HELIOS RENEWABLE ENERGY PROJECT

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Environmental Statement Appendix 8.7: Invertebrate Survey Report

June 2024

Helios Renewable Energy Project

on behalf of Enso Green Holdings D Limited

Technical Appendix 8.6: Invertebrate Scoping Assessment Report

avianecology

Report Verification and Declaration of Compliance

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Summary

Five days fieldwork in early July generated a total of 870 records of 235 invertebrate species. 6 of these have a UK conservation status. At 2.55% this is a low proportion of scarce or rare species reflecting the heavily modified nature of most of the land area surveyed.

The tortoise beetle *Cassida nebulosa* is classed as Nationally Scarce[1], Cereal stem moth *Ochsenheimeria vacculella* is Nationally Scarce A, the leafhopper *Pediopsis tiliae* is Nationally Notable category B, as are large yellow-faced bee *Hylaeus signatus* and hill cuckoo-bee *Bombus rupestris* (the latter two likely to be downgraded at next review). Caterpillars of the cinnabar moth *Tyria jacobaeae* were found, this is a Section 41 Priority[2] species.

The record of cereal stem moth is the first in the Mid-west Yorkshire vice county and only the second in Yorkshire, the first occurring in 1946. The tortoise beetle *Cassida nebulosa* is also likely to be new to Mid-west Yorkshire.

Pantheon[3] analysis showed the flower-rich resource assemblage (based on bees) to be favourable. None of the other assemblages were found to be favourable but both the bark and sapwood decay and fungal fruiting bodies (both associated with older open-grown trees) came close to being favourable. A full survey with three or four visits would see these assemblages and the scrub edge assemblage reach favourable condition.

Introduction

This report covers the invertebrate interest of the proposed Helios renewable energy site. An area of approximately 475 hectares and this received a walkover survey over five days between 3rd and 7th July 2023. A small area in the eastern part of the site couldn't be surveyed as agricultural operations were taking place there at the time. This area did not appear to be dissimilar to the rest of the site.

The majority of the site consists of arable land. The boundaries of the individual fields are variable. Ditches are frequent across the whole site, but many are dry or have low water levels. Some ditches support a wetland flora with species such as branched bur-reed *Sparganium erectum*, reed canary grass *Phalaris arundinacea*, common reed *Phragmites australis* etc.

Hedges vary from gappy and species poor examples that are less than 2 metres tall to dense, intact species-rich examples up to 6 metres tall with standard trees. Woodland blocks and

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[1] 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).

[2] 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.

[3] An online analytical tool for invertebrate samples developed by Natural England and Centre for Ecology and Hydrology.

shelter belts are scattered across the site. Some of the edges of these and some of the hedgerows and other field boundaries include mature trees, some with veteran features including dead limbs and bracket fungi.

An open grown ash tree showing wood decay features.

Field margins range from less than one metre in diameter up to 25 metres. Many are species poor, dominated by coarse grasses and other species tolerant of elevated nutrient levels such as nettle *Urtica dioica,* hogweed *Heracleum sphondylium* and broad-leaved dock *Rumex obtusifolius.* Better margins occur at SE61202759, where neutral grassland species such as common knapweed *Centaurea nigra* and goat's-beard *Tragopogon pratensis* occurred, oxeye daisy *Leucanthemum vulgare*, musk mallow *Malva moschata*, lady's bedstraw *Galium verum* and bird's-foot trefoil *Lotus corniculatus* are found in the margin at SE61922607.

Methods and timings

The survey was conducted over five days in early July 2023. Weather conditions were generally favourable for invertebrate activity.

3/7/2023 Heavy rain AM, occasional showers in afternoon, strong breeze, maximum temperature 16 Celsius.

4/7/2023 Sunny spells, 5/8 cloud, breezy, occasional showers, maximum temperature 18 Celsius.

5/7/2023 7/8 cloud, fresh breeze maximum temperature 18 Celsius.

6/7/2023 6/8 cloud, moderate breeze, maximum temperature 20 Celsius.

7/7/2023 Mostly sunny, 1/8 cloud, light breeze, maximum temperature 21 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 235 species were recorded over the five days fieldwork in July, 6 species have a conservation designation (see table 1). The breakdown included 72 beetle species, 52 true flies, 39 hymenopterans (bees, wasps, sawflies and ants), 36 true bugs, 12 moths, 10 butterflies, and 15 other species split between seven groups.

Table 1 Species with conservation designation

Common & scientific name	Conservation status	Location	Ecological notes
A tortoise beetle *Cassida nebulosa*	Nationally Scarce	SE64842524	A local and declined tortoise beetle, although one that has perhaps recovered somewhat in recent years. Associated mainly with Chenopodiaceae, especially fat-hen although possibly with other species in disturbed habitats. Scatterted records in England, mostly south of the Humber. Seems to have a stronghold in the Brecks on Norfolk/Suffolk border. Adults recorded from May to September.
A leafhopper *Pediopsis tiliae*	Nationally Notable-category B	SE65582608	A striking leafhopper with brown wings and unmarked yellow head and pronotum. Scattered records in the British Isles with most records south of the Mersey-Humber line. Adults on lime trees from June to September.
Cereal stem moth *Ochsenheimeria vacculella*	Nationally Notable-category A	SE61712570	A rare resident species with scattered records in Great Britain, mainly from south of Humber-Mersey line. Larvae feed in rye-grass, wheat and other grasses. Adults on the wing in July and August, often resting under bark.
Cinnabar moth *Tyria jacobaeae*	S41 Priority	SE63572668	Still very widespread but declining in England, Wales and the southern half of Scotland. Larvae feed on ragworts and groundsels *Senecio* especially common ragwort *S. jacobaea.* Adults fly from May to July.

Common & scientific name	Conservation status	Location	Ecological notes
Hill cuckoo bee *Bombus (Psithyrus) rupestris*	Nationally Notable-category B	SE62102595	Recorded widely in England and Wales, though very localised in occurrence. Rare in Scotland. It favours large expanses of flower-rich open habitats such as unimproved calcareous grassland, coastal grasslands, dunes and shingle. Females of this species kill the queens of red-tailed bumblebee and take over the nest; male and female eggs are laid and tended by the workers of the deposed red-tailed queen. Shows recent increase and spread northwards.
Large yellow-faced bee *Hylaeus signatus*	Nationally Notable-category B	SE64812523	Widespread though very local in occurrence from the south of England to Yorkshire (with outliers in Newcastle and Edinburgh). Range has increased in recent decades with brownfield sites supporting good populations. Pollen is collected exclusively from flowers of *Reseda*, with the nests in the dead woody stems of brambles and roses, or occasionally in hard clay banks. Adults recorded from Mid-June to September.

The species list was entered into Pantheon, a software application which assesses the importance of invertebrate assemblages. Only one assemblage was found to be favourable, this being the rich flower resource with 23 species where a favourable score requires 15. The qualifying species for this assemblage are bees, including honeybee, bumblebees and solitary bees. This is classed as a 'low-grade' assemblage as it is relatively easily achieved but still shows that there is value in the hedgerows, and better field margins.

Another 'low-grade' assemblage is the oner associated with scrub edge. This has a wider range of species groups associated with scrub, hedges and adjacent open grasslands. This was unfavourable with only 7 of the required 11 species found, however there is little doubt that a normal cycle of 3 or 4 visits over the course of a summer would see this assemblage reach favourable condition.

Two of the higher value assemblages would also likely reach favourable condition with further survey effort. The bark and sapwood decay assemblage (includes dead wood beetles, flies, but also solitary bees and wasps that utilise standing dead wood) with 14 from the 19 species required. This would achieve favourable condition particularly if a visit when hawthorn was

blossoming in May. Many saproxylic[4] beetles time their emergence as adults with hawthorn blossom, which fuels dispersal to other areas of larval habitat. The fungal fruiting bodies assemblage (beetles and other invertebrates associated with bracket fungi on trees) with 5 from 7 of the species required for favourable condition, this would likely achieve favourable status with survey effort in late summer/autumn.

Table 2 Pantheon assemblage scores

Broad biotope	Habitat	SAT	Reported condition
open habitats		rich flower resource	Favourable (23 species, 15 required)
tree-associated	decaying wood	bark & sapwood decay	Unfavourable (14 species, 19 required)
open habitats		scrub edge	Unfavourable (7 species, 11 required)
tree-associated	decaying wood	fungal fruiting bodies	Unfavourable (5 species, 7 required)
open habitats	short sward & bare ground	bare sand & chalk	Unfavourable (3 species, 19 required)
tree-associated	decaying wood	heartwood decay	Unfavourable (2 species, 6 required)
open habitats		scrub-heath & moorland	Unfavourable (1 species, 9 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.

- The most important habitat resource on the site is the older open grown trees that occur in fields, sometimes as features in hedgerows or on woodland edges. Many of

[4] Referring to an organism that is dependent on dead or decaying wood during its life cycle, including other organisms (such as fungi) that are dead wood dependant.

these have dead wood and decay features such as bracket fungi, dead limbs, heartwood decay and in some cases entire dead trees.

- Wherever possible these features should be retained intact and in situ. If maintenance is needed for safety or operational reasons, then dead wood features should again be retained as intact and close to source as possible.
- 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.
- 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.
- 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, ox-eye daisy and lady's bedstraw should make up part of the species list.

One of the more herb-rich margins at SE61922607.

- 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 common cudweed, corn spurrey etc.
- 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.

- Himalayan balsam *Impatiens glandulifera* is dominant in some of the ditches, efforts should be taken to eradicate this non-native species locally.

Areas of bare ground are important for nesting solitary bees and wasps.

References

Davis, A.M., 2012: *A Review of the Status of Microlepidoptera in Britain*. Butterfly Conservation, Wareham. (Butterfly Conservation Report No. S12-02).

Falk, S. 1991: *A review of the scarce and threatened bees, wasps and ants of Great Britain.* Research and survey in Nature Conservation 35. Nature Conservancy Council. Peterborough.

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.

Kirby, P., 1992: *A review of the scarce and threatened Hemiptera of Great Britain*. 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