

Tween Bridge Solar Farm

Environmental Statement Appendix 7.11: Invertebrate Scoping Report

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms
and Procedure) Regulations 2009

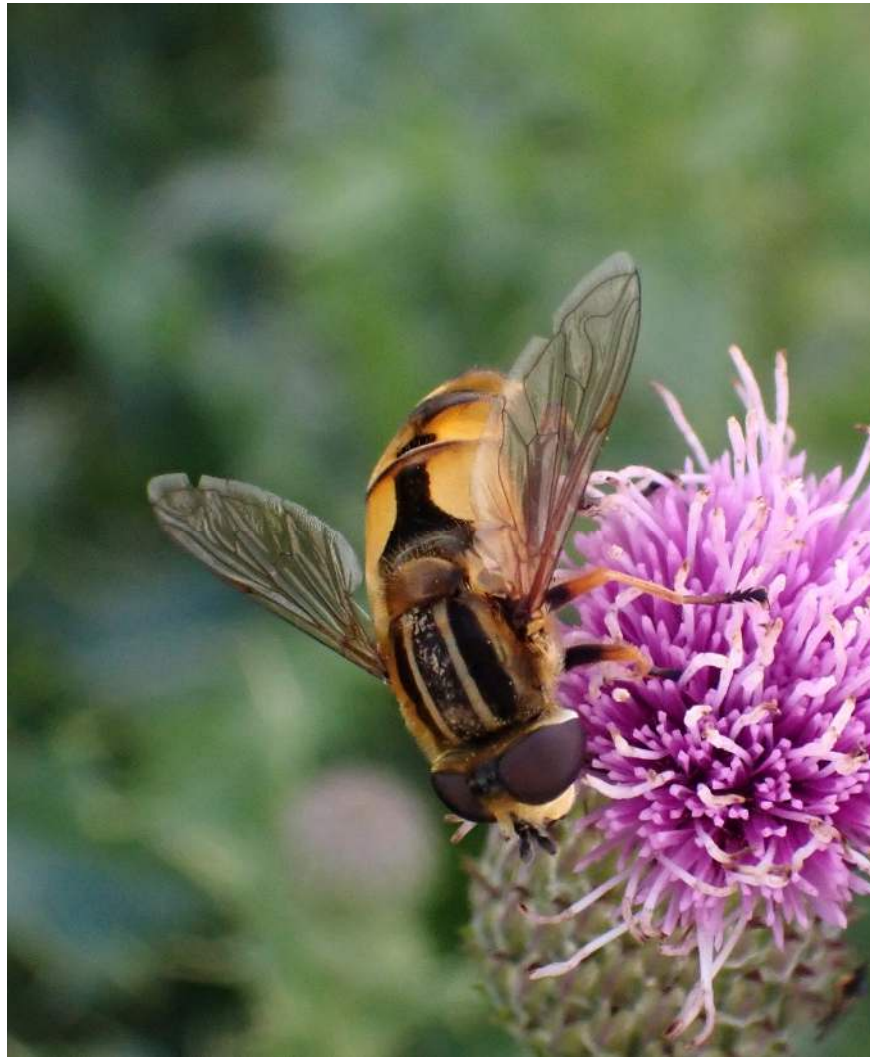
APFP Regulation 5(2)(a)

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Revision 1

Invertebrate scoping assessment of proposed renewable energy project at Tween Bridge



The wetland specialist hoverfly *Helophilus hybridus*

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Summary

Nine days fieldwork in September and October 2023 generated a total of 650 records of 198 invertebrate species. Seven of these have a current UK conservation status, although four of these are moths that are listed as Section 41 Priority¹ species for research only. The other three species have undergone large increases in abundance and range and will be downgraded at next review if populations remain at the current level.

Pantheon analysis showed none of the assemblages to be favourable. One or two of the lower grade assemblages such as rich flower resource may reach favourable status if survey were extended across the full season of invertebrate activity.

Introduction

This report covers the invertebrate interest of land at Tween Bridge in South Yorkshire, the area covered totalled approximately 1535 hectares. The vast majority of the area is intensive arable farmland, boundaries between many of the fields consist of coarse grassy margins (some under 1m but up to 10 metres in places). Many of the margins have coarse vegetation typical of nutrient enrichment such as nettle *Urtica dioica*, hogweed *Heracleum sphondylium*, broad-leaved dock *Rumex obtusifolius* and coarse grasses.

Herb-rich grassland is rare, there are examples with species such as bird's-foot trefoil *Lotus corniculatus*, common knapweed *Centaurea nigra*, yarrow *Achillea millefolium*, lady's bedstraw *Galium verum* and common cat's-ear *Hypochaeris radicata*. Ditches generally have water levels far below the field margin. Woodland cover is rare and hedgerows and field trees are sparsely represented. Examples occur at SE729129, SE700098, SE701098, SE71209 and SE717132.

Methods and timings

Survey was conducted in September and October 2023, weather conditions were largely favourable for invertebrate activity, with unseasonably warm weather during the October visit.

11/09/2023 8/8 cloud, moderate breeze, light showers PM., maximum temperature 21 Celsius.

12/09/2023 8/8 cloud, light breeze, heavy rain, maximum temperature 18 Celsius.

¹ Priority habitats and species are those identified as being of principal importance for the conservation of biodiversity in England. They are listed in Section 41 of the Natural Environment & Rural Communities Act 2006. The lists are derived from those UK BAP Priority habitats and species which occur in England.

13/09/2023 2/8 cloud, light breeze, maximum temperature 17 Celsius.

14/09/2023 7/8 cloud, light breeze, showers AM., maximum temperature 17 Celsius.

15/09/2023 3/8 cloud, light breeze, maximum temperature 21 Celsius.

16/10/2023 1/8 cloud, still, maximum temperature 15 Celsius.

17/10/2023 2/8 cloud, light breeze, maximum temperature 16 Celsius.

18/10/2023 2/8 cloud, fresh breeze, maximum temperature 17 Celsius.

19/10/2023 7/8 cloud, fresh breeze, maximum temperature 18 Celsius.

Sweep netting: random sampling of grassland and shrubs using a butterfly net, sweep-netting over bare ground, targeted sweeping of insects from flowers, shrubs, seepages.

Suction sampling of plants in grassland, moss and bare ground using a small 'dustbuster' electric vacuum cleaner.

Visual searching, particularly of flowering plants, edges of water bodies, turning over stones etc.

Beating tray: A large white canvas sheet that is held under trees and shrubs, collecting insects that are beaten from foliage or dead branches.

Most species are identified in the field. Some specimens are euthanized using ethyl acetate and are stored in 7ml glass snap top vials for identification at a later date (prior to report writing).

All species were recorded on iRecord and were analysed using Pantheon, an analytical tool for invertebrate samples developed by Natural England and Centre for Ecology and Hydrology.

Results

A total of 198 species were identified during survey work or later in the office using microscope and dichotomous keys. Seven species have a current UK conservation status (see Table 1). The breakdown of the invertebrate fauna includes 55 true flies, 46 beetles, 33 true bugs, 16 hymenoptera (ants, bees, wasps etc), 9 moths and 38 species from 9 other groups.

Seven species have a current UK conservation status and are listed in Table 1. All of these species are now relatively common and widespread and have increased in numbers and range in recent decades. The exception are the Section 41 Priority moths, while still common and widespread these species have undergone a significant decline in numbers over the same time period.

Table 1 Species with a current UK conservation status

Common & scientific name	Conservation status	Location	Ecological notes
Alder leaf beetle <i>Agelastica alni</i>	Nationally Rare Data Deficient (Very likely to be downgraded in any future review)	SE76190962 SE699098 SE70630877	Formerly considered extinct in Great Britain, this species was rediscovered in 2004 and has since spread rapidly. Will often defoliate alders and will also feed on a range of broad-leaved trees including hazel and willow.
Adonis' ladybird <i>Hippodamia variegata</i>	Nationally Scarce- category B (no longer warrants this status due to rapid spread in range)	SE722139 SE687101 SE715092	Widely distributed, formerly scarce in southern and eastern England, now increasing rapidly with records as far north as southern Scotland. Generally colonises warm areas such as arable margins and brownfield sites but now consolidating in semi natural grasslands. Adults and larvae are probably predators on other insects.
A plant bug <i>Lygus pratensis</i>	Red Data Book-Rare (Very likely to be downgraded in any future review)	SE72861310	Ecology of this species is poorly known though it seems to have a preference for open rides and glades in woodland and has been found in an area of heather and gorse. Formerly restricted to heaths in southern England this species has now been recorded from scattered localities in Great Britain with a concentration of records in central and southern England.

Common & scientific name	Conservation status	Location	Ecological notes
Grey dagger <i>Acronicta psi</i>	Section 41 Priority	SE72851266	Considered to be widely distributed and generally common in England and Wales and more scattered in Scotland. This moth has suffered a steep decline of around 65% over the last 25 years. Larvae feed on a wide range of foodplants, mainly trees and shrubs. Adults on the wing from May to August and occasionally as a second brood in September and October.
Knot grass <i>Acronicta rumicis</i>	Section 41 Priority	SE71121407 SE715092	Considered to be widely distributed and generally common across much of the British Isles although less common in Scotland. This moth has suffered a steep decline of 68% over a period of 25 years. Caterpillars feed on a range of herbaceous plants as well as leaves of trees and shrubs. Adults on the wing in May to July with a second brood in south from August to September.
Sallow <i>Cirrhia icteritia</i>	Section 41 Priority	SE75471369	Considered to be common and widespread across much of the British Isles. This moth has suffered a steep decline of 71% over a 25 year period. Larvae feed at first on willow catkins and then on a range of herbaceous plants. Adults fly in September and October.

Common & scientific name	Conservation status	Location	Ecological notes
Blood-vein <i>Timandra comae</i>	Section 41 Priority	SE71881226	Considered to be fairly common and widespread across England and Wales, although scarce in the far north of England and into Scotland. This moth has suffered a steep decline of 67% over a 25-year period. Larvae feed on herbaceous plants including docks. Two broods flying from May to September.

Nationally Rare (NR) A native species recorded from between 1- 15 hectads (10km x 10km square) of the Ordnance Survey national grid in Great Britain since 1990 and: • There is reasonable confidence that exhaustive recording would not find them in more than 15 hectads. • Where it is believed to occur as a breeding species within each of these hectads (i.e. discount those that are known to contain only casual immigrants).

Nationally Scarce or Nationally Notable species are those recorded within 16 to 100 hectads (10 km squares) in GB and hence are of significant nature conservation importance. The designation is sometimes split into Nationally Scarce A (16-30 hectads) and Nationally Scarce B (17 to 100 hectads).

Red Data Book category species (1 = endangered, 2 = vulnerable, 3 = rare, K = suspected of falling within categories 1-3, but insufficient information available, p = proposed for inclusion at next revision). The majority of invertebrate groups have so far not been subject to the IUCN (International Union for Conservation of Nature) criteria.

Priority species are those identified as being of principal importance for the conservation of biodiversity in England. They are listed in Section 41 of the Natural Environment & Rural Communities Act 2006. The lists are derived from those UK BAP Priority species which occur in England.

The species list was entered into Pantheon, a software application which assesses the importance of invertebrate assemblages. None of the species assemblage types (SATs) came close to being favourable (see Table 2). It is possible that one of the lower grade assemblages (such as rich flower resource) might reach favourable status if survey was spread across the whole season of invertebrate activity, but the implications for the development are unlikely to change.

The Pantheon analysis is unsurprising as in some cases the non-cultivated land is in short supply and is generally of low quality in nature conservation terms.

Table 2 Pantheon assemblage scores

Broad biotope	Habitat	SAT	Reported condition
open habitats		rich flower resource	Unfavourable (7 species, 15 required)
open habitats		scrub-heath & moorland	Unfavourable (4 species, 9 required)
tree-associated	decaying wood	heartwood decay	Unfavourable (1 species, 6 required)
open habitats	short sward & bare ground	bare sand & chalk	Unfavourable (1 species, 19 required)
open habitats	short sward & bare ground	open short sward	Unfavourable (1 species, 13 required)
wetland	acid & sedge peats	reed-fen & pools	Unfavourable (1 species, 11 required)

Management and mitigation

There should be no requirement for further invertebrate survey providing the management recommendations (particularly those in bold) are followed.

- **Establish herb-rich neutral grassland from seed sources of UK (preferably local) provenance. Species such as bird's-foot trefoil, yarrow, common knapweed, musk mallow, common cat's-ear, ox-eye daisy and lady's bedstraw should make up part of the species list.**
- **Areas of bare ground, both vertical and horizontal, should be retained or created in places that receive full sun for most of the day. These will provide nesting opportunities for burrowing bees and wasps as well as other heat loving invertebrates.**
- Some margins should be cultivated on rotation to provide opportunities for 'arable weeds' such as corn spurrey and other annuals.
- Increasing the water levels in ditches would help them support a better wetland vegetation and in turn a richer invertebrate fauna including aquatic species and terrestrial species with aquatic or semi aquatic larvae.
- **Maintaining ditch water levels should be carried out in conjunction with managers of the adjacent SSSIs.**
- Hedgerows should be allowed to grow to at least two metres tall, dense and managed on rotation so that there is always a large proportion that are able to produce flowers and fruit.
- Ensure that a proportion of margins along woodland edges and hedges are left unmanaged in some years. These will provide hollow stems for hole nesting solitary bees and wasps.
- Mature and open grown trees, including those on woodland edge and in hedgerows should not be absorbed into new woodland plantings. There should

be sufficient space for the trees to retain or expand their canopy to full diameter and to receive sufficient sunlight.

- There are formerly open grown trees in the woodland at SE727127 that have been surrounded by secondary growth of birch. Sensitive halo-thinning over time may allow these trees to reach maturity and senescence.

References

Fox, R., Conrad, K.F., Parsons, M.S. & Woiwod, I.P. 2006: *The state of Britain's larger moths*. Butterfly Conservation & Rothamsted Research. Wareham, Dorset

Hubble, D.S., 2014: *A review of the scarce and threatened beetles of Great Britain. The leaf beetles and their allies, Chrysomelidae, Megalopodidae and Orsodacnidae. Species status no. 19*. Natural England.

Hyman, P.S. & Parsons, M.S., 1992: *A Review of the scarce and threatened Coleoptera of Great Britain*. Part 1. JNCC. Peterborough.

Electronic resources

Pantheon analytical software

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. (2018). Pantheon - database version 3.7.6

Addendum: Area covered by invertebrate scoping survey

