HOLTON PITS, HALESWORTH

PRELIMINARY INVERTEBRATE SURVEY

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CONTENTS

1. INTRODUCTION

1.1 General Introduction

1.1.1 This report has been prepared by Adrian Knowles, Consultant Entomologist, for Holton Pits Community Interest Company. It comprises a preliminary survey of key invertebrate groups at the Holton Pits open space off Southwold Road, Holton, near Halesworth.

1.1.2 The site has recently been taken on by the local community group to manage it as an open space resource for local residents. Various suggestions are being discussed to enhance the site for wildlife, including the creation of a Sand Martin nesting cliff. Detailed data on the species present will also help guide future management of the existing features to benefit wildlife.

1.1.3 It has long been recognised that old sand and gravel pits can be valuable habitat for solitary-nesting bees (collectively known as mining bees) and solitary-nesting wasps (collectively, digger wasps). As these names suggest, many such species nest in holes or elongated galleries dug into the ground, with dry, sandy soil being preferred by most species. That said, many such species actually nest in dead wood, either excavating their own tunnels or utilising old galleries created by larvae of wood-boring beetles. Hollow plant stems are also used by some species.

1.1.4 Abandoned sandpits often develop short, patchy grassland (termed “acid grassland”), creating a mosaic of plants and bare ground. This vegetation can attract a range of scarce beetles and bugs that are able to exploit these hot, dry conditions and the plants that grow there. Many such insects are plant-specific, so that, for example, the weevil *Apion rubens* is only ever found on Sheep’s Sorrel plants. This plant is a characteristic component of acid grasslands.

1.2 Objectives of the Survey

1.2.1 This survey was commissioned in order to gather data on the existing invertebrate interest, with particular attention paid to the sandy cliffs and acid grassland vegetation at the northern end of the site.

1.3 Survey Methodology

1.3.1 The site was visited on 20th June, 24th June (brief visit), 15th July, 9th August and 29th August. On each occasion, various methods were used to sample the invertebrates present in the various habitats:

- Visual hunting of flying insects with a small hand net;
- Sweeping tall vegetation with a rigid-framed net;

- Use of a battery-powered suction sampler to extract specimens from the ground layer;
- Beating trees and bushes, to knock invertebrates into a white tray held below.

1.3.2 The survey primarily focussed on bees, wasps and ants; beetles; and bugs, although *ad hoc* records from other groups were also collected. Spiders and flies were not collected, since their identification would have required the services of external experts, which would have rapidly increased costs beyond the available, grant-aided budget.

1.3.3 A very small number of records from previous survey work by local naturalist Hawk Honey have been included, to provide a more thorough record of the bees and wasps present here.

1.3.4 Appendix 1 provides a competency statement for Adrian Knowles, the ecologist involved in this study.

1.4 Data Analysis Methods

1.4.1 The overall species list has been analysed using the "Pantheon" software being developed by Natural England and the UK Centre for Ecology and Hydrology (Webb *et al.*, 2018). This incorporates "ISIS" (Invertebrate Species-habitat Information System) which had previously been developed by Natural England as a tool to aid monitoring within Sites of Special Scientific Interest (SSSI). **It is not intended to be a tool to determine whether or not a site is worthy of SSSI status.**

1.4.2 Pantheon generates a good deal of additional data concerning the species assemblage being analysed, including resource requirements, conservation statuses and draft Species Quality Index (SQI) calculations. As such, it can be used to give guidance as to which habitats are the most important on any given site.

1.5 Conservation Statuses

1.5.1 The following section briefly explains the conservation statuses used in this report.

1.5.2 "Nationally Scarce" species have limited distributions as the result of precise habitat requirements, or climatic factors. As such, a Nationally Scarce species might be found across Great Britain but only sporadically, because it needs precise requirements, such as short turf calcareous grassland, large ancient woodland or wet seepages. Other species might be limited by climatic conditions and so only found in the relatively warm and dry south-east of England. Here, they might be quite widespread but not found at all outside their limited range.

1.5.3 “Nationally Threatened” Red Data Book species are felt to be at risk of national extinction. The most at risk are labelled RDB1 (Endangered), followed by RDB2 (Vulnerable) and RDB3 (Rare) for the less immediately threatened species.

1.5.4 “Section 41 Priority Species” – these are identified by the Natural Environment and Rural Communities (NERC) Act 2006 and are also known as Species of Principal Importance in England (SPIE). This list is, in essence, the answer to the question, “which species are most in need of conservation efforts and worthy of targeting resources at?”.

1.5.5 Although the majority of these species (formerly described as UK Biodiversity Action Plan Priority species) receive no direct legal protection, the NERC Act 2006 places an obligation on local authorities to have regard to their conservation and this is most obviously brought to bear through their planning control functions. As such, the presence of such species can be a material consideration to a planning decision. Hence, if changes to land use or alterations to a site are being proposed, it would be prudent to bear in mind the ecological requirements of these species, so that a mitigation or compensation strategy can be formulated so that there is no significant impact upon the populations of these critical species.

1.5.6 In non-planning scenarios, these species highlight those most in need of active management to enhance their habitat and benefit their population on a site.

1.6 Constraints of Methodology

1.6.1 It is recognised by the developers of Pantheon, and entomologists in general, that the ‘Species Quality Index’ analysis used in the analysis is an imprecise science, since it relies on assigning scores and undertaking calculations using published conservation statuses (e.g., Nationally Scarce, Red Data Book ‘threatened’). Not only do these scoring systems differ across different taxonomic groups, but many species have out-dated conservation statuses, with some species now being much rarer or more common than their published status suggests. These instances are discussed within the report text. Within the report text and the species list given in Appendix 2, square brackets are used to identify statuses which are generally recognised as being out of date, but which have not been updated by a formal review process.

1.6.2 It should be recognised that using Pantheon to analyse these data is pushing beyond the limits of its original intended use. SSSI condition monitoring usually entails a rigid, repeatable survey framework of timed events and different survey techniques. It was not intended to analyse data using variable amounts of survey effort to collect the data. Nevertheless, the

Pantheon output is a useful tool in describing the species assemblages present at a site and, importantly, their relative value within the site and within the specific survey regime employed.

1.6.3 Statements concerning national and local distribution patterns have been derived from several online resources, such as NBN Atlas and various national Recording Schemes. It is recognised that the results are inevitably patchy since they rely on individual recorders or recording groups to distribute their data for display. Published books and status reviews can help to mitigate these problems, but they are static descriptions that inevitably go out of date, compared with the more dynamic output from active recording schemes.

2. RESULTS

2.1 Survey Data Summary

2.1.1 Some 231 species were recorded during the survey, from 11 different taxonomic groups. These are tabulated in Appendix 2.

Taxonomic Group	No. of Species Recorded
Bees, wasps and ants (Hymenoptera)	78
True bugs (Hemiptera)	73
Beetles (Coleoptera)	54
True flies (Diptera)	8
Butterflies and moths (Lepidoptera)	8
Bush-crickets/grasshoppers (Orthoptera)	3
Lacewings (Neuroptera)	2
Woodlice (Isopoda)	2
Damselflies (Odonata)	1
Millipedes (Myriapoda)	1
Earwigs (Dermaptera)	1
TOTAL	231

2.2 Nationally Significant Species

2.2.1 Of these 231 species, 28 (12%) have been assigned a national conservation status of one level or another. Totalling the number of rare or scarce species within a site's overall species list is a slightly more refined way of gauging its nature conservation value, rather than merely looking at the total species list number. However, as cautioned in Section 1.6.1, above, it should be noted that current expert opinion suggests several species no longer merit their national scarcity/rarity statuses, with many species now known to be more widely distributed than previously thought. These are denoted here by having their statuses displayed in square brackets.

2.2.2 A few species are poorly known as British species and are listed as "data deficient". These are usually generally rare species and hence deserve a precise status of one form or another, but our current knowledge does not allow an accurate assessment to be made as to in which category they should be placed. Species that are thought to require review are still included in this synopsis of interesting species, despite being of less significance than was once thought.

2.2.3 Three of these species are listed as "Section 41 Priority Species" (see Section 1.5.4): the Five-banded Digger Wasp *Cerceris quinquefasciata*; the Small Heath butterfly *Coenonympha pamphilus*; and Cinnabar Moth *Tyria jacobaeae*. The latter species is one of a large group of moths that have been included in order to stimulate research into their populations. Whilst

many of these “research only” species are quite widespread, their populations are thought to be in decline.

2.2.4 The 28 species with a conservation status are listed below. Within each group, species are presented in alphabetical order, for ease of reference.

2.2.5 Coleoptera (Beetles)

Brachypera dauci [Nationally Scarce]

This weevil is associated with Common Stork’s-bill *Erodium cicutarium*, which is generally found in short, dry, sandy grasslands. It is thinly scattered across England, Wales and southern Scotland.

Strophosoma faber Nationally Scarce

This weevil feeds on the roots of various herbaceous plants.

2.2.6 Hemiptera (Bugs)

Agnocoris reclairei Nationally Scarce

This bug is most often associated with White Willows (*Salix alba*), with mature specimens of this tree present in the centre of the level grassland area.

Lygus pratensis [Nationally Threatened (RDB 3)]

This bug certainly no longer merits its Red Data Book status and might even not qualify for the lower status of Nationally Scarce. It has undergone a dramatic range expansion in the last 20-30 years, having previously been restricted to southern county heaths but now found widely across southern Britain in a variety of habitats.

2.2.7 Hymenoptera (Bees, Wasps and Ants)

Andrena trimmerana [Nationally Scarce]

This mining bee is now more widely distributed than when its status was published. It nests in galleries excavated in sandy banks with sparse vegetation cover. Most Suffolk records come from the south of the county, with relatively few for the north-east, where Holton is situated. Its nests are attacked by a “cuckoo bee”, *Nomada marshamella*, which was also recorded during this survey.

Auplopus carbonarius Nationally Scarce

This spider-hunting wasp is largely restricted to south-east England. In Suffolk it has been recorded sparingly across the county. It has a complex nesting behaviour, comprising the construction of clusters of small, barrel-shaped cells fashioned from small pellets of damp

clay which are constructed in a cavity, such as a hole in a wall or within loose joinery, behind loose tree bark and large snail shells.

Chrysis illigeri Nationally Scarce
East Anglia is a national stronghold for this ruby-tailed wasp, which is also common on the heaths of Surrey, Hampshire and Dorset. It is a “cuckoo wasp”, laying its eggs in the nests of the digger wasp *Tachysphex pompiliformis*. In Suffolk, it is quite common in the Brecks and is also known from records scattered along coastal districts. Its host was recorded in this survey.

Colletes cunicularius [Nationally Threatened, RDB 3]
This spring-nesting species was recorded by local entomologist Hawk Honey on a previous visit to the site. Its activity period is well before the current survey visits, collecting pollen from willow flowers in March and early April. It was formerly restricted to north-west England and North Wales but recently it has appeared across southern England. It is being speculated that this is the result of immigration from mainland Europe rather than an expansion of the long-standing native population. It is known in Suffolk from a handful of scattered sites, with this being the second for the north-east.

Cerceris quinquefasciata Section 41 Priority Species, [Nationally Threatened (RDB3)]
The Five-banded Digger Wasp is a “Section 41 Priority Species”. This status is based upon a decades-long decline in its populations within England and Wales, although in recent years it has proven to be widely found in suitable habitat in both East Anglia and the far south-east of England. As such, it may no longer merit its Red Data Book status. However, its preferred habitat – old, brownfield sites on sandy soils – are often targeted for development, so its habitats are under constant threat. In Suffolk, it has been widely recorded from the Brecks, the south-eastern heaths and along the coast.

It nests in moderately to steeply sloping, sparsely vegetated sandy ground, where it provisions its nest cells with a wide variety of common weevils. This is an example of where two very different habitat types are needed by one species: bare sandy slopes for nesting and extensive areas of rough grassland within which it can hunt for its prey. It is the host of the cuckoo wasp *Hedychrum niemelai* which was regularly recorded during this survey (and is discussed below).

Dasypoda hirtipes [Nationally Scarce]
This distinctive mining bee has been recorded from sites in Wales and southern England, with the main populations being in the south-east and East Anglia. In Suffolk it has been

recorded widely in Breckland and also in the sandy coastal districts. It nests in sparsely vegetated sandy soil in level or very gently sloping locations and forages for pollen largely from yellow-flowered members of the daisy family, such as ragworts, hawkbits, Common Cat's-ear and Dandelions.

Evagetes pectinipes Nationally Threatened, RDB1

Prior to 2007, this spider-hunting wasp was only known from the sand dune systems of Deal and Sandwich Bay in Kent. In 2007, it was discovered by the author at Walton Naze in north-east Essex. It has since been recorded in Sussex, Suffolk and Norfolk and so is clearly undergoing a range expansion that suggests its national status needs reviewing.

This is another "cuckoo" species, laying its eggs in the underground nests of other spider-hunting wasps, usually *Episyron rufipes*, which was also recorded during this survey. The host nests in shallow banks of very loose sand rather than the compacted sand faces favoured by many other species.

Hedychridium cupreum Nationally Scarce

This "cuckoo wasp" attacks the nests of the digger wasp *Dryudella pinguis*, which was recorded several times during the survey. It has a curious national distribution, being very thinly scattered across England, Wales and southern Scotland, roughly mirroring the distribution of its host. *Hedychridium cupreum* is a rare Suffolk species, with this being the first record for the north-east of the county, with only half a dozen known locations across the county.

Hedychrum niemelai [Nationally Threatened, RDB 3]

This "cuckoo wasp" attacks the nests of the digger wasp *Cerceris quinquefasciata* (described above). Both of these wasps were regarded as being Nationally Threatened (RDB3) but both are now more widely recorded across East Anglia and south-east England. A status of Nationally Scarce might be more appropriate. *H. niemelai* has been recorded from all the major sandy districts in Suffolk.

Heriades truncorum [Nationally Threatened (Data Deficient)]

Heriades truncorum is associated with two distinct habitat types: dead wood in sunny locations, where it nests in old beetle galleries; and open grassland, where its forage plants (typically Common Ragwort, *Jacobaea vulgaris*) are found. This is another good illustration of the fact that many insects need different habitats at different times of year and for different stages in their lifecycle.

This bee has been placed in the “data deficient” category within the national Red Data Book. This reflects a rapidly changing status following a large range expansion from its traditional distribution around the heaths of Surrey and Sussex. It is now widespread in East Anglia and south-east England and has been recorded from across Suffolk. As such, it probably no longer warrants this Nationally Threatened status, at any level. Its strong reliance on Ragwort flowers creates a conflict with the tendency to remove this plant from sites to stop it from spreading to pastures and meadows, where it can be toxic to livestock, if included in cut hay for winter food.

Lasioglossum malachurum [Nationally Scarce]

This mining bee is another species that no longer merits a national conservation status, it being very common in south-east England and the Midlands. It is probably one of the more common mining bees in Suffolk. It nests in sandy or clayey ground that is level or only gently sloping and forages at a very wide variety of flowering plants.

Lasioglossum pauperatum [Nationally Threatened, RDB 3]

This small mining bee is restricted to south-east England and East Anglia. It is known from only a handful of sites in Suffolk, with this being the second record in the north-east of the county. It is thought to nest in sparsely vegetated sandy banks.

Lasioglossum pauxillum [Nationally Scarce]

A recent range expansion suggests that it no longer merits this national status. Indeed, it is one of the more common species in Suffolk, in dry, sparse grassland, heaths and sandy brownfield locations. Nationally, it is widespread in central and southern England and East Anglia.

Lasioglossum puncticolle Nationally Scarce

This Nationally Scarce bee is becoming largely confined to southern and eastern coastal counties in the UK. In Essex it is widespread in coastal districts and rare elsewhere but in Suffolk there seems to less of a bias towards the coast, although it has been far less widely recorded here. It is often found foraging at Buttercups and umbellifers.

Nitela lucens [Nationally Threatened, Data Deficient]

This small wasp was only described as new to science in 2000. As such, it is uncertain just how rare it is, hence its “data deficient” status. It is seemingly a recent colonist to Suffolk, being first recorded in 2021 at Bury St Edmunds. Holton Pits is only the third Suffolk record and the first for east Suffolk vice county. It nests in galleries within dead wood in sunny locations, highlighting the value of standing dead trees.

Nomada fucata [Nationally Scarce]

This is a “cuckoo bee”, which attacks the nests of the mining bee *Andrena flavipes*, which nests as a large aggregation in the steep cliff slopes at the northern end of the site. *Nomada fucata* is now known widely across southern Britain and has been recorded across all parts of Suffolk where sandy soils prevail.

Nysson dimidiatus [Nationally Scarce]

This wasp has now been recorded across much of southern Britain and hence may not merit its Nationally Scarce status. It is quite common in the Suffolk Brecks but is rare in eastern districts, with this being only the second record for the north-east. It was recorded by Hawk Honey in September 2023 but not during the 2024 survey. It is another “cuckoo” species, normally attacking the nests of the digger wasp *Harpactus tumidus*, although this was not recorded during the survey. This host is rarely found in large numbers so is easily overlooked.

Nysson trimaculatus [Nationally Scarce]

This wasp has been recorded across southern Britain and no longer merits its Nationally Scarce status. It has been recorded from sites scattered across much of Suffolk. It is a “cuckoo”, attacking the nests of wasps in the genus *Gorytes*, although no such species were recorded in this survey.

Philanthus triangulum [Nationally Threatened (RDB2)]

The Bee Wolf is well known as a predator of Honeybees. Up until 30 years ago, it was a great national rarity, restricted to the Isle of Wight, adjacent parts of the Sussex/Hampshire coast and a single Suffolk location. The current distribution map shows records across southern Britain, southwards from Yorkshire and Lancashire. As such, this digger wasp certainly does not merit its UK Red Data Book status and arguably is not even Nationally Scarce, although it may remain vulnerable to climatic fluctuations and consequent reduction in distribution. In Suffolk it has been recorded from across the county, with concentrations of records from the north-west, the east coast and south-east, where sandy soils are found. It usually nests in moderately sloping, sparsely vegetated banks where it can form large colonies. It is not thought to be a significant threat to the viability of managed honeybee hive populations.

Sphecodes crassus [Nationally Scarce]

The so-called blood bees (on account of their partially dark red coloration) are “cuckoo” species and *S. crassus* attacks the nests of mining bees in the genus *Lasioglossum*, probably including *L. pauxillum* (discussed above). *Sphecodes crassus* is now quite widespread across southern Britain and has been widely, though sparingly, recorded across Suffolk.

Sphecodes miniatus Nationally Scarce

This remains a genuinely scarce bee, restricted to East Anglia and south-east England but has been quite well recorded across Suffolk. It also attacks the nests of *Lasioglossum* bees.

Sphecodes niger [Nationally Threatened, RDB 3]

This bee is now quite common across the southern third of Britain and certainly does not merit its current published status. It is known in Suffolk from a few, scattered records across most of the county. It attacks the nests of the small mining bee *Lasioglossum morio*, which is one of the most common mining bees in Suffolk.

2.2.8 Lepidoptera (Butterflies and Moths)

Coenonympha pamphilus Section 41 Priority Species

The Small Heath butterfly currently remains a relatively common and widespread species in Suffolk and occurs throughout Britain. However, its populations have seen significant long-term decline in recent decades. It tends to inhabit short, dry grasslands where the larvae feed on various grasses, including Bents (*Agrostis* spp)., Fescues (*Festuca* spp.) and Meadow-grasses (*Poa* spp.).

At Holton Pits it is likely to be utilising the slightly longer bent-grass (*Agrostis*) swards away from the heavily trampled ground. It is important that this grassland resource is available for its caterpillars throughout the summer.

Tyria jacobaeae Section 41 Priority Species (research only)

The yellow and black caterpillars of the Cinnabar moth are a well-known site and still widespread across the country, including Suffolk. However, its population is in decline. This might be fuelled by the modern tendency to remove Ragwort wherever it grows for fear that it will seed itself into paddocks and hay meadows and hence enter the food chain of livestock. When dried in hay, the plant can be toxic to horses.

There is currently plenty of ragwort growing around the pits and I do not see any clear reason why it should be controlled as yet.

2.3 Locally Significant Species

2.3.1 The following catalogue of species are those which do not have a national conservation status but are nevertheless significant at a county level or are of particular interest for the site.

2.3.2 Coleoptera (Beetles)

Pyrrhalta viburni

Whilst this leaf beetle is widespread in central and south-eastern England, it has a precise niche, being found only on Viburnum bushes. A single bush of Wayfaring Tree *Viburnum lantana* grows in the flat grassland between the cliffs and the car park.

2.3.3 Hemiptera (Bugs)

Conomelus anceps

This main point of interest with this planthopper is that it feeds on rushes and is therefore part of the fauna that relies on the damp patch of ground with rushes in the middle of the otherwise very dry site.

Dictyonota strichnocera

As its name suggests, the Gorse Lacebug feeds on Gorse and is one of several species that specialise on Gorse plants. Another is the weevil *Exapion ulicis*, which was also found here. In some heathland and acid grassland locations, Gorse can become a dominant shrub that requires control, but small patches are beneficial for this reason.

Ischnocoris angustulus

The British Bugs website describes this ground bug as, “Abundant on heathland in southern England and recorded as far north as Scotland… this species feeds on heather and probably other plants.” It is interesting that this heathland specialist should be found here, perhaps attempting to utilise “other plants”. The Pits are not too distant from the heathlands of Wenhaston and this bug may be dispersing from the Heathers found there.

Megacoelum beckeri

This bug generally inhabits Scots Pine trees, with a large standard present in the oak wood near the cliffs. The pine itself was not sampled so this individual must have strayed onto the oak below, which was sampled. Its presence merely highlights the value of keeping isolated conifers even if they are not native to the area.

2.3.4 Hymenoptera (Bees, Wasps and Ants)

Colletes hederae

The Ivy Bee is a relatively new colonist of this country, being first recorded in 2001. It is now widespread in southern Britain. It is mentioned here because its large nesting aggregations can cause alarm amongst people nervous of bees. In the late August visit, large numbers of males were seen zooming around close to the ground in front of the eastern end of the cliffs. They would have been looking for mates. These bees are quite harmless to most people (in

fact, males cannot sting at all). They are very loathed to sting although people with sensitivity to stings should take care.

Miscophus bicolor

This small black and red wasp was discovered new to Britain by the author in 2003, at Maidscross Hill near Lakenheath. Since then, it has been found at a number of sites along the Norfolk/Suffolk border but Holton Pits is thought to be only the ninth place in the whole of Britain where it has been found. In reality, it is bound to be in other localities awaiting discovery but it is nevertheless a rare insect in this country. It nests in steep, sandy banks and hunts small spiders as food for its larvae.

Odynerus spinipes

The Spiny Mason Wasp has been recorded widely but sparingly across southern Britain but remains a rare Suffolk insect, this being about the seventh known locality and the third for the north-east of the county. Members of the genus *Odynerus* have an interesting tendency to construct narrow curved chimneys at the entrance to their nest burrows – see picture below. At present, their nesting activity appears to be limited to the small area of vertical sand, shown on the front page of this report. It does not nest in anything other than vertical faces.

"Chimney" built over the entrance to a nest of the Spiny Mason Wasp.

2.3.5 Nests of this wasp are attacked by the cuckoo wasp *Chrysis mediata.* This ruby-tailed wasp is one of a group of very similar species that are difficult to identify, so it may be under-recorded in Suffolk but this is one of only six known localities in the county.

2.4 Pantheon Assemblage Analysis

2.4.1 The presence of nationally or locally scarce or threatened species is not the only important quality that a site might possess. It might also be of value because it exhibits a wide range of species that are "typical" for its type; *e.g.*, it might be an excellent example of a lowland acid grassland invertebrate assemblage, supporting many or all of the species that one would expect to find in such a habitat, knowing their feeding or breeding habits. These might be relatively common species, rather than national rarities, but nevertheless highly characteristic of a particular habitat type. A good assemblage would suggest that the habitat is "mature"

2.4.2 The habitat analysis in Pantheon has a three-stage hierarchy. The lowest level comprises Broad Biotopes. These are then sub-divided into Habitats, each of which usually generates one or more Specific Assemblage Types (SAT), although it should be noted that some SATs are derived directly from Broad Biotopes, without the intermediate Habitats stage.

2.4.3 Pantheon uses a value known as an SQI to calculate the relative value of Habitats and SATs. SQI refers to a Species Quality Index. This is an attempt at placing a numerical value (largely for the purposes of site comparison) on the conservation importance of the species assemblage present and is based on assigning different numerical values to the different conservation statuses. Thus, common species score low, Nationally Scarce species score higher and Nationally Threatened species score higher still. This is a tool which is still in development, with no accurate threshold for what constitutes a "good" site. A habitat that only supports common species would score 100. The number of species with a conservation status can also be used as a crude measure of a site's value to invertebrate conservation. Whilst the age of the conservation status reviews on which these calculations are based vary considerably, leading to some species requiring revised statuses, the SQI calculation nevertheless provides a reasonable tool for comparing data, where the inconsistencies are at least applied equitably.

2.5 Habitats

2.5.1 Table 1, below, shows the Habitats associated with the main Broad Biotopes identified. This has been generated by pooling together all of the survey data.

Broad Biotope	Habitat	No. of species	SQI	Species with conservation status
Open Habitats	Tall Sward and Scrub	71	100	1
Open Habitats	Short Sward and Bare Ground	82	159	22
Tree-associated	Arboreal	31	110	1

Table 1. Main Pantheon Habitats present.

2.5.2 It should be noted that several other Habitats have been identified from the dataset, but they are all represented by relatively few species which generate unreliable SQI values.

2.5.3 This table clearly shows that the most important habitat is “short sward and bare ground”. This would include the bare sandy cliff faces, the sparsely vegetated lower slopes of the cliffs and also much of the floor of the pit where a short turf exists. This habitat is the most populous (with 82 species exploiting this habitat) and has the most valuable conservation resource in terms of scarce or rare species (SQI of 159 and 22 species with a conservation status).

3. DISCUSSION

3.1 General Summary

3.1.1 This short survey has revealed that the pits support an important assemblage of insects, including national rarities, nationally scarce species and several significant species in a county context.

3.1.2 As was anticipated, the most valuable parts of the pits are the sandy cliffs and the flat, sparsely vegetated ground in front of them.

3.1.3 Characteristic species were also found associated with oaks, willows, Gorse scrub and even the small patches of rushes in a hollow within the open grassland.

3.1.4 Three "Section 41 Priority species" were recorded during the survey. These are species deemed to be a priority target for conservation efforts to halt significant population decline. These three are listed below, along with their habitat requirements:

- Five-banded Digger Wasp *Cerceris quinquefasciata*. It requires steeply sloping, sparsely vegetated sandy banks in a sunny location as its nesting site. It will be hunting widely in rough grassland for its weevil prey.
- Small Heath butterfly *Coenonympha pamphilus*. The caterpillars feed on shorter, finer grasses and is probably using bent-grasses (*Agrostis* spp.) here.
- Cinnabar moth *Tyria jacobaeae.* The caterpillars feed on Common Ragwort. Its recent decline may be worsened by the modern trend of removing this plant from sites for fear of its affecting nearby pasture/hay meadows.

3.1.5 Proposals to create a Sand Martin cliff would be beneficial to insects such as the Spiny Mason Wasp *Odynerus spinipes* that nest in vertical sandy cliff faces. Removing some of the Stinging Nettle cover from other parts of the cliff to re-expose steeply sloping sand would benefit many of the other important ground-nesting bees and wasps, such as the nationally rare *Miscophus bicolor*.

3.1.6 Standing dead wood should be left in place, unless it is perceived to be a danger to members of the public. The current dead wood features are home to a very scarce wasp, *Nitela lucens.*

Bibliography and References

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APPENDIX 1: COMPETENCY STATEMENT

Adrian Knowles started his ecological career in 1987 with Hampshire County Council, undertaking specialist botanical surveys of key habitats in connection with their Heritage Sites policy at the time. A brief stint as a college lecturer was followed by nearly thirty years' experience with the Essex Wildlife Trust and its consultancy subsidiary, Essex Ecology Services Ltd. During this time, he co-authored various editions of the Local Wildlife Site (LoWS) selection criteria and was involved with undertaking LoWS surveys, at least in part, in all 14 local authorities in the county.

During this time with the Essex Wildlife Trust he undertook numerous Preliminary Ecological Appraisals across the county. He also gained experience of a wide range of more detailed species surveys and mitigation work, including the construction of artificial Badger setts and relocating Badgers from setts requiring closure. Regular work has included Great Crested Newt surveys under a Class 1 licence and also occasional translocation exercises, under licence. He also holds a Class 1 licence allowing him to undertake Dormouse surveys and is also a regular volunteer with the Essex and Suffolk Dormouse Group as co-ordinator for two National Dormouse Monitoring Project sites.

He has been County Recorder for Aculeate Hymenoptera (bees, wasps and ants) within the Suffolk Naturalists' Society since 2001 and in 2011 was accepted as a Fellow of Royal Entomological Society in recognition of his work with this insect group. This has developed into a wider interest in invertebrates, undertaking numerous surveys and he has become skilled in the use of the 'Pantheon' software being developed by CEH and Natural England. Since 2021 he has been the Hemiptera Recorder for the Suffolk Naturalists' Society and in 2024 was made Essex County Recorder for Homopteran bugs.

APPENDIX 2: SPECIES LIST

Order	Family	Species	Common Name	Conservation status	Habitat
Coleoptera	Apionidae	Apion haematodes	a weevil		
(Beetles)		Apion rubens	a weevil		
		Aspidapion aeneum	a weevil		tall sward & scrub
		Ceratapion carduorum	a weevil		tall sward & scrub
		Exapion ulicis	a weevil		
		Protapion apricans	a weevil		tall sward & scrub
		Protapion fulvipes	a weevil		tall sward & scrub
		Protapion trifolii	a weevil		tall sward & scrub
	Cantharidae	Malthinus seriepunctatus	a soldier beetle		decaying wood
		Rhagonycha fulva	a soldier beetle		tall sward & scrub
	Carabidae	Amara tibialis	a ground beetle		short sward & bare ground
		Bembidion guttula	a ground beetle		marshland
		Bembidion properans	a ground beetle		short sward & bare ground
		Harpalus affinis	a ground beetle		short sward & bare ground
		Microlestes minutulus	a ground beetle		short sward & bare ground
		Notiophilus substriatus	a ground beetle		short sward & bare ground
		Paradromius linearis	a ground beetle		tall sward & scrub
		Pterostichus madidus	a ground beetle		tall sward & scrub
		Syntomus foveatus	a ground beetle		short sward & bare ground
	Cerambycidae	Agapanthia villosoviridescens	a longhorn beetle		tall sward & scrub
		Rutpela maculata	a longhorn beetle		decaying wood
	Chrysomelidae	Chaetocnema hortensis	a leaf beetle		tall sward & scrub
		Cryptocephalus fulvus	a leaf beetle		short sward & bare ground
		Cryptocephalus moraei	a leaf beetle		short sward & bare ground
		Cryptocephalus pusillus	a leaf beetle		arboreal
		Pyrrhalta viburni	a leaf beetle		arboreal
		Sphaeroderma testaceum	a leaf beetle		tall sward & scrub
	Coccinellidae	Adalia bipunctata	Two-spot Ladybird		
		Adalia decempunctata	10-spot Ladybird		arboreal
		Coccinella septempunctata	Seven-spot Ladybird		
		Exochomus quadripustulatus	Pine Ladybird		arboreal
		Harmonia axyridis	Harlequin Ladybird		
		Rhyzobius litura	a ladybird		tall sward & scrub
		Subcoccinella vigintiquattuorpunctata	24-spot Ladybird		tall sward & scrub
		Tytthaspis sedecimpunctata	16-spot Ladybird		tall sward & scrub

	Curculionidae	Andrion regensteinense	a weevil		
		Archarius pyrrhoceras	a weevil		arboreal
		Brachypera dauci	a weevil	[Nationally Scarce]	short sward & bare ground
		Curculio glandium	Acorn Weevil		arboreal
		Otiorhynchus sulcatus	a weevil		
		Parethelcus pollinarius	a weevil		tall sward & scrub
		Rhinoncus castor	a weevil		
		Rhinoncus perpendicularis	a weevil		marshland
		Sitona hispidulus	a weevil		tall sward & scrub
		Sitona lineatus	a weevil		tall sward & scrub
		Sitona obsoletus	a weevil		tall sward & scrub
		Strophosoma faber	a weevil	Nationally Scarce	short sward & bare ground
		Strophosoma melanogrammum	a weevil		arboreal
	Melyridae	Anthocomus rufus	a soft-winged flower beetle		acid & sedge peats
	Nitidulidae	Meligethes aeneus	a pollen beetle		
	Oedemeridae	Oedemera lurida	a false blister beetle		tall sward & scrub
		Oedemera nobilis	a false blister beetle		tall sward & scrub
	Staphylinidae	Tachyporus hypnorum	a rove beetle		tall sward & scrub
	Tenebrionidae	Lagria hirta	a darkling beetle		tall sward & scrub
Diptera	Conopidae	Sicus ferrugineus	Ferruginous Bee-grabber		short sward & bare ground
(Flies)		Thecophora atra	Small Beegrabber		short sward & bare ground; tall sward & scrub
	Syrphidae	Episyrphus balteatus	Marmalade Hoverfly		tall sward & scrub
		Eristalis arbustorum	a hoverfly		acid & sedge peats
		Eristalis horticola	a hoverfly		acid & sedge peats
		Eristalis pertinax	a hoverfly		acid & sedge peats
		Sphaerophoria scripta	a hoverfly		tall sward & scrub
		Xanthogramma pedissequum	a hoverfly		
Hemiptera	Acanthosomatidae	Elasmucha grisea	Parent bug		arboreal
(Bugs)	Anthocoridae	Anthocoris confusus	a flower bug		arboreal
		Anthocoris nemoralis	a flower bug		arboreal
		Anthocoris nemorum	a flower bug		
		Cardiastethus fasciiventris	a flower bug		arboreal; decaying wood
		Orius niger	a flower bug		tall sward & scrub
		Temnostethus pusillus	a flower bug		
	Aphrophoridae	Aphrophora alni	Alder Spittlebug		
		Neophilaenus campestris	a spittlebug		tall sward & scrub
	Cicadellidae	Alebra albostriella	a leafhopper		arboreal

		Cicadella viridis	a leafhopper		
		Doratura stylata	a leafhopper		tall sward & scrub
		Eupteryx urticae	a leafhopper		tall sward & scrub
		Kybos ludus	a leafhopper		arboreal
		Macropsis prasina	a leafhopper		arboreal
		Oncopsis tristis	a leafhopper		arboreal
		Psammotettix confinis	a leafhopper		tall sward & scrub
		Thamnotettix dilutior	a leafhopper		tall sward & scrub
	Cixiidae	Reptalus quinquecostatus	a planthopper		
	Coreidae	Coreus marginatus	Dock Bug		tall sward & scrub
		Coriomeris denticulatus	Denticulate Leatherbug		short sward & bare ground
		Syromastus rhombeus	Rhomboid Leatherbug		short sward & bare ground
	Delphacidae	Conomelus anceps	a planthopper		
		Hyledelphax elegantula	a planthopper		tall sward & scrub
		Javesella pellucida	a planthopper		tall sward & scrub
	Lygaeidae	Cymus melanocephalus	a ground bug		tall sward & scrub
		Heterogaster urticae	a ground bug		tall sward & scrub
		Ischnocoris angustulus	a ground bug		short sward & bare ground
		Kleidocerys resedae	a ground bug		arboreal
		Nysius huttoni	a ground bug		
		Peritrechus lundii	a ground bug		tall sward & scrub
		Stygnocoris fuligineus	a ground bug		tall sward & scrub
	Miridae	Acetropis gimmerthalii	a plant bug		tall sward & scrub
		Agnocoris reclairei	a plant bug	Nationally Scarce	arboreal
		Amblytylus nasutus	a plant bug		tall sward & scrub
		Apolygus spinolae	a plant bug		tall sward & scrub
		Deraeocoris lutescens	a plant bug		arboreal
		Dicyphus globulifer	a plant bug		tall sward & scrub
		Halticus luteicollis	a plant bug		short sward & bare ground
		Leptopterna dolabrata	a plant bug		tall sward & scrub
		Leptopterna ferrugata	a plant bug		tall sward & scrub
		Liocoris tripustulatus	a plant bug		tall sward & scrub
		Lygocoris pabulinus	a plant bug		tall sward & scrub
		Lygus pratensis	a plant bug	[Nationally Threatened, RDB 3]	
		Megacoelum beckeri	a plant bug		arboreal
		Megaloceroea recticornis	a plant bug		tall sward & scrub
		Megalocoleus tanaceti	a plant bug		short sward & bare ground

		Notostira elongata	a plant bug		tall sward & scrub
		Orthotylus marginalis	a plant bug		arboreal
		Orthotylus nassatus	a plant bug		arboreal
		Orthotylus ochrotrichus	a plant bug		tall sward & scrub
		Phytocoris ulmi	a plant bug		arboreal
		Phytocoris varipes	a plant bug		tall sward & scrub
		Pilophorus clavatus	a plant bug		arboreal
		Plagiognathus arbustorum	a plant bug		tall sward & scrub
		Plagiognathus chrysanthemi	a plant bug		short sward & bare ground
		Psallus confusus	a plant bug		arboreal
		Psallus haematodes	a plant bug		arboreal
		Psallus varians	a plant bug		arboreal
		Salicarus roseri	a plant bug		arboreal
		Stenodema calcarata	a plant bug		tall sward & scrub
	Nabidae	Himacerus major	a damsel bug		tall sward & scrub
		Himacerus mirmicoides	a damsel bug		tall sward & scrub
		Himacerus apterus	a damsel bug		arboreal
		Nabis ferus	a damsel bug		tall sward & scrub
		Nabis rugosus	a damsel bug		tall sward & scrub
	Pentatomidae	Aelia acuminata	Bishop's Mitre Bug		tall sward & scrub
		Dolycoris baccarum	Hairy Shieldbug		tall sward & scrub
		Palomena prasina	Common Green Shieldbug		tall sward & scrub
	Rhopalidae	Stictopleurus abutilon	a scentless plant bug		short sward & bare ground
	Tingidae	Acalypta parvula	a lace bug		short sward & bare ground
		Dictyonota strichnocera	a lace bug		
		Kalama tricornis	a lace bug		short sward & bare ground
Hymenoptera	Andrenidae	Andrena flavipes	a mining bee		short sward & bare ground
(Bees, Wasps, Ants)		Andrena semilaevis	a mining bee		short sward & bare ground
		Andrena trimmerana	a mining bee	[Nationally Scarce]	short sward & bare ground
	Apidae	Anthophora bimaculata	a mining bee		short sward & bare ground
		Anthophora plumipes	a mining bee		short sward & bare ground
		Apis mellifera	Honeybee		
		Bombus lapidarius	Red-tailed Bumblebee		tall sward & scrub
		Bombus pascuorum	Common Carder-bee		tall sward & scrub
		Epeolus variegatus	a variegated cuckoo-bee		short sward & bare ground
		Melecta albifrons	a mourning bee		short sward & bare ground
		Nomada fabriciana	a nomad bee		short sward & bare ground

		Nomada fucata	a nomad bee	[Nationally Scarce]	short sward & bare ground
		Nomada goodeniana	a nomad bee		short sward & bare ground
		Nomada marshamella	a nomad bee		short sward & bare ground
	Chrysididae	Chrysis illigeri	a cuckoo wasp	Nationally Scarce	short sward & bare ground
		Chrysis mediata	a cuckoo wasp		decaying wood
		Hedychridium cupreum	a cuckoo wasp	Nationally Scarce	short sward & bare ground
		Hedychridium roseum	a cuckoo wasp		short sward & bare ground
		Hedychrum niemelai	a cuckoo wasp	[Nationally Threatened, RDB 3]	short sward & bare ground
		Hedychrum nobile	a cuckoo wasp		
		Trichrysis cyanea	a cuckoo wasp		decaying wood
	Colletidae	Colletes cunicularius	a mining bee	[Nationally Threatened, RDB 3]	short sward & bare ground
		Colletes daviesanus	a mining bee		short sward & bare ground
		Colletes fodiens	a mining bee		short sward & bare ground
		Colletes hederae	a mining bee		short sward & bare ground
		Hylaeus brevicornis	a yellow-faced bee		tall sward & scrub
		Hylaeus hyalinatus	a yellow-faced bee		decaying wood
	Crabronidae	Cerceris quinquefasciata	Five-banded Digger Wasp	[Nationally Threatened, RDB3]; Section 41 Priority Species	short sward & bare ground
		Cerceris rybyensis	Ornate-tailed Digger Wasp		short sward & bare ground
		Diodontus luperus	a black wasp		short sward & bare ground
		Diodontus minutus	Minute Black Wasp		short sward & bare ground
		Diodontus tristis	Melancholy Black Wasp		short sward & bare ground
		Dryudella pinguis	a digger wasp		short sward & bare ground
		Entomognathus brevis	a digger wasp		short sward & bare ground
		Mimesa equestris	a digger wasp		short sward & bare ground
		Mimesa lutaria	a digger wasp		short sward & bare ground
		Miscophus bicolor	a digger wasp		short sward & bare ground
		Nitela lucens	a digger wasp	[Nationally Threatened, Data Defficient]	decaying wood
		Nysson dimidiatus	a digger wasp	[Nationally Scarce]	short sward & bare ground
		Nysson trimaculatus	a digger wasp	[Nationally Scarce]	shaded woodland floor
		Oxybelus uniglumis	a digger wasp		short sward & bare ground
		Philanthus triangulum	Bee Wolf	[Nationally Threatened, RDB 2]	short sward & bare ground
		Tachysphex pompiliformis	a digger wasp		short sward & bare ground
		Trypoxylon figulus	a digger wasp		decaying wood

	Formicidae	Formica fusca	an ant		
		Lasius fuliginosus	Jet Black Ant		decaying wood
		Lasius niger	Black Garden Ant		short sward & bare ground
	Halictidae	Lasioglossum calceatum	a mining bee		short sward & bare ground
		Lasioglossum malachurum	a mining bee	[Nationally Scarce]	short sward & bare ground
		Lasioglossum minutissimum	a mining bee		short sward & bare ground
		Lasioglossum morio	a mining bee		short sward & bare ground
		Lasioglossum parvulum	a mining bee		short sward & bare ground
		Lasioglossum pauperatum	a mining bee	[Nationally Threatened, RDB 3]	short sward & bare ground
		Lasioglossum pauxillum	a mining bee	[Nationally Scarce]	short sward & bare ground
		Lasioglossum puncticolle	a mining bee	Nationally Scarce	short sward & bare ground
		Lasioglossum villosulum	a mining bee		short sward & bare ground
		Sphecodes crassus	a blood bee	Nationally Scarce	short sward & bare ground
		Sphecodes ephippius	a blood bee		short sward & bare ground
		Sphecodes geoffrellus	a blood bee		short sward & bare ground
		Sphecodes miniatus	a blood bee	Nationally Scarce	short sward & bare ground
		Sphecodes monilicornis	a blood bee		short sward & bare ground
		Sphecodes niger	a blood bee	[Nationally Threatened, RDB 3]	short sward & bare ground
	Megachilidae	Coelioxys conoidea	a sharp-tailed bee		short sward & bare ground
		Heriades truncorum	Large-headed Resin Bee	[Nationally Threatened, Data Deficient]	decaying wood
		Megachile maritima	Coast Leafcutter Bee		short sward & bare ground
	Melittidae	Dasypoda hirtipes	a mining bee	[Nationally Scarce]	short sward & bare ground
	Mutillidae	Myrmosa atra	Least Velvet-ant		short sward & bare ground
	Pompilidae	Agenioideus cinctellus	a spider-hunting wasp		short sward & bare ground
		Anoplius viaticus	a spider-hunting wasp		short sward & bare ground
		Arachnospila anceps	a spider-hunting wasp		tall sward & scrub
		Auplopus carbonarius	a spider-hunting wasp	Nationally Scarce	shaded woodland floor
		Episyron rufipes	a spider-hunting wasp		short sward & bare ground
		Evagetes crassicornis	a spider-hunting wasp		short sward & bare ground
		Evagetes pectinipes	a spider-hunting wasp	Nationally Threatened, RDB1	short sward & bare ground
	Sphecidae	Ammophila sabulosa	Red-tailed Sand Wasp		short sward & bare ground
	Vespidae	Odynerus spinipes	Spiny Mason Wasp		short sward & bare ground
		Vespula germanica	German Wasp		tall sward & scrub
		Vespula vulgaris	Common Wasp		tall sward & scrub

Lepidoptera	Erebidae	Tyria jacobaeae	Cinnabar Moth	Section 41 Priority Species - research only	tall sward & scrub
(Butterflies, Moths)	Nymphalidae	Aglais io	Peacock Butterfly		tall sward & scrub
	Nymphalidae	Coenonympha pamphilus	Small Heath butterfly	Section 41 Priority Species	short sward & bare ground
	Nymphalidae	Maniola jurtina	Meadow Brown Butterfly		tall sward & scrub
	Nymphalidae	Pyronia tithonus	Gatekeeper Butterfly		tall sward & scrub
	Pieridae	Pieris brassicae	Large White		
		Pieris rapae	Small White		
	Yponomeutidae	Yponomeuta rorrella	Willow Ermine Moth		arboreal
Neuroptera	Chrysopidae	Chrysoperla carnea	a lacewing		
(Lacewings)	Hemerobiidae	Hemerobius humulinus	a lacewing		arboreal
Odonata	Coenagrionidae	Ischnura elegans	Blue-tailed Damselfly		marshland
(Damselflies)					
Orthoptera	Acrididae	Chorthippus brunneus	Common Field Grasshopper		tall sward & scrub
(Grasshoppers,		Chorthippus parallelus	Meadow Grasshopper		
Bush-crickets)	Meconematidae	Meconema thalassinum	Oak Bush-cricket		arboreal
Dermaptera	Forficulidae	Forficula auricularia	Common Earwig		
(Earwigs)					
Julida	Julidae	Ommatoiulus sabulosus	Striped millipede		shaded woodland floor
(Millipedes)					
Isopoda	Philosciidae	Philoscia muscorum			
(Woodlice)	Porcellionidae	Porcelio scaber			