Cyfoeth Naturiol Cymru
Natural Resources Wales

Saproxylic Invertebrate Survey of Wye Valley Woodlands Special Area of Conservation (SAC) in 2018

Keith N. A. Alexander

NRW Evidence Report No. 320

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Contents

List of Tables

1. Crynodeb Gweithredol

Bwriad y ddogfen hon yw ychwanegu at ein gwybodaeth gyfredol am y ffawna infertebratau saprosylig a geir ledled Ardal Cadwraeth Arbennig Coetiroedd Dyffryn Gwy. Er y dynodiad nid oes llawer iawn yn hysbys am ffawna infertebratau saprosylig yr Ardal Cadwraeth Arbennig. Gwyddys ei bod yn cynnal poblogaethau sylweddol o nifer o rywogaethau cenedlaethol prin a rhywogaethau dan fygythiad, ond hyd yma ni chynhaliwyd ond ymchwiliadau cyfyng o'r ffawna. Chwilen bisgwydd, *Ernoporus tiliae*, a chwilen ag adenydd rhwydog Cosnard, *Erotides cosnardi*, yw'r ddwy rywogaeth nodedig y gwyddys amdanynt yn yr ACA, y ddwy yn Rhywogaethau o Brif Bwysigrwydd yn Lloegr ond heb eu cynnwys yn Adran 7 Deddf yr Amgylchedd (Cymru) 2016.

Y nod yn y pen draw yw llunio rhestr dros dro o ffawna infertebratau saprosylig coetir ledled y Safleoedd o Ddiddordeb Gwyddonol Arbennig (SoDdGA) sy'n ffurfio rhan Cymru o ACA Coetiroedd Dyffryn Gwy. Lle bo modd, bydd yr ymdrech gofnodi yn canolbwyntio ar nodi unrhyw rywogaeth saprosylig o bwysigrwydd cadwraeth genedlaethol neu leol. Y gwaith hwn fydd rhan gyntaf corff gwaith arfaethedig mwy a gynllunnir ar gyfer y blynyddoedd i ddod, gyda'r bwriad o gynhyrchu rhestr gynhwysfawr o infertebrata o ddiddordeb ledled Coetiroedd Dyffryn Gwy. Bydd y rhestr hon yn y tymor hwy yn helpu'r broses o lunio canllawiau rheoli yn sail i reoli'r coetiroedd o fewn Ardal Cadwraeth Arbennig Coetiroedd Dyffryn Gwy ac, o bosibl, y dirwedd ehangach yn gynaliadwy.

Yn 2017, cynhaliwyd arolwg infertebratau saprosylig yn Ardal Cadwraeth Arbennig Coetiroedd Dyffryn Gwy yn hwyr yn y tymor. Ymgymerwyd â gwaith arolwg newydd yn 2018, gan ganolbwyntio'r ymdrech o amgylch y ddau gyfnod allweddol ar gyfer infertebrata saprosylig - 'gwanwyn hwyr' a 'chanol haf'. Canolbwyntiwyd ymdrech yr arolwg ar ddau Safle o Ddiddordeb Gwyddonol Arbennig (SoDdGA) – SoDdGA Coedwigoedd Pierce, Alcove a Piercefield a SoDdGA Blackcliff/Wyndcliff - a gwnaed nodiadau ar y ffawna saprosylig. Ymwelwyd â thri Safle o Ddiddordeb Gwyddonol Arbennig (SoDdGA) arall yn gyflym – SoDdGA Graig Wood, SoDdGA Harper's Grove – Lord's Grove a SoDdGA Ceunant Gwy Uchaf. Cynhaliwyd prosiect ar wahân ochr yn ochr â hyn ar hyd tymor maes 2018 a oedd yn defnyddio'r dull trapio ymyrru wrth hedfan.

Mae cyfanswm y rhywogaethau infertebratau saprosylig sy'n hysbys o'r Ardal Cadwraeth Arbennig bellach wedi cyrraedd 230 o rywogaethau erbyn hyn, y mwyafrif ohonynt ymhlith 144 rhywogaeth Coleoptera (chwilod) a 83 Diptera (pryfed). Mae'r rhain yn cynnwys 59 o rywogaethau â statws cadwraeth ffurfiol, dau ohonynt o dan fygythiad, tri yn fregus, dau yn agos at fod dan fygythiad, un â data diffygiol, tri yn brin yn genedlaethol a 48 yn anfynych yn genedlaethol. Y canfyddiadau mwyaf arwyddocaol a gafwyd yn 2018 yw Chwilen ag adenydd rhwydog Cosnard *Erotides cosnardi* – y cofnod cyntaf yng Nghymru ers 1944 – a'r pryfyn bregus *Phortica variegata*, na sylwyd arno yng Nghymru yn y gorffennol, yn ôl pob golwg. Mae'r ddwy yn Rhywogaeth o Brif Bwysigrwydd yn Lloegr. Mae canfod y gwybedyn *Mycetobia gemella* yn arbennig o ryfeddol gan fod y rhywogaeth hon ond wedi ei chanfod ym Mhrydain o'r blaen yng nghoedwigoedd pinwydd Caledonaidd. Canfuwyd rhywogaethau eraill sydd heb gynefinoedd saprosylig ac sydd â statws cadwraeth yn achlysurol. Bydd nifer dda o rywogaethau yn ychwanegiadau at y rhestrau gwirio presennol ar gyfer Cymru. Mae un rhywogaeth chwilen saprosylig sy'n anfynych yn

genedlaethol, *Mordellistena variegata*, a thair rhywogaeth o bryfed yn ôl pob golwg yn rhywogaethau na sylwyd arnynt yn flaenorol: *Dilophus bispinosus* (Bibionidae), *Mycetobia gemella* (Mycetobiidae) a *Phortica variegata* (Drosophilidae). Mae'n debygol bod ardal gyfoethog fel hon yn cynnal llawer mwy o rywogaethau sy'n barod i gael eu darganfod.

Mae dwy system wedi'u dyfeisio ar gyfer asesiad cymharol ansawdd safle ar gyfer cadwraeth natur wrth ddefnyddio chwilod saprosylig: y Mynegai Dilyniant Ecolegol a'r Mynegai Ansawdd Saprosylig. Mae gwerth Mynegai Ansawdd Saprosylig SoDdGA Coedwigoedd Pierce, Alcove a Piercefield a SoDdGA Blackcliff/Wyndcliff ar hyn o bryd yn 398 a 416 yn ôl eu trefn, gyda holl ran yr Ardal Cadwraeth Arbennig sydd yng Nghymru yn cyrraedd 471. Mae unrhyw safle â Mynegai Ansawdd Saprosylig o 300 neu fwy yn gosod y safle ymysg y safleoedd â'r ansawdd gorau ym Mhrydain.

Gyda data ychwanegol arolwg 2018, mae SoDdGA Coedwigoedd Pierce, Alcove a Piercefield a SoDdGA Blackcliff/Wyndcliff wedi profi eu bod yn lled gyfoethog o ran rhywogaethau mewn rhywogaethau chwilod hen dyfiant, ac mae gwerthoedd y Mynegai Dilyniant Ecolegol bellach â gwerthoedd lleiaf o 32 a 23 yn ôl eu trefn. Mae Mynegai Dilyniant Ecolegol cronnus y rhan o Ardal Cadwraeth Arbennig Coetiroedd Dyffryn Gwy sydd yng Nghymru wedi cael hwb ac mae ganddo werth o 56 ac y mae bellach nid yn unig o arwyddocâd cenedlaethol (DU) ond hefyd hanner ffordd tuag at gyrraedd arwyddocâd Ewropeaidd (gwerth Mynegai Dilyniant Ecolegol 80+). Mae'r gwerthoedd Mynegai Dilyniant Ecolegol hyn yn werthoedd lleiaf gan fod y Mynegai'n fynegai cronnus, felly mae'n bosib y gallai gwaith arolwg pellach roi hwb i'r gwerthoedd – gwelwyd hyn yn glir yng nghanlyniadau 2018. Mae'n ymddangos yn bosibilrwydd gwirioneddol yn ystod ar adeg hon y prosiect arolwg bod modd i'r Ardal Cadwraeth Arbennig gyflawni gwerth Mynegai Dilyniant Ecolegol 80 wrth ei hastudio ymhellach. Y gwerth uchaf o ran y Mynegai Dilyniant Ecolegol ar gyfer unrhyw safle yng Nghymru ar hyn o bryd yw Parc Castell y Waun (SoDdGA Castell y Waun a'i Barcdir) sydd â gwerth o 75, gyda Pharc Castell Powis (63) a Pharc Ceirw Dinefwr (SoDdGA Ystad Dinefwr) (54) yn dilyn. Gwelir erbyn hyn bod Ardal Cadwraeth Arbennig Coetiroedd Dyffryn Gwy o fewn y tri safle uchaf yng Nghymru ar gyfer cynrychiolaeth o chwilod saprosylig hen dyfiant.

Mae'r arolygon hyn wedi dangos bod Ardal Cadwraeth Arbennig Coetiroedd Dyffryn Gwy o ddiddordeb mawr o bosib oherwydd infertebrata saprosylig ac yn rhoi cyfiawnhad digonol am gynnal arolygon parhaus, pan fo adnoddau'n caniatáu. Maent yn awgrymu mai ffactor allweddol yw helaethder y coetir yn yr Ardal Cadwraeth Arbennig, er y gallai mannau unigol fod â diddordeb arbennig mwy lleoledig oherwydd rhywogaethau penodol sy'n brin ac o dan fygythiad. Caiff pwysigrwydd coed hynafol ei bwysleisio, yn ogystal â gwerth coed unigol sy'n tyfu ar eu pen eu hun. Mae gwerth penodol sefyllfa ymyl y coetir a'r llennyrch mewnol wedi'i ddangos yn ogystal, yn arbennig ar hyd yr ymylon is gyda'u hen brysgwydd drain duon a'r glaswelltiroedd corsiog blodeuog. Mae'r rhain yn arwyddocaol gan eu bod yn awgrymu addasu dulliau o ran cadwraeth saprosylig o fewn yr Ardal Cadwraeth Arbennig, gan roi mwy o sylw i gynnal neu greu amrywiaeth yn y strwythur ffisegol – ymylon a llennyrch – yn ogystal â strwythur oedran y coed, trwy agor bylchau mewn rhai coed er mwyn i'r goron ddatblygu'n llawn. Mae rheolaeth ddiweddar wedi cynnwys adfer coedlan â safonau rheoli yn yr ardaloedd mwy hygyrch gan adael llwyfannau o hen dyfiant coed ffawydd ac yw fel ymyriad lleiaf. Mae canfyddiadau'r arolwg saprosylig yn cynnig cymorth ac anogaeth ar gyfer y dull mosaig hwn o ymyrryd.

2. Executive Summary

This document aims to add to our current knowledge of the saproxylic invertebrate fauna found across the Wye Valley Woodlands SAC. Despite the designation remarkably little is known about the saproxylic invertebrate fauna of the SAC. It is known to support significant populations of a number of nationally rare and threatened species, but until now only limited investigation of the fauna had been carried out. The two outstanding species known from the SAC are the Bast Bark Beetle *Ernoporus tiliae* and Cosnard's Net-winged Beetle *Erotides cosnardi*, both Species of Principal Importance in England but not included on Section 7 of the Environment (Wales) Act 2016.

The ultimate objective is to compile a provisional inventory of woodland saproxylic invertebrate fauna across the Sites of Special Scientific Interest (SSSI) that make up the Welsh side of the Wye Valley Woodland SAC. Where possible, recording effort will focus on the identification of any saproxylic species of national or local conservation importance. These works will be the first phase of an intended larger body of work planned for the coming years aimed at producing a comprehensive inventory of invertebrate interest across the Wye Valley Woodlands. This inventory in the longer term will aid the process of drawing up management guidelines as a basis for the sustainable management of the woodlands within the Wye Valley Woodlands SAC and potentially the wider landscape.

In 2017, a saproxylic invertebrate survey had been undertaken of the Wye Valley Woodlands SAC late in the season. New survey work was undertaken in 2018, focussing effort around the two other key periods for saproxylic invertebrates – 'late spring' and 'high summer'. Survey effort was focussed on two of the SSSIs – Pierce, Alcove & Piercefield Woods SSSI and Blackcliff/Wyndcliff SSSI - and notes were made on the saproxylic fauna. Three further SSSIs were also briefly visited – Graig Wood SSSI, Harper's Grove – Lord's Grove SSSI and Upper Wye Gorge SSSI. A separate project using flight interception trapping across the whole 2018 field season was also carried out in parallel.

The total number of saproxylic invertebrate species known from the SAC has now reached 230 species, dominated by 144 species of Coleoptera (beetles) and 83 of Diptera (flies). These include 59 species with formal conservation status, of which 2 are Endangered, 3 Vulnerable, 2 Near Threatened, 1 Data Deficient, 3 Nationally Rare and 48 Nationally Scarce. The most significant finds from 2018 are the Endangered Cosnard's Net-winged Beetle *Erotides cosnardi* – the first Welsh record since 1944 - and the Vulnerable sap fly *Phortica variegata*, apparently previously overlooked in Wales. Both are Species of Principal Importance in England. The discovery of the wood-gnat *Mycetobia gemella* is particularly remarkable as this species has only previously been found in Britain in Caledonian pine forests. Other species with non-saproxylic habits and with conservation status have also been found incidentally.

A good number of species will be additions to the current checklists for Wales. One Nationally Scarce saproxylic beetle species *Mordellistena variegata* and three species of fly appear to be previously overlooked species: *Dilophus bispinosus* (Bibionidae), *Mycetobia gemella* (Mycetobiidae) and *Phortica variegata* (Drosophilidae). A rich area such as this is likely to hold many more species awaiting discovery.

Two systems have been devised for the relative assessment of site quality for nature conservation using saproxylic beetles: the Index of Ecological Continuity (IEC) and the Saproxylic Quality Index (SQI). The current SQI values for Pierce, Alcove & Piercefield Woods SSSI and Blackcliff/Wyndcliff SSSI are 398 and 416 respectively, with the whole Welsh part of the SAC reaching 471. Any site achieving a SQI of 300 or more places a site amongst the best quality sites across Britain.

With the additional survey data from 2018, both Pierce, Alcove & Piercefield Woods SSSI and Blackcliff/Wyndcliff SSSI have been shown to be relatively species-rich in old growth beetle species, with IEC values now at minimum values of 32 and 23 respectively. The cumulative IEC for the Welsh section of the Wye Valley Woodlands SAC has now been boosted to a value of 56 and is now not only of national (GB) significance but is also half way towards reaching European significance (IEC of 80+). These IEC values are all minimum values as the IEC is a cumulative index, and so further survey work may potentially boost the values – this has been well-demonstrated by the 2018 results. It does seem to be a real possibility at this stage in the survey project that the SAC may achieve an IEC of 80 with further study.

The highest IEC value for any Welsh site is currently 75 for Chirk Castle Park (Castell y Waun a'l Barcdir/Chirk Castle and Parkland SSSI), followed by Powis Castle Park (63) and Dinefwr Deer Park (Dinefwr Estate SSSI) (54). This means that the Wye Valley Woodlands SAC is now demonstrated to be amongst the top three sites in Wales for representation of old growth saproxylic beetles.

These surveys have further demonstrated the great potential interest of the Wye Valley Woodlands SAC for saproxylic invertebrates and provide ample justification for continued survey, as resources permit. They suggest that it is the extent of the tree cover in the SAC that is a key factor, although individual areas may have more localised special interest for particular rare and threatened species. The importance of veteran trees is emphasised as well as the value of individual open-grown trees. The particular value of the woodland edge situation and internal glades has also been demonstrated, notably along the lower edges with their old blackthorn scrub and flowery marshy grasslands. These are significant as they suggest modified approaches to saproxylic conservation within the SAC, with greater focus on maintaining or creating variation in physical structure – edges and glades – as well as age structure of the trees, through opening up of selected trees to provide space for full crown development. Recent management has included restoration of coppice-with-standards management in the more accessible areas while leaving stands of old growth beech-yew as minimum intervention. The findings of the saproxylic survey provide support and encouragement for this mosaic approach to intervention.

3. Introduction

3.1. Aim

This contract aims to add to our current knowledge of the saproxylic invertebrate fauna found across the Wye Valley Woodlands SAC, building on the findings of a preliminary survey in 2017 (Alexander, 2018c). Previously, dedicated saproxylic invertebrate surveys have been undertaken within the SAC at both Livox Wood SSSI and Graig Wood SSSI (Whitehead, 2013a). In addition, saproxylic surveys have also been undertaken in the Penallt area at Pwl Mawr Wood (Whitehead, 2013b) and at 'Piercefield Park' as part of the CCW Parklands Survey (Hammond & Hine, 1994). More general invertebrate surveys have been undertaken in Graig Wood SSSI (Kirby, 2006). Lady Park Wood has also been subject to some preliminary exploration of invertebrate interests, commissioned by the former Nature Conservancy Council (Alexander, 1984; Gibbs, 1985). Some invertebrate surveys have also taken place independently on the English side, primarily by the Woodland Trust in Cadora Woods and at Little Doward (Kirby, 2000, 2002, 2004), as well as specialist surveys for a Species of Principal Importance in England - Cosnard's Net-winged Beetle *Erotides cosnardi* - on behalf of the Species Survival Trust (Telfer, 2015; Alexander, 2017a & 2018a). Drane (2005) undertook a survey for the Bast Bark Beetle *Ernoporus tiliae* for the Forestry Commission and recorded several adults at Lower Wyndcliff.

The focus of the new surveys was sites with little or no existing data, followed by those deemed likely to produce further records of conservation significance.

3.2. Objective

To compile over the course of the contract, a provisional inventory of woodland saproxylic invertebrate fauna across the Sites of Special Scientific Interest (SSSI) that make up the Welsh side of the Wye Valley Woodland SAC.

Where possible, recording effort will focus on the identification of any saproxylic species of national or local conservation importance. These works will be the first phase of an intended larger body of work planned for the coming years aimed at producing a more comprehensive inventory of invertebrate interest across the Wye Valley Woodlands. This inventory in the longer term will help to determine invertebrate conservation priorities (e.g. SSSI features) and aid the process of drawing up management guidelines as a basis for the sustainable management of the woodlands within the Wye Valley Woodlands SAC and potentially the wider landscape.

4. Methods

4.1. Hand-search techniques

Rapid assessments of invertebrate faunas in structurally-complex habitats rely a great deal on field experience and the expertise of the contractor to target potentially significant features for further investigation. Survey techniques are varied according to the situation and it is up to the contractor to identify the most suitable methods to achieve a representative inventory of saproxylic invertebrate fauna for these woodlands.

The contract was for a minimum of 10 days of fieldwork, with the work to be carried out during the late spring and high summer periods of 2018. The approach taken was consistent with the guidance on invertebrate survey provided in Drake *et al.* (2007). The basic features that needed to be investigated were:

- Large old trunks of living trees, especially those with well-lit sunny areas, and both rough-barked and smooth-barked examples;
    - Inspection for active invertebrates
    - Inspection of any sap-runs or other wet fluxes
    - Inspection of any emergence holes
    - Bark cavities
    - Trunk cavities – rot-holes
    - Trunk cavities - hollowing
- Aerial dead branches on living trees;
- Aerial live branches;
- Standing dead trunks;
- Fallen trunks and boughs;
- Fruiting fungi;
- Targeted beating of blossom on flowering trees and shrubs;
- Field layer sweeping for resting insects.

More detail on these investigative techniques may be found in Drake *et al*. (2007).

Ideally, these hand-search techniques should be supplemented by trapping. Flight interception trapping is becoming an increasingly popular methodology as it offers continuous recording, whereas a surveyor may only be on site for relatively short periods. It is especially valuable as trapping continues whatever the weather, whereas the visits by the surveyor may encounter conditions less favourable for sampling. Trapping also appears to record many species elusive to hand search techniques, but due to the extreme localisation may also miss species more readily found by hand-searching. Ideally, the two techniques should be applied side-by-side. A separate project was therefore arranged in parallel to the exploratory hand search – see below.

The strategy adopted for the fieldwork was a walkabout exploration of the sites, attempting to cover a wide range of areas across each site, targeting potentially interesting saproxylic habitats as these were encountered. This is a well-attested standard technique for invertebrate surveys although difficult to quantify in a scientific way.

The sites and dates chosen for the 2018 field survey were:

- Blackcliff/Wyndcliff SSSI, June 4th, July 15th, 16th & 18th, August 7th, 8th & 9th
- Pierce, Alcove & Piercefield Woods SSSI, June 5th, July 17th, August 7th
- Harper's Grove – Lord's Grove SSSI, June 16th & 18th
- Graig Wood SSSI, July 17th
- Upper Wye Gorge SSSI, June 17th

Pierce, Alcove & Piercefield Woods SSSI is a large and varied area adjoining the historic parkland of Piercefield House.

Blackcliff/Wyndcliff SSSI is a large and varied area, largely managed by NRW, but including private land at Lower Linenwell Wood & Wyndcliff Wood, entered with permission from the owner.

Harper's Grove - Lord's Grove SSSI is large privately-owned wood; this was a general inspection visit only and the surveyor kept to the public footpaths.

The Prisk Wood section of Graig Wood SSSI is a nature reserve of the Gwent Wildlife Trust.

The Upper Wye Gorge SSSI falls across England and Wales. Within the SSSI sits Lady Park Wood National Nature Reserve (which also falls across England and Wales). The Welsh part of the Upper Wye Gorge SSSI is part of the Welsh Government Woodland Estate. Natural England Reserve staff are responsible for the management of Lady Park Wood NNR whilst Forestry Commission England are responsible for the management of the remaining Welsh woodlands in the Upper Wye Gorge SSSI and wider Highmeadows complex.

4.2. Flight interception trapping

A programme of flight interception trapping was arranged by the NRW Project Manager, Rob Bacon, in consultation with the contractor, and with the contractor arranging for sorting and identifying the catches, with the help of Peter Chandler for the Diptera. This work was carried out in parallel with the field survey described in the preceding section.

The flight interception traps are of a standardised construction:

- Four 2l plastic drinks bottles, with windows cut in sides, and bases bolted into a plastic base (plant pot saucer), the windows facing outwards;
- The traps hung in front of large trunk cavities or splits – at 1.5 - 2m above ground level - using baler twine, with the bottles hanging upside down beneath;
- The upside-down bottle tops filled with preservative solution (commercial antifreeze 50/50 with tap-water, plus a little washing up liquid to reduce surface tension) which can then be drained through the plastic cap.

These were set up to operate between each of the sampling visits, with captured invertebrates killed and preserved in the solution. The traps were emptied and re-set each subsequent visit, finally being closed down in the early winter period. Trapping enables sampling to take place all through the season and is especially valuable in dry periods when insect activity is greatest – there is always a danger that the site visits may coincide with poor weather conditions.

The 2018 trapping programme was arranged as follows:

- April 6th traps placed
- May 17th traps emptied and re-set
- June 26th traps emptied and re-set
- August 9th traps emptied and re-set
- September 21st traps emptied and re-set
- October 31st traps emptied and re-set
- December 15th traps emptied and removed

The trap locations are described in Appendix 1. Trap 1 disappeared before the first round of sample collection and was not replaced. Traps 2 and 3 were within the Blackcliff/Wyndcliff SSSI, the rest in the Pierce, Alcove & Piercefield Woods SSSI.

4.3. Species conservation status as used in this document

Species status of many invertebrate groups is currently in a state of flux, with some up-dating of old species reviews having taken place. For the sake of simplicity, this document uses the recent published statuses which have been assessed using IUCN Regional Guidelines plus the JNCC Nationally Rare/Scarce terminology. Older terminology for groups that have not yet been subject to new review has been up-dated in order to be consistent, hence 'Nationally Scarce' is used here for 'Notable'.

5. Results

5.1. Pierce, Alcove and Piercefield Woods SSSI

This SSSI forms a long section of the steep east-facing side of the Wye Valley, extending from Chepstow in the south, through Castle Wood, Alcove Wood, Pierce Wood and Cave Wood, linking to Blackcliff/Wyndcliff SSSI to the north. The river has a sharp and dramatic meander here, with an Iron Age hillfort within the woodlands on the steep ridge formed inside the bend of the river. The woodland is backed by Piercefield Park which still retains a good range of large old veteran trees across the adjoining parkland. The woodland was also landscaped in the 18th century, as part of the picturesque landscape gardens surrounding the mansion of Piercefield. The SSSI citation describes the woodland as mixed beech, yew and lime, with a relict coppice structure, and with some standards on steep slopes. It notes the transition from acid to calcareous woodland types.

The SSSI was found to be of significant interest for saproxylic invertebrates in autumn 2017 and further species of interest have been found in 2018.

Larvae of two uncommon beetle species were found amongst collapsed beech and oak trees across the upper slopes of Piercefield Crags on June 5th. *Pediacus dermestoides* (Cucujidae) is an early-successional species which develops beneath bark while the wood is still sappy, while the click beetle *Stenagostus rhombeus* (Elateridae) colonises slightly later, while the bark is still tightly attached to the wood but beginning to loosen. Both species are regarded as weak indicators of old growth conditions (Alexander et al, 2003) – grade 3 species used in calculation of the Index of Ecological Continuity (IEC) - and were also found in the SAC during the autumn 2017 surveys. The naturalised Australian beetle *Pycnomerus fuliginosus* (Colydiidae) was also present beneath bark on the collapsed trees.

The Nationally Scarce beetle *Dasytes plumbeus* (Melyridae) was found in abundance at elder blossom along the well-lit lower edges of the woodland along the marshy river flats, together with the common and widespread *Anaspis maculata* and *A. regimbarti* (Scraptiidae). The ecology of *D. plumbeus* is currently very difficult to understand (Alexander, 2014a). The adults are most often found by sweep-netting through tall flowery grasslands, perhaps always near to trees, in woods, wood-pastures and parkland, but also heaths, bogs and fens; there are concentrations of records in the Somerset Levels and The Fens, suggesting an association with permanently damp

grasslands. The Wye-side situation is quite typical. But their larval ecology is not known. Some authors state that the larvae are predators living in rotting wood and, if so, it is with veteran trees growing in or by unimproved and/or marshy grassland. It seems more likely however that they develop in the hollow stems of large robust herbs such as umbels and thistles. The species is known from about five hectads in Wales, along the Border area and by the Carmarthenshire coast. Although previously reported from Monmouthshire, this appears to be the first record from the Wye Valley Woodlands SAC.

Searching amongst the collapsed large oak and beech along the lower woodland edge revealed further larvae of the uncommon click beetle *Stenagostus rhombeus*, as well as common and widespread beetles including *Anobium punctatum* (Ptinidae), larvae of the click beetle *Melanotus castanipes* (Elateridae) and cardinal beetles (Pyrochroidae). Brown Tree Ant *Lasius brunneus* was also present here – this currently has Nationally Scarce status (Falk, 1991) but it has been known for some time that this status merits down-grading. It was first reported in Wales by Alexander (2005) and remains confined to the Monmouthshire area. It may have spread westwards from its stronghold along the Severn Vale. The widespread soldier beetles *Malthinus seriepunctatus* and *Malthodes marginatus* (Cantharidae) were found on aerial dead branches of the trees lining the riverside marsh.

The marshy grassland flats outside of the woodland have also proved to be of interest for wetland Diptera. The uncommon fruit fly *Myopites inulaedyssenterica* (Tephritidae) was found to be plentiful on its hostplant fleabane on July 17th and three saltmarsh picture-winged flies *Ceroxys urticae* and *Melieria picta* (Ulidiidae) and *Campiglossa plantaginis* (Tephritidae) were found on August 9th. It is very unusual to find these saltmarsh species so far inland, a feature of the unregulated nature of the River Wye.

The stands of old blackthorn scrub at the lower woodland edge were highlighted in the autumn 2017 survey (Alexander, 2018c). The August 9th visit included a more intensive examination of one section with both *Ganoderma australe* and *Phellinus pomaceus* fungi hollowing the cores of dead heartwood. One group of old *P. pomaceus* brackets had a group of emergence holes of the Nationally Scarce beetle *Dorcatoma dresdensis*. This beetle develops in the hard, dead perennial brackets of *Ganoderma* and *Phellinus* fungi. It has a more restricted British range than the *D. substriata* found in Lower Linenwell Wood (see Section 5.2. Blackcliff/Wyndcliff SSSI below) – the only previous Welsh record appears to be from by the River Monnow opposite Kentchurch (Levey, 2005). Also breeding in the old blackthorn was the Nationally Scarce bark beetle *Scolytus mali* (Curculionidae: Scolytinae). This beetle has only previously been reported in Wales from Monmouthshire. It develops in the cambial layer of freshly dead woody Rosaceae and is very unusual in blackthorn, more typically being found in dead apple stems in traditional orchards.

This final visit also resulted in the discovery of darkling beetle larvae in a standing dead beech tree high on Piercefield Cliffs. This is probably of *Prionychus ater*, a species recently downgraded from Nationally Scarce status (Alexander *et al*., 2014) but could conceivably be of either of the Nationally Scarce *P. melanarius* or *Pseudocistela ceramboides*, both of which have been reported within the SAC. Larvae have been retained for rearing, to discover which of the three species they belong to. The two

hollowing beeches where larvae were found in autumn 2017 no longer appear to host larvae.

5.2. Blackcliff/Wyndcliff SSSI

Blackcliff/Wyndcliff SSSI forms a continuation of the Piercefield Woods and extends northwards along the Wye Valley towards Tintern. It comprises Lower Martridge Wood, Lower Wyndcliff Wood and Lower Linenwell Wood, from south to north, below the road, with Upper Linenwell Wood immediately above the road at the north end, and Upper Wyndcliff Wood and Blackcliff Wood along the rocky crags above. Strips of woodland along the upper edge are in the separate ownership of Porthcasseg Farm. The SSSI citation describes the vegetation as high forest and old coppice-with-standards on Carboniferous Limestone, with relict beech coppice an important feature.

The Nationally Rare beetle *Tetratoma ancora* (Tetratomidae) is particularly associated with old hazels, breeding in standing dead stems with fungal decay (Alexander *et al*., 2014). A small number were knocked from the old hazels within the southern section of Porthcasseg Woods on June 4th. This beetle appears not to have been reported from the Wye Valley Woodlands previously; it is otherwise known in Wales from just three hectads in the west, and therefore appears to be a previously overlooked species in Monmouthshire (VC35). Two females of another Nationally Scarce beetle *Anaspis costai* were also knocked from the same hazels. The ecology of *A. costai* is much less well-known. The adults have been found on oak and other broad-leaved tree species and are known to be attracted to elder blossom. The larval habitat is not known but assumed to be decaying wood of some description. It is known from very few sites in Wales, the NBN Atlas only showing records from Monmouthshire and Glamorganshire. This area was also found to be supporting a range of uncommon invertebrates associated with ancient semi-natural woodland; brown snail *Zenobiella subrufescens*, the ramsons-associated plant bug *Calocoris alpestris* and the leaf beetle *Orsodacne cerasi*, the last being found in abundance at spindle blossom.

A visit on July 15th targeted old hazels along the gentler slopes within Upper Wyndcliff Wood and further *Tetratoma ancora* beetles were found, together with the uncommon beetles *Orchesia undulata* (Melandryidae) and *Anobium fulvicorne*, as well as the barkfly *Psococerastis gibbosa* (Psocoptera). Another Nationally Scarce saproxylic beetle was found on the old hazels stems, *Cis festivus* (Ciidae), but this is a species which merits down-grading as it is much more widespread than was appreciated at the time of Hyman (1992). Path-side sweep-netting resulted in the capture of the false click beetle *Microrhagus pygmaeus* (Eucnemidae), which currently has RDB (Rare) status (Hyman, 1992) but awaits downgrading to Nationally Scarce (see Mendel & Clarke, 1996). The larvae of *M. pygmaeus* develop in well-decayed, white-rotten heartwood of fallen large branches (4–30cm in diameter) of broad-leaved trees, favouring old shady oak woods in Britain. The adults are typically found by sweep-netting the ground flora. The species has been known in the area for a very long time, the earliest record being from the Symonds Yat (Gloucestershire) area in about 1900 (Alexander, 2018b) but then a large gap before it was reported again, this time from the White Rocks Reserve, Little Doward (Herefordshire) in 2003 (Cooter, 2004) and Prisk Wood (Graig Wood SSSI) in 2004 and 2005 (Kirby, 2006). It may be expected to be widespread through the Wye Valley Woodlands SAC.

Two Nationally Scarce saproxylic beetle species were found in Lower Wyndcliff Wood during the August 7th visit. The fungus weevil *Platystomos albinus* (Anthribidae) was knocked from the old hazel stand where it was found in autumn 2017 and the false darkling beetle *Orchesia micans* (Melandryidae) was also knocked from hazels elsewhere. *O. micans* typically develops in the persistent annual bracket fungi of the *Inonotus* group and so presumably the hazel specimen was merely at rest rather than in breeding habitat. The old hazels have proved to be rich in invertebrates. On this occasion, other species found included the uncommon snails *Balea sarsii* and *Zenobiella subrufescens* and the saproxylic beetles *Salpingus planirostris* and *Ennearthron cornutum*.

Upper Linenwell Wood was explored on July 18th. A short section of track at the north end - a side route formerly used for access to the neighbouring pastures and so now able to develop flowering grasses, hemp-agrimony and Tintern spurge – was found to be a hot-spot for sun-loving saproxylic beetles. Sweep-netting here revealed plentiful *Mordellistena* (Mordellidae) and *Anaspis* (Scraptiidae) beetles, attracted to the sun-warmed blossom. Samples retained for microscopic examination proved to be of two Nationally Scarce species: the tumbling flower beetle *M. variegata* and *A. costai* (males and females). *M. variegata* has not previously been reported in Wales (Alexander *et al*., 2014) and is therefore a previously overlooked species. The larvae develop in decaying wood but no details are known. The adults are typically found by sweep-netting and at blossom in July and August. Sites include woodland glades, wood pastures and open farmland situations with old trees. Information on *A. costai* may be found above (p.9).

A follow-up visit on August 8th found the Nationally Scarce fungus weevil *Platystomos albinus* (Anthribidae) which clearly has a strong population within this SSSI. A good range of uncommon saproxylic beetles were also found including the false darkling beetle *Orchesia undulata* (Melandryidae), the hairy fungus beetle *Mycetophagus atomarius* (Mycetophagidae), *Cerylon ferrugineum* (Cerylonidae) and the sap beetle *Glischrochilus hortensis* (Nitidulidae).

Black Cliff Wood proved to be unproductive, partly perhaps due to its very dry character. Larger fallen tree trunks were found to be providing habitat for a typical assemblage of widespread saproxylic beetles – the rove beetle *Atrecus affinis* (Staphylinidae), the click beetle *Melanotus castanipes* (Elateridae) and the longhorn *Rhagium mordax* (Cerambycidae). One collapsed oak had an abundance of fruiting *Laetiporus sulphureus* fungus and this had attracted the moist-decay favouring beetle *Glischrochilus hortensis* (Nitidulidae).

Lower Wyndcliff Wood has concentrations of freshly-downed large beech stems, partly from tree safety cutting below the A road but also from natural collapse. The ambrosia beetle *Hylecoetus dermestoides* has been exploiting this resource abundance and galleries are very evident in many cut or broken stems throughout the area. This beetle had Nationally Scarce status in Hyman (1992) but has recently been downgraded as it has been found in 88 hectads since 1980 and is predicted to exceed 100 hectads in due course (Alexander *et al*., 2014). Its recent expansion is unexplained but may be in response to climate change, it being a warmth-loving species. It is an early-successional saproxylic and relatively mobile as a result – the fresh timber habitat being short-lived. The beetle develops in freshly-dead, sappy timber and root stumps

of hardwoods and softwoods, the female boring vertically into the wood, excavating a gallery network - the bore dust is ejected creating distinctive piles around the entrances. The eggs are laid within the galleries and the larvae feed on ambrosia fungus growing on the sappy walls of the excavated galleries (Alexander, 2002). The cambial layers of the trunk sections are colonised by cardinal beetles (Pyrochroidae), the longhorn beetle *Rhagium mordax*, and other saproxylic insects.

The old yew trees scattered through the steeper slopes are being heartwood-decayed by Chicken-of-the-Woods fungus *Laetiporus sulphureus* and summer 2018 saw an abundance of fungal fruiting. However, these woods are heavily shaded overall and few specialist invertebrates were exploiting the fungal abundance. Only where there were canopy breaks could the darkling beetle *Eledona agricola* (Tenebrionidae) be found with its host fungus. This beetle had Nationally Scarce status in Hyman (1992) but has been down-graded by Alexander *et al*. (2014), it having been reported from 120 hectads since 1990. It remains a site quality indicator species, grade 3 in the IEC. This appears to be the first record from the Wye Valley Woodlands SAC, perhaps reflecting its requirement for well-lit bracket fungus.

The lower riverside edge is rather narrow in comparison with Piercefield Woods but there are patches of blackthorn and privet scrub in places and these have the potential to be providing valuable nectar sources for insects. Wild privet is especially valuable in this respect as it flowers during the high summer period, after hawthorn and elder have finished. A section of lower woodland edge had some collapsed large oak branches and the aerial twigs were found to be supporting the Nationally Scarce false darkling beetle *Orchesia minor* as well as the more widespread beetle species *Cis hispidus* and *Ennearthron cornutum*. *O. minor* develops in aerial dead twigs, on fallen branches as well as while still attached to the parent trees, and was found in the SAC during the autumn 2017 survey.

Lower Linenwell Wood was visited on August 8th and found to be very comparable in site character to both Lower Wyndcliff and parts of Upper Wyndcliff Woods. A key find here was the Nationally Scarce beetle *Dorcatoma substriata* (Ptinidae), a species which has large colonies in the persistent annual fungal brackets of the *Inonotus* group, in this case *I. dryadeus* on a veteran oak. Crucially this veteran oak is a large old boundary standard, at the lower northern corner of the wood. The beetle favours trees growing in well-lit situations and would not be expected to use the fungus when fruiting on a tree in the interior of the wood. There is some suggestion that the fungus itself tends to mainly fruit in relatively well-lit situations. In Wales, this beetle is only known from a few sites within a few kilometres of the border with England, although as far north as Chirk Castle Park, Wrexham. A good range of uncommon saproxylics were also found including the awl-fly *Xylophagus ater* (Xylophagidae), the false darkling beetle *Orchesia undulata* (Melandryidae) and rhinoceros beetle *Sinodendron cylindricum* (Lucanidae). The ancient woodland mollusc fauna was also particularly rich, with Lapidary Snail *Helicigona lapicida* and Ash-black Slug *Limax cinereoniger* both noted.

Further discussions also took place with Tony Drane, the national authority on the lime bark beetles. He has clarified that it was the native lime that grows on the edge of the Lower Wyndcliff car park that produced the only Wye Gorge record for the Bast Bark Beetle *Ernoporus tiliae* (Drane, 2005), a Species of Principal Importance in England

(Section 41 species) and Endangered (Hyman, 1992). A branch that had died in the crown of this tree had fallen prior to his visit, enabling him to discover beetles in the bark. As this beetle species favours well-lit situations for oviposition it is most likely to target either open-grown trees, trees growing on south-facing crags, or the very tops of limes which are prominent in the woodland canopy. This makes finding occupied dead branches serendipitous.

5.3. Graig Wood SSSI

A brief visit was made to the Prisk Wood Nature Reserve, focusing in particular on the old lime pollards along the upper boundary banks. The characteristic emergence holes of the Nationally Scarce lime bark beetle *Ernoporicus caucasicus* were found in a small section of lime twig lying on the ground beneath one of the trees. The interior of the wood contains oak standards, old ash coppice stools and hazels with areas of wet alder woodlands. A fallen oak standard had been partly sawn to clear access to a path and bark of the cut end was loosely attached but still moist beneath. Six individuals of the uncommon saproxylic beetle *Orchesia undulata* (Melandryidae) were immediately visible together with more common and widespread associates – the rove beetle *Atrecus affinis* (Staphylinidae) and larvae of the longhorn beetle *Rhagium mordax* (Cerambycidae) and a cardinal beetle *Pyrochroa* sp. (Pyrochroidae). A sawn trunk section of a large felled cherry tree had many galleries of the uncommon ambrosia beetle *Hylecoetus dermestoides* (Lymexylidae). A further uncommon saproxylic insects was found beneath sappy bark on a felled sycamore trunk: *Xylocoris cursitans* (Anthocoridae). Beating a standing dead hazel pole revealed specimens of the predatory epiphytic bug *Loricula elegantula*. This fauna is typical of ancient semi-natural woodlands, with only the lime bark beetle providing special interest.

5.4. Harper's Grove - Lord's Grove SSSI

This section of steep, gorge-side woodland on the east bank of the River Wye was primarily visited to assess its potential for Cosnard's Net-winged Beetle, as part of a separate project being organised by the Species Recovery Trust (Alexander, 2018a). The woodland is privately owned and was explored on foot from the Public Footpaths. The woodland is typical Wye gorge woodland, designated for its large area of predominantly mixed coppice and mixed coppice with standards woodland. This particular site is considered notable for the stand of hornbeam at the upper end as well as the presence of large-leaved lime. Lord's Wood has been subject to clear-felling of some central blocks and replanting with conifers. It has two parallel disused railway tracks through its length, and which currently provide valuable access to the otherwise notably steep slopes. The precise boundaries of the SSSI were found not to accurately define the extent of semi-natural woodland and the present text relates to the geographical site rather than the designated site.

The wood was explored from the two tracks on the afternoon of June 16th and the morning of June 18th. Overall, the wood was assessed as mostly unsuitable for Cosnard's Net-winged Beetle due to the small pole size of much of the timber currently available as well as the dense closed canopy, but there is also a thin scatter of veteran beech and lime, including old pollards, as well as massive out-grown coppice stools. In this respect it is similar to Cadora Wood (Gloucestershire) around the time of acquisition by the Woodland Trust and before the conifer blocks began to be harvested, and the latter site has of course generated two sightings of Cosnard's Net-winged Beetle in 2002 (Kirby, 2002). Harper's Grove itself holds a massive lime pollard, about

7m in girth. The larger trees present potentially contain white-rotten heartwood and hollowing, potentially suitable for Cosnard's Net-winged Beetle larvae.

This woodland is notably heavily shaded and sweep-netting was notably unproductive in invertebrates. Woodland edge was the only habitat where species of interest could be found. Wyesham Lane separates Harper's Grove from Lord's Grove and provides a well-lit and flowery corridor through the dark woodlands. The Nationally Scarce beetle *Dasytes plumbeus* (Melyridae) was present in small numbers at dog-rose blossom along the upper parts of the lane.

5.5. Upper Wye Gorge SSSI

A brief exploratory visit was made to the Far Hearkening Rock area of the Upper Wye Gorge SSSI on the afternoon of June 17th, primarily to assess the potential for Cosnard's Net-winged Beetle. This SSSI is focused on Lady Park Wood NNR, said to be one of the best examples in Britain of a mixed deciduous woodland. The NNR was not entered however as it is fenced with locked gates. The Far Hearkening Rock area to the west of the NNR was found to have considerable potential interest for saproxylic invertebrates and would be well-worth a follow-up more detailed survey. There are long strips of old beech coppice including stub-coppice where there is a substantial high coppice stool with rot-holes and cavities generally. The best area noted was at SO543143. This area has considerable potential but is difficult to sample by standard hand-search techniques. Flight interception trapping would be the best approach here.

5.6. Resumé of species of interest found during the 2018 hand-search surveys

A total of 49 species of saproxylic beetle was found together with two saproxylic Dipterans, a Hemipteran and a mollusc. Species with other habitat associations were also found incidentally, in the course of sampling. The 2018 data include one beetle with Nationally Rare status (*Tetratoma ancora*) plus thirteen species with Nationally Scarce (or equivalent) status, of which three had also been found in autumn 2017, and including one species *Mordellistena variegata*, which appears not to have been found in Wales previously:

- *Anaspis costai* (Coleoptera: Scraptiidae)
- *Cis festivus* (Coleoptera: Ciidae)
- *Dasytes plumbeus* (Coleoptera: Melyridae)
- *Dorcatoma dresdensis* (Coleoptera: Ptinidae)
- *Dorcatoma substriata* (Coleoptera: Ptinidae)
- *Ernoporicus caucasicus* (Coleoptera: Curculionidae: Scolytinae)
- *Lasius brunneus* (Hymenoptera: Formicidae)
- *Microrhagus pygmaeus* (Coleoptera: Eucnemidae)
- *Mordellistena variegata* (Coleoptera: Mordellidae)
- *Orchesia micans* (Coleoptera: Melandryidae)
- *Orchesia minor* (Coleoptera: Melandryidae)
- *Platystomos albinus* (Coleoptera: Anthribidae)
- *Scolytus mali* (Coleoptera: Curculionidae: Scolytinae)

Comments on the ecology of these species have been made within the context of the site visits described above and will not be repeated here.

Strictly speaking, *E. caucasicus* has 'Endangered' status (Hyman, 1992) but more recent research has demonstrated that Nationally Scarce is the more appropriate status (Drane, 2005) and will be adopted once this group have been subject to a modern Species Status Review. Similarly, *Microrhagus pygmaeus* has RDB (Rare) status but is well-known to be long overdue down-grading to Nationally Scarce.

These represent many of the key saproxylic features of the SAC but emphasise in particular woodland edge habitats:

- the riverside edge of the woodlands with the extensive development of old growth blackthorn, supporting in particular the bark beetle *S. mali* and the bracket fungus associated beetle *D. dresdensis*;
- woodland edge situations more generally, with better-lit habitat, exemplified by the bracket fungus beetle *D. substriata*;
- sheltered flowery glades, with the tumbling flower beetles *M. variegata* and *A. costai*;

  but also:
- old hazels with dead stems, supporting the beetles *T. ancora, P. albinus, O. minor* and *C. festivus.*

One, *D. plumbeus*, is probably not saproxylic but develops in the dead pith stems of tall robust herbaceous plants such as umbellifers and thistles, and is therefore part of the riverside woodland edge fauna.

5.7. Resumé of species of interest found by flight interception trapping

The flight interception trapping exercise resulted in catches of 298 species of Diptera, 100 species of Coleoptera, plus a miscellany of other groups – not everything has been identified as some groups require specialist expertise not readily available to the contractor. Of the species identified, 50 have conservation status in Britain (see Tables below).

The Diptera included 23 species with conservation status of which four are Vulnerable (*Ctenophora flaveolata*, *Rhipidia ctenophora, Rymosia affinis* and *Phortica variegata*), two Near Threatened (*Acnemia amoena* and *Manota unifurcata*) and one Data Deficient (*Mycetobia gemella*). One further species, *Dilophus bispinosus*, has not been formally assessed but Alexander (2017b) has recommended Nationally Rare status. The total number of fungus gnat species was 113 out of a British list of around 570 species which, although not outstanding for a site in western Britain, is still remarkable. A similar flight-trapping survey of the ancient wood pasture of Thorneythwaite Fell in Borrowdale, Cumbria, during 2017 achieved a total of 167 species.

The cranefly *Ctenophora flaveolata* (Tipulidae) is thought to develop in rot-holes in veteran broadleaved trees. It has been associated with beech but also occurs with ash and oak at some sites. It is best-known in Britain from the New Forest and Windsor Forest but has also been found more widely including sites in Mid- and north Wales. The other Vulnerable cranefly *Rhipidia ctenophora* (Limoniidae) has been reared from a wide range of wood-decay situations, including rot-holes, sap-runs and rotting stumps; records have been associated with elm, horse chestnut and sycamore trees. The NBN Atlas shows three previous records from Wales but – like *C. flaveolata* - none from the Monmouthshire area.

The fungus gnats include three species of conservation importance. The Vulnerable *Rymosia affinis* is not a saproxylic but develops in the stipes of the fruiting bodies of various terrestrial gill fungi. It has a Mediterranean distribution and is known to aestivate in caves. It is naturally associated with Karst landscapes and has been reported in Wales from Breconshire and Flintshire. The two Near Threatened species are saproxylic and associated with decaying wood – *Acnemia amoena* has previously been reported from Dinefwr Deer Park and Powis Castle Park but the Wye Valley Woodlands SAC is a new area for the species; the only previously known Welsh locality for *Manota unifurcata* was Nicholaston Woods on the Gower. One of the Nationally Scarce fungus gnats *Mycetophila uliginosa* is also worthy of special note as it has recently been found to develop in the bracket fungus *Phellinus pomaceus* (P.J. Chandler, pers. comm.) and was taken by the flight trap situated amongst the old blackthorn scrub below Piercefield Woods. It appears not to have been found in Wales before.

The Vulnerable *Phortica variegata* is a fruit fly (Drosophilidae) associated with sap-runs. It is a Species of Principal Importance (Section 41 species) in England. This appears to be the first Welsh record although it is known from the English side of the Wye Gorge at Lancaut and Ban-y-Gor Nature Reserves.

Mycetobia gemella is a wood-gnat (Mycetobiidae) previously only known in Britain from three Caledonian pine forest areas where it is associated with rot-holes and sap-runs. Its discovery in the Wye Valley Woodlands SAC is very unexpected. It has Data Deficient status in the British Red List as the species was only identified as a British species in 1994 and was therefore thought likely to be found elsewhere with further targeted survey (Falk & Chandler, 2005). The Species Status Review will now need adjusting to take the focus away from old pine forest.

Other Nationally Scarce flies worth further mention include the picture-winged *Clusia tigrina* which is only known in Wales from Monmouthshire – although not previously in the Wye Gorge - and the Menai Straits area of north Wales. Larvae develop in decaying wood of broadleaved trees, usually of standing trees with exposed heartwood. The muscid fly *Phaonia exoleta* was only known from 9 post-1990 sites – including one in Cardiganshire - when listed (Falk & Pont, 2017). It develops in water-filled rot holes where the larvae are predaceous on mosquito and midge larvae. This is the type of situation used by the Nationally Scarce beetle *Prionocyphon serricornis*, also found in the flight traps in 2018.

The final fly which merits attention is the fever fly *Dilophus bispinosus* as the British status and ecology have only recently been reviewed (Alexander, 2017b). It has never been found in Wales previously and the closest known site is another limestone gorge system, Leigh Woods NNR on the Avon Gorge at Bristol. All previous British records have been of females and so the first Welsh specimen is unique in being a male. The species is believed to develop in soils rich in organic matter but dry and free-draining, often alluvial in origin, in areas with relatively mild microclimate. It appears to favour sheltered mosaics of flower-rich meadow with trees, woodlands and especially woodland edge. The male was taken by Trap 7 in exactly this type of situation, at the lower edge of Piercefield Woods, with open blackthorn scrub and the flowery marshy grassland of the river flats.

The Coleoptera included 24 species with conservation status, mostly Nationally Scarce but including the Endangered Cosnard's Net-winged Beetle *Erotides cosnardi* (Lycidae) and the Nationally Rare weevil *Anthonomus rufus*. There was also a Nationally Rare woodlouse *Armadillidium pictum*, a Nationally Scarce hopper bug *Issus muscaeformis* and the Nationally Scarce Brown Tree Ant *Lasius brunneus*.

The single male of Cosnard's Net-winged Beetle is an important discovery. While the species is currently only proven to occur in Britain in the Wye Gorge and on the South Downs, the Wye Gorge population was thought to be confined to the upper section, focused on Little Doward Hill (Alexander, 2014b). The only previous Welsh record was the original discovery of the species, as an overlooked British species, from Reddings Enclosure at Wyesham on the east bank of the Wye in 1944 (Airy Shaw, 1944). It has since been found in Cadora Wood and Highbury Wood NNR in Gloucestershire and at Little Doward, Herefordshire (Alexander, 2017a). Its ecology is poorly understood but it is associated with beech old growth woodlands – the family Lycidae are all saproxylic. As another Species of Principal Importance in England, it is currently the subject to an on-going research project led by the Species Recovery Trust.

The Nationally Rare weevil *Anthonomus rufus* is of particular significance as it ties in with the identified interest of the fringing blackthorn scrub along the lower edge of Piercefield Woods. The larvae develop in the flower buds, and usually mainly where there are actively-expanding fronts of young growth. It is best known from West Cornwall but there are a thin scatter of records from elsewhere, including Cardiganshire. This appears to be the first report from the Wye Valley Woodlands SAC and Monmouthshire.

A few of the Nationally Scarce beetles are also worthy of further comment. The rove beetle *Phyllodrepoidea crenata* (Staphylinidae) is a species of the northern and western hill country and has only previously been found in Wales in mid-Wales. It is an early successional saproxylic, with the larvae feeding on fungal mycelium and yeasts under sappy bark and the adults feeding on spores from external fungal fruit bodies.

The tumbling flower beetle *Mordellistena neuwaldeggiana* (Mordellidae) has been reared from branch wood of hornbeam and field maple in the early stages of decay, and presumably will also exploit other broad-leaved tree species as well. The only previous Welsh record appears to be from St. Fagans in Glamorganshire where it was also found by flight interception trapping (Levey, 1998).

The cylindrical bark beetle *Cicones variegatus* (Colydiidae) is a beech old-growth specialist, normally associated with encrustations of the wood-decay fungus *Ustulina deusta* on recently-dead, standing beech trunks. Although to be expected in the old growth beech stands of the Wye Valley Woodlands SAC, its only previous Welsh record is from Allt-yr-Esgair in Breconshire (Pavett & Levey, 2001). The beech bark beetle *Ernoporicus fagi* is another beech old growth species and only known in Wales from Monmouthshire and Erddig Park, Wrexham. It develops in the freshly dead bark of broken beech branches and trunks.

Not all of these species with conservation status are saproxylic but a high proportion are. Although there was some overlap with the Nationally Scarce beetles found by hand-searching (see Section 5.6), 9 of the 13 saproxylic beetle species were not found

in the flight interception traps. This is a typical illustration of how the two survey approaches are very much complementary.

Table 1 shows the number of specimens of each of the Diptera with conservation status captured in each trap. Traps 2 and 3 were located in Blackcliff/Wyndcliff SSSI, with the rest in Pierce, Alcove & Piercefield Woods SSSI.

Table 1. Trap locations where Diptera with a conservation status were found.

Species	Status	Assemblage	2	3	4	5	6	7	8	9	10
Tipulidae											
Ctenophora flaveolata	VU	saproxylic		1							
Ctenophora pectinicornis	NS	saproxylic		1			1				
Limoniidae											
Rhipidia ctenophora	VU	saproxylic							2		
Bibionidae											
Dilophus bispinosus	NR	field layer						1			
Mycetophilidae											
Acnemia amoena	NT	saproxylic			1		1		1		
Brachypeza armata	NS	fungi				3					
Docosia flavicoxa	NS	not known	1	4		1				2	
Docosia setosa	NS	not known	2								
Exechiopsis jenkinsoni	NS	not known	1	1		1			1		
Manota unifurcata	NT	saproxylic					2				
Mycetophila uliginosa	NS	saproxylic						2			
Rymosia affinis	VU	fungi							2		
Sciophila interrupta	NS	field layer	1								
Mycetobiidae											
Mycetobia gemella	DD	saproxylic					1				
Dolichopodidae											
Achalcus bimaculatus	NS	wetland						2			
Australachalcus melanotrichus	NS	saproxylic							1		
Clusiidae											
Clusia tigrina	NS	saproxylic							2		
Chloropidae											
Lasiambia brevibucca	NS	saproxylic	1	2					2	1	
Drosophilidae											
Phortica variegata	VU	saproxylic		1							
Fanniidae											
Fannia aequilineata	NS	saproxylic		1	3	5	3		1		4
Fannia clara	NS	nidicolous						1			
Fannia speciosa	NS	field layer						1			1
Piezura graminicola	NS	fungi						1			
Muscidae											
Phaonia exoleta	NS	saproxylic				1					

Table 2. Trap locations where Coleoptera with a conservation status were found.

Species	Status	Assemblage	2	3	4	5	6	7	8	9	10
Staphylinidae											
Euplectus mutator	NS	saproxylic	1								
Phyllodrepoidea crenata	NS	saproxylic					1				
Quedius truncicola	NS	saproxylic							1		
Scydmoraphes helvolus	NS	field layer						1			
Scirtidae											
Prionocyphon serricornis	NS	saproxylic					1		1		
Lycidae											
Erotides cosnardi	EN	saproxylic				1					
Cantharidae											
Malthodes pumilus	NS	saproxylic							1		
Ptinidae											
Dorcatoma dresdensis	NS	saproxylic			1						
Phloiophilidae											
Phloiophilus edwardsii	NS	saproxylic				1					
Cleridae											
Tillus elongatus	NS	saproxylic									1
Biphyllidae											
Diplocoelus fagi	NS	saproxylic					4				
Latridiidae											
Enicmus brevicollis	NS	saproxylic				1	9				
Ciidae											
Cis festivus	NS	saproxylic					2				
Tetratomidae											
Tetratoma ancora	NS	saproxylic		1		1					
Mordellidae											
Mordellistena neuwaldeggiana	NS	saproxylic				1			1		
Zopheridae											
Cicones variegatus	NS	saproxylic	6								
Oedemeridae											
Oedemera femoralis	NS	saproxylic				1	1	1			1
Scraptiidae											
Anaspis costai	NS	saproxylic			4			1	3		
Curculionidae											
Anthonomus rufus	NR	arboreal						12			
Ernoporicus fagi	NS	saproxylic	4								
Kyklioacalles roboris	NS	saproxylic	1							1	
Polydrusus formosus	NS	arboreal	1	1							1
Trachodes hispidus	NS	saproxylic	2			4		1			
Trypodendron signatum	NS	saproxylic					12				

Table 3. Trap locations where other invertebrates with a conservation status were found.

Species	Status	Assemblage	2	3	4	5	6	7	8	9	10
Hemiptera											
Issus muscaeformis	NS	arboreal	2			1	1				
Hymenoptera											
Lasius brunneus	NS	saproxylic								nest	1w
Oniscidea											
Armadillidium pictum	NR	field layer								1	

Only one of the species in Table 3 has a saproxylic ecology. Brown Tree Ant *Lasius brunneus* constructs its nests within the decayed heartwood of veteran broad-leaved trees and its workers forage out over the tree canopy. Trap 9 was situated on a tree containing an active nest and so captured large numbers of the ant. Trap 10 caught a single worker but was clearly close to an active nest.

The planthopper *Issus muscaeformis* is a little-known species associated with oak and yew woodlands and has a restricted distribution across western Britain – it was previously only known from five hectads in Britain. In Wales it is only known from Merionethshire and Monmouthshire (Whitehead, 2010). The only previously known Monmouthshire record is noted as 'Usk'.

The pill woodlouse *Armadillidium pictum* is associated with semi-natural vegetation on base-rich soils in the hill country of western Britain but is extremely localised and currently known from about 20 hectads nationally – Gregory (2009) shows just three in Wales. It has been found in ancient broad-leaved woodland but also in open rocky terrain with talus slopes. It is most abundant in Karst landscapes and has been known from the Wye Gorge for many years. It is unusual in climbing high into trees and it is presumed that the single specimen found in a flight trap had dropped from a branch above.

6. Discussion

6.1. Overview of saproxylic invertebrate fauna of the Wye Valley Woodlands SAC

The total number of species of saproxylic invertebrates which have been recorded in the Welsh section of the Wye Valley Woodlands SAC has now reached 230 species out of the British total of around 2000 species. The number of Diptera is almost certainly higher than this figure shows as the ecology of many species recorded within the SAC remains largely unknown.

Table 4. Species totals of saproxylic invertebrates from the Wye Valley Woodlands SAC.

Group	No. of saproxylics	EN	VU	NT	DD	NR	NS
Coleoptera	144	2				3	39
Diptera	83		3	2	1	-	7
Hymenoptera	1						1
Hemiptera	1						
Mollusca	1						1
Total	**230**	**2**	**3**	**2**	**1**	**3**	**48**

6.2. Site assessment using Saproxylic Quality Index

Two systems have been devised for the relative assessment of site quality for nature conservation using saproxylic beetles: the Index of Ecological Continuity (revised in Alexander, 2004) – see Section 6.4 below - and the Saproxylic Quality Index (Fowles *et al*., 1999).

The Saproxylic Quality Index (Fowles *et al*., 1999) is the more recent development, designed to take the whole saproxylic beetle fauna into account and to include some control of recording effort. The species are scored according to the level of their national status and on a geometric scale – from 1 point for common species through to 32 points for the rarest. The total of these scores is termed the Saproxylic Quality Score, and the Saproxylic Quality Index is calculated by dividing this score by the number of qualifying saproxylic species recorded and then multiplying the result by one hundred. Effectively the SQI is an index of rarity values rather than 'site quality'.

The SQI calculation has certain provisos:

- a threshold of 40 qualifying species have been recorded from the site;
- the list should be complete, i.e. include all qualifying species recorded during surveys;
- the same attention should have been applied to recording common species as rare ones.

Fowles *et al*. (1999) suggest that an SQI of 500 is probably an appropriate threshold for assessing national importance. However, Fowles *et al*. (1999) were unable to present data for more than 14 sites with an SQI of 500 or more and it does seem likely that the threshold is set much too high. Many sites which are nationally famous for their saproxylic beetles have SQI figures in the 300s and 400s.

The SQI approach is of particular use in comparing a series of datasets from a single site – the IEC is less useful for this as the list of qualifying species is intended to be built up over time. It can be instructive to see how the SQI figures have changed over time in relation to changes in site management. The control on recorder effort makes the SQI approach particularly useful for site condition monitoring.

SQI values have been calculated using all of the available data for the Welsh part of the Wye Valley Woodlands SAC as well as for the individual component SSSIs which have been subject to formal survey of their saproxylic invertebrate assemblages. The full list of saproxylic beetles species known from the SAC is presented in Appendix 2 which also shows the index calculations. With the 2018 field survey work and the flight interception trapping the number of qualifying species has now exceeded the threshold of 40 species for both Blackcliff/Wyndcliff SSSI and Pierce, Alcove and Piercefield Woods SSSI. The species lists for the other SSSIs remain below this threshold.

Table 5. Saproxylic Quality Score & Index for Wye Valley Woodlands.

Site name	Dates of survey	Saproxylic Quality Score	Number of qualifying species	Saproxylic Quality Index
Pwl-Mawr Wood	2013	50	21	238
Graig Wood	2013/18	53	18	294
Fiddlers Elbow	2017	41	11	373
Livox Wood	2013	71	18	394
Pierce, Alcove & Piercefield Woods	2017/18	322	81	398
Piercefield Park	1994	108	27	400
Blackcliff/Wyndcliff	2017/18	262	63	416
All sites combined	**-**	**622**	**132**	**471**

In Table 5, the sites have been ordered with lowest SQI first, through to the highest value. None of the SQI values reaches the threshold value of 500 for national significance but, as indicated above, this threshold is probably set too high. Any site achieving a SQI of 300 or more places a site amongst the best quality sites across Britain. Thus, the best sites within the SAC are Blackcliff/Wyndcliff SSSI and Pierce, Alcove and Piercefield Woods SSSI. Piercefield Park, with its veteran trees, appears not to be significantly better in this respect.

6.3. Site assessment using Index of Ecological Continuity

The Index of Ecological Continuity has been used to identify Britain's most important sites for the saproxylic invertebrates of ancient trees and wood-pasture type habitats, and a hierarchical site table has been developed. The Index calculation is based on the presence or absence of a select list of beetle species (revised by Alexander, 2004). The species are graded according to their degree of association with Britain's remaining areas of old growth – mainly the old wood pastures and historic parklands - and these grades are used as the basis for a scoring system. The total of these scores provides the Index.

The species in the qualifying list include many which are difficult to find on demand and so the Index is best built up over a number of visits and across many years. Records from earlier recording therefore contribute to the Index. A control on old records is however imposed, with only post-1950 records being used in the calculation.

Experience has suggested that sites of national importance have an IEC in the range of 25-80 while IEC values of 15-24 are of regional importance (Alexander, 2004). Sites in excess of 80 are considered to be of European significance.

Table 6. Index of Ecological Continuity for Wye Valley Woodlands.

Site name	Date of survey	Grade 1 species	Grade 2 species	Grade 3 species	IEC
Pwl-Mawr Wood	2013			1	1
Fiddlers Elbow	2017		1	2	4
Graig Wood	2013		1	5	7
Livox Wood	2013	1		4	7
Piercefield Park	1994	2		6	12
Blackcliff/Wyndcliff	2017		5	13	23
Pierce, Alcove & Piercefield Woods	2017	1	3	23	32
All sites combined	**-**	**4**	**6**	**32**	**56**

With the additional survey data from 2018, both Pierce, Alcove and Piercefield Woods SSSI and Blackcliff/Wyndcliff SSSI have been shown to be relatively species-rich in old growth beetle species and their IEC values now exceed that of Piercefield Park, although they have both now had the benefit of flight interception trapping, unlike Piercefield Park. However, Piercefield Park still stands out for the presence of two Grade 1 species, neither of which have yet been found in the neighbouring Piercefield Woods - *Ampedus cinnabarinus* (Elateridae), the larvae of which have been claimed to be predatory on those of the Lesser Stag Beetle *Dorcus parallelepipedus* (Lucanidae) but are probably omnivorous in decaying wood generally, and *Anitys rubens* (Ptinidae) which is specific to large volumes of red-rot and is associated with large open-grown oaks. Both were recorded at Piercefield Park by Hammond & Hine (1994). However, the discovery of the Grade 1 and Endangered *Erotides cosnardi* in Piercefield Woods is very significant and has a significant impact on both the IEC and SQI values for the site.

The cumulative IEC for the Welsh section of the Wye Valley Woodlands SAC has now been boosted to a value of 56 and is now not only of national (GB) significance but is now half way towards reaching European significance. These IEC values are all minimum values, of course, as the IEC is a cumulative index, and so further survey work may potentially boost the values – this has been well-demonstrated by the 2018 results. It does seem to be a real possibility at this stage in the survey project that the SAC may achieve an IEC of 80 with further study.

The highest IEC value for any Welsh site is currently 75 for Chirk Castle Park (Castell y Waun a'l Barcdir/Chirk Castle SSSI), followed by Powis Castle Park (63) and Dinefwr Deer Park (Dinefwr Estate) (54). This means that the Wye Valley Woodlands SAC is now recognised as amongst the top three sites in Wales for representation of old growth saproxylic beetles.

7. Recommendations

The 2018 surveys are intended to be part of a larger project to improve documentation of the saproxylic invertebrate fauna of the Wye Valley Woodlands SAC. The results have been impressive and informative and so it is recommended that survey work continues. Flight interception trapping has become the European standard approach for scientific studies on saproxylic insects and the 2018 trial has clearly demonstrated

its value. Expansion of the trapping programme into other areas of the SAC is recommended.

The surveys and subsequent analysis have highlighted the especial significance of veteran trees and open-grown trees, both features which are scarce and localised across the SAC. The 2018 results have again emphasised these factors and have additionally highlighted the special value of the woodland edge habitat and the lower edges to the River Wye to a much greater extent than appreciated in 2017. This reinforces the suggestion (Alexander, 2018c) that these aspects should feature more strongly in the conservation plans for these woodlands in the future. The veteran trees and open-grown trees have historic precedence through the earlier wood pasture history of sections of the SAC area. They need not become prominent features of the main woodlands, but rather be encouraged and maintained around the margins and in specified patches. The lower, riverside margins especially lend themselves to the retention of large old trees and the dead and decaying wood which they generate.

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10. Appendix 1. Flight Interception Trap Locations for Saproxylic Invertebrate Survey 2018 of Blackcliff/Wyndcliff SSSI and Pierce, Alcove & Piercefield Woods SSSI. Traps set and primed on either 6th April 2018 or 18th April 2018.

Trap 1 – ST 53131 97805 (6m acc.). Trap installed and primed 6/4/2018.
Located on a slope to a lower tier/shelf of beech plantation approximately 20m south of Minepit Wood. Trap located at base of beech tree showing evident signs of squirrel damage at the base which has led to significant decay of the heartwood. Several other trees in the vicinity showed similar signs of damage and decay.

Location of Trap 1.

Trap 2 – ST 52519 97402 (7m acc.). Trap installed and primed 6/4/2018.
Located at the head of a sap run on a veteran beech tree near to the perimeter fence in Wyndcliff Wood. Signs of fungal decay emerging from bark.

Location of Trap 2.

Trap 3 – ST 52924 97087 (6m acc.). Trap installed and primed 6/4/18.
Located in a relict hazel coppice with several stems of deadwood with signs of emergence holes. Coppice stool located in Lower Wyndcliff Wood, just high of the lower track where an oak branch has fallen amongst yew trees onto the track.

Location of Trap 3.

Trap 4 – ST 53587 94847 (6m acc.). Trap installed and primed 6/4/2018. Located amongst the cracked root plate of a large fallen beech tree amongst exposed heartwood and *Ganoderma australe* brackets. Tree located the north facing slopes of the Piercefield cliffs.

Location of Trap 4.

Trap 5 – ST 53692 95955 (5m acc.). Trap installed and primed 6/4/2018.
Located at the point that the stem of a relict coppiced small-leaved lime has fallen into a single standard of another small-leaved lime. Several ripped limbs some showing signs of regeneration (may be questionable how much fungal decay occurs of the sugars within the cambium layer if the tree is healing itself). RB checked various areas of the bark and chose and area that appeared to be in an earlier stage of decay (i.e. less frass and woodlice under bark). Tree located on the hillfort of Pierce Wood.

Location of Trap 5.

Trap 6 – ST 53642 95923 (6m acc.). Trap installed 6/4/18 and primed 18/04/2018. Trap located against a large crack within the fallen head of a mature beech tree on the hillfort of Pierce Wood.

Location of Trap 6.

Trap 7 – ST 53639 95911 (4m acc.). Trap installed and primed 6/4/2018.
Trap located at the base of a relatively mature blackthorn along the eastern margin of Pierce Wood, adjacent to the banks of the River Wye. The blackthorn was collapsed/broken at stomach height and a small fresh bracket of *Ganoderma australe* was observed at approx. 10cm above ground height. Another broken blackthorn with desiccated/spent remnants of *Phellinus pomaceus* was located a few metres away.

Location of Trap 7.

Trap 8 – ST 53804 96330 (7m acc.). Trap installed and primed 6/4/2018.
Veteran oak tree at the very northern tip of Pierce Wood, with a hollowed core.
The trap was sited at the entrance to the hollow which had a sap run from the bark to the right of the hollow entrance. *Ganoderma australe* bracket fungi were noticed both inside the hollowed core and at ground level on the outside of the tree.

Location of Trap 8.

Trap 9 – ST 52876 94587 (7m acc.). Trap installed 6/4/18, trap partially primed 6/4/18 with one remaining bottle primed with monopropylene mix on 18/4/2018.

Veteran pollarded oak in Castle Wood. Tree with a significantly hollowed core with two cavities (presumably from sites of previous pollard stems). Trap located in the entrance to the larger of these two cavities (hopefully concealed enough)

Location of Trap 9 (inside a larger cavity concealed by branches to the left of the visible cavity directly above the ladder).

Trap 10 – ST 53793 96096 (6m acc.). Trap installed and primed 18/4/2018.

Moderate sized beech tree with large fissure (roughly 20cm wide) running down length of the eastern face of the trunk. Fissure showing decay back to the heartwood with signs of beetle borings.

Location of Trap 10, at a height of around 6-7ft.

11. Appendix 2. Full species lists from 2018 surveys using hand-search techniques.

Site name	Order	Family	Species Identification	Status
Blackcliff/Wyndcliff SSSI	Coleoptera	Anthribidae	*Platystomos albinus*	NS
		Cantharidae	*Malthodes minimus*	
		Carabidae	*Agonum assimile*	
			Dromius quadrimaculatus	
			Ocys tachysoides	
		Cerambycidae	*Grammoptera ruficornis*	
			Rhagium mordax	
		Cerylonidae	*Cerylon ferrugineum*	
		Chrysomelidae	*Hermaeophaga mercurialis*	
			Ootypus concolor	
			Orsodacne cerasi	
		Ciidae	*Cis boleti*	
			Cis festivus	NS
			Cis hispidus	
			Ennearthron cornutum	
			Octotemnus glabriculus	
		Cryptophagidae	*Antherophagus similis*	
		Curculionidae	*Euophryum confine*	
		Elateridae	*Melanotus castanipes*	
		Erotylidae	*Triplax aenea*	
		Eucnemidae	*Microrhagus pygmaeus*	RDB3
		Lathridiidae	*Stephostethus angusticollis*	
			Aridius nodifer	
		Lucanidae	*Sinodendron cylindricum*	
		Lymexylonidae	*Hylecoetus dermestoides*	
		Melandryidae	*Orchesia micans*	NS
			Orchesia minor	NS
			Orchesia undulata	
		Monotomidae	*Rhizophagus dispar*	
		Mordellidae	*Mordellistena variegata*	NS

Site name	Order	Family	Species Identification	Status
		Mycetophagidae	*Mycetophagus atomarius*	
			Mycetophagus quadripustulatus	
		Nitidulidae	*Glischrochilus hortensis*	
		Ptinidae	*Anobium fulvicorne*	
			Anobium punctatum	
			Dorcatoma substriata	NS
			Ptilinus pectinicornis	
		Pyrochroidae	*Pyrochroa sp*	
		Salpingidae	*Salpingus planirostris*	
		Scolytinae	*Leperesinus varius*	
		Scraptiidae	*Anaspis costai*	NS
			Anaspis lurida	
			Anaspis pulicaria	
		Staphylinidae	*Atrecus affinis*	
		Tenebrionidae	*Eledona agricola*	
		Tetratomidae	*Tetratoma ancora*	NS
	Diptera	Hybotidae	*Tachypeza nubila*	
		Xylophagidae	*Xylophagus ater*	
	Heteroptera	Anthocoridae	*Xylocoris cursitans*	
		Berytidae	*Metatropis rufescens*	
		Miridae	*Bryocoris pteridis*	
			Calocoris major	
	Hymenoptera	Formicidae	*Lasius brunneus*	NS
	Mollusca		*Balea sarsii*	
			Discus rotundatus	
			Helicigona lapicida	
			Hygromia cinctella	
			Lehmannia marginata	
			Limax cinereoniger	
			Pomatias elegans	

Site name	Order	Family	Species Identification	Status
			Zenobiella subrufescens	
	Oniscidea		*Oniscus asellus*	
			Porcellio scaber	
	Psocoptera	Psocidae	*Metylophorus nebulosus*	
		Psocidae	*Psococerastis gibbosa*	
			Peripsocus milleri	
			Pteroxanium kellogii	
Graig Wood SSSI	Coleoptera	Cantharidae	*Rhagonycha fulva*	
		Carabidae	*Ocys tachysoides*	
		Cerambycidae	*Rhagium mordax*	
		Lymexylonidae	*Hylecoetus dermestoides*	
		Melandryidae	*Orchesia undulata*	
		Pyrochroidae	*Pyrochroa sp*	
		Scolytinae	*Ernoporicus caucasicus*	NS
		Staphylinidae	*Atrecus affinis*	
	Heteroptera	Anthocoridae	*Xylocoris cursitans*	
		Microphysidae	*Loricula elegantula*	
Pierce, Alcove & Piercefield Woods SSSI	Coleoptera	Cerylonidae	*Cerylon histeroides*	
		Ciidae	*Cis castaneus*	
			Ennearthron cornutum	
		Colydiidae	*Pycnomerus fuliginosus*	
		Curculionidae	*Euophryum confine*	
		Elateridae	*Stenagostus rhombeus*	
		Lucanidae	*Dorcus parallelepipedus*	
		Lymexylonidae	*Hylecoetus dermestoides*	
		Mycetophagidae	*Mycetophagus quadripustulatus*	
		Ptinidae	*Dorcatoma dresdensis*	NS
		Salpingidae	*Salpingus planirostris*	
		Scolytinae	*Scolytus mali*	NS
		Tenebrionidae	alleculine larvae	
			Eledona agricola	

Site name	Order	Family	Species Identification	Status
	Diptera	Tephritidae	*Campiglossa plantaginis*	
			Myopites inulaedyssenterica	
		Ulidiidae	*Ceroxys urticae*	
		Xylophagidae	*Xylophagus ater*	
Upper Wye Gorge SSSI	Coleoptera	Cerambycidae	*Grammoptera ruficornis*	
			Leiopus linnei	
			Pogonocherus hispidulus	
		Cerylonidae	*Cerylon ferrugineum*	
		Ptinidae	*Anobium fulvicorne*	
			Dryophilus pusillus	
		Throscidae	*Trixagus dermestoides*	
	Diptera	Agromyzidae	*Liriomyza pascuum*	
	Psocoptera	Psocidae	*Loensia fasciata*	
	Coleoptera	Cantharidae	*Malthodes mysticus*	

12. Appendix 3. List of saproxylic beetle species with IEC and SQI status in Wye Valley Woodlands.

	Checklist of Beetles of the British Isles Duff 2012	SQI Score	IEC Score (2004 with updates)	Pierce, Alcove & Piercefield Woods	Black Cliff & Wyndcliff	Fiddlers Elbow	Graig Wood	Livox Wood	Pwl-Mawr Wood	Piercefield Park
Histeridae	*Abraeus perpusillus*	4		2018	2018					
Histeridae	*Paromalus flavicornis*	2		2017						
Ptliidae	*Ptenidium errabunda*									1994
Leiodidae	*Anisotoma glabra*	2								
Leiodidae	*Anisotoma humeralis*	2		2018						
Leiodidae	*Agathidium nigripenne*	2							2013	
Staphylinidae	*Phyllodrepoidea crenata*	8		2018						
Staphylinidae	*Dropephylla koltzei (vilis)*	1								1994
Staphylinidae	*Phloeonomus punctipennis*	2						2013		1994
Pselaphinae	*Euplectus mutator (fauveli)*	8			2018					
Staphylinidae	*Phloeocharis subtilissima*	2						2013		
Staphylinidae	*Sepedophilus bipunctatus*	8								1994
Staphylinidae	*Sepedophilus testaceus*	8						2013		1994
Staphylinidae	*Dinaraea aequata*	1					2013			
staphylinidae	*Bolitochara bella*									1994
Staphylinidae	*Bolitochara obliqua*							2013	2013	
Staphylinidae	*Leptusa fumida*	1					2013		2013	1994
Staphylinidae	*Leptusa pulchella*	2		2017					2013	
Staphylinidae	*Leptusa ruficollis*	1								1994
Staphylinidae	*Gyrophaena affinis*									1994
Staphylinidae	*Gyrophaena gentilis*								2013	
Staphylinidae	*Dexiogyia corticina*	8								1994
Staphylinidae	*Ischnoglossa prolixa*	2								1994
Scaphidiidae	*Scaphidium quadrimaculatum*	2		2017						1994
Scaphidiidae	*Scaphisoma agaricinum*	2			2017				2013	1994
Scydmaenidae	*Stenichnus bicolor*	4	1	2018	2018					

	Checklist of Beetles of the British Isles Duff 2012	SQI Score	IEC Score (2004 with updates)	Pierce, Alcove & Piercefield Woods	Black Cliff & Wyndcliff	Fiddlers Elbow	Graig Wood	Livox Wood	Pwl-Mawr Wood	Piercefield Park
Staphylinidae	*Atrecus affinis*	1		2017	2018		2018	2013	2013	
Staphylinidae	*Gabrius splendidulus*	1					2013		2013	1994
Staphylinidae	*Quedius microps*	8	1				2013	2013		
Staphylinidae	*Quedius truncicola*	8	1	2018						
Staphylinidae	*Quedius xanthopus*	4	1	2018						
Lucanidae	*Lucanus cervus*	8							2013	
Lucanidae	*Dorcus parallelipipedus*	2		2018				2013	2013	1994
Lucanidae	*Sinodendron cylindricum*	2		2017	2018			2013	2013	
Scirtidae	*Prionocyphon serricornis*	8	1	2018						
Buprestidae	*Agrilus biguttatus*	8			2017					
Eucnemidae	*Microrhagus pygmaeus*	8	1		2018					
Elateridae	*Denticollis linearis*	1		2018	2018		2013	2013		
Elateridae	*Stenagostus rhombeus*	4	1	2018					2013	
Elateridae	*Ampedus cinnabarinus*	16	3							1994
Elateridae	*Melanotus castanipes*	1		2018	2018	2017	2013	2013	2013	1994
Lycidae	*Platycis minutus*	8	1	2017						
Lycidae	*Erotides cosnardi*	24	3	2018						
Cantharidae	*Malthinus balteatus*	8			2018					
Cantharidae	*Malthinus flaveolus*	1		2018						
Cantharidae	*Malthinus seriepunctatus*	2		2018	2018					
Cantharidae	*Malthodes guttifer*	8							2013	
Cantharidae	*Malthodes marginatus*	1		2018	2018					
Cantharidae	*Malthodes minimus*	1		2018	2018					
Cantharidae	*Malthodes pumilus*	2		2018						
Ptinidae	*Ptinus sexpunctatus*				2018					
Ptinidae	*Grynobius planus*	2		2018	2018				2013	
Ptinidae	*Xestobium rufovillosum*	4	1							1994
Ptinidae	*Hemicoelus fulvicornis*	1			2018				2013	
Ptinidae	*Anobium punctatum*	1		2018	2018					1994

	Checklist of Beetles of the British Isles Duff 2012	SQI Score	IEC Score (2004 with updates)	Pierce, Alcove & Piercefield Woods	Black Cliff & Wyndcliff	Fiddlers Elbow	Graig Wood	Livox Wood	Pwl-Mawr Wood	Piercefield Park
Ptinidae	*Ptilinus pectinicornis*	1		2018	2018		2013		2013	
Ptinidae	*Dorcatoma chrysomelina*	4	1							1994
Ptinidae	*Dorcatoma dresdensis*	16	2	2018						
Ptinidae	*Dorcatoma flavicornis*	8	1							1994
Ptinidae	*Dorcatoma substriata*	16	2		2018					
Ptinidae	*Anitys rubens*	8	3							1994
Lymexylidae	*Hylecoetus dermestoides*	4	1	2018	2018		2018			
Phloiophilidae	*Phloiophilus edwardsii*	8	1	2018						
Cleridae	*Tillus elongatus*	8	1	2018						
Sphindidae	*Aspidiphorus orbiculatus*	2		2018						
Nitidulidae	*Epuraea pallescens (florea)*	2		2018						
Nitidulidae	*Soronia grisea*	2		2018						
Nitidulidae	*Glischrochilus hortensis*			2018	2018					
Nitidulidae	*Glischrochilus quadriguttatus*	2			2018					
Monotomidae	*Rhizophagus bipustulatus*	1		2018	2018			2013		
Monotomidae	*Rhizophagus dispar*	1		2018	2018					
Monotomidae	*Rhizophagus nitidulus*	4	1	2017						
Monotomidae	*Rhizophagus parallelocollis*	2		2018						
Monotomidae	*Rhizophagus perforatus*	2		2018						
Cucujidae	*Pediacus dermestoides*	4	1	2018	2018		2013			
Cryptophagidae	*Cryptophagus scanicus*						2013			
Erotylidae	*Dacne bipustulata*	2		2018	2018					
Erotylidae	*Triplax aenea*	2			2018					
Biphyllidae	*Diplocoelus fagi*	8	2	2018	2017					
Cerylonidae	*Cerylon ferrugineum*	2		2018	2018			2013	2013	
Cerylonidae	*Cerylon histeroides*	4		2018						

	Checklist of Beetles of the British Isles Duff 2012	SQI Score	IEC Score (2004 with updates)	Pierce, Alcove & Piercefield Woods	Black Cliff & Wyndcliff	Fiddlers Elbow	Graig Wood	Livox Wood	Pwl-Mawr Wood	Piercefield Park
Endomychidae	*Symbiotes latus*	8	1							1994
Latridiidae	*Enicmus brevicornis*	8	1	2018						
Latridiidae	*Enicmus testaceus*	2		2018	2018					
Mycetophagidae	*Mycetophagus atomarius*	2	1	2018	2018					
Mycetophagidae	*Mycetophagus quadripustulatus*	2		2018	2018					
Ciidae	*Octotemnus glabriculus*	1		2018	2018			2013		
Ciidae	*Orthocis alni*	2								1994
Ciidae	*Cis bidentatus*	2								1994
Ciidae	*Cis bilamellatus*			2018	2018			2013		1994
Ciidae	*Cis boleti*	1		2018	2018	2017		2013		1994
Ciidae	*Cis castaneus (nitidus)*	2		2018	2018					1994
Ciidae	*Cis fagi*	2							2013	
Ciidae	*Cis festivus*	2		2018	2018					
Ciidae	*Cis micans (hispidus)*	4			2018					
Ciidae	*Cis submicans (micans)*	4							2013	
Ciidae	Cis vestitus	2		2017						
Ciidae	*Ennearthron cornutum*	2		2018	2018					
Tetratomidae	*Tetratoma ancora*	8	1	2018	2018					
Melandryidae	*Orchesia micans*	4			2018					
Melandryidae	*Orchesia minor*	8		2017	2018	2017				
Melandryidae	*Orchesia undulata*	4	1	2018	2018	2017	2018	2013		
Mordellidae	*Mordellistena neuwaldeggiana*	16	1	2018						
Mordellidae	*Mordellistena variegata*	8			2018					
Colydiidae	*Pycnomerus fuliginosus*			2018						
Colydiidae	*Cicones variegatus*	8	2		2018					
Tenebrionidae	*Eledona agricola*	4	1	2018	2018					

	Checklist of Beetles of the British Isles Duff 2012	SQI Score	IEC Score (2004 with updates)	Pierce, Alcove & Piercefield Woods	Black Cliff & Wyndcliff	Fiddlers Elbow	Graig Wood	Livox Wood	Pwl-Mawr Wood	Piercefield Park
Tenebrionidae	*Prionychus ater*	8	1	2018 (unconf'd)						
Tenebrionidae	*Prionychus melanarius*	32	3					2013		
Tenebrionidae	*Gonodera luperus*	2					2013			
Oedemeridae	*Oedemera femoralis*	8		2018						
Pyrochroidae	*Pyrochroa coccinea*	4	1	2017	2017	2017	2013	2013		1994
Pyrochroidae	*Pyrochroa serraticornis*	1		2018			2013			
Salpingidae	*Vincenzellus ruficollis*	2		2018						
Salpingidae	*Salpingus planirostris*	1		2018	2018	2017				
Salpingidae	*Salpingus ruficollis*	1		2018						
Scraptiidae	*Anaspis costai*	2		2018	2018					
Scraptiidae	*Anaspis garneysi*			2018	2018					
Scraptiidae	*Anaspis lurida*	2			2018					
Scraptiidae	*Anaspis pulicaria*	1			2018					
Scraptiidae	*Anaspis rufilabris*	1		2018	2018					
Cerambycidae	*Rhagium mordax*	1		2018	2018	2017	2018		2013	1994
Cerambycidae	*Stenocorus meridianus*	2		2018						
Cerambycidae	*Grammoptera ruficornis*	1			2018		2013			
Cerambycidae	*Rutpela maculata*	1							2013	
Cerambycidae	*Phymatodes testaceus*	4	1	2017						
Cerambycidae	*Clytus arietis*	1					2013			
Cerambycidae	*Pogonocherus hispidus*	2				2017				
Anthibidae	*Platyrhinus resinosus*	4	1					2013		
Anthibidae	*Platystomos albinus*	8	1		2018					
Curculionidae	*Euophryum confine*			2018	2018	2017		2013	2013	1994
Curculionidae	*Acalles misellus*	2		2018	2018					
Curculionidae	*Kyklioacalles roboris*	8		2018	2018					
Curculionidae	*Trachodes hispidus*	8	1	2018	2018					
Scolytinae	*Scolytus intricatus*	2		2017		2017				

	Checklist of Beetles of the British Isles Duff 2012	SQI Score	IEC Score (2004 with updates)	Pierce, Alcove & Piercefield Woods	Black Cliff & Wyndcliff	Fiddlers Elbow	Graig Wood	Livox Wood	Pwl-Mawr Wood	Piercefield Park
Scolytinae	*Scolytus mali*	8		2018						
Scolytinae	*Ernoporicus caucasicus*	16	2	2005	2017	2005	2018			
Scolytinae	*Ernoporicus fagi*	8	1		2018					
Scolytinae	*Ernoporus tiliae*	32	2		2005					
Scolytinae	*Dryocoetes villosus*	2		2018	2018			2013	2013	
Scolytinae	*Trypodendron domesticum*	2	1	2018	2018					
Scolytinae	*Trypodendron signatum*	8	1	2018						1994
Scolytinae	*Hylesinus crenatus*	2		2017	2017					
Scolytinae	*Hylesinus varius*	1		2017	2018	2017				
	Saproxylic Quality Score	**622**		**322**	**262**	**41**	**53**	**71**	**50**	**108**
	No. of qualifying species	**132**		**81**	**63**	**11**	**18**	**18**	**21**	**27**
	Saproxylic Quality Index	**471**		**398**	**416**	**373**	**294**	**394**	**238**	**400**
	Index of Ecological Continuity		**56**	**32**	**23**	**4**	**7**	**7**	**1**	**12**

13. Appendix 4. List of saproxylic Diptera in Wye Valley Woodlands SAC.

Family	Species	Status	Blackcliff/ Wyndcliff SSSI	Pierce, Alcove & Piercefield Woods SSSI
Tipulidae	*Ctenophora flaveolata*	VU	2018	
	Ctenophora pectinicornis	NS	2018	2018
	Tipula flavolineata		2018	2018
Limoniidae	*Achyrolimonia decemmaculata*		2018	2018
	Austrolimnophila ochracea		2018	2018
	Neolimonia dumetorum		2018	2018
	Rhipidia ctenophora	VU		2018
Bolitophilidae	*Bolitophila saundersii*			2018
Ditomyiidae	*Ditomyia fasciata*			2018
	Symmerus annulatus		2018	2018
Keroplatidae	*Macrocera anglica*			2018
	Cerotelion striatum			2018
	Keroplatus testaceus			2018
	Neoplatyura flava			2018
Mycetophilidae	*Acnemia amoena*	NT		2018
	Allocotocera pulchella			2018
	Anatella turi			2018
	Boletina basalis			2018
	Boletina edwardsi		2018	
	Boletina trispinosa		2018	
	Brevicornu sericoma			2018
	Dynatosoma fuscicorne			2018
	Dynatosoma reciprocum			2018
	Exechiopsis leptura		2018	2018
	Manota unifurcata	NT		2018
	Megophthalmidia crassicornis		2018	
	Monoclona rufilatera			2018
	Mycetophila autumnalis			2018
	Mycetophila marginata			2018
	Mycetophila ocellus		2018	2018
	Mycetophila ornata		2018	2018
	Mycetophila tridentata		2018	2018
	Mycetophila uliginosa	NS		2018
	Mycetophila vittipes			2018
	Mycomya annulata			2018
	Mycomya cinerascens		2018	2018
	Mycomya marginata			2018
	Neoempheria pictipennis			2018
	Phronia basalis			2018
	Phronia biarcuata			2018

Family	Species	Status	Blackcliff/ Wyndcliff SSSI	Pierce, Alcove & Piercefield Woods SSSI
	Phronia conformis			2018
	Phronia humeralis			2018
	Phronia nigricornis			2018
	Phronia notata			2018
	Phronia signata		2018	
	Phthinia humilis			2018
	Platurocypta punctum			2018
	Platurocypta testata			2018
	Polylepta guttiventris			2018
	Pseudobrachypeza helvetica		2018	2018
	Saigusaia flaviventris		2018	2018
	Sciophila nonnisilva		2018	2018
	Tetragoneura sylvatica			2018
	Trichonta vitta			2018
Sciaridae	*Trichosia confusa*			2018
Psychodidae	*Trichomyia urbica*		2018	2018
Mycetobiidae	*Mycetobia gemella*	DD		2018
	Mycetobia pallipes		2018	2018
Anisopodidae	*Sylvicola cinctus*		2018	2018
Xylophagidae	*Xylophagus ater*		2017	2018
Hybotidae	*Leptopeza flavipes*		2018	
Hybotidae	*Tachypeza nubila*		2018	2018
Dolichopodidae	*Australachalcus melanotrichus*	NS		2018
Dolichopodidae	*Neurigona pallida*			2018
Syrphidae	*Ferdinandea cuprea*		2018	
	Myathropa florea		2018	2018
	Xylota segnis			2018
	Xylota sylvarum			2018
Pallopteridae	*Palloptera muliebris*			2018
Lauxaniidae	*Pseudolyciella stylata*			2018
Clusiidae	*Clusia flava*			2018
Clusiidae	*Clusia tigrina*	NS		2018
Chloropidae	*Lasiambia brevibucca*	NS	2018	2018
Odiniidae	*Odinia boletina*			2018
Drosophilidae	*Drosophila helvetica*		2018	
Drosophilidae	*Drosophila obscura*		2018	2018
Drosophilidae	*Phortica variegata*	VU	2018	
Fanniidae	*Fannia aequilineata*	NS	2018	2018
Muscidae	*Helina pertusa*		2018	2018
Muscidae	*Phaonia exoleta*	NS		2018
Muscidae	*Phaonia palpata*			2018
Tachinidae	*Phytomyptera cingulata*			2018

14. Data Archive Appendix.

The data archive contains:

[A] The final report in Microsoft Word and Adobe PDF formats.

[B] Species records, which are held on the NRW Recorder 6 database.

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue http://libcat.naturalresources.wales or http://catllyfr.cyfoethnaturiol.cymru by searching 'Dataset Titles'. The metadata is held as record no 122417.

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