

**Land off Abbey Road
Wrexham Industrial Estate:
Grizzled skipper mitigation proposals**

**By:
Conops Entomology Ltd**

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By: Andy Jukes BSc (Hons) MCIEEM FRES
andy@conopsentomology.co.uk

Client contact: LeeGreenhough@tep.uk.com

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Conops Entomology Ltd
Registered Office:
Sharkley Meadow Farm
58, Churnet Valley Road
Kingsley Holt
Staffordshire Moorlands
Staffordshire
ST10 2BQ
Company registered in England and Wales.
Company No. 07505919.
VAT Reg No. 159133995

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1 Introduction

- 1.1 Conops Entomology Ltd was commissioned to undertake an appraisal for an existing mitigation strategy of a proposed development extension to include features that would be suitable for grizzled skippers (*Pyrgus malvae*). In particular Conops Entomology's remit was to advise on a best course of action to manipulate existing mitigation features that would provide added benefit of grizzled skippers and ensure their continued breeding presence at the proposed development site.

2 Grizzled skipper ecology

UK status

The grizzled skipper is a butterfly listed in Section 42 of the Natural Environment and Rural Communities Act (NERC Act) as a species of principal importance (referred to as S42). It is also a species listed by Butterfly Conservation as 'high priority', as it has declined by 49% since the 1970s¹.

Habitat preferences

The grizzled skipper is one of a suite of butterflies that depend upon early succession habitats, also referred to as open mosaic swards. The habitat mosaic includes areas of bare ground and short patchy swards that include one or more of the preferred larval food plants. The crucial and critical feature of high-value habitat is that the larval food plants are able to grow prostrate over the bare ground in order to elevate the microclimatic conditions that the grizzled skipper females preferentially select when laying their eggs. This elevated microclimate increases the developmental rates of the egg and young larvae, and possibly increases the success of larval hatching.

The adults also utilize the bare ground and short turf areas for foraging and basking, and are frequently observed basking on bare ground areas, particularly on cool but sunny days. Areas of taller sward grassland may also be beneficial for roosting and sheltering adult butterflies.

Food plants

The larvae are reliant upon plant species of the Rosaceae family. The most frequently utilized are wild strawberry (*Fragaria vesca*), creeping cinquefoil (*P. reptans*), and agrimony (*A. eupatoria*).

Life cycle

The life cycle of the species is dominated by the spring period when it is an adult and when eggs are laid. The approximate broad timings of each life cycle stage are as follows:

ova: May–June (laid on the larval host plant)

larva: late May–late July (largely stays on the leaves of the host plant, forming a small tent made from a leaf)

pupa: late July–May (pupates within a cocoon of leaves in low-growing vegetation less than 30 cm in height)

adult: May–June, partial second brood in southern districts in August (adult mainly stays around suitable larval habitat)

¹ Butterfly Conservation (2017). *Grizzled skipper species page*. [online] Available at: <http://butterfly-conservation.org/50-1011/grizzled-skipper.html> (Accessed 09 September 2017).

3 Location

- 3.1 The site is located at OS grid reference SJ 38475048.
- 3.2 The site is located towards the northwestern side of Wrexham Industrial Estate, to the east of Wrexham city.
- 3.3 Along with a map, the habitats present on site are detailed in the ecology assessment by TEP (ref: 7218.003)², but in summary the site ranges from unimproved neutral grassland, early successional vegetation, two suboptimal butterfly bunds and a ruderal and planted scrub bund. Scrub borders the site on the eastern and northern edges. Roads and development border the south and west.

4 Pre-existing mitigation

- 4.1 The proposed development footprint surrounds a previous application and as a consequence of this development condition there are mitigation features already in place on the site to take in to account flora and fauna displaced or impacted by the pre-existing development. These measures include great crested-newt (GCN) mitigation in the form of amphibian exclusion fencing and hibernacula.
- 4.2 As the site is also known to hold records for grizzled and dingy skippers (*Erynnis tages*), features to ensure their retention at the site were also included in the form of two butterfly bunds and retention/creation of early successional swards that includes their respective larval foodplants, see section 2 for grizzled skipper larval preferences, and for dingy skipper it is common bird's-foot trefoil (*Lotus corniculatus*).
- 4.3 As part of the mitigation for the site, an Ecological Management Plan (EMP) was also drawn up, put in to place, and coordinated through Marches Ecology Ltd.

5 Current monitoring

- 5.1 Following the establishment of the previous mitigation, Marches Ecology Ltd has been monitoring the site and its key species. The most recent monitoring report available (2018) noted grizzled skipper as present at the site but the numbers are very low with a total of four individuals recorded. There is no information on dingy skipper presence or absence.

6 Effect of proposed development on grizzled skippers

- 6.1 The proposed development expansion would impact suitable grizzled skipper habitat that has been retained and created as part of the previous application. There will be physical loss of suitable butterfly habitat amounting to 0.1ha of early successional mosaics (TEP, 2018). Along with this is an additional indirect loss caused by shading. This shading will impact at least one butterfly bund and further early successional habitat, though it is currently difficult to quantify the exact area that would be affected however it should be noted that any shading would render the habitat unsuitable for grizzled skippers and other thermophilic (warmth-loving) species such as the dingy skipper butterfly.

² TEP (2018) Land off Abbey Road, Wrexham Industrial Estate. Ecology Assessment. TEP Ref: 7218.003. Unpublished report for M&L Investment Partners Ltd

7 Mitigation proposals

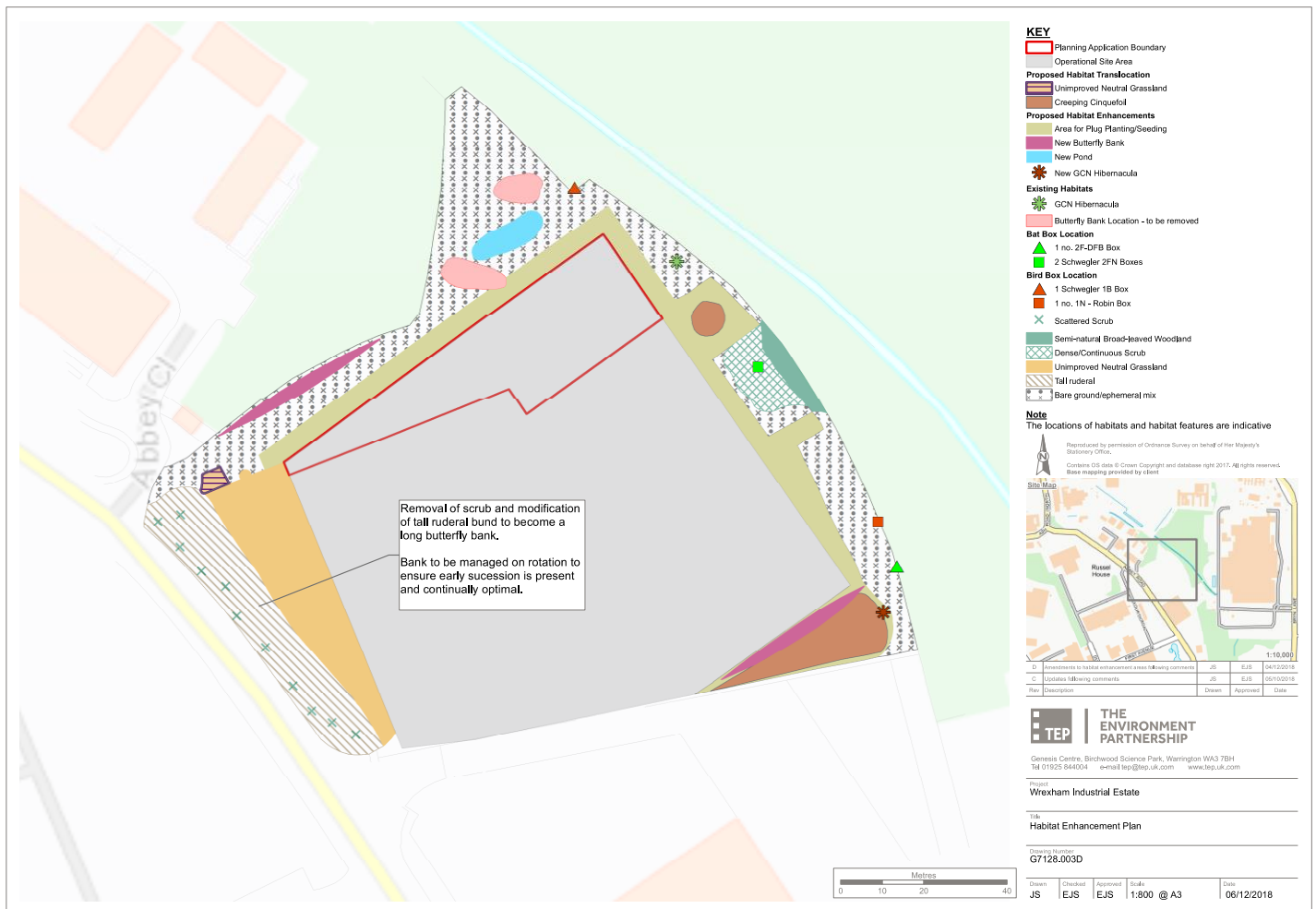


Figure 1: Indicative habitat enhancement plan (see Section 8 for revised enhancement plan)

- 7.1 The indicative habitat enhancement plan (Figure 1) illustrates the new design concepts for the proposed development mitigation. In some instances, features may require slight alterations or movement in order to accommodate factors relating to access for building maintenance, however the extent of each feature will not be decreased significantly in size or relocated wholesale away from these optimal aspects.
- 7.2 The proposals put forward in this section utilize the existing mitigation area however these habitats and features are suggested to be manipulated and/or repurposed for grizzled skippers given the significant losses that would be caused by the proposed development from direct and indirect impacts on the current grizzled skipper habitat and features.
- 7.3 No grizzled skipper mitigation will be undertaken or prioritized along the northeastern or eastern side of the development, where there is an impact from shading.
- 7.4 All mitigation will take place on low fertility soils with a preference towards alkaline substrates such as limestone aggregates.

Butterfly bunds

- 7.5 The two existing butterfly bunds are likely to be left redundant following the proposed development. To mitigate for loss of these and also increase the feature extent it is proposed that the boundary bund on the western side of the site is repurposed as a butterfly bund. As it is almost 73 metres in length, this could be a significant resource for the butterflies.
- 7.6 Currently the feature is unsuitable for butterflies as it is dominated by ruderals, coarse grass and planted scrub. All of this material will be stripped off (subject to any conditions relating to GCN). If the underlying substrate is not suitable for low fertility dependant plants then appropriate material such as limestone aggregate will be used at a depth of at least 50cm over any higher fertility soils that may be present. This low fertility material will be sparsely planted with predominantly creeping cinquefoil, but other low growing perennial flowers such as common bird's-foot trefoil will also be included.
- 7.7 Larval foodplants from impacted areas of the proposed development will also be used as part of this planting-up process. Again, foodplants of other species, namely the dingy skipper butterfly will also be relocated to the bund.
- 7.8 Some sparse over sowing of suitable low-growing perennial flowers will be undertaken to compliment the plug planting where thought necessary.
- 7.9 Two further butterfly bunds will be created. One along the north-west edge of the mitigation area. This will be unhindered by shading and have a southerly aspect. This long feature will be planted up and over sown with appropriate plants including creeping cinquefoil. The second will form part of the southeastern corner mitigation area. See section 7.10 to 7.11.

South-eastern corner

- 7.10 A GCN pond and butterfly bund was proposed for this location. Due to the losses of grizzled skipper habitat at the northern side of the site it is suggested that this area, due to its optimal southerly aspect, is devoted to grizzled skippers and the pond is relocated.
- 7.11 The area will include a butterfly bund spanning across the entire northern edge of the area and the remaining land surface will be created as a short perennial and bare ground mosaic that includes grizzled skipper larval food plants. This area could be further optimised through re-profiling of the land so that it has a southerly sloping gradient running from the toe of the new butterfly bound down to the southern boundary of the mitigation area.

Existing unimproved neutral grassland

- 7.12 Based on photographs within the TEP report (2018) the unimproved neutral grassland to the west of the existing development does not appear to be of high value. It is therefore suggested that if this is the case and that ruderal plants are now dominating the swards then it is repurposed to increase grizzled skipper habitat. The inclusion of this area would significantly increase the potentially optimal habitat for grizzled skipper.
- 7.13 To make it optimal grizzled skipper habitat the area should be partially scarified to expose the underlying substrate and then allowed to succeed naturally. Once this area has turfed over to a point where there is no bare ground left, then the remaining tall swards should be scarified to expose bare ground. This rotational scraping process can then be repeated in perpetuity.

On-going management

- 7.14 As the species is dependant on patchy early succession swards an EMP will be prepared that acknowledges this requirement and will include rotational scraping of all key areas, including bunds, as part of the on-going management.

8 Addendum 11.01.19

- 8.1 A meeting comprising of Andy Jukes, Emma Broad, Lee Greenhough, Mike McCarthy, Chris Davies Clive Cunio took place at McCarthy Distribution on January 11 to discuss the amended mitigation based on the proposed development footprint.
- 8.2 Following the site visit and discussions with Emma Broad a revised mitigation layout has been added to this report.
- 8.3 Modifications to the existing mitigation proposals include the following:

Southeast corner mitigation area

- 8.4 The current proposed butterfly bank running parallel to the southern edge of the maintenance strip will be extended eastwards as far as possible (whilst still being in a sunlit situation) and curved southeastwards to increase the length of the feature.

Northwest corner mitigation area

- 8.5 The current proposed butterfly bank running parallel to the northern boundary will now join the western boundary bund to form a single, continuous butterfly bank.

Perimeter bund

- 8.6 The perimeter bund will now join the aforementioned northern boundary butterfly bank to extend this optimal resource for grizzled skippers. The feature will be further diversified to include an undulating edge that increases it's footprint and also increases the southerly aspect faces that are preferred by the butterfly.

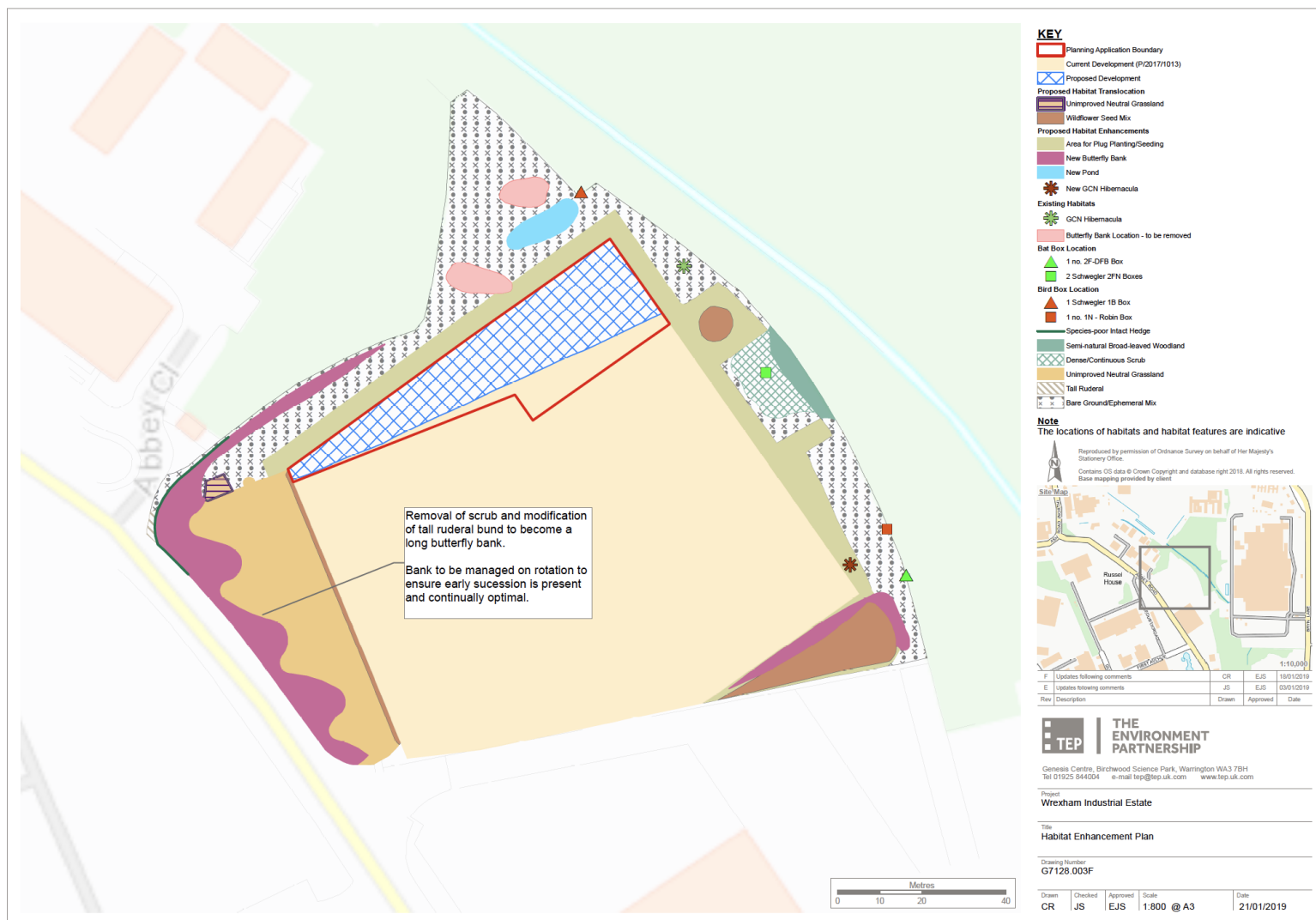
Unimproved neutral grassland mitigation area

- 8.7 The grassland mitigation area adjacent to the perimeter bund does not appear not to be in an optimal condition with several species of coarse grasses, dog rose, teasel, willowherbs and scrub developing on the area. To increase the area's value it is proposed that it is re-purposed as grizzled skipper habitat, being short sward and bare ground habitat.
- 8.8 Where existing flower-rich turf is required to be retained, alternative measures to introduce bare ground features will be deployed, namely the inclusion of concrete slabs (or similar) over which creeping cinquefoil can grow.
- 8.9 The west-facing car park slope adjacent to the grassland is proposed to be sown with a suitable wildflower seed mix to provide valuable nectar resources for the butterfly, whilst also contributing to wider pollinator foraging resources.

On-going management and monitoring

- 8.10 One of the key features of butterfly banks is that they are pragmatic to manage through rotational scraping and or/cutting. This will be undertaken at the site through the compartmentalisation of all the banks to ensure that at any one time there will always be sections of bund in favourable condition to support optimal oviposition sites for the grizzled skipper. It is envisaged that each bank will be divided up into management units, using stakes as demarcation points to enable effective long-term rotational management.
- 8.11 Coupled with the management of the features and habitat there will be on-going monitoring of the site including habitat assessment and butterfly counts at regular intervals to ensure the management is being undertaken correctly so if required, any modifications to the management practices or timings can be fed back to the contractors and client.

Figure 2: Revised indicative habitat enhancement plan



9 Addendum 31.07.19

Summary of proposed mitigation enhancements

- 9.1 It is suggested that should all of the above features be created optimally and managed effectively through an appropriate management plan, the site should provide high quality habitat for the grizzled skipper butterfly.
- 9.2 The enhanced mitigation proposals have the potential to be of greater benefit to the butterfly than the existing habitats and features on the site due to a proposed increase of open mosaic features created specifically for the species.

10 Supplementary information

Curriculum Vitae

Andy Jukes BSc (Hons) CIEEM FRES

Personal Profile

I am a professional invertebrate ecologist with 22 years post-graduate experience in ecology and 16 years as a consultant including running a small ecological consultancy, the Staffordshire Wildlife Trust's consultancy (Staffordshire Ecological Services Ltd). I now operate my own specialist invertebrate ecology consultancy.

I have 23 years involvement with invertebrates, both as an amateur including a University Honours project on the bog bush-cricket (*Metrioptera brachyptera*) and as a recognised professional entomologist as demonstrated by my Fellowship to the Royal Entomological Society and inclusion on Natural England's list of preferred invertebrate specialists for Common Stands Monitoring (CSM) contract work.

I have experience of a wide range of habitats and assemblages including wetlands, moorlands, lowland heath, saltmarsh, flower-rich habitats, sand dunes, bare ground and short turf, brownfield sites and woodlands.

I contribute as a volunteer and support national invertebrate recording schemes. I am a target species atlas co-ordinator for BWARS (Bees, wasps and Ants Recording Society) overseeing the preparation of species atlases. I also chair the Staffordshire Invertebrate Group (SIG) for which I have held the position for over 8 years. I am also a contributor to national recording schemes including Butterfly Conservation and the Odonata (dragonfly and damselfly) Recording Scheme.

I also contribute to the understanding of invertebrates through research. I have undertaken numerous studies including *Chalcosyrphus eunotus* (a Nationally Scarce coarse woody debris hoverfly), hairy wood ant (*Formica lugubris*) and red (southern) wood ant (*Formica rufa*) and the Red Data Book solitary bee *Andrena nigrospina*, breaking new ground on the scientific knowledge on these species. Along with a co-worker I have identified a new species of bee to science (2015, in prep). I also have a long history of studying the Nationally Scarce bog bush-cricket (*Metrioptera brachyptera*).

I have demonstrable survey and mitigation experience of working with Section 42/41 butterflies including grizzled skipper, dingy skipper, brown hairstreak and black hairstreak in both Wales and England.

Key Entomological Skills

- Invertebrate groups studied and recorded include Odonata (dragonflies and damselflies), butterflies (Lepidoptera), aculeate hymenoptera (bees and wasps), hoverflies, "larger" Brachycera (includes robberflies, horseflies, soldierflies), Orthoptera (crickets and grasshoppers), beetles and butterflies. A number of other fly families are also studied and recorded including the important key habitat indicator groups Dolichopodids (dollyflies), Empidoidea (danceflies) and Tipulidae (crane flies);
- I have experience of a wide range of habitats that contain good assemblages of key invertebrates such as saltmarshes, dune systems, bare ground and flower rich mosaics, calcareous grassland, lowland heath, upland moors, golf courses, brownfield sites (including quarries), inland marsh, ancient broad-leaved woodland (both saproxylic communities and shaded field layer assemblages), woodland stream courses and

farmland matrix field systems including semi-improved pasture and arable field margins;

- Use of Natural England's recommended sampling methods for use with the qualitative analysis application ISIS and Pantheon. Also use of transects and other standardised forms of targeted sampling and recording of invertebrates;
- Extensive research and desktop based experience including single species studies and surveys of scarce and threatened invertebrates;
- EcIA assessment and use of CIEEM significance criteria for invertebrate site status;
- I am on Natural England's preferred tenderers list for Common Standards Monitoring.
- I am a Fellow of the Royal Entomological Society

I also have extensive practical experience of providing advice on management, mitigation, restoration and creation of habitats and features and in particular I have extensive experience in providing site conservation/management for invertebrates.

Key management skills

I have 16 years management experience from running a small ecological consultancy (Staffordshire Ecological Services) to managing my own specialist invertebrate ecology consultancy (Conops Entomology Ltd). I have substantial experience of logistics, managing budgets, time, reporting deadlines and surveyors. Most recently I have been involved with a number of high profile and large scale contracts including:

- High Speed Rail 2 (HS2) (2012-2013, 2016-2017, 2018-ongoing) – Warwickshire, Staffordshire, Buckinghamshire, London and Cheshire sections. Co-ordinating, scoping and targeting key areas for biodiversity and organising/undertaking surveys of land within the disruption and landtake zone of the proposed HS2 route (technical terrestrial invertebrate specialist representing Atkins and latterly ARUP/ERM/Mott MacDonald/RSK. Staffing level: 7 surveyors;
- Heathrow Runway 3 expansion (2017-ongoing) – Co-ordinating and provision of survey and technical input to the mitigation of land for the Heathrow Airport expansion. Representing Wood/Mott Macdonald. Staffing level: 4 surveyors.
- Open mosaic habitat (OMH) assessment (2012) – designing the protocol, liaising with sub contractors and running the survey across 48 sites in England. Staffing level: 5 surveyors;
- Regularly undertake numerous invertebrate-related projects each year from bespoke species ecology work to EcIA projects; managing budgets, project workloads and landowner liaison where required such as the Natural England Common Standards Monitoring (CSM) for which I have been regularly involved with for 9 years.

Technical/Computer Skills

- GIS MAPINFO;
- Recorder 3.3, 6 and 2000;
- Mapmate;
- ISIS (v2010)
- Pantheon; and
- Microsoft including Word and Excel.

Projects/publication highlights

- (2017) Dunham Massey SSSI saproxylic invertebrate assessment. Unpublished report for Penny Anderson Associates Ltd.
- (2016) Jukes, A., Falk, S and Paxton, R. (in prep) *Nomada subcornuta* (Kirby, 1802) (Hymenoptera: Apidae) raised to full species rank. Bees, Wasps and Ants Recording Society;
- (2016) Wrexham Industrial estate. An invertebrate assessment. Unpublished report for Kingdom Ecology.

- (2016) Jukes, A. and Price, S. *A practical method for the translocation of nest forming wood ants*. Conservation Land Management.
- (2015) The translocation of hairy wood ants (*Formica lugubris*) – the investigation, survey, preparation of method statement and subsequent physical translocation and monitoring of 28 hairy wood ant nests moved from the Kincaig-Dalraddy A9 dualling. Representing Atkins;
- (2015) The creation of species-rich grassland for invertebrates – the removal of species rich turfs from a development site to a receptor site to create an invertebrate rich habitat using species rich turfs and green hay with special reference to the conservation of the NERC Act Section 41 brown-banded carder bee (*Bombus humilis*) in Worcestershire. Worcestershire County Council;
- (2015) Stag beetle surveys, Essex. Torc Ecology Ltd;
- (2014) Nectarworks – survey of pollinators at 10 flower-rich meadows in North Pennines AONB. North Pennines AONB;
- (2014) Donington Park SSSI saproxylic assessment – assessment of the SSSI condition of the saproxylic communities at a deer park in Leicestershire. Natural England;
- (2014) Southern damselfly survey – Hampshire. CSa Environmental Planning Ltd;
- (2014-2015) Calaminarian grassland invertebrate monitoring – a survey of calaminarian grasslands to monitor habitat management using invertebrates as indicators of success. Northumberland Wildlife Trust and Plantlife;
- (2012-2013) HS2 – Technical specialist for invertebrates presenting Atkins;
- (2012) An invertebrate assessment of Danbury Sandpit. Essex. Unpublished report for Torc Ecology Ltd;
- (2012) Natural England's Common Standard Monitoring of English lowland heathlands and chalk downlands;
- (2011) An autecology and the long-term conservation of *Colletes floralis* (the northern Colletes bee). Hymettus Ltd;
- (2011) Invertebrate surveys of TATA Steel, Scunthorpe focussing on the bees and wasps. Buglife (2011);
- (2010) Natural England's Common Standard Monitoring of English fens. Natural England;
- (2010) *Chalcosyrphus eunotus* – A red data book hoverfly. Its status, distribution, ecology and conservation. Published article in Dipterists Digest;
- (2010) *Highgate Common SSSI – an invertebrate hotspot*. Published article in Amateur Entomologists Society Bulletin;
- (2009) Natural England's Common Standard Monitoring of English saltmarshes. Natural England;
- (2009) An invertebrate survey and recommendations of Cannock Tip colliery. Unpublished report for Atkins Ltd;
- (2009) Autecology and conservation of the RDB solitary bee *Andrena nigrospina*. Staffordshire Wildlife Trust;
- (2008-09) Search for the Northern Bees. A continuation of a survey for, amongst other species, *Bombus muscorum* in the Peak District. Hymettus Ltd;
- (2008) Natural England's Common Standard Monitoring for English woodland shaded field layers;
- (2007) Search for the Northern Bees. A survey for a suite of northern bees including *Bombus muscorum* and *Andrena tarsata* in the Peak District and Morecambe Bay for Hymettus Ltd;
- (2006-09) Cannock Chase stream corridor survey. Stream quality survey of three streams on Cannock Chase using Diptera and aquatic invertebrates to assess the health of the stream resource on Cannock Chase, Staffordshire, Staffordshire Wildlife Trust;

- (2006) A site investigation into the possible nesting sites of *Megachile dorsalis* and recommendations for site enhancement for aculeate hymenoptera at Silverdale Colliery, Newcastle-under-Lyme, Staffordshire. White, Young, Green;
- (2006) An invertebrate survey and management recommendations for Branston Water Park, East Staffordshire. Focussing on Syrphidae and Larger Brachycera, East Staffordshire borough Council;
- (2005) Cannock Chase AONB monitoring – Conifer felling and its effects on invertebrate diversity. Staffordshire Wildlife Trust;
- (2004) An evaluation of the invertebrate fauna of Highgate Common in relation to the sites within Staffordshire and the West Midlands. Natural England;
- (2003) The habitat preferences and priority areas for the bog bush-cricket (*Metrioptera brachyptera*) on Cannock Chase. Cannock Chase AONB Unit;
- A survey of the Bog bush-cricket (*Metrioptera brachyptera*) on Cannock Chase. Cannock Chase AONB Unit;
- (2001) An Invertebrate survey of Cannock Chase. Year One. Cannock Chase AONB Unit.

Qualifications

Environmental Science BSc (Honours)

Professional Membership

Chartered Institute of Ecology and Environmental Management (CIEEM) – standard member
Royal Entomological Society (RES) - Fellowship

Special Interest Memberships

- Bees Wasps Ants Recording Society – I am currently a Target Species Co-ordinator for BWARS. This entails research into target species autecology, preparation of species profiles, collation of records and verification of problematic specimens for recorders for inclusion in new atlases prepared by BWARS;
- Dipterists Forum;
- Staffordshire Invertebrate Group (Chair);
- British Entomological and Natural History Society (BENHS);
- Staffordshire Invertebrate Science Fair (Chair) – entails the organisation and presentation of an annual invertebrate science fair in Staffordshire targeted towards encouraging the involvement of amateurs into the recording and conservation of invertebrates.

Licenses

Great crested newt (Over 15 years)
Fairy Shrimp (April, 2016)