocianus punctiger,* which occurs in 'grasslands, waste places and margins of tracks and woods' (Morris, 2008).

The remaining F2-associated nationally scarce species recorded from the combined C-Platform samples was *Trachyzelotes pedestris,* a spider of the family Gnaphosidae associated with arid grasslands and heathland that was recorded in several other survey units.

The rarest species recorded from the combined C-Platform samples included the nationally vulnerable (RDB2) soldierfly, the Silver Colonel *Odontomyia argentata,* attributed to the W3 – Permanent wet mire assemblage. Interestingly, the insect recorded was from one of the 2015 pan traps located just north of the existing Sizewell Powerstation and not as would be expected from the C-Platform wet woodland*.* Silver Colonel is a fenland and grazing marsh specialist, with an aquatic larval stage. The species has been recorded in several other compartments within the Sizewell survey area.

Nationally scarce species attributed to W3 included a wetland associated snail-killing fly *Pherbellia griseola,* the larvae of which develop in aquatic snails including the Marsh Snail *Lymnaea/Stagnicola palustris*; a wetland associated muscid fly *Lispe ulignosa and Stenus carbonarius*, a rove beetle found in richly vegetated lakeshores, fen and fluctuating marsh. The beetle is usually in association with willow or alder carr (Lott and Anderson, 2011).

In total, 10 SATs were represented within the ISIS output for the combined C-Platform site. Of these, two The F111 – Bare sand and chalk and F001 – Scrub edge SATs were both attributed with score exceeding the FCT thersholds specified for them in ISIS. F111 was attributed with 25 species, exceeding the FCT of 25, whilst the F001 scored 11 compared to a FCT of 10.

In accordance with ISIS protocol, SATs with scores above the corresponding FCT thresholds specified in ISIS can be seen as being of national significance. As SATs comprise species exhibiting a high level of specialism, where significant SATs occur these are considered as better indicators of high conservation value than the parent BATs. The high score achieved by the F111 – Bare sand and chalk samples collected from the C-Platform samples can largely be attributed to species recorded from the dry, disturbed habitats within the Platform footprint, but within close proximity to the high quality and herb-rich coastal strip. The five species of higher conservation significance, which have been attributed to the F111 assemblage are described in relation to the parent F1 BAT (above). These include Grayling *Hipparchia semele* and four aridophilous beetles; *Amara lucida, Hypera dauci, Longitarsus dorsalis* and *Trichosirocalus barnevillei*.

The other SAT represented in the sample that is nested in F1, the F112 – Open short sward assemblage, did not achieve its FCT of 12, but with a score of eight, was reasonably well represented. Uncommon species attributed to F112 included the Cryptic Leatherbug *Bathysolen nubilis* and pea weevil species *Sitona waterhousei* (both described above).

Three recorded SATs with some crossover recorded from the C-Platform dataset evidently relate strongly to the wet woodland of compartment 4a, rather than the drier habitat discussed above. These include W314 – Reedbed and pools, to which seven species were attributed against a FCT of 10 and two woodland related SATs, the A215 – Epiphyte fauna SAT, which was attributed with two species compared to its theshold of three and the A212 – Bark and sapwood decay SAT, to which 13 species were attributed compared to an FCT of 19. The bark and sapwood decay SAT was represented mainly by a range of local and widespread wood boring and bark dwelling beetles. These included longhorn beetles such as Stenurella melanura and Grammoptera ruficornis and boring beetles including a scolytid (Curculionidae) *Hylastes ater* and an anobiid *Anobium fulvicorne*. But no rarities were attributed to this SAT.

Whilst the scores recorded for these SATs do not achieve their associated FCTs, they are all reasonably represented in relation to their targets. The epiphyte fauna SAT is based on a small species pool in ISIS, hence the low threshold. Species attributed to this SAT included *Cardiastethus fasciiventris* a local anthocorid bug and *Phytocoris longipennis*, one of a number of arboreal mirid bugs recorded during the survey.

In addition, of the resource-based SATs (other than the Favourable F001) represented within the combined C-Platform samples, both F003 – scrub-heath and moorland assemblage with a score of seven compared to its FCT threshold of eight, was close to achieving FCT. Whilst the F002 – Rich flower resource SAT, scored 10 compared to its FCT of 14. These SATs reasonably reflect the more diffuse conditions present in and around the C-Platform area. The scores for the F003 and F002 were both close to their respective threshold scores, a number of generally widespread ground nesting bees including mining bees *Andrena* spp. and furrow bees *Lasioglossum* and associated cleptoparasitic species of the genus *Sphecodes,* were recorded from the C-Platform combined samples and these species persist in areas supporting significant nectar and pollen resources.

Collectively both the SATs and overarching BATs recorded within the combined C-Platform samples appear to accurately reflect the range of habitats present within this compartment. The high scores relating to the F1 – BAT and associated F111 (and F112) SATs reflect the importance of arid sandy disturbance habitat. Such conditions might be expected to occur within the footprint of an industrial site, which has been subject to some anthropogenically induced disturbance and importantly, which is more or less contiguous to an ecologically valuable coastal zone grassland habitat.

Whilst the Sizewell Powerstation is operational, the habitats are structurally and compositionally analogous to the S41 priority habitat category ‘Open mosaic habitats on previously developed land’. Such habitats often support invertebrate populations of high conervation value.

In contrast to these, essentially arid habitats, the wet woodland (compartment 4a), relates in terms of an ecological unit to the fen, carr and grazing marsh biotope which alongside the drier grasslands, heathland and sandy coastal habitats characterising the Sizewell area. Whilst results suggest that the wet woodland element *per se*, did not support highly significant assemblages, the associated W3 – Permanent wet mire BAT achieved a score exceeding its Favourable Condition Target, indicating that the W3 assemblage was of national importance.

SSSI Fen Meadow west of C-Platform

Combined data collected by Arcadis (2014 and 2016) and Amec (2009)

The following designated species have been recorded from the combined SSSI Fen Meadow survey data:

RDB species:

- Silver Colonel *Odontomyia argentata* (Diptera: Stratiomyidae) RDB2 Vulnerable
- Great Silver Water Beetle *Hydrophilus piceus* (Coleoptera: Hydrophilidae) IUCN (2001) Lower Risk – Near Threatened
- Scarce Chaser *Libellula fulva* (Odonata: Libellulidae) IUCN (2001) Lower Risk – Near Threatened
- A dolichopodid fly *Syntormon mikii* (Diptera: Dolichopodidae) IUCN (1994) Lower Risk – Near Threatened

Nationally Scarce species:

- A rove beetle *Bledius opacus* (Coleoptera: Staphylinidae) NS
- A planthopper *Criomorphus williamsi* (Hemiptera: Delphacidae)NS (Nb)
- A flea beetle *Longitarsus dorsalis* (Coleoptera: Chrysomelidae) NS (Nb)
- Ornate Brigadier *Odontomyia ornata* (Diptera: Stratiomyidae) NS (revised from RDB2)
- A ground Beetle *Oodes helopioides* (Coleoptera: Carabidae) NS (Nb)
- A sciomyzid fly *Psacadina verbekei* (Diptera: Sciomyzidae) NS
- An empid fly *Rhamphomyia caliginosa* (Diptera: Empididae) NS
- Long-horned Soldier *Vanoyia tenuicornis* (Stratiomyidae: Diptera) NS

Results

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W314	reedfen and pools	10		9	212
W125	slow-flowing rivers	2		8	
W211	open water on disturbed mineral sediments	2		5	123
W313	moss and tussock fen	2		4	212
M311	saltmarsh	2		2	
F001	scrub edge	2		1	
W312	Sphagnum bog	1		1	212
F003	scrub-heath & moorland	2		1	
F112	open short sward	1		1	
F111	bare sand & chalk	1		0	
A212	bark & sapwood decay	1		0	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W2	mineral marsh & open water	30	123		78	
W3	permanent wet mire	30	212	fav	78	
F2	grassland & scrub matrix	22	140		57	
W1	flowing water	6			15	
F1	unshaded early successional mosaic	1			3	
F3	shaded field & ground layer	1			3	
M3	saltmarsh, estuary & mud flat	1			3	
A1	arboreal canopy	0			1	
A2	wood decay	0			1	0

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	272
Number of errors in species list	12

Interpretation of SSSI Fen Meadow (compartment 3) ISIS analysis

The following interpretation is based on all available data collected within the SSSI Fen Meadow (Compartment 3) from surveys of terrestrial and aquatic invertebrates conducted by Arcadis (2014 and 2016) and Amec (2009). 2016 samples were collected mainly as a gap filling exercise to create a more comprehensive dataset, with better temporal coverage than was available from the 2014 sample alone. Sampling methods used during the 2016 survey were undertaken using exactly the same methods as in 2014 and by the same operative.

2016 Ditch samples

In 2016, two samples were collected from the ditch which formed the southern boundary of the Fen Meadow site using standard three-minute sweep aquatic invertebrate sampling methods as used in 2014. This added to data collected from the two ditches marking the western and eastern boundary of the Fen Meadow in 2014.

Norfolk Hawker

Being well vegetated and open, the ditch sampled in 2016 was considered to have some potential to support the UK protected Norfolk Hawker *Anaciaeschna isoceles*. A number (+/- seven) of adult Norfolk Hawkers were recorded on 21/6/2016 approximately 500 metres south of this site (around TM46710 63183), flying around and landing on emergent macrophyte vegetation in compartment 12. However, no adults or larvae were recorded at any time within the surveyed Fen Meadow (Compartment 3) including ditches. An observed difference between the ditches around which the dragonflies were recorded and those within Compartment 3, was the presence of a bladderwort *Utricularia* sp. in the ditch/ditches where the dragonflies were observed.

In total, 272 species recorded during the combined surveys were analysed using ISIS, as previously mentioned, the list includes both terrestrial and aquatic samples.

Of the species input, 12 errors were identified within ISIS, these errors comprised either of species not represented within ISIS, or those not recorded to species. The list was subject to rigorous check to ensure nomenclature used for target species was recognisable within ISIS.

Significant Broad Assemblage Types (BATs) recognised within ISIS

In total, nine Broad Assemblage Types (BATs) were recognised from the analysed SSSI Fen Meadow dataset. Of these, three comprised a sufficient number of species to be considered robust, i.e. being made up of more than 15 species.

The two most well represented BATs were the closely allied wetland assemblages, the W3 – Permanent wet mire and the W2 – Mineral marsh and open water. These two assemblages were each attributed with 78 species in ISIS. The other significant BAT represented within the ISIS output was F2 – Grassland and scrub matrix with 57 recognised species. The remaining BATs were represented by no more than three species, with the exception of the W1 – Flowing water assemblage, to which 15 species were attributing. This assemblage can be seen as being on the cusp of being considered significant.

In terms of conservation significance, one broad assemblage, the W3 – Permanent wet mire achieved a Rarity Score (RS) of 212. This score easily exceeded the Favourable Condition Target (FCT) of 180 specified within ISIS for the W3 assemblage indicating that the site supports a W3 – Permanent wet mire assemblage of National Importance. W3 assemblages are characteristically found in wetlands where disturbance is limited. They are typical of mires and seepages which may have little open water, but which remain permanently wet and with little fluctuation in waterlevel, often due to the presence of underlying peat (Lott *et al*, 2007). This description reasonably characterises the Fen Meadow, the habitat never entirely dried out over the summer months when the surveys were undertaken.

Whilst the W2 BAT was attributed with a similar number of species to the W3 assemblage, the RS achieved by W2 was 123, significantly lower than the FCT score of 150 specified in ISIS for this assemblage. This score indicates that whilst a number of species were attributed to the W2 – Mineral marsh and open water SAT, the species were comprised primarily of relatively common species with fewer rarities. In contrast to W3, habitat typically supporting W2 assemblages is characterised by still, open water and littoral areas on mineral substrates that may be subject to repeated distrubance, for example by flooding or grazing. W2 assemblages are typically found in floodplain wetlands, fluctuating meres, dune slacks, carr and wet woodland etc (Lott *et al*, 2007).

The Rarity Score exhibited by the other relatively species-rich BAT, the F2 - Grassland and scrub matrix assemblage, was 140 compared to the FCT score of 160 specified in ISIS. Whilst this score falls short of its associated FCT and therefore, does not indicate an F2 assemblage of national significance, based on the sample data. This score does indicate an assemblage of some conservation value.

Six species of recognised higher conservation status recorded from the Fen Meadow have been attributed to the W3 assemblage. Outstanding examples of this fauna include a nationally vulnerable (RDB2) soldierfly, the Silver Colonel *Odontomyia argentata* and two species classed under IUCN (2001) guidelines in the 'Lower Risk – Near Threatened' category (analogous to RDB3 'rare') Silver Water Beetle *Hydrophilus piceus* and a dolichopodid fly *Syntormon mikii*. The Silver Colonel and Silver Water Beetle have both been recorded in several locations throughout the survey area and during both Amec and Arcadis surveys. Silver Water Beetle (Britains largest aquatic insect) was recorded in both the western Fen Meadow ditch in 2014 and in the northern ditch during the recent (2016) survey.

This species and the Silver Colonel are extremely stenoecious species and in the UK are associated almost exclusively with coastal grazing marshes supporting extensive ditch networks. The ditches are typically well vegetated, the conservation biology of the Silver Colonel is said by Stubbs and Drake (2001) to be not well known; however, the larvae have been associated with ephemeral water-bodies within wetland areas and according to Stubbs and Drake (2001) larvae have been associated with rotting Alder on the continent, suggesting that open levels bordering areas of wet woodland may be important.

The Great Silver Water Beetle has been associated with weed-rich ditches, often supporting Frogbit *Hydrocharis morsus-ranae* and a strong population of aquatic snails of the family Planorbidae. These elements were both present within the Fen Meadow ditches and where the beetle was recorded elsewhere in the Sizewell survey area. The long-legged fly species *Syntormon mikii* has been recorded from a handful of mainly coastal wetland sites most in southwestern England, but also in East Anglia, its precise habitat preferences are currently unknown.

Nationally scarce species attributed to the W3 assemblage recorded within the Fen meadow included the Ornate Brigadier *Odontomyia ornata*, a ground beetle *Oodes helopioides* and a snail-killing fly *Psacadina verbekei.*

Ornate Brigadier was until recently, classed as RDB2 – Vulnerable in the UK, but has been recently reclassified to scarce due to an increase in records; the species has been recorded within several of the Sizewell compartments by both Arcadis and Amec. Like *O. argentata* and *H. piceus* listed above, the Ornate Brigadier is strongly associated with relict coastal grazing levels, the species being rarely found outside such biotopes. *Ooedes helopioides* is also exclusively found in wetlands and is unusual amongst the ground beetles in being amphibious. This species was also recorded during the 2014 Arcadis survey within SSSI Area 2 (Compartment 2). The larva of the snail-killing fly species *Psacadina verbekei* is a parasite of aquatic snails including *Lynaeidae* spp. It is found in a range of habitats including fens, damp heaths etc. But is thought to require permanent standing water.

No particular rarities were recorded for the W2 assemblage; however, two species of conservation designation were attributed to the W1 – Flowing water assemblage, this assemblage was populated with only 15 species, therefore a rarity score was not provided in ISIS. The Scarce Chaser *Libellula fulva* is a dragonfly that is on the increase in the UK, but is still afforded the equivalent RDB3 status of Lower Risk – Near Threatened under post-2001 IUCN guidelines. The species was identified from a larva collected from the northern boundary drain in 2016. L. fulva is particularly associated with slow flowing rivers and ditches with abundant emergent vegetation. The species is particularly associated with waterbodies adjacent to lush meadows. Also attributed to W1 was another species of soldierfly, the Long-horned Soldier *Vanoyia tenuicornis*. Like the Ornate Brigadier and Silver Colonel mentioned above, Long-horned Soldier is another fenland species with aquatic larvae. The species was recorded both from adult and larval specimens.

None of the 11 SATs recorded from ISIS analysis of the Fen Meadow dataset provided species-richness scores exceeding the specified FCTs set in ISIS. However, a score of 10 was attained for the W314 – Reedfen and pools SAT, this being equal to the FCT set in ISIS of 10. Species considered specialised enough to be attributed to this assemblage included both Silver Colonel and Ornate Brigadier soldierflies discussed above, as well as the Long-legged Fly *Syntormon mikii*, the Silver Water Beetle and the ground beetle *Oodes helopioides*. Collectively and these species impart a considerable rarity value on the Fen Meadow and their rarity alone indicates national significance.

Few other SATs recorded achieved scores close to the FCTs. Two species including the aforementioned Scarce Chaser *Libellula fulva* and an aquatic snail Leach’s Bithynia *Bithynia leachii* were attributed to the W125 – Slow-flowing rivers SAT, against the FCT of three specified in ISIS (the low threshold is based on the small species-pool attributed to this assemblage in ISIS). Four of the other SATs recorded from the Fen Meadow ISIS output were also attributed with only two species (four others with one species); however, the FCTs were higher. The species attributed to these SATs were however, specialists associated with a range of closely allied niches. These included W211 – Open water on disturbed mineral sediments, W313 – Moss and tussock fen, M311 – Saltmarsh and W312 – Sphagnum bog.

The grassland habitat of the fen meadow supported a range of typical wet grassland invertebrates. Grasshoppers and crickets were well represented with local species including the Great Green Bush-cricket *Tettigonia viridissima,* Short-winged Conehead *Conocephalus dorsalis* and Lesser Marsh Grasshopper *Chorthippus albomarginatus* occurring alongside the formerly rare Long-winged Conehead *Conocephalus discolor* and Roesel’s Bush-cricket *Metrioptera roeselii,* both species now being ubiquitous across much of the southern-half of the UK.

The findings of the ISIS analysis coupled with the large number of rare and scarce specialist invertebrates recorded within the Fen Meadow highlights the conservation importance of this relict fen meadow and associated ditches. These habitats should not be considered in isolation, as several of the more specialised species recorded, e.g. the Silver Colonel *Odontomyia argentata* have an affinity with wet woodland edge habitat as well as the open ditch and meadowland elements and the juxtaposition of the Fen Meadow to the reedswamp habitat within the SSSI Area 2 site undoubtedly imparts mutual conservation benefits. The BAT Rarity Score achieved for the W3 – Permanent wet mire habitat indicates the site to be of national significance for this assemblage. The high species score attained for the more specialised nested W314 – Reedfen and pools SAT further endorsed the value of this habitat.

Arable Margins

Combined data collected by Arcadis (2014, 2015 and 2016) and Amec (2009)

The following designated species have been recorded from the combined Arable Margins:

RDB species:

- A ground beetle *Ophonus parallelus* (Coleoptera: Carabidae) Pre-1994 RDB3 Rare
- An empid fly *Empis prodromus* (Diptera: Empidae) IUCN (1994) Lower Risk Near Threatened
- A tumbling flower beetle *Mordellistena humeralis* (Coleoptera: Mordellidae) RDBK – insufficiently known
- White-letter Hairstreak *Satyrium w-album* (Lepidoptera: Lycaenidae) IUCN (2001) Endangered; NERC (2006) S41

Nationally scarce species:

- A ground beetle *Amara lucida* (Coleoptera: Carabidae) NS (Nb)
- Red-girdled Mining Bee *Andrena labiata* (Hymenoptera: Andrenidae) NS (Na)
- Grey-gastered Mining Bee *Andrena tibialis* (Hymenoptera: Andrenidae) NS (Na)
- An apionid weevil *Catapion pubescens* (Coleoptera: Apionidae) NS (Nb)
- A rove beetle *Gabrius osseticus* (Coleoptera: Staphylinidae) NS (Nb)
- A ground bug *Megalonotus praetextatus* (Hemiptera Lygaeidae) NS (Nb)
- A ground bug *Megalonotus sabulicola* (Hemiptera Lygaeidae) NS (Nb)
- Small-spurred Digger Wasp *Nysson dimidiatus* (Hymenoptera: Crabronidae) NS (Nb)
- A rove beetle *Ocypus ophthalmicus* (Coleoptera: Staphylinidae) NS (Na)
- A rove beetle *Omalium allardi* (Coleoptera: Staphylinidae) NS
- A leaf beetle *Podagrica fuscicornis* (Coleoptera: Chrysomelidae) NS (Nb)
- An apionid weevil *Protapion dissimile* (Coleoptera: Apionidae) NS (Nb)
- An empid fly *Rhamphomyia caliginosa* (Diptera: Empidae) NS
- A shore bug *Saldula pilosella* (Hemiptera: Saldidae) NS
- A weevil *Sibinia primita* (Coleoptera: Curculionidae) NS (Nb)
- A ground beetle *Stenolophus skrimshiranus* (Coleoptera: Carabidae) NS (Nb)
- A ground beetle *Stenolophus teutonus* (Coleoptera: Carabidae) NS (Nb)
- A rove beetle *Sunius melanocephalus* (Coleoptera: Staphylinidae) NS
- A tetragnathid spider *Tetragnatha pinicola* (Araneae: Tetragnathidae) NS (Nb)
- A gnaphosid spider *Trachyzelotes pedestris* (Araneae: Gnaphosidae) NS (Nb)

Results

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F001	scrub edge	12	fav	7	
F112	open short sward	8		4	168

F002	rich flower resource	7	3	
F111	bare sand & chalk	10	2	168
F003	scrub-heath & moorland	7	2	
A212	bark & sapwood decay	6	1	
A211	heartwood decay	2	1	
M311	saltmarsh	1	1	
W314	reedfen and pools	1	1	155

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	40	127		176	
F1	unshaded early successional mosaic	17	168	fav	76	
A1	arboreal canopy	8	118		33	
W3	permanent wet mire	5	155		22	
F3	shaded field & ground layer	3			15	
W2	mineral marsh & open water	3			15	
A2	wood decay	3			12	0
W1	flowing water	2			10	
M3	saltmarsh, estuary & mud flat	1			5	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	442
Number of errors in species list	5

Interpretation of Arable Margins ISIS analysis

The following interpretation is based on all available data collected within the Arable Margins area from surveys of terrestrial invertebrates collected for Arcadis during targeted surveys in 2016, together with pitfall and pan trapping data collected for a reptile prey study in May 2015 and data collected by Amec in 2009.

For the Arable Margins site, 443 species recorded during the (above listed) combined surveys were analysed using ISIS, the list includes terrestrial samples only. Five errors were recorded within the list due to non-target species, not used in ISIS analysis.

Significant Broad Assemblage Types (BATs) recognised within ISIS

In total, nine Broad Assemblage Types (BATs) were recognised from the analysed arable Margins dataset. Of these, four BATs comprised a sufficient number of species to be considered robust, i.e. being made up of more than 15 species.

In terms of species deployment, the largest number of species attributed to a single BAT was 178, for the F2 – Grassland and scrub matrix assemblage; by far the greatest number of species attributed to a single BAT from the Arable Margins data. The second most species-rich BAT recognised was the F1 – Unshaded early successional mosaic assemblage to which 76 species were attributed. These BATs can both be seen as being well represented within the sample data and would be expected considering the general open-ness of the habitat surveyed. The remaining significant BATs recognised within ISIS for the Arable Margins site were the A1 – Arboreal canopy with 33 species and the W3 – Permanent wet mire assemblage to which 22 species were attributed. The Arboreal canopy BAT reflects the presence of species recorded from the trees and shrubs forming the hedgerows and wooded margins of the compartment and whilst the W3 – Permanent wet mire was complemented by far fewer species as the dominant F2 and F1 assemblages, the presence of this assemblage was not entirely unexpected. There were several ephemeral ponds within the Arable Margins compartment and the close proximity of the unit to high quality fen habitats would increase the chances of wetland species occurring in peripheral habitat.

In addition to the four BATs mentioned above, two of the remaining BATs; the F3 – Shaded field and ground layer and the W2 – Mineral marsh and open water BATs were each represented by 15 species, therefore being on the cusp of being considered significant in ISIS. Other recognised BATs included A2 – Wood decay represented by 12 species, W1 – Flowing water (10 species) and M3 – Saltmarsh, estuary and mudflat (5 species). The presence of species attributed to the M3 BAT reflects the close proximity of the site to brackish coastal habitats.

In terms of conservation significance, one of the recognised BATs, the F1 – Unshaded early successional mosaic assemblage achieved a Rarity Score exceeding the Favourable Condition Target set within ISIS. The RS achieved was 168 compared to the threshold of 160 specified for F1 in ISIS.

In comparison, the RS achieved for the most species-rich assemblage F2 - Grassland and scrub matrix assemblage was 127 compared to the FCT of 160 set for this assemblage in ISIS. This score is relatively low considering the species-richness of the assemblage and is likely to reflect a lower ratio of rare and uncommon species in relation to the more widespread species within the sample data recruited to this assemblage.

Whilst the habitat within the Arable Margins was essentially within a relatively intensely managed agricultural setting, the better margins supported a reasonable diversity of flowering ephemeral herbs with a resource of sandy exposed ground. This habitat has structural and compositional similarities to habitat supporting diverse F1 assemblages in nearby coastal dune, dune grassland and heath habitats and there is a strong mutual affinity between the supported faunas.

Eleven species with a recognised conservation status were attributed to the F1 assemblage recorded from the Arable Margins dataset. The rarest was an RDB3 ground beetle *Ophonus (Metaphonus) parallelus*, a coastal species in the UK, with records mainly along the south coast and the Thames area, but with several records for the Suffolk coast including one from Dunwich. *O. parallelus*, listed as *Harpalus parallelus* in Hyman and Parsons (1992) is, according to the same authors associated with coastal habitats including ‘calcareous grassland, chalk cliffs and open ground on chalky soils’.

Other uncommon beetles also attributed to the F1 assemblage within the Arable Margins site were all nationally scarce species, including another ground beetle *Amara lucida*, two species of rove beetle, *Gabrius osseticus* and *Ocypus ophthalmicus* an apionid weevil *Protapion dissimile* and a true weevil *Sibinia primita*. Within the literature, these species, without exception are insects with some affinity to open sandy soil habitats and there is a strong link with disturbed and coastal habitat. The weevil *Sibinia primita* is associated with pearlworts *Sagina* spp., spurreys *Spergularia* spp. and similar herbs of sandy and coastal biotopes. The weevil *Apion dissimile* is associated with Hare’s-foot Clover *Trifolium arvense*, which was recorded within the survey area.

Other nationally scarce species attributed to the F1 assemblage recorded from the Arable Margins included two closely related ground bugs *Megalonotus praetextatus* and *M. sabulicola*. The former of these was also recorded in the SZC – St James compartment. Both species share an affinity to dry, sandy habitats with warm microclimates. *M. sabulicola* is a predominately coastal species in the UK.

Other nationally scarce species attributed to the F1 assemblage recorded within the Arable Margins included the Red-Girdled Mining Bee *Andrena labitata*, a ground nesting species also recorded in other compartments within the survey area; the Grey-gastered Mining Bee *Andrena tibialis*, a species associated with open habitats with light soils including heathland, quarries, sandpits and other brownfield sites; and the Small-spurred Digger Wasp *Nysson dimidiatus*, another species which is primarily associated with dry sandy (and clayey) soils with sparse vegetation. *N. dimidiatus* is known to be a cleptoparasite of another ground nesting solitary bee *Harpactus tumidus,* however, this species was not recorded during the survey.

Four of the remaining Nationally Scarce species recorded from samples collected within the Arable Margin compartment were attributed to the F2 – Grassland and scrub matrix habitat. These included two beetles; a rove beetle *Sunius melanocephalus* associated with open habitats and damp soils and a flea beetle *Podagrica fuscicornis* of grassland, scrub and disturbed habitats where it is associated with mallows *Malva* spp. The other nationally scarce species attributed to F2 included *Trachzelotes pedestris* a xerophile species and *Tetragnatha pinicola,* which is found in lightly wooded habitats with young trees and tall herbage in open areas.

The A1 – Arboreal canopy BAT did not achieve a particularly high Rarity Score, with an RS of 118 far short of the FCT of 170. This is likely to be due to the range of species recorded being predominately widespread. However, one A1 species of higher conservation value was recorded from one of the 2015 water traps. The White-letter Hairstreak *Satyrium w-album* is classed as 'Endangered' under post-2001 IUCN criteria[1] as well as being listed as a 'Species of principal importance' under S41 of the NERC Act (2006). White-letter Hairstreak is associated exclusively with elms *Ulmus* spp. and has been afforded Endangered status due to a sharp population decline in recent decades.

Despite being composed of relatively few species, the W3 – Permanent wet mire BAT achieved a RS of 155, which can be seen as approaching the FCT of 180 specified in ISIS for the assemblage. As suggested above, the presence of W3 species within an essentially agricultural biotope, may reflect overspill from more suitable habitat nearby, rather than due to the quality of the wetland habitat within the Arable Margins compartment. One Nationally Scarce ground beetle *Strenolophus skrimshiranus* was attributed to the W3 assemblage. This species is a species of water margins, fens and standing water.

In total, nine SATs were represented within the ISIS output for the Arable Margins site. The F111 – Bare sand and chalk SAT nested within F1, discussed above, supported the majority of uncommon species with beetles including the RDB3 *Ophonus parallelus* and nationally scarce beetles *Amara lucida, Gabrius osseticus* and *Sibinia primita* and the ground bug *Megalonotus praetextatus* all being recognised as habitat specialists within this SAT. However, with a species-richness of 10 compared to a threshold score of 18, F1 fell well short of achieving Favourable Condition status.

In contrast, one of the resource-based SATs, the F001 – Scrub edge assemblage comprised of 12 species and therefore, exceeded the FCT of 10 set in ISIS. No particular rarities were attributed to this assemblage; however, the recognised score indicates the importance of the scrub edge habitat within the Arable margins compartment. The species attributed to F001 include specialists found on and around the hedgerows and more scrubby woodland edges characteristic of the Arable margins.

Other well represented SATs included the F003 – scrub-heath and moorland assemblage which exhibited a species score of seven, just falling short of the FCT of eight specified in ISIS and the F002 – Rich flower resource which scored seven compared to its FCT of 14. The F002 SAT comprises species with a strong requirement for nectaring sources, and is likely to comprise largely of mining-bees of the genus *Andrena* and *Lasioglossum* as well as bumblebees *Bombus* spp. Bees were represented within the sample data by around 20 species. Many species are polylectic, foraging both within the early season tree blossom and pollen resources of trees such as Blackthorn *Prunus spinosa,* Hawthorn *Crataegus monogyna* and willows *Salix* spp. and from flowering grassland herbs. The juxtaposition of these resources is often an important habitat feature.

Overall, despite being one of the more disturbed and intensively managed compartments within the survey area, the Arable margins site supported a BAT and SAT which achieved the Favourable Condition Targets specified within ISIS as well as an extensive list of species of recognised conservation status. Most of the 24 rare and uncommon species recorded within the Arable margins site are associated with sparsely vegetated, sandy marginal habitats anologous to the coastal grasslands, dunes and heathland habitats characteristic of the broader landscape. The F1 – Unshaded early successional BAT assemblage recorded from analysis of data collected within the compartment, exceeded the FCT set in ISIS and the site can, therefore be seen as supporting a F1 assemblage of National significance. However, the nested F111- Bare earth SAT, SATs being considered to be of greater intrinsic conservation value than the parent BATs, fell short of achieving its FCT.

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[1] ISIS works on species rarity (based on grid square occupancy) rather than factors such as rate of decline used in post-2001 IUCN conservation status. Consequently, species such as White-letter Hairstreak *Satyrium w-album* which have been afforded Endangered status under post-2001 IUCN criteria, but which are still widely recorded in the UK (despite a marked decline in recent decades) are scored as widespread species. A rarity value of 1 is given to White-letter Hairstreak in ISIS, species with a score of 2 are generally local, nationally scarce species score 4 and so on.

Cross-cutting resource based SATs are somewhat difficult to interpret in assessing site value as they are based on more diffuse habitat resources, rather than being based on more tangible and recognisable habitat features. The FCT achieved for the F001 – Scrub edge SAT, again indicates an F001 resource of national significance; however, such a result may not be as useful in impact assessment as for informing nature conservation targets.

The value of the arable margin hedgerow habitat is arguably the most irreplaceble element of the habitat as flower-rich arable margins are amongst the more easily replicable habitats, whilst hedgerows comprising mature woody species cannot be replicated in the short term. The value of the marginal and open ground habitat cannot be easily seen in isolation from the hedgerows and also, the habitat should be seen primarily as an overspill for the surrounding higher quality, heathland, dune, sparsely vegetated coastal grassland and fen habitats. Without these habitats the arable margin habitat would undoubtedly support an invertebrate fauna of far lower conservation value.

Goosehill Rides (Compartment 13)

Combined data collected by Arcadis (2015 and 2016) and Amec (2007)

The following designated species have been recorded from the combined Goosehill Rides survey data:

RDB species:

- An antlion *Euroleon nostras* (Neuroptera: Myrmeleontidae) pRDB2
- A spider-hunting wasp *Arachnospila consobrina* (Hymenoptera: Pompilidae) Pre-1994 RDB3 Rare
- Levels Yellow-horned Horsefly *Hybomitra ciureai* (Diptera: Tabanidae) Pre-1994 RDB3 Rare
- Grayling *Hipparchia semele* (Lepidoptera: Nymphalidae) IUCN (2001) Vulnerable; NERC (2006) S41
- White Admiral *Limenitis camilla* (Lepidoptera: Nymphalidae) IUCN (2001) Vulnerable; NERC (2006) S41

Nationally Scarce species:

- A scraptiid beetle *Anaspis thoracica* (Coleoptera: Scraptiidae) NS (Nb)
- A ground bug *Aphanus rolandri* (Hemiptera: Lygaeidae) NS
- Panteloon Bee *Dasypoda hirtipes* (Melittidae: Hymenoptera) NS (Nb)
- A weevil *Dorytomus filirostris* (Coleoptera: Curculionidae) NS (Nb)
- Lesser Cockroach *Ectobius panzeri* (Dictyoptera: Blattellidae) NS (Nb)
- A chloropid fly *Lasiambia palposa* agg. (Diptera: Chloropidae) NS
- An opomyzid fly *Geomyza majuscula* (Diptera: Opomyzidae) NS
- Horsetail Weevil *Grypus equiseti* (Coleoptera: Erirhinidae) NS (Nb)
- A spider-hunting wasp *Priocnemis cordivalvata* (Hymenoptera: Pompilidae) NS (Nb)
- A spider-hunting wasp *Priocnemis coriacea* (Hymenoptera: Pompilidae) NS (Na)
- A rove beetle *Stenus pusillus* (Coleoptera: Staphylinidae) NS (Nb)
- A chloropid fly *Trachysiphonella scutellata* (Diptera: Chloropidae) NS
- A gnaphosid spider *Trachyzelotes pedestris* (Araneae: Gnaphosidae) NS (Nb)
- An ambrosia beetle *Xyleborus dispar* (Coleoptera: Curculionidae) NS (Nb)

Results

The specific assemblage types represented in this list are as follows:

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F001	scrub edge	20	fav	11	
F002	rich flower resource	23	fav	10	
A212	bark & sapwood decay	29	fav	6	157
F112	open short sward	10		5	163

F111	bare sand & chalk	20	fav	5	163
F003	scrub-heath & moorland	10	fav	3	
F006	dung	2		2	
W314	reedfen and pools	2		2	169
A211	heartwood decay	2		1	157
A213	fungal fruiting bodies	1		1	157
M311	saltmarsh	1		1	

All SATs scoring more than zero are listed

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
F2	grassland & scrub matrix	32	130		167	
F1	unshaded early successional mosaic	17	163	fav	90	
A2	wood decay	8	157		44	3
W3	permanent wet mire	6	169		32	
F3	shaded field & ground layer	6	124		29	
A1	arboreal canopy	5	140		26	
W2	mineral marsh & open water	3			14	
W1	flowing water	2			9	

Rarity scores are shown only for BATS represented by more than 15 species in the assemblage / fauna being analysed

Technical statistics:

Number of species	559
Number of errors in species list	39

Antlion *Euroleon nostras* at Goosehill

During the 2016 survey, the Goosehill Rides were searched for signs of larval activity of the antlion *Euroleon nostras*. During the June site visit an aggregation was found under the shelter of the corrugated iron roof of Walk Barn alongside the sandy track edge, forming the southern edge of the Barn. Inside the woodstore of the Barn under the shelter of the roof, a large aggregation of c300 burrows was recorded. The burrows appeared to have been partially obliterated by recently stacked logs. Despite extensive searching throughout the tracks, rides and any visible sand exposure within the Goosehill area, no antlion burrows were recorded outside of the sheltered areas in and around Walk Barn during the course of the survey.

Interpretation of Goosehill Rides ISIS analysis

The following interpretation is based on all available data collected within the Goosehill Rides area from surveys of terrestrial invertebrates collected for Arcadis during targeted surveys in 2016, together with pitfall and pan trapping data collected for a reptile prey study in May 2015 and data collected by Amec in 2009.

For the Goosehill Rides site, 559 species recorded during the (above listed) combined surveys were analysed using ISIS. The list includes terrestrial samples only. 42 errors were recorded within the list due to non-target species, not used in ISIS analysis.

Significant Broad Assemblage Types (BATs) recognised within ISIS

In total, eight Broad Assemblage Types (BATs) were recognised from the analysed Goosehill Rides dataset. Of these, five BATs comprised a sufficient number of species to be considered robust, i.e. being made up of more than 15 species.

In terms of species deployment, the largest number of species attributed to a single BAT was 167, for the F2 – Grassland and scrub matrix assemblage; by far the greatest number of species attributed to a single BAT from the

Goosehill data. The second most species-rich BAT recognised was the F1 – Unshaded early successional mosaic assemblage to which 90 species were attributed. Whilst the overiding habitat at Goosehill is essentially plantation woodland, the target habitats for the purpose of this survey were mainly open, well-lit sandy rides supporting areas of predominately acid grassland and more open, partially vegetated habitats which reflect the assemblages recorded.

The best represented of the remaining significant BATs was A2 – Wood decay, with 44 attributed species, reflecting the abundance of mature and decaying trees within the site. Importantly, much of the wood decay habitat was coniferous. The three remaining significant BATs included W3 – Permanent wet mire (32 species), F3 – Shaded field and ground layer (29 species) and A1 – Arboreal canopy (26 species). These BATs reasonably reflected the habitat types recorded within the site, which included some wetter areas alongside the prevailing dry and sandy habitats.

A fifth BAT, W2 – Mineral marsh and open water, with 14 attributed species, came close to the significance threshold of 15, but as such cannot be considered robust enough for the purposes of appraisal.

In terms of conservation significance, one of the recognised BATs, the F1 – Unshaded early successional mosaic assemblage achieved a Rarity Score exceeding the Favourable Condition Target set within ISIS. The RS achieved was 166 compared to the threshold of 160 specified for F1 in ISIS. Interestingly, this score was very close to that achieved from samples collected in the adjoining Arable Margins compartment, which despite the different landuse was very similar in geological and edaphic terms.

In comparison, the RS achieved for the most species-rich assemblage F2 - Grassland and scrub matrix assemblage was 130 compared to the FCT of 160 specified for this assemblage in ISIS. This score is relatively low considering the species-richness of the assemblage and is likely to reflect a lower ratio of rare and uncommon species in relation to the more widespread species within the sample data recruited to this assemblage.

Whilst none of the other significant BATs recorded within the Goosehill Rides produced Rarity Scores which exceeded the FCTs specified within ISIS, the scores attained for all four of the W3, A2, F3 and A1 BATs all approached their FCTs and can be seen as supporting BATs of some conservation value. The score attained by W3 – Permanent wet mire was 169 and was, therefore, close to the FCT of 180. The A2 – Wood decay assemblage achieved an RS of 157 compared to a threshold of 190; for F3 – Shaded field and ground layer the RS was 124 and the FCT 150 and the RS score or A1 – Arboreal canopy was 140 compared to its FCT of 170.

The largest number of species with a recognised conservation status attributed to a single BAT was nine species attributed to the F1 – Unshaded early successional mosaic assemblage. Red Data Book species included the Grayling *Hipparchia semele*, a butterfly classed as ‘vulnerable’ based on post-2001 IUCN criteria, which is also afforded ‘Species of Principal Importance’ status under S41 of the NERC Act (2006) and a RDB3 ‘rare’ spider-hunting wasp *Arachnospila consobrina*. The Grayling has been recorded from a number of the drier, more sandy compartments including the coastal dune grasslands and heathlands within the Sizewell survey area. The species is fairly xerophilic and characteristic of arid conditions. The Grayling’s conservation status is based on a significant decline over recent decades, however it is still relatively common in suitable habitats.

In contrast *Arachnospila consobrina* is of very restricted range in the UK, and whilst it has formerly been recorded from close to the survey site in Suffolk, most British records are from coastal habitats in south Wales. *A. consobrina* is a species of sandy habitats, including coastal dunes, but little is known of its biology.

Nationally scarce species attributed to the F1 assemblage recorded from Goosehill Rides included two more spider-hunting wasps *Priocnemis cordivalvata* recorded by Amec in 2007 and *P. coriacea*, recorded from the 2015 pan trap samples alongside, *P. perturbator*, a much commoner species which was found in a number of samples across the survey area. P. *cordivalvata* is associated with mature woodlands and sunny glades on clay soils (Day, 1998), whilst *P. coriacea* and *P. perturbator* are species of sandy habitats.

Other nationally scarce hymenoptera recorded at Goosehill included the Panteloon Bee *Dasypoda hirtipes,* a distinctive species mainly found on heathland and dry, sandy coastal districts. The Panteloon Bee is strongly associated with yellow composites and would benefit from the resource of Common Cat’s-ear *Hypochaeris radicata* found throughout the Goosehill Rides area.

Other nationally scarce F1 species recorded from Goosehill included *Aphanus rolandri,* a striking black and red ground bug associated with dry, sheltered and well-drained habitats including heathlands and coastal habitats and two species of chloropid fly; *Trachysiphonella scutellata* and *Lasiambia palposa* agg. These are species of dry grassland. *T. scutellata* occurs in both acid heathland and calcareous biotopes.

The remaining rarities were scattered thinly between the other recorded BATs. Another RDB3 species the Levels Yellow-horned Horsefly *Hybomitra ciureai* was attributed to the W3 – Permanent wet mire BAT. This species was formerly recorded during the 2014 surveys and is a fenland specialist of very restricted range in the UK.

The F2 – Grassland and scrub matrix assemblage included a nationally scarce spider *Trachyzelotes pedestris,* a species of arid grasslands and heathland that was recorded in several other survey units.

The White Admiral *Limenitis camilla* a butterfly classed as ‘vulnerable’ based on post-2001 IUCN criteria, and is an S41 ‘Species of Principal Importance’ was attributed to the A1 – Arboreal canopy assemblage as was a nationally scarce weevil *Dorytomus filirostris* which is associated with poplars *Populus* spp. often in fenland habitats. The only rarity associated with the A2 – Wood decay assemblage recorded was *Anaspis thoracica*, a species that was recorded on several sites within the Sizewell survey area.

12 SATs were recognised following ISIS analysis of the Goosehill Rides dataset. Of these, five produced scores exceeding the FCTs specified in ISIS. As such, the following assemblages can be regarded as being of national importance: F001 – Scrub edge (score 20; FCT threshold 10); F002 – rich flower resource (score 23; FCT threshold 14), A212 – Bark and sapwood decay (score 29, FCT threshold 19), F111 – Bare sand and chalk (score 20; FCT threshold 18) and F003 – scrub heath and moorland (score 10; FCT threshold 8).

These scores indicate Goosehill to be a site that collectively provides a wide range of habitat niches which, in turn, support a very diverse range of specialist invertebrate species. A number of the SATs achieving scores exceeding the Favourable Condition targets were resource based and therefore somewhat intangible in terms of habitat interpretation. However, the F111 – Bare earth and chalk assemblage was attributed with five species of higher conservation status including Grayling *Hipparchia semele*, a spider-hunting wasp *Arachnospila consobrina*, the Panteloon Bee *Dasypoda hirtipes* and two chloropid flies *Trachysiphonella scutellata* and *Lasiambia palposa.*

Interestingly, much of the wood decay habitat recorded within the Goosehill Rides compartment was provided by over mature conifers and species contributing to the specialist A212 – Bark and sapwood decay assemblage included some species either in part or wholly associated with coniferous trees.

Overall, the results indicate the Goosehill Rides to support both BAT and SAT assemblages of National Importance. The more open habitat areas benefit from shelter and there was a mixture of dry, sandy habitats beneficial to strongly thermophilous species typical of those more frequently found on heathlands and localised geological variation provided some interesting transitions to wetlands. The mature trees, including conifers and resource of wood decay habitat, which was often left *in situ* evidently provided habitat for a range of species associated with wood decay, including both saproxylic species and secondary colonisers such as solitary hymenoptera.

As suspected, the Goosehill Rides were found to support a range of ground nesting aculeate hymenoptera, a group that was not well covered during the 2014 survey. Several rare and uncommon species were recorded from the Goosehill Rides not found elsewhere on site. The invertebrate fauna of the Goosehill Rides will inevitably benefit from the movement of specialist fauna from the adjacent coastal dunes, grassland, heathland as well as the wet woodlands and fen and grazing marsh habitats which border the site to the south and east.

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