FIVE ESTUARIES
OFFSHORE WIND FARM

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10.31 ORFORD NESS SURVEYS REPORT

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Five Estuaries Offshore Wind Farm, Lesser Black-backed Gull Compensation Site

2024 Vegetation & Invertebrate Survey Report

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Table of Contents

2024 Vegetation & Invertebrate Survey Report

Tables in Text

Drawings

1.0 Introduction

SLR Consulting Ltd. (SLR) was commissioned by GoBe Consultants Limited to undertake vegetation and invertebrate surveys on an area of land identified as a Proposed Compensation Site (PCS). The land is at Orford Ness, Suffolk (Grid Ref: TM 4560 5102). Orford Ness is a shingle spit which forms part of the Alde-Ore Estuary SPA.

1.1 Background

Full background details are provided in the Five Estuaries Offshore Wind Farm Environment Statement, Lesser Black Backed Gull Ecological Impact Assessment (AS-053, updated revision to be submitted at Deadline 4).and Lesser Black Backed Gull Compensatory Areas Environmental Impact Assessment (AS-047, updated revision to be submitted at Deadline 4). Briefly, a Report to Inform the Appropriate Assessment as part of the Development Consent Order application (associated with the Five Estuaries Offshore Wind Farm Limited (the Applicant) extension plan) identified that an Adverse Effect on Integrity cannot be ruled out for the Lesser Black-Backed Gull (LBBG) feature of the Alde-Ore Estuary Special Protection Area (SPA). Therefore, compensatory measures are proposed to ensure the overall coherence of the National Site Network is protected.

There is an existing breeding colony of LBBG at Orford Ness which has declined dramatically since the late 1990s. A factor which may be contributing to this decline is predation of the eggs by foxes and other predators. The Proposed Compensation Site (PCS) will take the form of predator exclusion fencing around an area(s) of Orford Ness (not at the location of the existing breeding colony) with the aim of excluding mammalian predators, especially foxes, providing a safe refuge for breeding LBBG, and therefore boosting productivity to compensate for losses associated with the project in combination with other offshore wind farms.

The installation of the predator exclusion fence may also have ecological impacts. Full details are provided in the Lesser Black Backed Gull Ecological Impact Assessment (AS-053, updated revision to be submitted at Deadline 4).

1.2 Site Description and Location

To fulfil the requirement for compensatory measures, the Applicant has identified a Proposed Compensation Site (PCS) at Orford Ness, Suffolk (see Drawing 01). Orford Ness is a shingle spit which forms part of the Alde-Ore Estuary SPA. The PCS is approximately 5.96ha in extent and centred on Grid Ref: TM 4550 5114.

The location of the PCS has been amended as the project progressed and therefore the survey area covered in this report now lies outside but immediately adjacent to the PCS. The survey area is approximately 9ha in extent and centred on Grid Ref: TM 4560 5101

The southern and western boundaries of the Survey Area are marked by drainage channels containing brackish water, and the eastern boundary is a long line of dilapidated timber fencing. The Site is exposed with the vegetation growing on shingles. Some areas of shingle are slightly raised and either exposed or support grassland communities, whereas other areas are lower hollows containing seasonally fluctuating shallow lagoons and saltmarsh communities.

1.3 Scope of Works

1.3.1 Vegetation Surveys

The objective was to provide a vegetation survey during late August to assess plant communities within the PCS. A priority was to search for the plant species listed in the Ramsar citation described in the EIA and to map these species (see Table 1-1 below).

Table 1-1 Plant species listed in the Ramsar citation

Althaea officinalis	Marsh mallow
Frankania laevis	Sea heath
Lathyrus japonicus	Sea pea
Lepidum latifolium	Dittander
Medicago minima	Bur Meddick
Parapholis incurva	Curved Hard-grass
Puccinellia fasciuculata	Borrer's saltmarsh grass
Ruppia cirrhosa	Spiral tasselweed
Sarcocornia perennis	Perennial glasswort
Sonchus palustris	Marsh Sowthistle
Trifolium suffocatum	Suffocated clover
Trifolium glomeratum	Clustered Clover
Trifolium striatum	Knotted Clover
Trifolium scabrum	Rough Clover
Vicia lutea	Yellow-vetch
Zostera angustifolia	Narrow-leaved Eelgrass

A principal objective of the vegetation surveys was to categorize the plant communities at the Survey Area following the guidelines used in '*Coastal Vegetation Structures of Great Britain'* by Sneddon & Randall (JNCC, 1993). Because coastal saltmarsh and plant communities are complex and varied the categories first used in the National Vegetation Classification (NVC) of British Plant Communities (Rodwell) were further divided by Sneddon & Randall to provide a method of classification with greater accuracy for complex coastal communities based on the species present.

1.3.2 Invertebrate Surveys

The second main objective was to undertake a series of invertebrate surveys of the Survey Area over three visits between late August and early October to record assemblages and species of conservation interest. A priority was to search for the invertebrate species listed in the Ramsar citation and to map these species (see Table 1-2 below).

Table 1-2 Invertebrate species listed in the Ramsar citation

Malacosoma castrensis	Ground Lackey Moth
Campsicnemus magius	Fancy-legged fly
Cheilosia velutina	A hoverfly
Empis prodromus	A species of dagger-fly
Dixella attica	A species of midge
Hylaeus euryscapu syn Hylaeus annularis	Shingle Yellow-face Bee
Pseudamnicola confusa	A snail
Nematolstella vectensis	Starlet sea anemone
Gammarus insnensibili	Lagoon sand shrimp
Euophrys browningi syn, Pseudeuophrys obsoleta	A jumping spider
Baryphyma duffeyi syn. Praestigia duffeyi.	Duffy's Bell-headed Spider
Haplodrassus minor	A spider
Trichoncus affinis	A spider

Further objectives for the 2024 invertebrate survey are summarised as follows:

- Undertake three surveys to support an improved understanding of invertebrate potential and value of the Survey Area;
- Make observations and records of invertebrates;
- Undertake targeted sampling of invertebrate micro-habitats, i.e. areas and features where potential is considered relatively high;
- Focus survey effort on species and groups likely to be of particular interest - especially in specific searches for uncommon species for which apparently suitable habitat is present, and groups, such as Coleoptera and Araneae, which are of value in assessment and of potential interest at a landscape scale;
- Prepare a full list of invertebrate records made;
- Analyse the final species list using Pantheon[1];
- Provide brief descriptions and specific habitat requirements of any rare or uncommon species recorded; and
- Evaluate the population(s) in the local, regional, and national context.

[1] Webb, J., Heaver, D., Lott, D., Dean, H.J., van Breda, J., Curson, J., Harvey, M.C., Gurney, M., Roy, D.B., van Breda, A., Drake, M., Alexander, K.N.A. and Foster, G. (2023). Pantheon - database version 3.7.6

1.4 Legislation, Policy, and Invertebrate Status

Many invertebrate species are covered by the UK's domestic wildlife legislation, national biodiversity policies and relevant international statutes. Most of these measures aim to protect vulnerable species, but the need for controls of certain invasive alien species is also covered by legislation. A full list of relevant legislation is provided in Appendix 2.

The statuses of individual invertebrate species are provided in full in the individual species accounts (Appendix 1). The conservation status of UK invertebrate species is described in Appendix 3.

2.0 Methods

2.1 Field Survey Methods

2.1.1 Vegetation Surveys

A detailed botanical survey of the semi-natural habitats was undertaken using the National Vegetation Classification (NVC) survey method (Rodwell, 2006). This involved recording plant presence and abundance in a series of quadrats measuring 2x2 m and mapping the boundaries between community types. Twenty-four quadrats were selected (up to six per community type). In addition, the area was searched for the plant species listed on the Ramsar citation. A map of the vegetation communities to community level was produced in accordance with those published in British Plant Communities (Rodwell, 1991 et seq) and/or Sneddon and Randall (1993).

The survey was undertaken on 28/29th August 2024.

2.1.2 Invertebrate Surveys

A survey for terrestrial invertebrates was undertaken, comprising sampling of invertebrates from semi-natural habitat within the site. Following standard protocols (Natural England, 2007), a variety of techniques were used, including ground searching, beating, sweep netting, suction sampling and trapping to take samples from each semi-natural habitat type. The survey focused on key groups of invertebrates namely Lepidoptera (moths and butterflies), Coleoptera (beetles), Hymenoptera (bees, wasps, ants), Heteroptera (typical bugs), adult Diptera (flies), adult Trichoptera (caddis) and Araneae (spiders). In addition, the area was searched for the species listed on the Ramsar citation and protected and priority species of invertebrate. Three visits were undertaken, in late summer and early autumn, and up to 10 samples were collected from each habitat type during each survey visit. The samples were sorted and the collected animals were identified to species level, where possible, either in the field or in the laboratory. The results were analysed using Pantheon software to aid evaluation of the quality of the site for invertebrates.

The surveys were undertaken on 28/29th August 2024 (Visit 1), 12th/13th September 2024 (Visit 2) and1st/2nd October 2024 (Visit 3).

Table 2-1 Timetable of invertebrate sampling

Date	Time	Weather	Work
28 August 2024	10.00 – 15.30	Sunny and hot, 25°C. SE wind 7mph.	Install 10 pitfall traps to be left overnight. Pond netting of water bodies. Observational recording/sweep netting/beating/hand-searching/collecting at key locations
29 August 2024	10.00 – 15.30	Sunny and warm, 23°C. W wind 10mph.	Collect contents of pitfall traps. Observational recording/sweep netting/beating/hand-searching/collecting at key locations

Date	Time	Weather	Work
12 September 2024	10.00 – 15.30	Sunny spells, rain by 15.00. WNW wind 12mph. 14°C	Install 10 pitfall traps to be left overnight. Pond netting of water bodies. Observational recording/sweep netting/beating/hand-searching/collecting at key locations
13 September 2024	10.00 – 15.30	Sunny spells, WNW wind 10mph. 16°C	Collect contents of pitfall traps. Observational recording/sweep netting/beating/hand-searching/collecting at key locations
01 October 2024	10.00 – 15.30	Cloudy, then heavy rain by 15.00. W wind 15-30mph. 14°C	Install 10 pitfall traps to be left overnight. Pond netting of water bodies. Observational recording/sweep netting/beating/hand-searching/collecting at key locations
02 October 2024	10.00 – 15.30	Sunny spells, then heavy rain by 15.00. NE wind 15-30mph. 15°C	Collect contents of pitfall traps. Observational recording/sweep netting/beating/hand-searching/collecting at key locations

2.2 Limitations

The invertebrate survey was undertaken in accordance with current published guidelines.[2] This 2024 field sampling survey used only a limited range of active recording methods, as set out in Table 2-1 above. There are many other methods which could be used to sample less accessible and more specialised species, and such species tend to include a large fraction of those species with a formal conservation status. The proportion of the recorded fauna composed of species with high status should therefore not be considered a full inventory of the Survey Area's invertebrate fauna, but a representative sample of the principal habitats sampled.

A degree of under-recording the invertebrate assemblage is to be expected and will vary according to the ecology and habits of the animals. For example, saproxylic insects, many of which spend much of their lives hidden within dead wood, are notoriously time-consuming to record at all thoroughly, and are likely to be relatively under-recorded compared to those phytophagous species which live exposed on the standing parts of plants. The recording of

[2] Drake C.M, Lott D.A, Alexander K.N.A and Webb J. (2007). Natural England Research Report NERR005 Surveying terrestrial and freshwater invertebrates for conservation evaluation. Natural England, Peterbrough.

some ecological groups, such as those associated with carrion or fungi, is dependent on the chance finding of corpses or fruiting bodies: it should be noted that no substantial fungal fruiting bodies or mammal/bird corpses were found during the present survey.

Other than leaving pit-fall traps out overnight, survey work was mainly diurnal, so nocturnal groups have been largely unrecorded and found only when they could be disturbed from their day-time resting places. Many additional species could no doubt be added by night-time surveys including light trapping.

The main constraints relating to the sampling approach for invertebrates, and for completing the vegetation quadrats, were the times of year, (late August/September/early October is outside the time when most insect species are in the adult stage). Weather conditions were ideal during the first visit in late August, but already by then most flowering plants and grasses were either dead or almost dead therefore limiting the potential for any pollen and nectar seeking insects. The opportunities for pollen and nectar seeking insects had further deteriorated by September despite reasonable weather but were non-existent by the October visit (which was further constrained by periods of heavy rain). It should be noted that reasonable attempts were made to access the site for surveying during August and September, but were hampered by landowner access arrangements and storms, pushing the final surveys into October.

Within the samples obtained, some species belonged either to groups which, because of their obscurity, seemed unlikely to be informative for site assessment, or to groups beyond the identification skills of the surveyor. Specimens of such groups, i.e. those not listed above, were not retained and no attempt was made to identify uncommon species from these groups.

No attempt has been made to sample the subterranean fauna, though some partially or predominantly subterranean species have been recorded beneath refugia or collected from pit-fall traps.

Terrestrial Invertebrate surveys, and to a lesser extent botanical surveys, are samples of what is present at a particular time and place[3]. Furthermore, invertebrate populations fluctuate wildly with localised extinctions and metapopulation dynamics which can only be fully assessed over sufficient time and with multiple survey visits throughout the year. This is a significant limitation, as the surveys were only separated by five weeks with many of the same species identified being present in each survey. It is also likely that further plant species would be recorded during the spring and summer months.

The PCS has proportionally more Sea Couch and/or False-oat grass dominated vegetation, and less salt marsh vegetation than the Eastern Survey area and it is generally more densely vegetated with these coarse grasses. Nevertheless, there are areas of open water and less dense vegetation, and it has piles of timber. The PCS is therefore likely to support the same range of plant and invertebrate species as the Eastern Survey area. It is also likely to support Common Lizard, Meadow Pipit, Skylark, Linnet, Marsh Harrier, Brown Hare and possibly Otter (drainage ditches). The open water is much less extensive in the PCs and therefore waterbird species such as Little Egret, Redshank and Teal are much less likely to use the PCS.

[3] New, T., (1998). Invertebrate Surveys for Conservation. Oxford: Oxford University PressOxford University Press.

2.3 Evidence of Technical Competence and Experience

Invertebrate surveys were undertaken by Kevin McGee MSc (Entomology) 2013, Harper Adams University. Kevin is a Senior Field Ecologist at SLR Consulting with over ten years' experience in ecological consultancy. The report was reviewed by Richard Arnold BSc Hons MRes MCIEEM CEnv, a Technical Director at SLR Consulting. Richard has 25 years of experience in ecological consultancy.

3.0 Survey Area Descriptions

Table 3-1 Target Notes – Locations of invertebrate sampling and some vegetation quadrats

Target Note	Habitat Description	Photograph
TN1	Target Note 1 is a section of the drainage channel at the southern Survey Area boundary. The water here is brackish, and pond-netting found it to have a poor assemblage of aquatic invertebrates, with just one species of water beetle recorded and one water bug recorded. Aquatic invertebrates that were collected were *Gammarus locusta* (a gammarid shrimp, several), *Idotea balthica* (a marine isopod, abundant), *Palaemon serratus* (common prawn, occasional), and *Palaemon varians* (common ditch shrimp, abundant). Pitfall trapping alongside the channel was unsuccessful on each visit. Other than algal bloom on the surface in places no aquatic plants were recorded; the bed of the channel being devoid of vegetation. However, one small section of the bank supports a different plant community to elsewhere on Survey Area. There is an extensive area of *Juncus gerardii* (saltmarsh rush) alongside the channel	 Plate 1. The location of Target Note 1.  Plate 2. Target Note 1. A detail showing the extent of *Juncus gerardii* (saltmarsh rush) at the edge of the channel.

Target Note	Habitat Description	Photograph
	together with *Phragmites australis* (common reed), and occasional *Salicornia ramosissimal* (purple glasswort) and *Bolboschoenus maritimus* (sea club-rush). It conforms closely to SM16 - Sub-community, Juncus gerardii dominant. This represents the only SM16 community and is located at Quadrat 24. Twenty-eight (28) invertebrate species were recorded at TN 1. Species of note were the Nationally Scarce water scavenger beetle *Enochrus bicolor, Coenonympha pamphilus* small heath butterfly with NERC. S.41 status, and the uncommon sawfly *Brachythops flavens.* It should be noted that the small heath butterfly was recorded from every Target Note area, but only as singles.	

Target Note	Habitat Description	Photograph
TN2	Target Note 2 is one of the areas of grassland on Survey Area dominated almost entirely by *Arrhenatherum elatius* (false oat-grass) with sparsely scattered flowering plants including *Jacobaea vulgaris* (common ragwort), *Helminthotheca echioides* (bristly oxtongue), and *Hypochaeris radicata* (catsear). Occasional saltmarsh species present are *Atriplex portulacoides* (sea-purslane), *Suaeda maritima* (annual sea-blite), and *Beta vulgaris* subsp. *maritima* (sea beet). These areas conform most closely to SH71 - Arrhenatherum elatius dominated grassland and are present at Quadrats 4, 5, 6, 7, 11 and 12. Thirty-two (32) invertebrate species were recorded at TN 2. Species of note were the ground spider *Zelotes subterraneus* (Nationally Scarce), the true bug *Rhopalus rufus* (Nationally Rare), and the uncommon species of grass pyralid moth *Platytes cerusella.*	 Plate 3. Target Note 2. A detail showing a pitfall trap in position and examples of the large old planks of wood on the ground in places. The nationally scarce spider *Zelotes subterraneus* was collected from beneath the plank in the foreground.
TN3	Target Note 3 is a typical area of saltmarsh dominated by purple glasswort alongside a shallow seasonal lagoon. Further species recorded in these areas were only present in small numbers, they were annual sea-blite, *Spergularia media* (greater sea spurrey), and *Tripolium pannonicum* (sea aster). These habitats conform to SM8 - Annual Salicornia salt-marsh community, and typical zones are at Quadrats 19 – 23.	 Plate 4. Target Note 3.

Target Note	Habitat Description	Photograph
	Eleven (11) invertebrate species were recorded at TN 3. One species of note was the uncommon carabid ground beetle *Bembidion varium.*	
TN4	Target Note 4 is one of several similar areas where plant sub-communities are either sharply defined or blend together. However, overall, they are mainly dominated by shingles populated mainly by *Elytrigia atherica* (sea couch) on the slightly higher ground conforming most closely to SH78 - Elytrigia atherica dominated grassland. These areas mingle with small patches of salt marsh dominated by purple glasswort around the shallow seasonal pools in the lower hollows conforming to SM8 - Annual Salicornia salt-marsh community. Other grasses in the drier areas are occasional *Festuca rubra* (red fescue), *Agrostis capillaris* (common bent), and sparsely scattered flowering plants in the drier zones may include small patches of developing *Rubus fruticosus* agg., (bramble), *Glaucium flavum* (yellow horned poppy), *Senecio viscosus* (sticky ragwort) and *Cirsium arvense* (creeping thistle), with sea beet and sea-purslane in the damper ground. These complex areas where vegetation types merge together (particularly to the west of the Survey Area) are where very small patches of plant species may occur found nowhere else within the Survey Area. These include	 Plate 5. Target Note 4.  Plate 6. The invasive alien *Senecio inaequidens* (narrow-leaved ragwort) among shingles and sea couch near Target Note 4.

Target Note	Habitat Description	Photograph
	Hypericum perforatum (perforate St John's-wort), *Armeria maritima* (thrift), and *Senecio inaequidens* (narrow-leaved ragwort), an alien invasive species. Ten (10) invertebrate species were recorded at TN 4. One species of note was the uncommon carabid ground beetle *Bembidion varium.*	
TN5	Target Note 5 is similar to TN4 (above) in terms of its complex plant communities varying between the dry raised areas of shingle, and the seasonally wet hollows supporting SM8 saltmarsh communities. However, the main feature is the long lines of old large planks of gradually decaying timber, possibly from former fencing. These old planks provide safe refuge underneath for a wide range of invertebrates in this exposed setting, particularly spiders and beetles. Twenty-six (26) invertebrate species were recorded at TN 5. Species of note were the Nationally Scarce NERC. S.41 wolf spider *Arctosa fulvolineata*, the Nationally Scarce NERC. S.41 jumping spider *Pseudeuophrys obsoleta,* the Nationally Scarce ground beetles *Dicheirotrichus obsoletus, Bembidion ephippium* and *B. normannum,* the uncommon ground beetles *Pogonus chalceus* and *Bembidion varium,* and the Notable A weevil *Rhinocyllus conicus.*	 Plate 7. Target Note 5.  Plate 8. Target Note 5. A view showing a pitfall trap in position alongside an old plank of timber. Three females of the Nationally Scarce NERC. S.41 wolf spider *Arctosa fulvolineata* were found beneath these planks.

Target Note	Habitat Description	Photograph
TN6	Target Note 6 is a section of the drainage channel at the western Survey Area boundary. Like TN1 (above) the water here is brackish, and pond-netting found it to also have a poor assemblage of aquatic invertebrates. Again, other than algal bloom on the surface in places no aquatic plants were recorded; the bed of the channel being devoid of vegetation. The vegetation alongside the channel conforms closely to SH78 - *Elytrigia atherica* dominated grassland with few flowering plants and typical zones are at Quadrats 14 – 18. Species of interest occurring occasionally in small patches are *Filago vulgaris* (common cudweed), *Lotus corniculatus* (bird's-foot trefoil), and the alien invasive *Conyza floribunda* (bilbao fleabane). Twenty-four (24) invertebrate species were recorded at TN 6. Species of note were the ground spider *Zelotes subterraneus* (Nationally Scarce), the Nationally Scarce wolf spider *Pardosa agrestis*, the uncommon wolf spider *Arctosa leopardus*, the uncommon leaf beetle *Chrysolina hyperici*, and the Nationally Scarce water scavenger beetle *Enochrus bicolor.*	 Plate 9. Target Note 6.  Plate 10. *Conyza floribunda* (Bilbao fleabane) on shingles at Target Note 6.

Target Note	Habitat Description	Photograph
TN7	Target Note 7 is another typical area of saltmarsh dominated by purple glasswort alongside a shallow seasonal lagoon. Please refer to the notes for TN3 (above). Eleven (11) invertebrate species were recorded at TN 7, but these were replicated at the same habitat type at Target Note 8, see below for further details.	 Plate 11. Target Note 7.
TN8	Target Note 8 is also a typical area of saltmarsh dominated by purple glasswort alongside a shallow seasonal lagoon. Please refer to the notes for TN3 (above). The photographs for TN7 and TN8 were taken during hot dry conditions during late August. The areas of exposed mud were extensive, and several small ground beetle (Carabidae) species were actively running across the mud in the warm conditions. This enabled capture of several species: including the nationally scarce species *Bembidion ephippium and B. normannum.* However, by the September and October visits these areas of exposed mud were beneath flood water following periods of high rainfall. Pitfall trapping yielded low results in the poor weather conditions later in the year. Sixteen (16) invertebrate species were recorded at TN 8. In addition to those described above (which were also present at TN7) a	 Plate 12. Target Note 8.  Plate 13. *Spergularia media* (Greater sea-spurrey) occurs sparingly in all the saltmarsh zones.

Target Note	Habitat Description	Photograph
	species of note was the Nationally Rare ant beetle *Cyclodinus salinus* captured in a pitfall trap in a raised dry zone.	
TN9	Target Note 9 is another area of SH71 - Arrhenatherum elatius dominated grassland along the eastern boundary. Please see the notes for TN2 (above). Thirty (30) invertebrate species were recorded at TN 9. Species of note were the ground spider *Zelotes subterraneus* (Nationally Scarce), the bombardier beetle *Brachinus crepitans* (Nationally Scarce), the ground beetle *Masoreus wetterhallii* (Nationally Rare), the ground beetle *Pogonus littoralis* (Nationally Scarce), and the uncommon ground beetle *Pogonus chalceus.*	 Plate 14. Target Note 9.

4.0 Results

4.1 Vegetation

Table 4-1 Vegetation classifications of the five main habitat types identified plus a further breakdown of small sub-communities present in areas dominated by shingle.

Habitat Types	Quadrat No.	Vegetation Communities
1	QD4	SH71 - Arrhenatherum elatius dominated grassland
1	QD5	SH71 - Arrhenatherum elatius dominated grassland
1	QD6	SH71 - Arrhenatherum elatius dominated grassland
1	QD7	SH71 - Arrhenatherum elatius dominated grassland
1	QD11	SH71 - Arrhenatherum elatius dominated grassland
1	QD12	SH71 - Arrhenatherum elatius dominated grassland
1	QD8	SH78 - Elytrigia atherica dominated grassland
2	QD14	SH78 - Elytrigia atherica dominated grassland

Habitat Types	Quadrat No.	Vegetation Communities
2	QD15	SH78 - Elytrigia atherica dominated grassland
2	QD16	SH78 - Elytrigia atherica dominated grassland
2	QD17	SH78 - Elytrigia atherica dominated grassland
2	QD18	SH78 - Elytrigia atherica dominated grassland
3	QD9	SH36 - Elytrigia atherica present with various maritime herbs
3	QD10	SH36 - Elytrigia atherica present with various maritime herbs
4	QD2	SM8 - Annual Salicornia salt-marsh community
4	QD19	SM8 - Annual Salicornia salt-marsh community
4	QD20	SM8 - Annual Salicornia salt-marsh community
4	QD21	SM8 - Annual Salicornia salt-marsh community
4	QD22	SM8 - Annual Salicornia salt-marsh community
4	QD23	SM8 - Annual Salicornia salt-marsh community
5	QD13	SH76 - Festuca rubra present with various maritime herbs
6	QD24	SM16 - Sub-community, Juncus gerardii dominant
7	QD3	SM9 – Suaeda maritima salt-marsh community

Please Note: Habitat 6 is a very small area alongside the ditch at the south. This was the only area where *Juncus gerardii* and *Phragmites australis* were the main species. It was not necessary to complete five quadrats here. Habitat 7 was similarly local, occurring near SM8 on drier ground.

4.1.1 Overview

Table 3.1 (above) and Drawing 01 show that five main habitat types were identified, although it is important to note the high level of integration between distinct zones of habitats in places, possibly due to the complexities of how some areas are seasonally affected (or not) by rainwater. Where possible, only homogenous zones of 'typical' examples of the main vegetation type were sampled, parts of the Survey Area are mosaics of all habitats in close proximity, particularly the areas dominated by shingle which contain small pockets of SH coastal grassland communities conforming closely to SH36, SH71, and SH76, although these may also merge together such is the complexity of the Survey Area. Please refer to the habitat map showing the vegetation communities (below), and the detailed quadrat data also included later in the report.

Habitats 1 – 3 conform adequately to the habitat communities described in '*Coastal Vegetation Structures of Great Britain'* by Sneddon & Randall (JNCC, 1993). These are the various SH coastal grassland communities (see Table 3.1). However, the areas of salt marsh dominated by *Salicornia* and a small area dominated by *Juncus* and *Phragmites* are not described by Sneddon & Randall, therefore these areas have been assigned to the nearest NVC classifications using '*British Plant Communities', Vol.5* (Rodwell, 2001). These are areas with SM prefixes.

Emphasis was placed on searching for the plant species listed in the Ramsar citation (see Table 1.1) considered to possibly occur at the Survey Area but none were found.

Sneddon & Randall (1994) describe how lichen and bryophyte communities are also commonly associated with pioneer saltmarsh habitats where they become established on bare ground, shingles, and old timber on the ground. One moss species identified found within the Survey Area was *Ceratodon purpureus.* This common species was found sparingly on large pieces of old timber on the ground. Three common species of lichen were identified: *Cladonia fimbriata* and *Parmotrema perlatum* were present in patches on bare dry ground in places, and the bright orange *Xanthoria parietina* was frequently found growing on shingles in the drier areas.

Table 4-2 Plant species list of the survey area.

Family	Species	Vernacular	DAFOR
Amaranthaceae	*Atriplex portulacoides*	Sea purslane	F
Amaranthaceae	*Beta vulgaris* subsp. *maritima*	Sea beet	F
Amaranthaceae	*Salicornia ramosissima*	Purple glasswort	A
Amaranthaceae	*Suaeda maritima*	Annual sea-blight	F
Asteraceae	*Aster tripolium*	Sea aster	F
Asteraceae	*Cirsium arvense*	Creeping thistle	R
Asteraceae	*Conyza floribunda*	Bilbao fleabane	O
Asteraceae	*Dipsacus fullonum*	Common teasel	R
Asteraceae	*Filago vulgaris*	Common cudweed	O
Asteraceae	*Helminthotheca echioides*	Bristly oxtongue	O
Asteraceae	*Hypochaeris radicata*	Cat’s-ear	O
Asteraceae	*Jacobaea vulgaris*	Common ragwort	R
Asteraceae	*Senecio inaequidens*	Narrow-leaved ragwort	R
Asteraceae	*Senecio viscosus*	Sticky ragwort	R
Caprifoliaceae	*Dipsacus fullonum*	Common teasel	R
Caryophyllaceae	*Spergularia media*	Greater sea-spurrey	F
Cyperaceae	*Bolboschoenus maritimus*	Sea club-rush	R
Fabaceae	*Lotus corniculatus*	Bird’s-foot trefoil	R
Juncaceae	*Juncus gerardii*	Saltmarsh rush	R
Juncaceae	*Juncus maritimus*	Sea rush	R
Hypericaceae	*Hypericum perforatum*	Perforate St John’s-wort	R
Papaveraceae	*Glaucium flavum*	Yellow-horned poppy	R
Plumbaginaceae	*Armeria maritima*	Thrift	R
Poaceae	*Agrostis capillaris*	Common bent	O
Poaceae	*Arrhenatherum elatius*	False oat-grass	F
Poaceae	*Elytrigia atherica*	Sea couch	A
Poaceae	*Festuca rubra*	Red fescue	R
Poaceae	*Holcus lanatus*	Yorkshire fog	R
Poaceae	*Phragmites australis*	Common reed	R
Poaceae	*Puccinella maritima*	Common saltmarsh-grass	R
Polygonaceae	*Rumex acetosella*	Sheep’s sorrel	O
Rosaceae	*Rubus fruticosus* agg.	Bramble	O

The DAFOR scale was used to estimate the percentage cover of plants within the Survey Area habitats: D: Dominant (>75%); A: Abundant (51-75%); F: Frequent (26-50%); O: Occasional (11-25%); and R: Rare (1-10%).

4.2 Invertebrates

4.2.1 Overview

A relatively low number of seventy-eight (78) invertebrate species were identified. However, this must be viewed in the context of the Survey Area which comprises of habitats only suitable for a restricted suite of species specially adapted to exist in the exposed saline conditions with a very limited flora. The Survey Area is representative of a rare habitat in the UK and consequently many of the species evolved to thrive in these habitats are also rare. This is reflected in the high percentage of species with official conservation status of various forms. Fifteen (15) or 19.2% of the species recorded have conservation status. This means the Survey Area is of National Importance for its invertebrate assemblage. If the species listed as 'occasional' are included the percentage of rare and uncommon species rises to 29.5%.

One of the invertebrate species listed in the Ramsar citation (see Table 1.2) was found. The Nationally Scarce NERC Sec.41 jumping spider *Pseudeuophrys obsoleta* was closely observed on the surface of one of the large old timber planks on an area of open shingle in the centre of the Survey Area on 28.08.24. Although it evaded capture it is definitely considered to be this very distinctively marked species unlikely to be confused with any other; especially in this unique habitat it is associated with.

Emphasis was placed on searching for further species in the Ramsar citation considered to possibly occur at the Survey Area, particularly Ground Lackey Moth, Shingle Yellow-face Bee, Starlet sea anemone, Lagoon sand shrimp, and the spiders *Haplodrassus minor* and *Trichoncus affinis.* However, none were found.

4.3 Survey Area Habitat Assessment

The final species list was analysed using Pantheon to evaluate associated habitats and resources, conservation status, habitat fidelity scores and other information for them. This also assesses if components of the species list qualify as a Species Assemblage Type (SAT) and indicates the condition of this. SAT's are adapted from the Invertebrate Species-habitat Information System [ISIS] and are based on assemblages present in sites with known conservation value for invertebrates.

Where Pantheon analysis has recorded the Broad biotype and Habitat for a given species on the overall Survey Area list as N/A, this is because either this is not known, or they are a species with no strong associations.

Pantheon analysis shows that twenty (20) species recorded during the surveys are associated with tall sward and scrub, the majority of these are common with a Species Quality Index (SQI) of 100. However, fifteen (15) species are associated with short sward and bare ground of which seven (7) have conservation status resulting in a SQI of 247, and ten (10) species were recorded associated with saltmarsh of which eight (8) have conservation status resulting in a high SQI of 420. See Table 4-3 below.

Table 4-3 Pantheon Habitat Associations

Broad biotope	Habitat	No. of species	SQI	Species with conservation status
open habitats	tall sward & scrub	20	100	
open habitats	short sward & bare ground	15	247	7
coastal	saltmarsh	10	420	8
wetland	marshland	6	100	

Broad biotope	Habitat	No. of species	SQI	Species with conservation status
wetland	acid & sedge peats	5	100	
coastal	brackish pools & ditches	2	250	1
wetland	running water	2	100	
coastal	sandy beach	1	400	1

Table 4-4 Pantheon Species Assemblage Types identified

Habitat	SAT	No. species	Species with conservation status	SQI	Reported condition
short sward & bare ground	bare sand & chalk	7	6	414	Unfavourable (7 species, 19 required)
saltmarsh	saltmarsh & transitional brackish marsh	5	5	480	Unfavourable (5 species, 9 required)
short sward & bare ground	open short sward	3	1	100	Unfavourable (3 species, 13 required)
open habitats	scrub edge	1		100	Unfavourable (1 species, 11 required)
open habitats	rich flower resource	1		100	Unfavourable (1 species, 15 required)

Table 4-3 (above) shows that all habitats on Survey Area are calculated to be Unfavourable. However, this reflects that the surveys were undertaken outside the main season for robust invertebrate surveys. The two key habitats at the Survey Area are open habitats with short sward and bare ground, and coastal saltmarsh. The table shows that both habitats fall short of the number of species with conservation status required to achieve Favourable condition. However, if surveys were undertaken in the peak periods for adult invertebrates between May and early August it is highly likely that four more species with conservation status would be found on saltmarsh habitats, for example.

Table 4-5 Key invertebrate species recorded at the Orford Ness Survey Area

Taxon	Status	Notes
Araneae - spiders		
Gnaphosidae – ground spiders		

Taxon	Status	Notes
Zelotes subterraneus	Nationally Scarce	 Plate 15. *Zelotes subterraneus* (male) collected from under an old timber plank at the eastern boundary at Target Note 2. A male and female were collected from beneath old timber planks on the ground in the drier areas at the western and eastern boundaries. Genitalia of both sexes was carefully inspected microscopically to confirm this rare species. The NBN Atlas[4] distribution map has just 40 UK records from various coastal areas, including three from the Orford Ness complex between 1994 and 1998.
Lycosidae – wolf spiders		
Arctosa fulvolineata Yellow-striped Bear-spider.	Nationally Scarce NERC. S.41	 Plate 16. *Arctosa fulvolineata* (female) beneath an old timber plank on wet ground at Target Note 5.

[4] Species.nbnatlas.org

Taxon	Status	Notes
		Small numbers of females were observed and photographed beneath old timber planks on the ground alongside seasonally wet areas at and around Target Note 5. One female was collected to confirm identification by microscopic examination. This is also a saltmarsh specialist with very few records from English coastal regions. Online searches found just 18 UK records with a small cluster of records from the Norfolk and Suffolk coasts including Orford Ness.
Pardosa agrestis	Nationally Scarce	One female was collected from shingles near Target Note 6. Online searches found records from most coastal areas including the Orford Ness area.
Salticidae – jumping spiders		
Pseudeuophrys obsoleta	Nationally Scarce NERC. S.41	A single *Pseudeuophrys obsoleta* was closely observed on the surface of one of the large old timber planks on an area of open shingle near Target Note 5 during the August visit. Although it evaded capture it is considered to be this very distinctively marked species unlikely to be confused with any other; especially in this unique habitat it is associated with. This is one of the invertebrate species listed in the Ramsar citation (see Table 1.2). Online searches found scattered records from the coasts of Norfolk, Suffolk, and Kent including the Orford Ness area.
Coleoptera - beetles		
Anthicidae – ant beetles		
Cyclodinus salinus	Nationally Rare	One was collected from a pitfall trap at the eastern boundary near Target Note 9. Online searches found scattered records from the coasts of East Anglia, north Kent, and Hampshire, with none from this part of the Suffolk coast.
Carabidae – ground beetles		
Bembidion ephippium	Nationally Scarce	Small numbers were collected from bare mud in saltmarsh areas, with most being from Target Notes 7 & 8. Found at coastal locations in eastern and southern England, the NBN Atlas distribution map shows several records from the Orford Ness area with the most recent being from 2016.
Bembidion normannum	Nationally Scarce	Small numbers were collected from bare mud in saltmarsh areas, with most being from Target Notes 7 & 8. Found at coastal locations around much of

Taxon	Status	Notes
		the England and South Wales the NBN Atlas distribution map shows several records from the Orford Ness area with the most recent being from 2019.
Brachinus crepitans	Nationally Scarce	 Plate 17. *Brachinus crepitans* collected from a pitfall trap at the eastern boundary at Target Note 9. Widely scattered throughout much of central and southern England including four records from the Orford Ness area on the NBN Atlas distribution map, with the most recent being from 2019.
Dicheirotrichus obsoletus	Nationally Scarce	 Plate 18. *Dicheirotrichus obsoletus* beneath an old timber plank at Target Note 5. Three were collected from beneath old timber planks on the ground at Target Note 5. Found mainly around the coasts of eastern and southern

Taxon	Status	Notes
		England online searches found records from the Orford Ness area.
Masoreus wetterhallii	Nationally Rare	One was collected from a pitfall trap at the eastern boundary near Target Note 9. There are just 301 records on the NBN Atlas distribution map, with none from this part of the Suffolk coast.
Pogonus littoralis	Nationally Scarce	 Plate 19. *Pogonus littoralis.* One collected from grassland alongside bare mud in a saltmarsh area during the August visit. Found at coastal locations around much of the England and South Wales including one record from the Orford Ness area on the NBN Atlas distribution map from 2012.
Curculionidae - weevils		
Rhinocyllus conicus	Notable A	One was swept from creeping thistles near Target Note 5. The NBN Atlas distribution map shows no records from Orford Ness, but there is a record from a site a short distance inland during 2021.
Hydrophilidae – water scavenger beetles		
Enochrus bicolor	Nationally Scarce	One collected from a pitfall trap alongside the ditch at the western boundary, and one from mud at the edge of the ditch along the southern boundary. The NBN Atlas distribution map shows two records from Orford Ness in 1993 and 2003. This species is on the list of protected species recorded from Orford Ness supplied to SLR by Suffolk Biodiversity Information Service (SBIS).

Taxon	Status	Notes
Hemiptera – true bugs		
Rhopalidae		
Rhopalus rufus	Nationally Rare	 Plate 20. *Rhopalus rufus* swept from grassland at Target Note 2. There are just seventy-one (71) UK records on the NBN Atlas distribution map with most from the southern counties but there are two records from the Suffolk coast, the nearest to Orford Ness being one recorded near Aldeburgh in 2003. Little is known of this species, but it overwinters as an adult and the host plants may include spurreys *Spergularia*[5].
Lepidoptera – butterflies & moths		
Nymphalidae		
Coenonympha pamphilus	NERC. S.41	The small heath butterfly was observed as singletons only throughout the Survey Area, with most records from the August visit during fine sunny weather. The population here is considered to be stable. This species is on the list of protected species recorded from Orford Ness supplied to SLR by Suffolk Biodiversity Information Service (SBIS).

[5] Britishbugs.org.uk

5.0 Conclusions and Recommendations

5.1 Vegetation

A principal objective of the vegetation surveys was to categorize the plant communities at the Survey Area following the guidelines used in '*Coastal Vegetation Structures of Great Britain'* by Sneddon & Randall (JNCC, 1993). However, areas of salt marsh dominated by *Salicornia* and a small area dominated by *Juncus* and *Phragmites* are not described by Sneddon & Randall, therefore these areas have been assigned to the nearest NVC classifications using '*British Plant Communities', Vol.5* (Rodwell, 2001). These are areas with SM prefixes. The main plant communities identified are:

- SH71 - Arrhenatherum elatius dominated grassland
- SH78 - Elytrigia atherica dominated grassland
- SH36 - Elytrigia atherica present with various maritime herbs
- SH76 - Festuca rubra present with various maritime herbs
- SM8 - Annual Salicornia salt-marsh community

Two small areas were identified as

- SM16 - Sub-community, Juncus gerardii dominant
- SM9 – Suaeda maritima salt-marsh community

A priority was to search for the plant species listed in the Ramsar citation described in the EIA and map any of these found, namely Dittander, Bur meddick, Curved hard-grass, Spiral tasselweed, and Perennial glasswort. None were found during the surveys.

Extensive parts of the Survey Area contain pioneer saltmarsh habitat. This is one of the habitats listed under the Habitats Directive as a 'typical' Annex 1 Habitat. Coastal saltmarsh is also listed as a UK Priority Habitat with a Biodiversity Action Plan[6]

5.2 Invertebrates

A priority was to search for the invertebrate species listed in the Ramsar citation and map any of these found. One of the species was found: the jumping spider *Pseudeuophrys obsoleta.* Although none of the other species were found it does not mean they are not present and may have been missed due to the timings of the surveys. For example, the habitats on Survey Area are suitable for the ground lackey moth (*Malacosoma castrensis*). Although adults are occasionally recorded at light traps the fully grown and distinctive larvae can be found 'basking' on saltmarsh vegetation during warm sunny weather in July prior to pupation[7]. One of the larval foodplants is sea purslane, which is plentiful at the Survey Area. The NBN Atlas distribution map shows several recent records from Orford Ness, with the most recent being from 2009 and 2014. A second example is the Shingle Yellow-face Bee (*Hylaeus annularis*). The NBN Atlas distribution map shows just thirty-seven (37) accepted UK records, including a single record from Orford Ness in 2012. *H. annularis* is restricted to coastal shingle where adults are active from June to early August when they can be found visiting flowers of sea kale (*Crambe maritima*), ragworts, and brambles[8]; the latter two being

[6] data.jncc.gov.uk/

[7] Caterpillars of the British Isles. Porter, J (1997)

[8] Steven Falk's collections on flickr.com

present on Survey Area and sea kale being present on top of the eastern shingle bank just off Survey Area.

Species that were recorded with conservation status are listed below.

Table 5-1 Species with published conservation status recorded during the Orford Ness surveys in 2024.

Taxon	Vernacular	Status
Zelotes subterraneus	A ground spider	Nationally Scarce
Arctosa fulvolineata	A wolf spider	Nationally Scarce NERC. S.41
Pardosa agrestis	A wolf spider	Nationally Scarce
Pseudeuophrys obsoleta	A jumping spider	Nationally Scarce NERC. S.41
Cyclodinus salinus	An ant beetle	Nationally Rare
Bembidion ephippium	A ground beetle	Nationally Scarce
Bembidion normannum	A ground beetle	Nationally Scarce
Brachinus crepitans	Bombardier beetle	Nationally Scarce
Dicheirotrichus obsoletus	A ground beetle	Nationally Scarce
Masoreus wetterhallii	A ground beetle	Nationally Rare
Pogonus littoralis	A ground beetle	Nationally Scarce
Rhinocyllus conicus	A weevil	Notable A
Enochrus bicolor	A water scavenger beetle	Nationally Scarce
Rhopalus rufus	A true bug	Nationally Rare
Coenonympha pamphilus	Small heath butterfly	NERC. S.41

The Survey Area is representative of a rare habitat in the UK and consequently many of the species evolved to thrive in these habitats are also rare. This is reflected in the high percentage of species with official conservation status of various forms. Fifteen (15) or 19.2% of the species recorded have conservation status. However, analysis of the final species list using Pantheon shows that all habitats on Survey Area are calculated to be Unfavourable, this reflects that the surveys were undertaken outside the main season for invertebrates in the adult stage. For example, it is highly likely that four further saltmarsh species with conservation status would be found during the peak periods of the season which would result in the saltmarsh habitats being Favourable.

Despite Pantheon analysis finding the habitats to be in Unfavourable condition, the Survey Area is considered to be of National importance. This is because of the established presence of breeding populations of the following species;

- ***Zelotes subterraneus*** The NBN Atlas distribution map has just 40 UK records from various coastal areas, including three from the Orford Ness complex between 1994 and 1998.
- ***Arctosa fulvolineata*** Online searches found just 18 UK records with a small cluster of records from the Norfolk and Suffolk coasts including Orford Ness.

- ***Pseudeuophrys obsoleta*** This is one of the species listed in the Ramsar citation (see Table 1.2). Online searches found scattered records from the coasts of Norfolk, Suffolk, and Kent including the Orford Ness area.
- ***Cyclodinus salinus*** Online searches found scattered records from the coasts of East Anglia, north Kent, and Hampshire, with none from this part of the Suffolk coast.
- ***Rhopalus rufus*** There are just 71 UK records on the NBN Atlas distribution map with the nearest to Orford Ness being one recorded near Aldeburgh in 2003.

5.3 Further species recorded during the surveys

5.3.1 Birds

Table 5-2 Birds observed on site or overhead

Birds on-site or overhead	
Swallow	6
Meadow pipit	20
Linnet	6
Little egret	1
Heron	1
Mallard	10 over
Shelduck	6 over
Buzzard	3 over
Kestrel	1 over
Herring gull	2 over
Black-headed gull	2 over
Greater black-backed gull	5 over
Marsh Harrier	1 over
Teal	30
Redshank	2
Snipe	1 over
Curlew	1

5.3.2 Reptiles

Two juvenile Common lizards (*Zootoca vivipara*) were found sheltering beneath old timber fence posts on the ground alongside the eastern boundary on 13.09.24.

5.4 Recommendations

It is recommended that as much as possible of the discarded and fallen timber in the form of old sections of fencing are retained in-situ. These are providing safe refuge for a wide variety of invertebrates within the exposed environment. These include nationally scarce species for which the Survey Area is of national importance, namely**;** the spiders *Zelotes subterraneus* and *Arctosa fulvolineata.*

Further surveys in peak periods during spring and summer are recommended to try and establish the presence of further species listed in the Ramsar citation.

DRAWING 01

645400
645600
645800
251200
251000
250800
N
QD11
QD12
SH71
QD13
QD14
QD15
SH78
TN8
QD16
QD21
TN9
SM8
TN7
SM8
SM8
TN6
QD2
SH71
QD3
QD10
QD17
QD20
QD9
SH78
QD18
TN5
QD19
QD8
SM8
QD7
SM8
SH78
QD22
QD6
TN4
TN3
QD23
QD5
QD4
TN2
SH78
SH71
QD24
TN1
SM16
INSET MAP
Blackstakes Reach
Lantern Marshes
44
45
46
47
ORE
King's Marshes
LEGEND
Lesser Black-backed Gull (LBBG) Compensation Area
Survey Area
Proposed Fence Line
Target Note
Vegetation Quadrat Location
National Vegetation Classification (NVC) Habitat
SH71 - Arrhenatherum Elatius Dominated Grassland
SH78 - Elytrigia Atherica Dominated Grassland
SM8 - Annual Salicornia Salt-Marsh Community
SM16 - Festuca Rubra Salt-Marsh Community
Varying Shingle Habitat
0
50
100
Metres

PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM
DRAWING TITLE:
VEGETATION AND INVERTEBRATE SURVEY

VER	DATE	REMARKS	Drawn	Checked
1	14/11/2024	Deadline 4	DB	JRS

DRAWING NUMBER: 4

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:2.000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

APPENDIX 02

Vegetation Survey Data

SH71 – Arrhenatherum elatius dominated grassland

The quadrats containing this habitat with the Domin Scale of cover/abundance. F = Frequency of the species within the habitat.
Following the National Vegetation Classification User's Handbook (JNCC, 2006)

		Q4	Q5	Q6	Q7	Q11	Q12	F	min	max
False oat-grass	*Arrhenatherum elatius*	9	9	8	8	10	4	V	4	10
Cat's ear	*Hypochaeris radicata*	1	1	1		1	1	V	1	1
Sea beet	*Beta vulgaris* subsp. *maritima*				1	1	1	III	1	1
Creeping thistle	*Cirsium arvense*	4			1			II	1	4
Sea couch	*Elytrigia atherica*	1	1					II	1	1
Red fescue	*Festuca rubra*	4	4					II	4	4
Bristly oxtongue	*Helminthotheca echioides*	4	1					II	1	4
Sticky ragwort	*Senecio viscosus*					1	4	II	1	4
Bare Ground							8	I	8	8
Sea purslane	*Atriplex portulacoides*			7				I	7	7
Common teasel	*Dipsacus fullonum*	4						I	4	4
Yellow horned poppy	*Glaucium flavum*						1	I	1	1
Common ragwort	*Jacobaea vulgaris*	1						I	1	1
Bramble	*Rubus fruticosus* agg.				1			I	1	1
Sheep's sorrel	*Rumex acetosella*						4	I	4	4
Annual sea blite	*Suaeda maritima*					1		I	1	1

SH78 – Elytrigia atherica dominated grassland

The quadrats containing this habitat with the Domin Scale of cover/abundance. F = Frequency of the species within the habitat.
Following the National Vegetation Classification User's Handbook (JNCC, 2006)

		Q8	Q14	Q15	Q16	Q17	Q18	F	min	max
Bare Ground		9	1	8	5	1	1	V	1	9
Sea couch	*Elytrigia atherica*	4	9	7	9	9	7	V	4	9
Lichen sp	*Xanthoria parietina*	2		1	5	4	4	V	1	5
Bilbao fleabane	*Conyza floribunda*				4	1	1	III	1	4
Sea beet	*Beta vulgaris* subsp. *maritima*		1	4				II	1	4
Common cudweed	*Filago vulgaris*		4				1	II	1	4
Bristly oxtongue	*Helminthotheca echioides*			4	1			II	1	4
Cat's ear	*Hypochaeris radicata*					4	1	II	1	4
Common reed	*Phragmites australis*					4		II	4	4
Common saltmarsh-grass	*Puccinella maritima*			1			4	II	1	4
Sticky ragwort	*Senecio viscosus*	4		1				II	1	4
Moss sp	*Ceratodon purpureus*			4				I	4	4
Lichen sp	*Cladonia fimbriata*	2						I	2	2
Red fescue	*Festuca rubra*			4				I	4	4
Yellow horned poppy	*Glaucium flavum*	1						I	1	1
Sea rush	*Juncus maritimus*						7	I	7	7
Bird's-foot trefoil	*Lotus corniculatus*					1		I	1	1
Bramble	*Rubus fruticosus* agg.						1	I	1	1

SH76 – Festuca rubra present with various maritime herbs

The quadrats containing this habitat with the Domin Scale of cover/abundance.

		Q13
Bare Ground		8
Lichen sp	*Xanthoria parietina*	5
Lichen sp	*Cladonia fimbriata*	4
Red fescue	*Festuca rubra*	5
Common bent	*Agrostis capillaris*	4
Annual sea blite	*Suaeda maritima*	4
Sea purslane	*Atriplex portulacoides*	4

SH36 – Elytrigia atherica present with various maritime herbs

The quadrats containing this habitat with the Domin Scale of cover/abundance.

		Q9	Q10
Bare Ground		8	8
Lichen sp	*Xanthoria parietina*	4	4
Sea couch	*Elytrigia atherica*	4	4
Sea beet	*Beta vulgaris* subsp. *maritima*	5	4
Annual sea blite	*Suaeda maritima*		4

SM8 – Annual salicornia salt-marsh community

The quadrats containing this habitat with the Domin Scale of cover/abundance. F = Frequency of the species within the habitat.
Following the National Vegetation Classification User's Handbook (JNCC, 2006)

		Q19	Q20	Q21	Q22	Q23	F	min	max
Sea aster	*Aster tripolium*	1	6	4	4	9	V	1	9
Purple glasswort	*Salicornia ramosissima*	8	7	9	9	9	V	7	9
Greater sea spurrey	*Spergularia media*	4	1	4	4	1	V	1	4
Bare Ground		5	5			2	III	2	5
Red fescue	*Festuca rubra*			4	4		II	4	4
Annual sea blite	*Suaeda maritima*	1		5			II	1	5

SM9 – Suaeda maritima salt-marsh community

The quadrats containing this habitat with the Domin Scale of cover/abundance.

		Q3
Bare Ground		7
Sea couch	*Elytrigia atherica*	3
Annual sea blite	*Suaeda maritima*	7
Sea purslane	*Atriplex portulacoides*	3
Greater sea spurrey	*Spergularia media*	3
Sea aster	*Aster tripolium*	3

SM16 – Sub-community, Juncus gerardii dominant

The quadrats containing this habitat with the Domin Scale of cover/abundance.

		Q24
Saltmarsh rush	*Juncus gerardii*	8
Common reed	*Phragmites australis*	7
Purple glasswort	*Salicornia ramosissima*	3
Sea club-rush	*Bolboschoenus maritimus*	2

APPENDIX 02

Complete Species List from the 2024 Invertebrate Survey

The species shown in blue have published conservation status.

Note on Nomenclature

Checklists and other sources used for names have been selected as far as possible on the basis of easy availability, broad coverage, specific reference to the British fauna, of being reasonably recent, and of their availability in printed form. Online resources considered to be reliable, up-to-date and accurate were also consulted. There are few occasions when all these criteria are met. The following sources have been used:

- Araneae. Bee et al., 2017. NBN Atlas (online, 2023).
- Coleoptera. Luff, 2007, Lott & Anderson, 2011. Lott, 2009. Hackston, 2023. NBN Atlas (online, 2023).
- Diptera. Chandler, 2017. NBN Atlas (online, 2023).
- Hemiptera-Heteroptera. Aukema & Rieger, 1995-2006. NBN Atlas (online, 2022). Britishbugs.org.uk (online, 2023).
- Hymenoptera Aculeata. Falk & Lewington, 2015. Bwars.com (online, 2022). NBN Atlas (online, 2023).
- Lepidoptera. Agassiz et al., 2013. NBN Atlas (online, 2023).
- Odonata. Cham et al., 2014. NBN Atlas (online, 2023).
- Orthoptera. Sutton, 2015. NBN Atlas (online, 2023).

Most records are of insects. Within this group, orders are arranged alphabetically, families alphabetically within orders, and species alphabetically within families.

No groupings between family and order, or between genus and family, are used.

Table 5-3 Invertebrate species list of the survey area. Those in blue are uncommon or have official conservation status

Order	Family	Taxon	Vernacular	Status
Araneae	Araneidae	*Araneus diadematus*	An orbweb spider	
Araneae	Araneidae	*Larinioides cornutus*	An orbweb spider	
Araneae	Dysderidae	*Dysdera crocata*	Woodlouse spider	Non-native
Araneae	Gnaphosidae	*Drassodes lapidosus*	A ground spider	
Araneae	Gnaphosidae	*Zelotes subterraneus*	A ground spider	Nationally Scarce
Araneae	Lycosidae	*Arctosa fulvolineata*	Yellow-striped Bear-spider	Nationally Scarce NERC. S.41
Araneae	Lycosidae	*Arctosa leopardus*	A wolf spider	Occasional
Araneae	Lycosidae	*Pardosa agrestis*	A wolf spider	Nationally Scarce
Araneae	Salticidae	*Heliophanus flavipes*	A jumping spider	
Araneae	Salticidae	*Pseudeuophrys obsoleta*	A jumping spider	Nationally Scarce NERC. S.41
Araneae	Salticidae	*Salticus scenicus*	A jumping spider	
Araneae	Tetragnathidae	*Tetragnatha montana*	A long-jawed orbweb spider	
Coleoptera	Anthicidae	*Cyclodinus salinus*	An ant beetle	Nationally Rare
Coleoptera	Carabidae	*Bembidion ephippium*	A ground beetle	Nationally Scarce
Coleoptera	Carabidae	*Bembidion normannum*	A ground beetle	Nationally Scarce
Coleoptera	Carabidae	*Bembidion varium*	A ground beetle	Occasional
Coleoptera	Carabidae	*Brachinus crepitans*	Bombardier beetle	Nationally Scarce
Coleoptera	Carabidae	*Calathus fuscipes*	A ground beetle	
Coleoptera	Carabidae	*Calathus melanocephalus*	A ground beetle	
Coleoptera	Carabidae	*Dicheirotrichus obsoletus*	A ground beetle	Nationally Scarce
Coleoptera	Carabidae	*Masoreus wetterhallii*	A ground beetle	Nationally Rare
Coleoptera	Carabidae	*Pogonus chalceus*	A ground beetle	Occasional
Coleoptera	Carabidae	*Pogonus littoralis*	A ground beetle	Nationally Scarce
Coleoptera	Chrysomelidae	*Chrysolina hyperici*	A leaf beetle	Occasional
Coleoptera	Chrysomelidae	*Neocrpidodera transversa*	A leaf beetle	
Coleoptera	Coccinellidae	*Coccidula rufa*	A ladybird	
Coleoptera	Coccinellidae	*Coccinella bipunctata*	2-spot ladybird	
Coleoptera	Coccinellidae	*Coccinella septempunctata*	7-spot ladybird	
Coleoptera	Curculionidae	*Rhinocyllus conicus*	A weevil	Notable A
Coleoptera	Curculionidae	*Sitona humeralis*	A weevil	
Coleoptera	Hydrophilidae	*Enochrus bicolor*	A water scavenger beetle	Nationally Scarce
Coleoptera	Staphylinidae	*Ocypus olens*	A rove beetle	
Crustaceae	Armadillidiidae	*Armadillidium vulgare*	Common pill woodlouse	
Crustaceae	Gammaridae	*Gammarus locusta*	A gammarid shrimp	
Crustaceae	Idoteidae	*Idotea balthica*	A marine isopod	

Order	Family	Taxon	Vernacular	Status
Crustaceae	Palaemonidae	*Palaemon serratus*	Common prawn	
Crustaceae	Palaemonidae	*Palaemon varians*	Common ditch shrimp	
Crustaceae	Talitridae	*Arcitalitrus dorrieni*	Landhopper	Non-native
Dermaptera	Forficulidae	*Forficula auricularia*	Common earwig	
Diptera	Syrphidae	*Helophilus trivitattus*	A hoverfly	Occasional
Diptera	Tephritidae	*Sphenella marginata*	A picture-wing fly	
Diptera	Tipulidae	*Tipula paludosa*	A cranefly	
Hemiptera	Aphrophoridae	*Neophilaenus lineatus*	A froghopper	
Hemiptera	Gerridae	*Gerris lacustris*	Common pondskater	
Hemiptera	Lygaeidae	*Cymnus melanocephalus*	A ground bug	
Hemiptera	Miridae	*Orthops kalmii*	A plant bug	
Hemiptera	Pentatomidae	*Aelia acuminata*	Bishop's Mitre	
Hemiptera	Rhopalidae	*Rhopalus rufus*	A rhopalid bug	Nationally Rare
Hemiptera	Saldidae	*Saldula palustris*	A shore bug	
Hymenoptera	Apidae	*Bombus lapidarius*	Red-tailed bumblebee	
Hymenoptera	Apidae	*Bombus lucorum* s.l.	White-tailed bumblebee	
Hymenoptera	Formicidae	*Formica fusca*	An ant	
Hymenoptera	Formicidae	*Lasius flavus*	Yellow meadow ant	
Hymenoptera	Formicidae	*Lasius niger*	Black garden ant	
Hymenoptera	Tenthredinidae	*Brachythops flavens*	A sawfly	Occasional
Hymenoptera	Vespidae	*Vespula vulgaris*	Common wasp	
Lepidoptera	Crambidae	*Crambus perlella*	A grass pyralid moth	
Lepidoptera	Crambidae	*Platytes cerusella*	A grass pyralid moth	Occasional
Lepidoptera	Erebidae	*Phragmatobia fuliginosa*	Ruby tiger	
Lepidoptera	Geometridae	*Camptogramma bilineata*	Yellow shell	
Lepidoptera	Geometridae	*Eupithecia centaureata*	Lime-speck pug	
Lepidoptera	Lasiocampidae	*Macrothylacia rubi*	Fox moth	
Lepidoptera	Lycaenidae	*Lycaena phlaeas*	Small copper	
Lepidoptera	Lycaenidae	*Polyommatus icarus*	Common blue	
Lepidoptera	Noctuidae	*Autographa gamma*	Silver Y	
Lepidoptera	Nymphalidae	*Coenonympha pamphilus*	Small heath	NERC. S.41
Lepidoptera	Nymphalidae	*Vanessa atalanta*	Red admiral	
Lepidoptera	Pieridae	*Pieris brassicae*	Large white	
Lepidoptera	Pieridae	*Pieris rapae*	Small white	
Mollusca	Helicidae	*Cepaea nemoralis*	Brown-lipped snail	
Mollusca	Helicidae	*Cepaea hortensis*	White-lipped snail	

Order	Family	Taxon	Vernacular	Status
Odonata	Aeshnidae	*Aeshna mixta*	Migrant hawker	
Odonata	Calopterygidae	*Calopteryx splendens*	Banded demoiselle	
Odonata	Libellulidae	*Sympetrum sanguineum*	Ruddy Darter	
Odonata	Libellulidae	*Sympetrum striolatum*	Common darter	
Opiliones	Phalangiidae	*Opilio parietinus*	A harvestman	
Orthoptera	Acrididae	*Chorthippus bruneus*	Field grasshopper	

Please note: Species listed as ‘occasional’ are considered worthy for further discussion due to their somewhat local distribution and specialised requirements.

APPENDIX 2: RELEVANT LEGISLATION AND PLANNING POLICY

Legislation

A summary of legislation relevant to (onshore) biodiversity in England is provided below. Note that the summary provided here is intended for general guidance only and the original legislation should be consulted for definitive information.

Conservation of Habitats and Species Regulations 2017

The Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations) consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law. Under the Habitats Regulations it is an offence to deliberately capture, kill or disturb[1] wild animals listed under Schedule 2 of the Regulations. It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is not present at the time).

Wildlife & Countryside Act 1981

The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way (CRoW) Act 2000 and the Natural Environment and Rural Communities (NERC) Act 2006, consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive), making it an offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act;
- intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act;
- intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection;
- Pick or uproot any wild plant listed under Schedule 8 of the Act; or
- Plant or cause to grow in the wild any plant species listed under Schedule 9 of the Act.

Protection of Badgers Act 1992

The Protection of Badgers Act 1992 makes it illegal to kill, injure or take a badger or to intentionally or recklessly interfere with a badger sett. Sett interference includes disturbing badgers whilst they are occupying a sett or obstructing access to it.

Natural Environment & Rural Communities (NERC) Act 2006

Section 40 of the NERC Act 2006 places a duty on public authorities to have regard to the purpose of conserving biodiversity to have due regard for biodiversity and nature conservation during the course of their operations. Public authorities include government departments, local authorities and statutory undertakers.

Section 41 of the Act requires the publication of a list of habitats and species publish which are of principal importance for the purpose of conserving biodiversity. The Section 41 list is used to guide authorities in implementing their duty to have regard to the conservation of biodiversity.

Planning Policy

A summary of national planning policy relevant to (onshore) biodiversity in England is provided below. Note that the summary provided here is intended for general guidance only and the original policy documents should be consulted for definitive information. For local planning policy relevant to biodiversity the relevant sections of the Birchall Gardens Environmental Statement and local plans should be consulted.

National Planning Policy (England)

The National Planning Policy Framework (NPPF)[2] sets out guidance for local planning authorities and decision-makers in how to apply planning policies when drawing up plans and making decisions about planning applications. Along with Government Circular 06/05[3], the broad policy objectives in relation to the protection of biodiversity and geological conservation in England through the planning system are set out. Specific policies relating to habitats and biodiversity are set out in paragraphs 170 and 174-177 of the NPPF.

Paragraph 170 states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);

b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;

c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;

d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate".

Paragraph 174 states that:

"To protect and enhance biodiversity and geodiversity, plans should:

a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and

b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity."

Paragraph 175 of the NPPF states that:

"When determining planning applications, local planning authorities should apply the following principles:

a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity."

Paragraphs 176-177 relate to European sites (referred to as habitats sites) and state:

"The following should be given the same protection as habitats sites:

a) potential Special Protection Areas and possible Special Areas of Conservation;

b) listed or proposed Ramsar sites; and

c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site."

APPENDIX 3 - INVERTEBRATE STATUS

Each of the species recorded has been assigned at least one status. The better-known groups of invertebrates were assessed for formal conservation status in Red Data Books and National reviews from the mid-1980s onwards, using criteria from the IUCN for the rarest (Red Data Book) species, and defining species believed to occur in 100 or fewer 10-kilometre squares of the National Grid as Nationally Scarce (Notable). The earlier IUCN criteria have been superseded, but much of the British invertebrate fauna remains to be fully assessed, in published reviews, under the newer criteria.

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

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

Red Data Book category 3 – Rare (RDB3). Taxa with small populations that are not at present Endangered or Vulnerable but are at risk. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. Usually, such taxa are not likely to exist in more than fifteen post-1970 10km squares. This criterion may be relaxed where populations are likely to exist in over fifteen 10km squares but occupy small areas of especially vulnerable habitats.

Red Data Book category K - insufficiently Known (RDBK). Taxa in Great Britain that are suspected, but not definitely known, to belong to any of the above categories, because of lack of information. Criteria for inclusion are: species recently discovered or recognised in Great Britain, which may prove to be more widespread in the future; species with very few or perhaps only a single known locality but which belong to poorly recorded or taxonomically difficult groups; species known from very few localities but which occur in inaccessible habitats or habitats which are seldom sampled; 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.

Nationally Scarce category A (Na). Taxa which do not fall within RDB categories, but which are nonetheless uncommon in Great Britain and are thought to occur in 30 or fewer hectads of the National Grid or, for less well recorded groups, within seven or fewer vice-counties.

Nationally Scarce category B (Nb). Taxa which do not fall within RDB categories, but which are nonetheless uncommon in Great Britain and are thought to occur in between 31 and 100 10km squares of the National Grid or, for less well-recorded groups, between eight and twenty vice-counties.

Nationally Scarce (N). For some less well-recorded groups and species, it has not been possible to determine which of the Nationally Scarce categories (A or B) is most appropriate for scarce species. These species have been assigned to an undivided Nationally Scarce category.

Two categories from the revised IUCN criteria have been used:

Vulnerable (VU)

A taxon is considered Vulnerable if it fulfils any of the following criteria.

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of 70% or more over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible and understood and ceased.

2. An observed, estimated, inferred or suspected population size reduction of 50% or more over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased or may not be understood or may not be reversible.

3. A population size reduction of 50% or more, projected or suspected to be met within the next ten years or three generations, whichever is the longer.

4. An observed, estimated, inferred or suspected population size reduction of 50% or more over any ten year or three generation period, whichever is the longer, where the time period must include both the past and the future, and where the reduction or its causes may not have ceased or may not be understood or may not be reversible.

B. Geographic range in the form of either B1 (extent of occurrence) or B2 (area of occupancy) or both:

1. Extent of occurrence estimated to be less than 500 km2, and estimates including at least two of a-c:

- A, Severely fragmented or known to exist at no more than five locations
- B, Continuing decline, observed, inferred or projected, in extent of occurrence, area of occupancy, area, extent or quality of habitat, number of locations or subpopulations, or number of mature individuals
- C, Extreme fluctuation in extent of occurrence, area of occupancy, number of locations or subpopulations, or number of mature individuals.

2. Area of occupancy estimated to be less than 500 km2, and estimates including at least two of a-c:

- A, Severely fragmented or known to exist at no m more than five locations.
- B, Continuing decline, observed, inferred or projected, in extent of occurrence, area of occupancy, area, extent or quality of habitat, number of locations or subpopulations, or number of mature individuals.
- C, Extreme fluctuations in area of occupancy, extent of occurrence, number of locations of subpopulations, or number of mature individuals.
- D, Population size estimated to be fewer than 2500 mature individuals and either:

An estimated continuing decline of at least 20% within five years or two generations, whichever is the longer, or

4. A continuing decline, observed, projected or inferred, in numbers of mature individuals and at least one of the following:

- Population structure either with no subpopulation estimated to contain more than 250 mature individuals or at least 95% of mature individuals in one subpopulation
- Extreme fluctuations in the number of mature individuals.
- Population size estimated to number fewer than 350 mature individuals.
- Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer.

Lower Risk

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

1. Conservation Dependent (CD). Taxa, which are the focus of a continuing taxon specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.

2. Near Threatened (NT). Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable - in Britain, defined as occurring in 15 or fewer hectads but not CR, EN or VU. The absolute count of hectads is, in this review, considered subordinate to evidence of decline on an extent not qualifying the species for CR, EN or VU.

4. Least Concern (LC). Taxa, which do not qualify for Conservation Dependent, Near Threatened or National Scarce subcategories - in Britain, this covers all species found on evaluation not to fit into any of the other categories. Under the revised criteria, at the national level, countries are permitted to refine the definitions for the non-threatened categories and to define additional ones of their own. The Nationally Rare (NR) category is defined as species recorded from 15 or fewer hectads of the Ordnance Survey national grid in Great Britain. The Nationally Scarce (NS) category is defined in the same way, but the species is recorded from between 16 and 100 hectads since 1980. These correspond respectively to the former Red Data Book Categories 1-3 and the former Nationally Scarce (or Nationally Notable) categories A and B. Collectively, they are referred to as the GB Rarity status.

In recent reviews of invertebrate statuses, it has become the convention to assign each species both a GB Rarity status and an IUCN status. In earlier reviews, however, the GB Rarity status was applied only to species which did not qualify for any IUCN status but were nonetheless uncommon. In the interests of simplicity and consistency, in this report GB Rarity status is not given for species with an IUCN status of Near Threatened or higher, even if one has been assigned.

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

Species falling into none of these categories have been assigned a status estimated on a four-point scale: common, frequent, occasional and rare. No pretence is made that these statuses are assigned after rigorous assessment against precise criteria, but broad guidelines to their significance are as follows:

Common: species found in good numbers over substantial areas, usually in a number of habitats, and either having no very special ecological requirements or having requirements which are easily and widely met (restriction to a common foodplant, e.g.). Such species are expected or unsurprising in any sizeable tract of "wider countryside" within the central parts of their range.

Frequent: typically, species with somewhat more specialised or infrequently met habitat requirements, but expected where these characteristics are met; such species may be restricted to a narrow habitat range or to particular soil types, require a particular foodplant of less than universal occurrence, or be associated with a widespread but erratic habitat resource, such as standing dead wood of particular species or in particular conditions. Species in this category are expected or unsurprising wherever the habitat types with which they are associated is found.

Occasional: typically, species with a very particular and infrequently met habitat requirement; or species of poor mobility whose presence may be heavily dependent on habitat continuity; or species

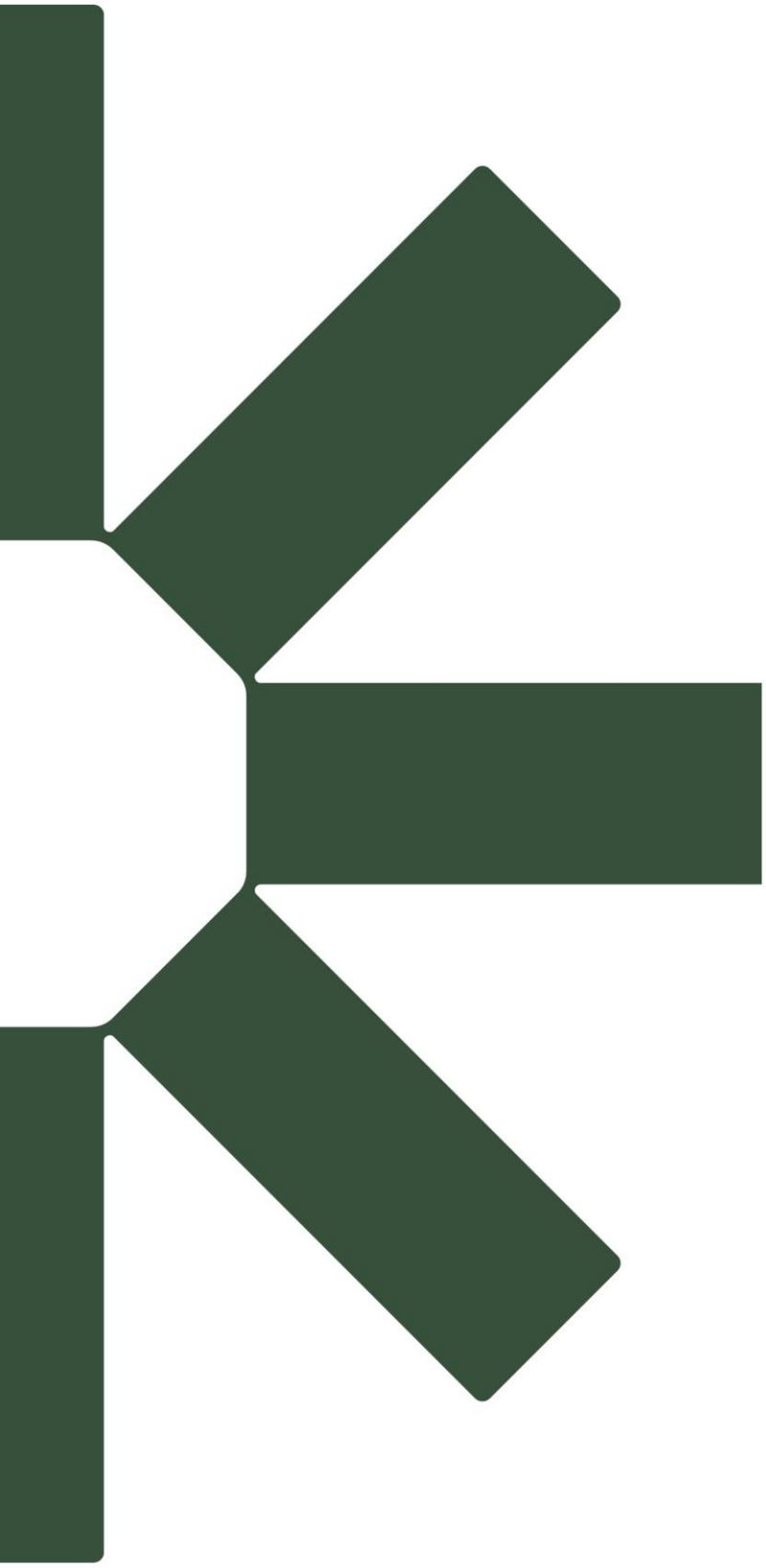
which, though not obviously of highly restrictive requirements, are nonetheless rarely recorded. Such species may be erratic in occurrence, and often require specific search of their specialist niches in order to be located; only in special circumstances are they expected merely on the grounds of broad habitat type.

Rare: typically, species with a particular and infrequently met habitat requirement, but sometimes merely highly geographically restricted. Such species are generally significantly less frequently found than apparently suitable habitat, and are expected, if at all, only when their very particular and special niche is found. They are expected to have very few populations within the county, unless it contains the core of a very restricted range or an unusual concentration of a very special habitat. Species falling into this category are usually expected to have already been assigned a formal conservation status. It is a useful category for groups and species which have not yet been included in formal reviews, or are disproportionately rare in this region, but it is infrequently used.

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

- Araneae. Bee et al., 2017. NBN Atlas (online, 2022).
- Coleoptera. Foster & Friday, 2011 & 2014. Luff, 2007, Lott & Anderson, 2011. Lott, 2009. Morris, 2008. NBN Atlas (online, 2022).
- Diptera. Chandler, 2017. NBN Atlas (online, 2022).
- Hemiptera-Heteroptera. Aukema & Rieger, 1995-2006. NBN Atlas (online, 2022). britishbugs.org.uk (online, 2022).
- Hymenoptera Aculeata. Falk & Lewington, 2015. bwars.com (online, 2022). NBN Atlas (online, 2022).
- Lepidoptera. Agassiz et al., 2013. NBN Atlas (online, 2022).
- Odonata. Cham et al., 2014. NBN Atlas (online, 2022).
- Orthoptera. Sutton, 2015. NBN Atlas (online, 2022).

The list has also been checked for any Priority species in the UK Biodiversity Action Plans (Biodiversity Reporting and Information Group, 2007). These are also species listed as "species of principal importance for the conservation of biodiversity" in Section 41 of the NERC Act, 2006. Such species are indicated in the summary species list by the abbreviation “BAP”. However, BAP statuses are erratically and inconsistently applied amongst invertebrates, and are largely irrelevant to assessment; needless to say, they are also often not the species of principal importance for the conservation of biodiversity.



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