Baseline invertebrate monitoring for the Wilder Blean rewilding project, involving bison, proxy grazers and controls - DRAFT

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Fig. 1. A selection of some of the scarce species of the survey.

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0 – Summary

Kent Wildlife Trust are 'rewilding' a large area of West Blean and Thorndean Woods (a project known as 'Wilder Blean'). The project will involve the use of bison, and exciting opportunity to see the effects of a significant browsing animal on woody vegetation and the taxa it will in turn influence. A key missing driver in the rewilding toolkit. An experiment involving three treatments has bene devised, with bison, proxy grazers and a control area receiving an equal amount of survey effort.

The author has carried out invertebrate surveys using a carefully devised and standardised methodology that works at the landscape scale on a wide range of different rewilding projects, regenerative agriculture projects and ecological restoration projects.

The basic methodology involves selecting eight compartments that capture the character, geography and management history of the site. The site is then visited six times between April and September and 30 minutes is spent recording in each plot. This creates eight comparable plots and a more easily repeatable survey over time. This effort was replicated three times, with bison, proxy grazers and a control area, each receiving the same effort in eight compartments, resulting in 24 compartments being surveyed in all.

On each visit, the methods pertinent to the season were used, being: beating, sweeping, sieving leaf litter, suction-sampling, turning logs and stones, searching flowers etc. Any species not field identifiable were taken back to the microscope for identification over the winter.

A total of 4424 records of 826 species were made. Of the 826 species, 67 had some form of conservation status. The full matrix of species is attached in the appendices and is available as a working spreadsheet. Although there were some 4420+ records, the total number of registrations in the full matrix was 3695, showing that c725 records were repeat records.

Tab. 1. Summary of the results across the three treatments

Metric	Control	Bison	Proxy	ALL
Species	525	541	524	826
Species with status	37	38	41	67
Proportion of species with status	7.0%	7.0%	7.8%	8.1%
Proportion of total species in treatment	63.6%	65.5%	63.4	100%
Araneae	128	130	127	178
Aculeates	22	21	25	34
Lepidoptera - butterflies	10	15	12	19
Heteroptera	58	62	49	82
Lepidoptera - moths	57	61	69	114
Diptera	39	36	31	63
Coleoptera	132	133	134	223

The most speciose group recorded were the beetles, with 223 recorded. Remarkably, 178 species of spider were recorded across the site, the second most speciose group. Moths were the third most speciose group with 114 species recorded. This latter was higher than the Heteroptera, at 82 species.

A significant driver of the ecology in this wood is the presence of **Red Wood Ant (*Formica rufa*)**. So abundant are they in the wood that they were recorded in all 24 compartments on the first round of visits. This level abundance is rare in invertebrates and shows just how

abundant and significant they are at Blean. A number of myrmecophile species associated with the ants were recorded, including the Nationally Scarce ***Clytra quadripunctata*** and the Nationally scarce a, **Scarce 7-spot Ladybird (*Coccinella magnifica*).**

The spider assemblage is remarkable and it may be one of the best and most significant woodland spider assemblages in the UK. Some incredibly rare spiders not seen for decades and only ever known from Blean were recorded, including the Critically Rare ***Pistius truncatus***. The first UK records in 20 years of this iconic species. It has only ever been known recently from Blean and historically, the New Forest. Two individuals were beaten from regenerating oak in one specific compartment (C2). The Endangered money spider, ***Walckenaeria mitrata***, has only ever been known from Blean, and there only from Sweet Chestnut coppice. A single adult male was suction-sampled from pine litter in a small plantation.

There is an incredible leaf litter assemblage of spiders, many of which are rare or scarce and many of which are widespread in the project area. These include (all Nationally Scarce) ***Phrurolithus minimus***, ***Scotina celans***, ***Euryopis flavomaculata***, ***Haplodrassus silvestris*** (also IUCN Vulnerable), ***Tapinocyba insecta*** and ***Sintula corniger*** as well as the unusual harvestman, ***Trogulus tricarinatus***.

A single individual of the RDB2 weevil, ***Dissoleucas niveirostris***, was also suction sampled from C2. This incredibly rare saproxylic weevil has not been seen in the UK since 1988.

Lepidoptera were well represented too, with some iconic Blean specialists recorded. ***Anania funebris*** (Nationally scarce a and Section 41) was recorded only once, on the pylon ride at P5. **Heath Fritillary** was recorded in 8/24 plots and was recorded in all three treatments, mainly in areas with some open habitat. It was the commonest butterfly.

Sickle-bearing Bush-cricket (*Phaneroptera falcata*), a recent colonist to the UK was detected by the presence of its nymphs in the regenerating compartment, C2. This species was first found in the UK around 20 years ago at Hastings. It has since spread to several other sites, notably Dungeness but it has not spread greatly there. Other recent colonists included a single record of the money spider ***Neriene emphana*** and the small spider ***Nigma flavescens*** was found to be abundant on the site, recorded in 8/24 plots after only first being recorded in the UK in 2017. The non-native, thistle-mining, longhorn-beetle, ***Agapanthia cardui*** was also recorded after first being spotted near the Channel Tunnel in 2018. These species show the ever-changing nature of our invertebrate fauna.

Analysing the data at the treatment level showed there was no significant variation in species-richness, number of species with status or proportion of species with status between the three treatments. This is a useful result and shows that the starting point for the three treatments is fairly similar. The overall proportion of species with conservation status was slightly higher in the proxy treatment (7.8%) compared to the other two treatments (both 7.0%). This is thought to be due to a single plot, P5, elevating the treatment due to the management that is carried out here and the resultant habitat continuity clearing underneath the pylon provides. There was quite a difference in the heterogeneity of the different treatments, with the proxy area having the most heterogeneity through to the control area which had the least heterogeneity.

Analysing the data at the plot level provides different insight. The plot that performed the best was P5. It had the second highest number of species at 205, it held 23 (of the 67 rare species of the whole survey) and the highest proportion of invertebrates with status, 11.2%. This being well above the site average. It has continuity of management in the form of the

wayleave that is managed under the pylon. The plot with the most species (211) was B2. A recently cleared area, the most significant in size of the whole survey, and with still significant amounts of bare ground, nectar and a wide variety of structural types. The worst performing plot was P4, with only 111 species recorded (as well as the lowest number of species with status and proportion of species with status). This plot was non-intervention high-forest, with a dense under-storey of Holly and a closed canopy of Pedunculate Oak and Beech.

Of the different habitats surveyed, the open habitats stood out and were statistically more species-rich than the other habitats. It was also clear that many of the worst performing compartments were closed-canopy high forest, which was much closer to non-intervention in their nature.

Using Pantheon at the site level, 11 habitats were found with five of these being seen as being in favourable condition. Clearly, 'bark and sapwood decay' was the most significant assemblage recorded, followed by scrub edge and then scrub heath and moorland. Rich flower assemblage was favourable at the site level but not at the treatment levels. 2021 was a poor year for bees in general due to the cold and wet summer.

There is a significant difference in the species that use dead and decaying timber in the Control plots, with 50% more associated species than the other two plots. This is not obviously explainable as it is not necessarily the case that the plots in this treatment had more dead and decaying timber, yet it is likely that this is the case. It shows the value of this method for detecting changes that may have not been visually evident.

This is an exceptional site with a very high number of rare species not recorded from this part of the Blean woodlands complex before, and care must be taken to make sure this project enhances the habitat for these species. The spider fauna is particularly important and it is perhaps the best woodland site, if not one of the best sites for invertebrates, that the author has surveyed. Especially so at the landscape scale. A sign of success would be the elevation of some of the less well performing compartments to being closer to the better ones. This also shows the value of detailed survey and monitoring that should not be limited to projects, SSSIs like this deserve this level of monitoring in their own right.

Management recommendations are provided to help guide Kent Wildlife Trust and the Wilder Blean project through potential pitfalls that could befall a rewilding project on such an important SSSI. Over grazing of the field layer in open spaces and homogenising the sward and damaging the understory, closing over of open space and a reduction in structure and flower resources are all potential risks without some form of feedback into the management cycle that is dependent on careful monitoring and observation and a critical thinking approach. KWT are encouraged to adopt a 'grey area' approach to rewilding, which involves mechanical interventions when a missing driver is discovered and no 'natural' alternative is available. This pragmatic approach should not be seen as a failure of rewilding but as a win for wildlife and rewilding.

Targeted management in the control area, especially compartment C2 to keep as much of this open on a rotation, will have a significant impact on the invertebrate population here.

A survey of this magnitude should be repeated no sooner than in five years' time but this could be brought forward if significant changes are occurring earlier and need to be addressed but certainly no sooner than 2024.

1 – Introduction

The following (1.1 to 1.8) was provided by Kent Wildlife Trust for context.

1.1 - Overview / landscape context
The Blean Woodlands to the north and west of Canterbury form one of the largest surviving blocks of ancient semi-natural woodland in England. Today, the majority of the woodland areas, plus some neighbouring land, is in the ownership of organisations that manage the land primarily for conservation and public access. There is great potential for collaboration at a landscape scale for the benefit of wildlife and the local communities.

1.2 - West Blean and Thornden Woods
The woodland is a mosaic of different habitat types as a result of extensive replanting. The oldest and most natural types are Oak-Hornbeam community (c.24ha) and mixed broad-leaved coppice with standards (c.78ha). Of more recent origin are extensive, almost pure stands of Sweet Chestnut coppice (c.165ha), most of which has been cut at least once since 1980. During the last 55 years or so, extensive areas (c.214ha) of the woodland have been cleared and conifer plantations established, some of which have since been thinned or felled. Within the woodland, small areas of heath have survived, along rides, under overhead power lines and within areas cleared for conifer planting. There are a few limited, but important, areas of wetland habitat within the woodland. These including artificial ponds, dug as water supplies for fire-fighting in the conifer plantations, wildlife and grazing animal watering ponds and other natural features such as seasonal ponds and streams.

1.3 - Habitats (areas and percentages of KWT ownership only)
Ancient semi-natural woodland comprising: -Oak-Hornbeam community (c.24ha -5%), mixed coppice-with-standards (c.78ha -16%), Sweet Chestnut coppice (c.165ha -34%), conifer plantations (c.214ha -44%), and ponds, wooded heath, rides and open space (c.3ha -<1%). Parts of the woodland are classified as NVC W10 –*Quercus robur* –*Pteridium aquilinum* – *Rubus fruticosus* or NVC W16 -*Quercus* spp. –*Betula* spp. –*Deschampsia flexuosa*.

1.4 - Land use history and Archaeology
Historic and archaeological features showing Radfall and other notable features. The area is ancient woodland and has seen human interventions and management for hundreds if not thousands of years. For many years large areas were owned by local religious institutions with links to the nearby city of Canterbury. The management of the woodland has seen a number of major changes over time, largely based on economics of the times. Early management would likely not have dramatically changed the composition of the woodland as much as in modern times. The woodland that exists today has been altered many times. At some time, in the last few hundred years, large areas of the woodland were converted to Sweet Chestnut coppice, often with oak standards, most likely to produce materials for fencing and the hop industry. More recently, the later half of the 20thcentury saw another major conversion, with large areas being replaced with conifer plantations. Mainly Corsican pine. Features such as boundary banks and ditches can still be seen throughout the site. The main ancient feature is The Radfall, an ancient banked and ditched drove way separating West Blean and Thornden Woods on an old parish boundary.
Geology

The soils are mainly London Clay with gravel and sand drift deposits, giving rise to a range of freely-to poorly-drained, moderately acidic soils. The woods lie on an east-west ridge at 27-67 metres above sea level, with streams draining to the north, east and south.

1.5 - Designations

Designated as a SSSI in 1981. There are a number of SSSI units many of which are not owned or managed by KWT. The area is also classed as Ancient Semi Natural Woodland (ASNW), meaning that it has been wooded since at least 1600. A small area of the SEW ownership falls within a conservation area (largely concerned with development in the village). Tyler Hill.

1.6 - Recent management
Since KWT took on ownership and management of the site in 2003 a number of activities have been undertaken.

- -PAWS restoration, beginning the process of restoring previously planted conifer plantations back to native species woodland, through thinning and clear-felling operations.
- -Coppicing, largely of species such as Sweet Chestnut coppice.
- -Open space management, woodland rides have been created and maintained allowing light to the woodland floor benefiting a wide range of species.
- -Grazing and infrastructure, 5 grazing compartments were constructed in 2012 as part of a Heritage lottery fund (HLF) project. grazing was introduced with small numbers of cattle or ponies grazing many years. The grazing was introduced as a natural method for managing open space and an attempt at creating structural diversity within areas of the site.in recent years between 6 and 12 Konik ponies have been grazing the sites original grazing compartments.
- -Pond creation, the HLF project that included the grazing infrastructure also included the creation of new ponds, both as habitat features and as livestock drinking resources. -Other specific habitat works for species such as the Heath Fritillary. This work mainly focussed around increasing the availability of the species main food plant common cow-wheat.
- -Visitor infrastructure, as part of the HLF project a visitor car park was created. The wild art trail, and a range of waymarked walking routes at differing lengths. Interpretation boards at key entrance points were designed and installed.
- -Safety work, dealing with dangerous trees next to highways or public rights of way or other hazards. Management on the SEW owned woodland areas has been much the same with Kent Wildlife Trust staff and volunteers working with SEW to manage the areas. often as part of schemes such as Countryside Stewardship. Activities such as Coppicing, open space management, and some surveying work for key species.

1.7 - Cluster Vision
The Blean Complex established as a sustainable connected landscape where natural processes can act to maintain habitats and wildlife, for present and future generations to value and enjoy. An iconic landscape, with a sense of place.

1.8 - Long Term Vision
West Blean, Thornden and Broadoak woods will be part of a wider established area of national biological importance for its scale, diversity and abundance of woodland and species. Human interventions will be limited, with the reintroduction of large herbivores allowing natural processes to drive change throughout the sites. The sites will be physically and ecologically connected with barriers removed or bypassed to allow for full integration across the Blean Complex. Local communities will be educated and engaged, taking pride in West Blean and Thornden woods as an iconic part of the local landscape.

1.9 - Survey and monitoring

The author was approached to advise on monitoring based on their experience with setting up and monitoring a wide range of sites, especially rewilding projects across the UK. The author's particular experience is in monitoring invertebrates in rewilding surveys. One benefit of using this standardised survey methodology is that it can be compared to other sites where this methodology has been carried out.

For this methodology to work it had to be a compromise between number of samples, representative samples both in terms of habitats and geography and a sensible route that can be complete easily within a day. The methodology was devised by the author in 2015 at Knepp and it has since been carried out at Butcherlands (2017), Ken Hill (2019), Biddenfield (2019&20), Knepp (2020), Doddington (2021), Waterhall (2021) and Knepp regenerative agriculture (2021). The author has three more surveys following this methodology planned for the 2022 field season.

1.10 – Recording

All plots sit in the hectad TR16 in VC15/East Kent. Blean is a well recorded area historically for invertebrates, especially spiders. Yet this particular part of Blean is poorly recorded compared to the rest of the woodlands. This is especially true for spiders. This is therefore a rare opportunity to add significantly to our understanding of these important woodlands.

2 – Methodologies

This survey follows the same methodology as the author's rewilding invertebrate surveys that have been conducted at a wide range of sites including Knepp, Ken Hill and Doddington. This means that comparisons can be made between these surveys as they are based on a similar methodology carried out by the same person.

The basic methodology consists of taking a large site and deciding upon eight compartments to monitor. They do not have to be identical size-wise but perhaps within an order of magnitude is sensible. Each area is surveyed for 30 minutes each month from April to September, allowing for eight comparable site lists internally and a standardised and stratified survey that can be compared to other sites and to a repeat of the same survey in the future.

In order to fit with the Wilder Blean project, a control area was also needed, effectively taking the number of plots to 16. Finally, a third treatment was added, being the proxy grazers, bringing the plots to 24. The survey now being effectively three times the effort of the basic rewilding methodology mentioned above. Therefore, to summarise the recording effort in the three treatments was:

- C = Control (8 plots)
- B = Bison (8 plots)
- P= Proxy grazer (8 plots)

Further to this, each area was further stratified to reflect the habitats available and it was vital for these to be represented in each of the above treatments in the exact same proportions. This eliminates as much bias between the three treatments as possible. Getting exact matches is never possible but this goes a long way to eliminate bias.

Tab. 2. Breakdown of the plots per habitat per treatment.

Habitat/treatment	Control	Bison	Proxy	ALL
Coppice	2	2	2	6
High forest	1	1	1	3
Native regen	1	1	2	4
Open	2	2	1	5
Open (Heather dominated)	1	1	1	3
Open (without/limited Heather)	1	1	0	2
Permanent open space	0	0	1	1
Plantation	2	2	2	6
Total	8	8	8	24

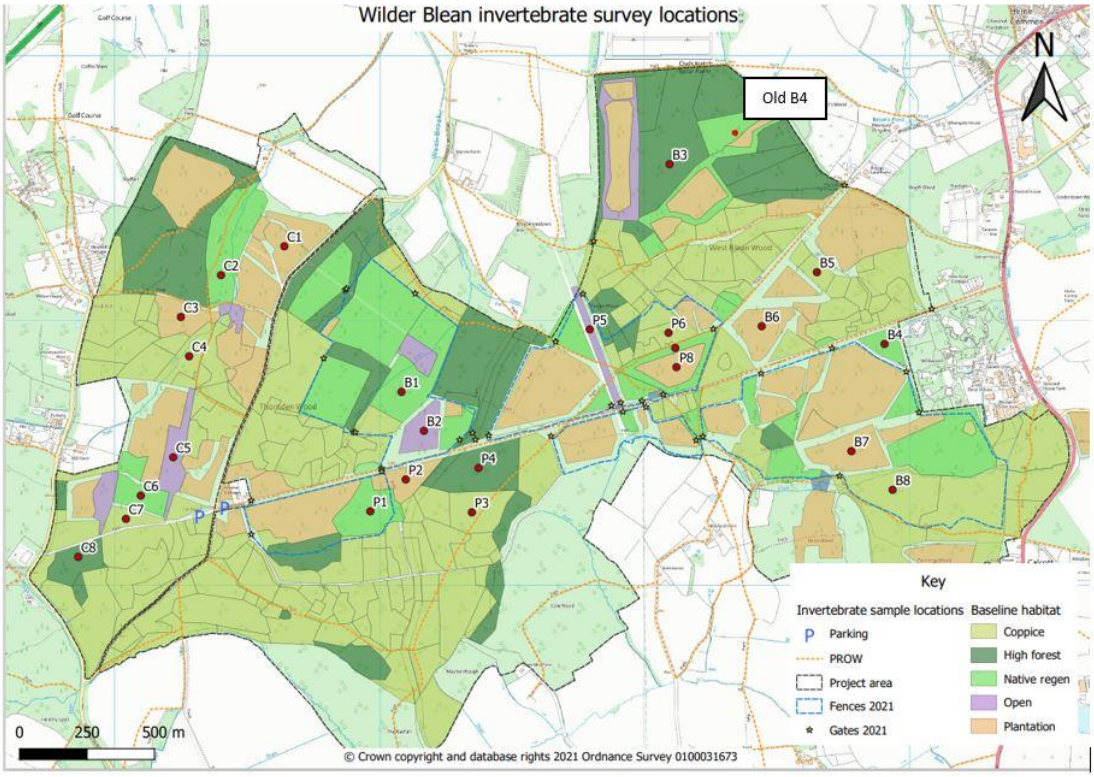

Fig. 2. Location of the 24 monitoring compartments.

B3 and Old B4 were difficult to access being remote from the other samples but Old B4 was not only remote, it was completely impossible to access the area due to thick brambles and scrub. It also lacked any heathy component, which was a distinct feature of the 'Open' habitats of the 'C' and 'P' treatments. Therefore, it was decided to try and find an area within 'B' with an open, significant and easily accessible component. In hindsight, it may have made more sense to also move B3 for ease, but it has been left, despite being the remotest block that cannot be accessed on a circular route.

C2 is best described as open. Although it is passing to natural regeneration it still has a significant open feel to it that is comparable to other plots. In terms of invertebrates, it is still very much open. The new location for B4 was clearly mapped incorrectly as this is very much Heather dominated open-space. Again, it is passing to regen but at the moment still contains a significant open space component which is what invertebrates need.

Treatment 'C' was distinct from the other two treatments spatially, therefore these were also surveyed in one block, while 'P' and 'B' were intermixed and tackled concurrently, depending on the route walked.

On each visit, the methods pertinent to the season were used, being: sweeping, beating, suction-sampling, grubbing, searching flowers, searching bare ground, turning logs etc. Three individual comparable site lists were created on the first visit (comprising one overall site list and 24 sub-site lists). These were then added to on each subsequent visit.

The site was visited on the following occasions:

- April – 6th, 7th & 8th 2021
- May – 5th & 7th
- June – 6th & 8th
- July – 5th & 7th
- August – 2nd, 5th & 10th
- September – 10th, 15th & 17th

The May, June and July visits were condensed into two very long days in order save time and fuel. This could only be done if the weather was suitable and there was enough light and had to be carefully timed. It was exhausting but is not thought to have negatively affected the survey. That said, when there was an opportunity to return to covering the survey over three days, it was taken.

All records were recorded to a generic grid reference at the centre of each woodland compartment (a site centroid). All records will be passed in time to the Kent & Medway Biological Records Centre. Any especially rare species recorded in the wood will be recorded to a higher resolution using an eight-figure grid reference. The records are currently stored in the author's personal Recorder 6 database.

3 - Results

3.1 - Summary of findings

A total of 4424 records of 826 species were made. Of the 826 species, 67 had some form of conservation status. The full matrix of species is attached in the appendix and is available as a working spreadsheet. Although there were some 4420+ records, the total number of registrations in the full matrix was 3695, showing that c725 records were repeat records.

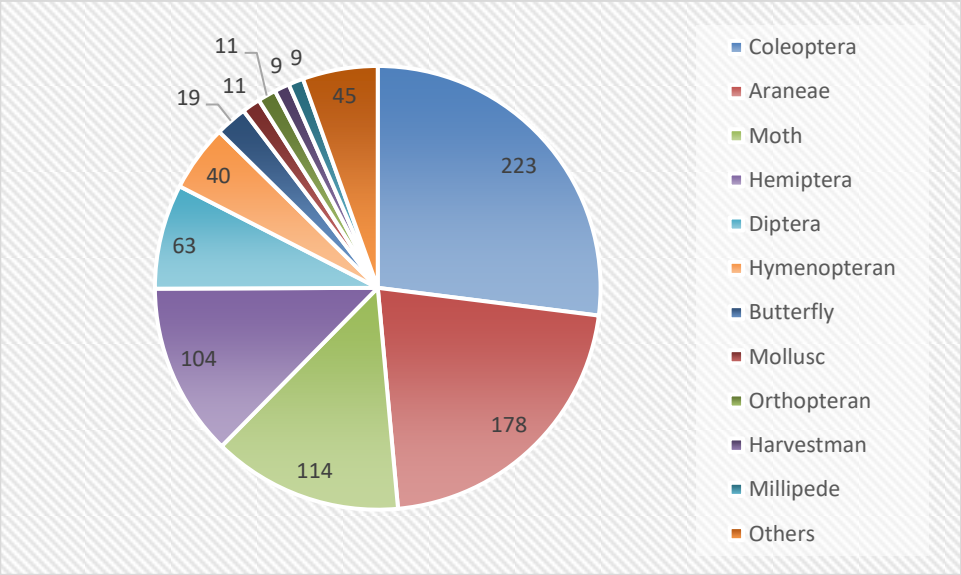

Fig.3. Breakdown of the major groups recorded.

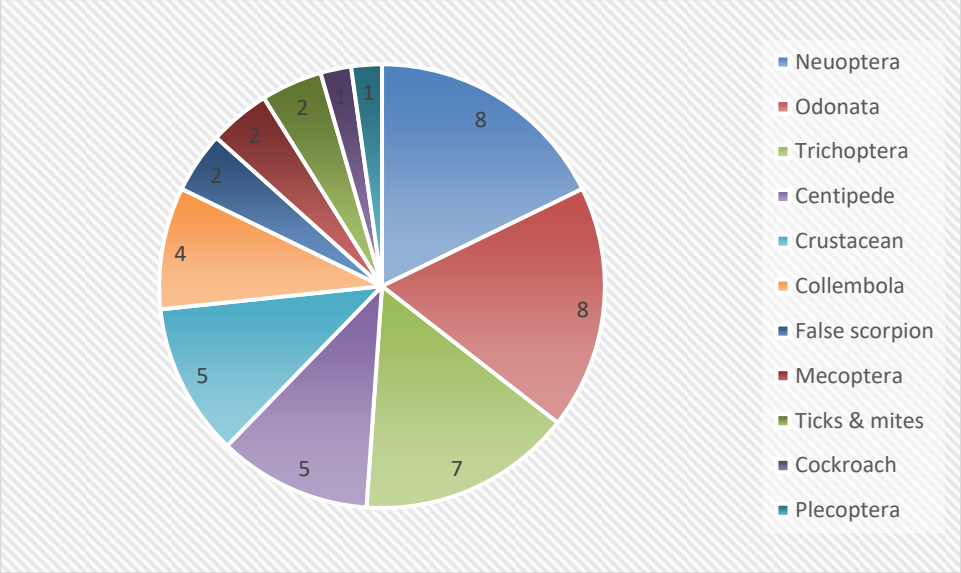

Fig. 4. 'Others' from figure 3 above.

Although beetles were, as is usually the case from one of the author's surveys, the most speciose group, the overall proportion of beetles was quite low. Typically, beetles account for a third of the species whereas here the total is closer to a quarter. Spiders were a close second. Often, there are more bugs than spiders, with spiders typically being in third place. The number of spiders here being more comparable to the beetles, showing just how

significant an assemblage the spider assemblage is as at Blean. Bugs were actually in fourth place, behind moths. Another atypical result.

3.2 – Species with conservation status

Conservation status is a complex issue. Each taxonomic group has used a slightly different set of criteria for assessing their species. Within each group, some species are assessed more often or more thoroughly than others. Some are long overdue and as a result there are two systems running at present. Mike Edwards has kindly allowed the author to use this text to explain both systems.

"GB Conservation Status categories are in the process of being upgraded. This means that it is currently necessary to provide values for both systems as not all groups have been dealt with.

The old RDB (Red Data Book) Conservation Status categories were based purely on the number of 10km squares which a species was known to have been recorded from, with a base-line date of 1970. These categories are obviously susceptible to the progressive accumulation of new records over time. This is especially so as, for some species in particular, non-specialist recording has increased significantly. There are also known changes in range and abundance which have been increasingly commented on by specialists.

The old system graded species like this:

RDB 1. Endangered. Species currently (post 1970) known to exist in five or fewer ten-kilometre squares.

RDB 2. Vulnerable. Species in severely declining or vulnerable habitats, or of low known populations. Known to exist (post 1970) in ten, or fewer, ten-kilometre squares.

RDB 3. Rare. Species with small populations, not at present Endangered or Vulnerable, but which are felt to be at risk. Species currently known to exist (post 1970) in fifteen, or fewer, ten-kilometre squares.

RDB K. Species of undoubted RDB rank, but with insufficient information for accurate placement; includes possible recent arrivals.

Nationally Scarce. Species currently (post 1970) known to exist in one hundred, or fewer, ten-kilometre squares.

In some groups these are further sub-divided into:-

Nationally Scarce a. Species currently (post 1970) known to exist in thirty, or fewer, ten-kilometre squares.

Nationally Scarce b. Species currently (post 1970) known to exist in thirty-one to one hundred ten-kilometre squares.

The new IUCN-type Red Data Book Conservation Status categories are based on perceived threat, of which distribution is only one part, the other being related to the population trend over the 10 years previous to the assessment, for the species in question. Such trends may be inferred from accumulated specialist knowledge, but, as the quantity and quality of data improves increasing effort is being made to model such changes. The output of such modelling being then compared with the specialist knowledge. Species with a negative trend may not be inherently rare, it is the decline which is the significant factor.

The new system grades species like this (This is very much a summary, there is considerable detail to this, please consult the group-appropriate published Great Britain Red List for a better understanding of how the gradings have been arrived at):

Regionally Extinct (RE). See group-appropriate Red List for criteria. In general, a sufficiently long time has elapsed since the last record of this species.

Critically Endangered (CE). Species with a very severe decline in population trend or geographic range within the area considered.

Endangered (E). Species with a severe decline in population trend or geographic range within the area considered.

Vulnerable (V). Species with a marked decline in trend or geographic range within the area considered.

Near Threatened (NT). Species which are suspected to qualify for Vulnerable, but where the data does no quite support such a category.

Least Concern (LC). Species which show no marked negative population trend or geographic range. Indeed, they may have positive values for either or both.

There will be a number of species where it has been considered that there is insufficient information to provide a supported grading, such species are called Data Deficient (DD). There are also categories for invasive (with anthropogenic agency) species, which are usually assessed as Not Applicable (NA).

The IUCN Red List system was primarily developed for assessing large mammal populations and fish stocks, adapting it for invertebrates is, inevitably, an experimental process and it is to be expected that there will be variability in its application and interpretation between groups. However, each published GB Red List has information on the actual way in which decisions have been arrived at. These should be consulted where necessary.

There is no inherent equivalence between the old and new systems

Great Britain has a considerable environmental gradient from north to south and, to a lesser extent, east to west. Species which are stable in their trend or geographic extent may still be considerably limited by the availability of suitable habitat resources. In order that such species do not get missed from conservation considerations a second, parallel, system of GB scarcity has been developed. This is similar to the old Conservation Status system in that it is based on the number of 10km squares which the species is known from, in a given time period, usually 30 years previous to the date of the assessment.

Categories for this National Scarcity rating are:

NR, with 1-15 10Km occupied squares

NS, with 16 to 100 10Km occupied squares.

Clearly both systems will require periodic revision if they are to remain relevant to the needs of a modern country and the conservation of its fauna."

The ‘research BAP’ was a list of declining but still common moths that would focus resources on these declines in terms of research. It was never meant to carry equivalence to the true BAP, yet these species are often listed as having conservation status incorrectly by consultants (at the same time as not listing the conversation statuses that they do have). Here, this includes species like Cinnabar. While the true BAP list includes genuinely scarce species such as *Anania funebris*.

Aculeate Hymenoptera (bees, ants & wasps)

Only 34 species were recorded, with bees being particularly poorly represented in the survey. This being a reflection on how little suitable forage there is in woodlands. Much of the bee interest being in the open areas but even this was limited. Of the 34 species recorded, 21 were bees, 11 were ants and two were wasps. Ants were well represented but wasps were remarkably thin on the ground too, with only two species recorded in the whole survey. Out of all of these 34 species, only one had conservation status and that species would not retain it in any forthcoming review.

***Philanthus triangulum* (Bee-wolf) – RDB3**

This species is unlikely to maintain even the status of Nationally Scarce in any forthcoming review, it has done well out of warmer summers. This large wasp predates Honey Bees and was recorded only once on the warm ride under the pylon in P5, where a wealth of prey was also observed.

Araneae (spiders)

The site is exceptional for spiders, and boasted a list of over 70 species after the first round of visits alone. By the end of the survey, an incredible 178 species of spider had been recorded. Of these, 24 had some form of conservation status. That is 24 of the 67 species with status, over a third of all species recorded with status, were spiders. This is remarkably high, and reflects the value of this wood for this taxa, perhaps being one of the most significant woods for spiders in the UK. Being temperature resilient and a good indicator of structure, they are a great group at gauging changes in management, especially rewilding. Spider conservation statuses were assessed last in 2017, meaning they are quite up to date. Yet even some of these statuses are now out of date due to the level of spider recording that has been happening in the UK in the last three years.

***Araniella inconspicua* – Nationally Scarce**

A scarce species that is usually found on trees and bushes in the open in spring but is extremely uncommon and a difficult spider to find. Here it was recorded in B2 and P5, both being heathy glades with regenerating scrub.

***Argenna subnigra* – Nationally Scarce**

A single female of this species, that usually likes open, warm and bare places, was recorded from C3. This plot was a Scot's Pine plantation, making this quite an unusual record.

***Ballus chalybeius* – Nationally Scarce**

An arboreal jumping spider that clearly moves into the leaf litter during the winter months. Nationally, it perhaps no longer warrants the status it has. It was widespread here recorded in 18/24 plots in all three treatments.

***Cicurina cicur* – Nationally Scarce**

A species that is mostly found on the woodland floor under logs. It is perhaps most common in the south east of England in the UK. It was only recorded in 'B' in this survey, being recorded in B2, B5 & B8.

***Coelotes terrestris* – Nationally Scarce**

Although listed as Nationally Scarce, this spider is quite common in the region. It is typically found in the same places as the above species – under logs and stones. It was recorded in only two blocks, B5 and B8.

***Entelecara flavipes* – Nationally Scarce**

This tiny money spider is usually found on chalk-grassland sites but here it was recorded only once in B5. This was an area of Sweet Chestnut coppice.

***Episinus maculipes* – Nationally Scarce**

This species has spread from the south west rapidly over the last decade. The author recorded it new to Sussex (West Sussex) in 2016. It has since become a common species, especially in shady woods dominated with Holly. Yet it is also found in open chalk-downland. Here it was recorded in 17/24 plots, making it one of the commonest species with status of the whole survey. Found in all three treatments.

***Euryopis flavomaculata* – Nationally Scarce**

An interesting find as this species appears to be new to the whole of the Blean complex and being so well recorded in general, it is unlikely that this distinctive spider has been overlooked and it's far more likely that it is a recent colonist. It was widespread, being recorded in 9/24 plots. It is a specialist at predating ants and is known as the Ant-tiger.

Fig.5. *Euryopis flavomaculata*.

***Haplodrassus silvestris* – Vulnerable, Nationally Scarce**

It is unusual for a species to be designated as IUCN Vulnerable but also only Nationally Scarce, showing that its threat level is significantly more worrying than the number of hectads it occurs in. A real Blean specialist where it is an abundant component of the leaf-litter assemblage there. A genuinely scarce spider that the author has only ever recorded once before. It was recorded in 10/24 plots.

Fig.6. An immature *Haplodrassus silvestris*.

***Hypsosinga sanguinea* – Nationally Scarce**

Restricted to the plots that were open and contained Heather. This species is very rarely found away from dwarf-shrub heath and is therefore thought to be a genuine habitat specialist. Recorded in C7 (in a heathy embayment in a coppice plot) and P5 (the pylon ride) only, both compartments with a significant heathy component.

***Laseola tristis* – Nationally Scarce**

This small black spider specialises on feeding on Red Wood Ants (*Formica rufa*). It was widespread during the survey, being found where ever there was some open habitat with heath but sometimes in shadier places too. It was recorded in 7/24 plots but was most widespread on C (with four plots).

***Meioneta mollis* – Nationally Rare, Near Threatened and Section 41**

Perhaps the most overly-designated spider in the UK. Usually found in open places. It does not have any particular habitat associations and would perhaps not even be assessed as Nationally Scarce if it were assessed today. It was recorded once in P5 only.

***Micrommata virescens* – Nationally Scarce**

The striking large, brightly-coloured green spider was widespread at Blean, being found in 9/24 plots. It was only found in one C plot while it was recorded in five of the B plots. It is often associated with *Molinia* but this is clearly not the case at Blean.

Fig. 7. A female *Micrommata virescens*.

***Philodromus longipalpis* – Nationally Scarce**

A scarce species, this being the first time the author has encountered it. It was recorded in B2 and P5 only. The two most open compartments, each with a significant component of regenerating scrub. In both cases, the animals were found by sweeping/beating this resource.

Fig. 8. An adult male *Philodromus longipalpis*.

***Phrurolithus minimus* - Nationally Scarce**

This is something of a Blean speciality, and was a common component of the leaf-litter assemblage here. It was recorded in 18/24 plots, making it the (joint with *Ballus*) most widespread of all the spiders with status on the site. It is an ant mimic and as such is often seen near ants.

Fig. 9. An adult male *Phrurolithus minimus*.

***Pistius truncatus* – Nationally Rare, Critically Endangered**

Possibly the find of the survey, the author never expected to find this, despite Blean being the only known location for this in the UK (it was historically also found in the New Forest). It was last seen in the UK at East Blean Woods in 2000. A single immature was beaten from the edge of compartment C2 in June and again in the same compartment, around 50 m away in August. This time it was swept from low regenerating oak in the centre of the compartment. It was a remarkable sweep net with an immature Sickle-bearing Bush-cricket in the same sweep. Regenerating scrub in the open is clearly a vital resource for many of the rarer species at Blean. The retention/even expansion of species such as *Pistius* due to the bison's activities should be a measure of success. As C2 is in the control area, everything should be done to keep some of this area open

From conversations with the author and the county recorder for spiders, Tony Russel-Smith, he went on to look for the spider in several other areas of Blean and in fact recorded it at two different, new locations.

Fig. 10. One of the two immature *Pistius truncatus*.

Fig.11. The second, large *Pistius*, recorded in August.

***Salticus zebraneus* – Nationally Scarce**

A scarce jumping spider often found on big old pines but also on oaks. Unusually, it was swept from a heathy/scrubby ride in the new location of B4 as a single male but was not recorded again.

***Scotina celans* – Nationally Scarce**

A remarkably common part of the leaf litter fauna at Blean. It was recorded in 18/24 plots and was common throughout the year with adult females in nearly every month and adult males later in the year. Typically found by sieving leaf litter. *Scotina gracilipes*, which usually likes dry heath, was not recorded anywhere in the survey.

***Sibianor aurocinctus* – Nationally Scarce**

This species is spreading rapidly in the south east and is rapidly becoming a common jumping spider in warm, dry places in the region. Here, it was common in B2 but was also recorded in B4 and C5.

***Sintula corniger* – Nationally Scarce**

A tiny money spider with unusually shaped palps that is most often associated with bogs, especially *Sphagnum*. Here, this is not the case at all. It was widespread around the site, recorded in 8/24 plots in roughly similar amounts in all three treatments.

***Tapinocyba insecta* – Nationally Scarce**

A scarce species that the author had not recorded anywhere before this survey. A tiny money spider that is found in the leaf litter. It was recorded in C8 and P6. Being high forest and chestnut coppice respectively, but it does not seem to require open habitats, more mature closed-canopy woodland.

Fig.12. A male *Tapinocyba mitis* showing how small it is (the squares are 1 x 1 mm).

***Walckenaeria furcillata* – Nationally Scarce**

A singe female was recorded in C4, an area of coppice and is quite a different habitat to where the author has encountered this species before (typically open wet heathland).

***Walckenaeria mitrata* – Nationally Rare, Endangered**

Perhaps the second best find of the survey in terms of rarity and unexpectedness. A single male was found in P4 in April. All the records of this species are thought to be associated with Sweet Chestnut coppice. Yet this individual was recorded by suction sampling conifer plantation leaf litter. No further individuals were found in the specific corner of this plantation block nor were they found anywhere else on the site.

It has only ever been known from Blean (bit again like *Pistius*, not from this area of Blean) and less than 10 individuals have ever been found in the UK.

Fig.13. The unusual male *Walckenaeria mitrata*.

Fig.14. The exact location the *Walckenaeria mitrata* was found.

***Xerolycosa nemoralis* – Nationally Scarce**

A species more often than not associated with bare sand on heaths or in heathy woods. Here it was only recorded four times, across all three treatments but was most frequent in the open compartment B2 but it was also seen in a clearing in coppice in C7 and in two P compartments.

Coleoptera (beetles)

As is usually the case for one of the author's surveys, this was the most speciose order, with 223 species recorded. Of these, 22 have some form of conservation status.

***Acalles ptinioides* – Nationally scarce b**

Although listed as Nationally scarce b and thought to have some association with Heather stems, this species is by no means restricted to heathland and almost certainly does not warrant this status now. It was fairly common in leaf litter at Blean (although difficult to spot, as it tucks its legs in and being small and cryptic, looks like a particle of soil). It was recorded in 7/24 compartments and in all treatments but most numerous in C (4) and least in B (1).

***Anaspis thoracia* – Nationally Scarce**

Scattered across the site, recorded in C6, B2, B7 and P6. It is a saproxylic species as a larva and requires flowers as an adult.

***Anisandrus dispar* – Nationally scarce b**

A bark beetle that is fairly local and is usually associated with broad-leaved trees. Here it was recorded only once in the coppice plot, C7.

***Anthribus fasciatus* – Nationally scarce a**

Two adults were found in one compartment on the same day but no more specimens were recorded of this striking arboreal anthribid. It is thought to predate aphids in the canopy. It seems to be spreading but is still genuinely rare; the author has only ever seen it once before in 2015.

Fig. 15. *Anthribus fasciatus*.

***Clytra quadripunctata* – Nationally Scarce**

A striking myrmecophile and an expected find of the survey with so many *Formica rufa* being present across the site. Despite this, it was not common and only recorded as individuals in C2, B6, P5 & P6.

Fig.16. *Clytra quadripunctata*.

***Coccinella magnifica* (Scarce 7-spot Ladybird) – Nationally scarce a**

Another myrmecophile found only within a few metres of *Formica rufa* nests. It looks quite like the common 7-spot Ladybird (which is commoner on the site). It was recorded on five different plots, most numerous in B where it was recorded in three locations, always where there is an element of open space and ants.

***Cryptocephalus parvulus* – Nationally Scarce**

Recorded once on the pylon ride at P5. A bright metallic blue-green leaf beetle that feeds on birch.

***Dirrhagus pygmaeus* – RDB3**

This saproxylic species of false click beetle has become far more widespread in recent years and perhaps no longer even warrants the status of Nationally Scarce, it seems to turn up in nearly any type of shady woodland, even those that are not especially interesting.

***Dissoleucas niveirostris* – RDB2/Vulnerable**

A single adult was recorded by suction sample on the edge of C2 and was a real surprise, this being the first UK record of this species since 1988. It is the rarest and most significant beetle find of the survey. It is a genuine rarity and all the more unusual that it was collected by suction sample, being a dead wood associated species. It was recorded in the same few square metres as the *Pistius* were recorded, showing how important open space is at Blean; where ever there is open space, there are rare invertebrates in this wood. As this is in the control area, management should be targeted at maintaining some of this large compartment as permanent open space.

Fig. 17. *Dissoleucas niveirostris.*

***Hypulus quercinus* - Nationally Rare**

A genuine rarity. This being the only individual the author has ever seen. It was beaten from understorey foliage in C8. A saproxylic species.

Fig. 18. The striking *Hypulus quercinus*.

***Kyklioacalles roboris* - Nationally scarce b**
Another species associated with leaf litter. It was recorded from 5 out of 24 plots.

***Lagria atripes* – Regionally Extinct**

Several larger and brighter looking *Lagria* were spotted earlier than expected in woodland leaf litter and the author decided to collect them knowing there was a rare cryptic look alike species compared to the ubiquitous *Lagria hirta*. It was widespread at Blean, being found in 8 out of 24 compartments across all three treatments but it was most abundant (4) on the Control treatment. No *Lagria hirta* were recorded at all. It has been found to be spreading in Kent in recent years, so this is not that much of a surprise.

Fig. 19. *Lagria atripes* was widespread at Blean.

***Magdalis cerasi* – Nationally scarce b**
A saproxylic weevil, usually associated with oak. It is fairly common in the area but was only recorded once here, in B2.

***Notiophilus quadripunctatus* – Nationally Scarce**
A scarce carabid of heaths and bare ground, here it was recorded only once in B1.

***Orsodacne cerasi* – Nationally Scarce**
This species feeds on flowers in the spring/early summer but it is not clear what the larvae feed on, possibly something to do with trees, especially oaks. It looks superficially like it should be saproxylic.

***Platystomos albinus* – Nationally scarce b**
A saproxylic weevil associated with fungus. It is now fairly common and perhaps no longer warrants the status. Recorded once only in C6.

***Pterostichus quadrifoveolatus* - Nationally Scarce**
A distinctive large carabid with foveate punctures. A fairly recent colonist to the UK, it is found in woods and wooded heaths. It was only found once in P6.

***Protapion difforme* - Nationally scarce b**
A small, black, apionid weevil that is fairly common in the south east. It feeds on clovers. Recorded once on the pylon ride, P5.

***Rhagonycha translucida* - Nationally Scarce**
A scarce woodland solider beetle that is rarely encountered. It was recorded only once in the conifer plantation, C1.

Fig.20. *Rhagonycha translucida*.

***Trachodes hispidus* - Nationally scarce b**
A striking but small saproxylic weevil that was found in the leaf litter throughout the woodland. It was recorded in four locations across all three treatments. Three of the four plots it was found in were in coppice and one was conifer plantation.

***Tritoma bipustulata* - Nationally scarce a**

A genuinely rare fungus beetle. The author has only one record for this species from a site in West Sussex. Three individuals were found in C8 on a recently fallen oak limb covered in fresh fruiting bodies of a bracket fungus.

Fig.21. The ladybird-like *Tritoma bipustulata*.

***Tychius parallelus* - Nationally scarce a**

A rare weevil that feeds on Broom. This appears to be a new record for North Kent, with the beetle only previously known from Dungeness in the county. One individual only was recorded by sweeping the foodplant in C5 in the spring.

Fig.22. *Tychius parallelus*.

Diptera (true flies)

A total of 63 species were recorded across the survey. Only two of these were found to have conservation status.

***Gymnosoma rotundatum* – RDB3**
This species is now much commoner than its status would suggest. A tachinid fly, that parisitises shieldbugs, especially Green Shieldbug. It was recorded only once from pylon ride, P5.

***Rhamphomyia marginata* – RDB DD**
An unusual fly, recorded only once from the regen strip P7. This is the first time the author has encountered it. There are very few UK records apparently and little can be determined about its life cycle. It is a an empid, and is therefore likely to be predatory.

Fig. 23. The unusual *Rhamphomyia marginata*.

Hemiptera (true bugs)

A total of 81 species of Hemiptera were recorded across the survey, a fairly low total for so many survey visits. Of these, only three were found to have conservation status.

***Ceraleptus lividus* – Nationally Scarce**

This species of squash bug has spread in recent years and is perhaps reaching a point that it doesn't warrant the status it has. It is usually found in warm places with a short and broken turf. Here it was recorded only from B2, the large recently cleared compartment.

***Lygus pratensis* – RDB3**

This species no longer warrants the status of Nationally Scarce, let alone RDB3. It is now one of the commonest plant bugs in late summer in the south east, wherever composites are found. Here it was recorded C2, C7 and B4 only.

***Megalonotus dilatatus* – Nationally scarce b**

A fairly scarce bug that is mainly tide to bare ground on heaths. A large black ground bug that was found crawling across bare ground on the pylon ride, P5.

Lepidoptera – butterflies

A total of 19 species of butterfly were recorded, three of which had conservation status.

Heath Fritillary – Endangered, Section 41, Protected

In early June, this was the commonest butterfly across the site. Recorded in a third of all the plots and present in all three treatments where ever some permanent open space (rides) that are wide enough to support them. Feeds on Common Cow-wheat but also known to take Ribwort Plantain on site.

Fig. 24. A Heath Fritillary.

Small Heath – Near Threatened, Section 41

A well-known and still common butterfly that is highly designated, despite being widespread and non-specialist in its requirements. It needs short turf with finer grasses and warmth. Here it was recorded in B2, B4 and P5 only. It was not recorded in the control area at all.

White Admiral – Vulnerable, Section 41

This well-known species feeds on Honeysuckle. It was only recorded once in the whole survey, seen briefly flying in B7.

Lepidoptera – moths

Moths were well represented with 114 species recorded. This includes many records of moths in the larval stages. Of these, six were found to have some form of conservation status.

Anania funebris **(White-spotted Sable) – Nationally scarce a, Section 41**

A single, worn specimen was recorded on the pylon ride in P5. An iconic species and well known from Blean as it feeds only on Golden-rod (and occasionally Dyer's Greenweed – but this is not relevant on this site). Only one worn specimen was observed, including walking between plots.

Ancylis obtusana **– Nationally scarce b**

A scarce tortrix that feeds on buckthorns, here it would be feeding on Alder Buckthorn. Recorded twice from P7 and P8.

Dasycera oliviella **– Nationally scarce a**

A saproxylic species that is often found in hollow, red-rotten trees but here that is unlikely here. The author has seen it also associated with sun-baked, freshly cut, live timber, which is not an especially scarce resource. It was recorded in C2, C8 and B2.

Festoon – Nationally scarce b

This species feeds on oaks and probably no longer warrants this status, being fairly common in the south east. It was recorded once from B1 where an adult was beaten from oak foliage.

White-line Snout – Nationally scarce b

Recorded once from P2. It is unknown what this scarce moth species feeds on.

Yellow-legged Clearwing – Nationally scarce b

A single animal was swept from regenerating oaks in the pylon ride, P5. The larvae feed inside live oak timber.

Myriapods (millipedes and centipedes)

A total of nine species of millipede, three of which have conservation were recorded. Both of these being fairly high totals for one of the author's surveys. A further five species of centipede were also recorded, all of which were common species.

Choneiulus palmatus **– Nationally Scarce**
A very small millipede that the author has not encountered before now. It was only identifiable by its genitalia at high power. It was recorded in P1 and P8.

Cylindroiulus londinensis **– Nationally Scarce**
An extremely large millipede that was found in several areas in the wood, in leaf litter and under logs. Recorded in three plots, two being coppice plots and one being a plantation plot. Recorded in B7, P6 & P8. This species is restricted to the south east and was found under logs and in leaf litter.

Fig. 25. The large *Cylindroiulus londinensis*.

Polyzonium germanicum **(Kent Pin-head) – Nationally Scarce**

A Blean speciality. Recorded in two plots, both being coppice. Recorded in B8 and P6. This species is restricted to the south east and was found under logs and in leaf litter.

Fig. 26. *Polyzonium germanicum*.

Mollusca (slugs & snails)

Only 11 species were recorded, with one of these having status. The limited number is down to the acidic nature of the site, which is always a limiting factor for high molluscan biodiversity.

***Phenacolimax major* (Greater Semi-slug)**

Recorded only once in April, in C2, where it was sieved from a pile of rush litter.

Orthopteroids (crickets, grasshoppers & allies)

Eleven species of cricket and grasshopper were recorded and one cockroach. Two of these had conservation status.

Tawny Cockroach – Nationally Scarce

A fairly frequent species in the region, not restricted to any particular habitat. Here it was recorded in 11/24 plots but was most numerous in B, where it was recorded in five plots.

Woodland Grasshopper – Nationally Scarce

A local species, typically found on wooded heaths. Here it was only recorded once at the far south of the site in B8 only.

3.3 - other species of note

The following species lack conservation status but are worthy of mention for one reason or another.

Agapanthia cardui – Non-native

This non-native longhorn beetles, is one of the few whose larvae develop inside the stems of tall herbs and not dead and decaying wood. This species particularly (but not exclusively) uses thistles. It was first found close to the Channel Tunnel in Kent in 2018. It is likely to spread quickly.

Fig 27. The invasive *Agapanthia cardui*.

Nigma flavescens

This spider is a recent colonist and was only recorded in the UK in 2017. As such, it was assessed in the 2017 review as 'Not Assessed'. Interestingly, the far commoner (but Nationally Scarce) *Nigma puella* was not recorded at all during the survey. This is the first time the author has encountered this species. It was recorded in 8/24 plots but was most numerous in 'B' and least in 'C'. The females are distinctive in the field yet the males require microscopic examination to rule out *Nigma puella*. All individuals were collected but all were of the more recent colonist.

Trogulus tricarinatus

A scarce and unusual harvestman that would undoubtably be assessed as Nationally Scarce if the harvestmen had conservation statuses assigned to them. It was found on two occasions in leaf litter, in B3 and B8 only.

Fig. 28. The unusual harvestman *Trogulus tricarinatus* glues detritus to its body.

Sickle-bearing Bush-cricket (*Phaneroptera falcata*)

Recorded in Hastings c.20 years ago and also in the last decade it has colonised Dungeness Bird Observatory, in a very specific part of the shingle where they have hardly spread since. The presence of nymphs in ‘C2’ in July was remarkable. On the August and September visits, large nymphs were also recorded but not adults. A large nymph was photographed in enough detail to rule out the look alike species.

Fig. 29. A nymph of a Sickle-bearing Bush-cricket in July.

Figs. 30 & 31. Another nymph in July above and one month later in August below.

Lapidary Snail (*Helicigona lapicida*)

The large and impressive Lapidary Snail was recorded on C8 (high forest) and P6 (coppice). Although it lacks status, this is an uncommon spider that is typically associated with ancient woodlands.

Fig. 32. The striking Lapidary Snail showing the diagnostic sharp keel.

Neriene emphana

This spider was first recorded in the UK on the Isle of Wight in 2000. It has more recently (2020) been discovered in dark and shay woods in Easy Kent not far from Blean. It has clearly been here before this though as old material was checked by the county recorder and he found that the spider has been in Kent before this time. Only a single animal was recorded by the author, this adult male. It was found in dense shady coppice in B8.

Fig. 33. The male *Neriene emphana*.

Cow-wheat Shieldbug - Nationally Scarce (not recorded on the survey proper)

Although this species was not recorded on any of the 24 plots it was searched for in an area that had a large mass of the foodplant in bright sunny conditions, a resource that was not replicated anywhere in the 24 plots – most of the foodplant was under canopy. A brief session with the suction-sampler found this Nationally Scarce bug quickly. This is a good way to determine whether or not you are not finding a species or simply missing it/do not know how to find it.

Fig. 34. The distinctive Cow-wheat Shieldbug.

4 – Analysis and conclusions

Throughout all charts, error bars represent ± one standard error.

4.1 – Comparison between the three treatments

Unique and ubiquitous

Of the 826 species recorded, 284 were only recorded in one of the 24 plots (34.3%), these are known as 'unique' species. While only four species were recorded in all 24 plots, these are known as 'ubiquitous' species. These four species were; *Formica rufa* (recorded in all plots by the end of the first round of visits), *Araneus diadematus*, *Philoscia muscorum* s. l. and *Paroligolophus agrestis*.

Tab. 3. Comparison between the three plots. For any taxa/metric, the lowest scoring is highlighted in red and the highest in green to show any trends.

	C	B	P	ALL
Species	525	541	524	826
Species with status	37	38	41	67
Proportion of species with status	7.05%	7.02%	7.8%	8.1%
Araneae	128	130	127	179
Aculeates	22	21	25	34
Butterflies	10	15	12	19
Heteroptera	58	62	49	82
Lepidoptera - moths	57	61	69	114
Diptera	39	36	31	63
Coleoptera	132	133	134	222
Ubiquitous (by plot)*	14	12	8	n/a
Ubiquitous (by treatment)**	277	277	277	277
Ubiquitous (by survey)***	4	4	4	4
Unique (by plot)*	237	261	267	765
Unique (by treatment)**	110	117	112	339
Unique (by survey)***	89	98	97	284

This table will be extended to include analysis using the resource database at the treatment level.

*By plot means the total number of species that were only found in 1/8 plots in each treatment or were found in 8/8 plots in each treatment.

**By treatment means the total number of species that were only seen in 1/3 treatments or the total number of species that were seen in 3/3 treatments.

***By survey means the total number of species in any given treatment that were only recorded once in the entire survey in 1/24 of the plots or the total number of species that were seen in all 24 plots.

The above table shows that there is very little difference in the assemblages, beyond treatment P having a higher proportion of species with status and C generally scoring a little lower, perhaps down to being less open in general.

4.2 - Comparison at the plot level

The number of species per plot varied from the lowest being 111 species recorded in P4 (a high forest plot) through to 211 in B2, a large open area of clear fell with significant varied structure, botanical interest and bare ground.

The number of rare or scarce species per plot varied from three in P4, through to an incredible 23 from the pylon ride, P5. This shows the high value of 'ecological continuity'.

The 'proportion of species with conservation status' ranges from 2.7% again in P4, through to 11.2% in P5, echoing the above point on ecological continuity. All the treatments varied significantly, mainly down to habitat type, across the treatments. The bison area was perhaps a little less variable with percentages ranging from 4.5% to 8.4%, a much narrower bracket than the 2.7% to 11.2% seen in the proxy area (and the 3.4% to 9.4% range seen in the control area).

Tab. 4. Comparison at the plot level (including resource analysis)

Plots	C1	C2	C3	C4	C5	C6	C7	C8	B1	B2	B3	B4	B5	B6	B7	B8	P1	P2	P3	P4	P5	P6	P7	P8
Total species	126	198	131	139	189	147	200	125	134	211	133	196	160	114	145	151	160	131	115	111	205	158	190	126
Species with status	10	15	9	13	7	5	12	11	11	16	6	11	11	8	8	12	6	8	7	3	23	14	11	9
Proportion	7.9	7.6	6.9	9.4	3.7	3.4	6.0	8.8	8.2	7.6	4.5	5.6	6.9	7.0	5.5	7.9	3.8	6.1	6.1	2.7	11.2	8.9	5.8	7.1

The table will be extended here to include the analysis from the resource database at the plots level.

Clearly the plot that performed the best was P5. It had the second highest number of species at 205, it held 23 (of the 67 rare species of the whole survey) and the highest proportion of invertebrates with status, 11.2%. This being well above the site average. What is so different about this area? It has continuity of management in the form of the wayleave that is managed under the pylon. This is a stark reminder that good wildlife habitat does take significant intervention.

The plot with the most species (211) was B2. A recently cleared area, the most significant in size of the whole survey, and still with significant amounts of bare ground, nectar and a wide variety of structural types. It was botanically rich too, with Heather, Sheep's Sorrel, Heath Groundsel and Common Cat's-ear among species that were less common elsewhere.

The worst performing plot was P4, with only 111 species recorded (as well as the lowest number of species with status and proportion of species with status). This plot was non-intervention high-forest, with a dense under-storey of Holly and a closed canopy of Pedunculate Oak and Beech.

4.3 - Statistical analyses between the three treatments

Statistical tests were attempted to show whether there were any significant differences between the three treatments at the baseline level. A sample size of eight is low for statistical analyses but not low enough to make it use meaningless.

Species-richness

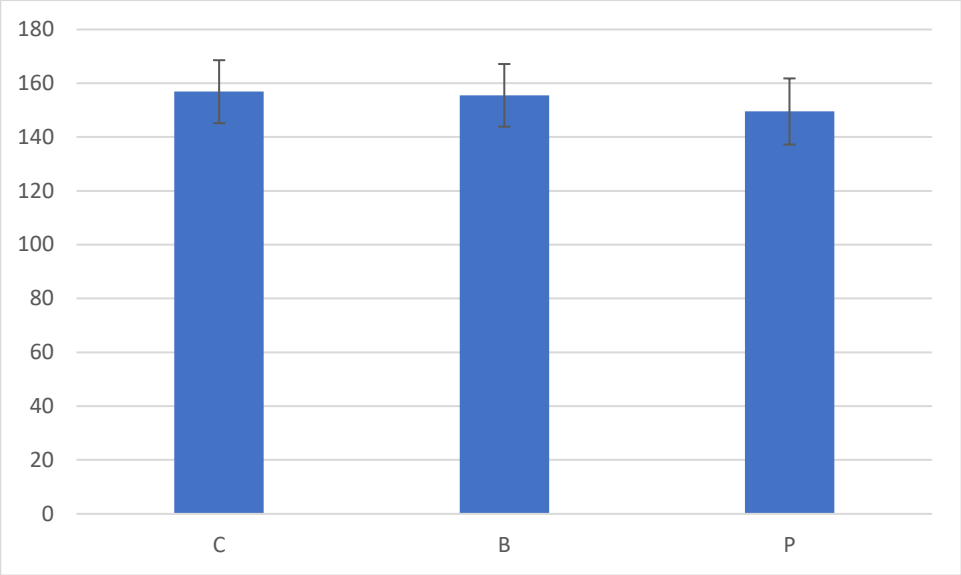

Fig. 35. Mean species-richness of all invertebrate across the three treatments.

The data here was not normally distributed across the treatments, meaning weaker non-parametric tests had to be used. No significant differences were seen between the treatments using Kruskal-Wallis ($x^2=0.377$, $P=0.83$).

Number of species with status

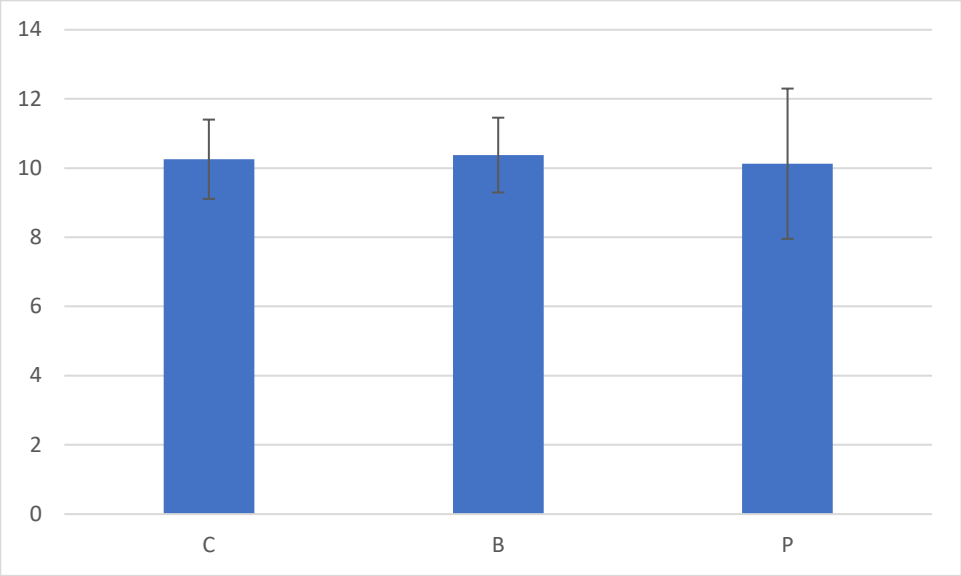

Fig. 36. Mean species-richness of invertebrates with status across all three treatments.

This data was normally distributed meaning parametric tests could be used. There was no statistical difference between the number of species with status per plot (F=0.00649, P=0.994). This result shows just how close the plots are, which is a good starting point for a baseline.

Proportion of species with conservation status

It is interesting that if the mean of the proportion of invertebrates with status is taken, then P actually comes out slightly lower at 6.5% (compared to C & B both being 6.7%). Yet, at the treatment level, P is significantly higher than the other two plots. The reason for this is likely down to the pylon ride (P5) carrying this whole area, pushing up the proportion collectively but not helping to do much when averaged out with seven other compartments that do not perform very well. This might also be down to the fact that there is only one 'open' area in P and an additional 'native regen' plot, which is likely to bring down the average at the plot level.

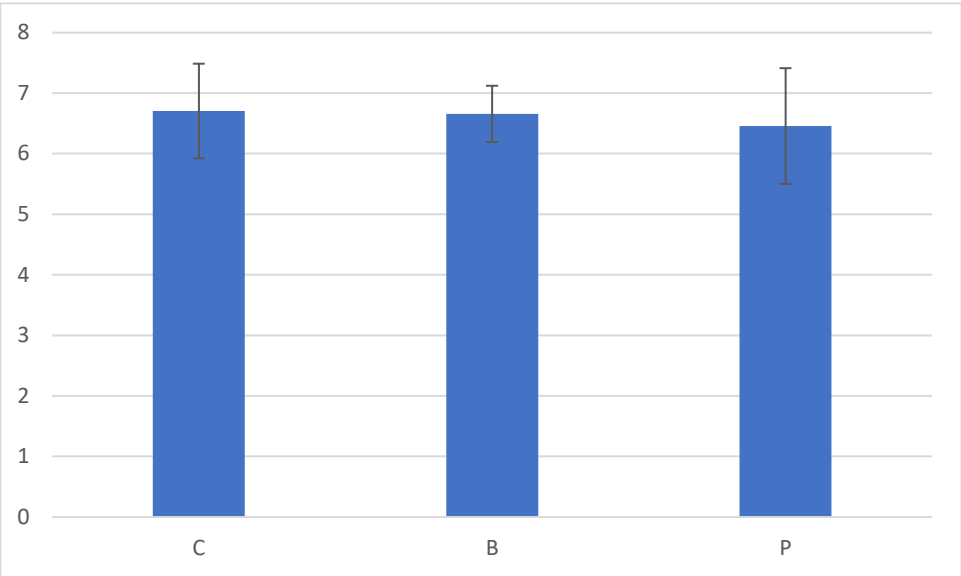

Fig.37. Mean proportion of species with conservation status across the three treatments.

The larger error bars in P and C are evident here. This again show no significant differences between the three treatments (F=0.0293, P=0.971).

4.4 – Statistical analyses by habitats

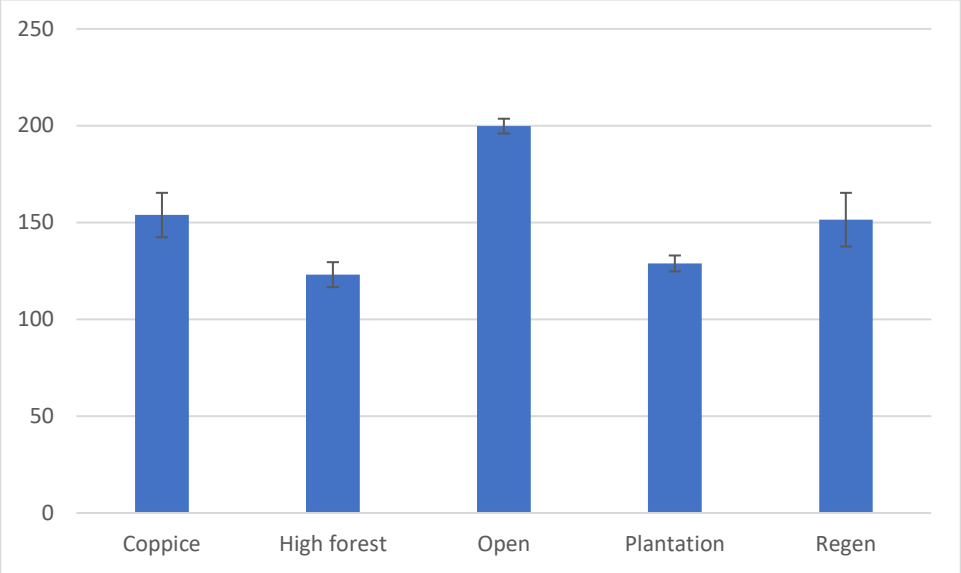

Fig. 38. Mean species-richness of invertebrates per plot by habitat.

These data were, surprisingly, normally distributed, and as such parametric tests were used and using ANOVA, a highly significant difference between the three habitats was noted (F=12.2, P<0.01). This should be read with caution however, due to the low sample size. Tukey tests were applied to see which habitats were statistically different to one another. Open was found to be significantly higher than all the other habitats but no other significant difference between the habitats were found. The difference was highly significant between open and high forest and also open and plantation.

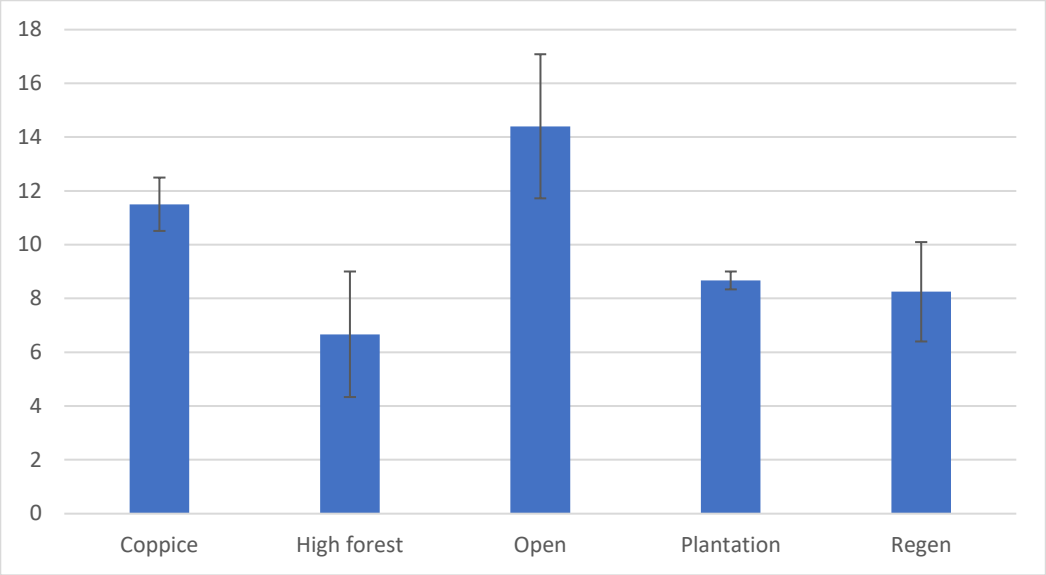

Fig. 39. Mean number of species with status per plot by habitat.

There was a significant difference in the number of rare species between the five habitats but this was not as strong as the above result (F=3.27, P=0.03). Tukey tests however showed that none of the comparisons were significant, with open and regen being the closest with (t=2.98 P=0.053). Interpreting this data, the author believes there is likely a significant result here but the low sample size is masking the difference.

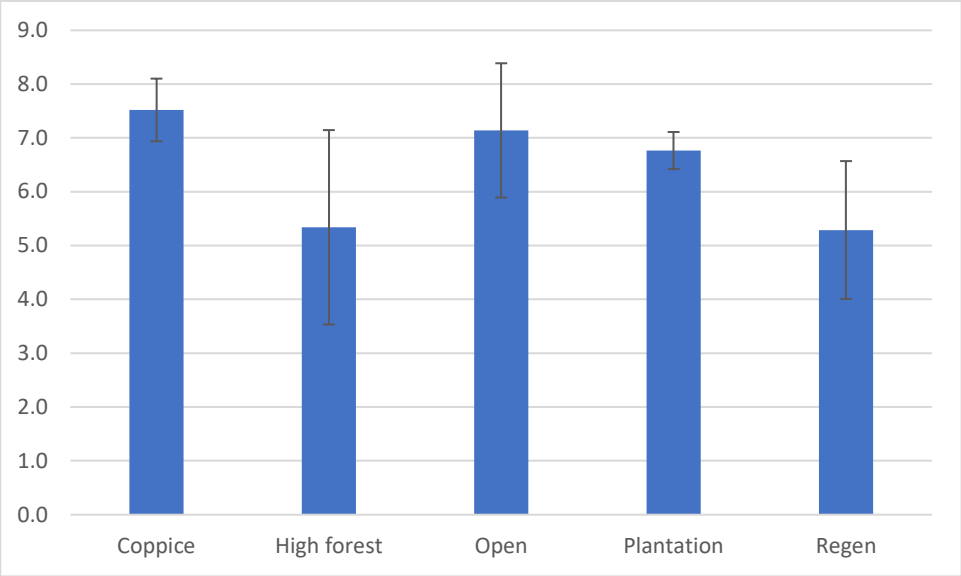

Fig. 40. Mean proportion of invertebrates with status per plot by habitat.

There was no significant difference between the mean proportion of invertebrates with status between thee three habitats (F=1.10, P=0.383).

4.5 - Comparison with other sites (at the site level)

As the amount of recording effort in this survey at the site level is far greater (18 days) than any other survey, then direct comparisons on species-richness are meaningless. Comparing proportions, chiefly the proportion of species with conservation status, is more meaningful. However, even this should be used with caution. With such high numbers of fields days, there is an increased chance of recording scarce species that are typically only ever represented by one individual. Therefore, the more visits to a given site, the more rare species are found. And with many visits this effect is likely to become more exaggerated as more and more rare species are found while simultaneously relatively few new common species are added, ever pushing up this proportion.

In the following chart, Blean as a whole can be compared to the author's recent invertebrate surveys. The rolling average is currently 6.4%, meaning the 8.1% seen here is significantly higher than average. Initially after the fieldwork, this result was over 10% but relatively few rare species came of out of the microscopic identifications, bringing the average down.

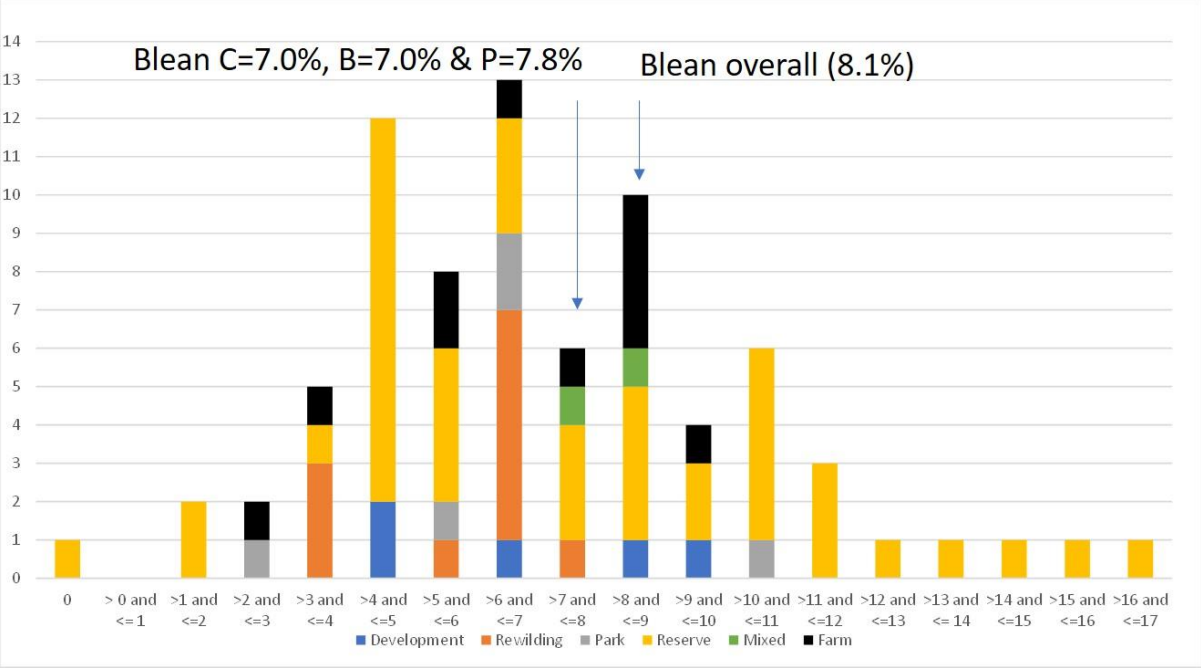

Fig.41. Frequency distribution of the proportion of invertebrates with status from the author's recent surveys. Here, Blean is only included once at the site level and it is shown as a 'reserve' until the rewilding project is underway (i.e., future repeats of this chart will show it as a rewilding project).

4.6 - Analysis using Pantheon

The Biological Record Centres online database is similar to Mike Edwards system but is far more simplistic and lacks nuance. It is quick in comparison though and is included here for comparison. An example of this crudeness is Pantheon's 'Rich flower resource'. This is comparable to the 'flower' resource from Mike's database. In Mike's database, this works across all taxa that use flowers, be they beetles, flies or bees. While in Pantheon, this really is simply just a list of bees. A database like this only works well if it is pulling together invertebrates from all groups. Flowers are such a key resource in any grazing project, as if you graze too hard (and in time, too little) you will lose this flower resource. It is a shame that the Pantheon database does not look at all invertebrate orders here.

Tab. 6. Analysis of resource from Pantheon/ISIS. Resources in favourable condition are highlighted in bold and a larger font. The highest scoring treatment per resource is further highlighted in green and the lowest in red.

	C	B	P	ALL
Bark and sapwood decay	**31/19**	**20/19**	**22/19**	**43/19**
Scrub edge	**24/11**	**26/11**	**21/11**	**33/11**
Scrub heath & moorland	**24/9**	**24/9**	**20/19**	**32/9**
Rich flower resource	10/15	11/15	12/15	**19/15**
Bare sand and chalk	8/19	10/19	6/19	14/19
Heartwood decay	4/6	4/6	5/6	**7/6**
Open short sward	3/13	5/13	3/13	7/13
Epiphyte fauna	1/3	1/3	1/3	2/3
Fungal fruiting bodies	1/7			1/7
Stream & river margin	1/6			1/6

At the site level, 11 habitats were found with five of these being seen as being in favourable condition. Clearly, 'bark and sapwood decay' was the most significant assemblage recorded, followed by scrub edges and then scrub heath and moorland. Rich flower assemblage was favourable at the site level but not at the treatment level. 2021 was a poor year for bees in general due to the cold and wet summer.

There is a significant difference in the species that use dead and decaying timber in the Control plots, with 50% more associated species than the other two plots. This is not obviously explainable as it is not necessarily the case that the plots in this treatment had more dead and decaying timber yet it is likely that this is the case. It shows the value of this method for detecting changes that may have not been visually evident.

4.7 - Comparison with other sites (at the treatment level)

Tab. 7. Comparative analysis with other rewilding surveys, ecological restoration sites and agricultural regeneration sites, including Pantheon analysis.

	Knepp 2015 #	Butcherlands 2017 #	Ken Hill 2019	Knepp 2020	Hants site 2019&20	C 2021	B 2021	P 2021	Knepp Reg Ag 2021	Doddington 2021
Species	567	529	811	657	787	525	541	524	683	778
Species with status	34	33	50	46	51	37	38	41	48	20
Proportion of species with status	6.0%	6.2%	6.2 %	7.0%	6.4%	7.0 %	7.0 %	7.8 %	7.0%	2.6%
Mean species per plot	185.5 ± 4.2	174.5 ± 5.3	234.1 ±13.2	216.6 ±6.1	239.0 ±10.5	156.9 ± 11.7	155.5 ± 11.6	149.5 ± 12.3	235.4 ± 12.0	218.3 ± 7.1
Records	1476	1396	1895	1790	2007	1513	1505	1421	2124	1976
Years rewilded	6 - 15	10-16	0	11-20	n/a	0	0	0	n/a	0
Habitat	Clay	Clay	Mix	Clay	Clay	Wood	Wood	Wood	Clay	Mix
Minimum	174	151	175	189	182	125	114	111	206	183
Maximum	200	198	269	246	275	200	211	205	290	249
Ubiquitous	26	31	13	22	10	14	12	8	33	15
Unique	257	243	379	281	379	237	261	267	291	409
Heterogeneity index*	9.8	7.8	29.1	12.8	37.9	16.9	21.75	33.4	8.8	27.3
Pantheon/ISIS analysis										
Rich flower resource	15/15	18/15	42/15	19/15	30/15	10/15	11/15	12/15	24/15	24/15
Scrub-heath and moorland	6/9	6/9	31/9	7/9	12/9	24/9	24/9	20/9	8/9	10/9
Bare sand and chalk	5/19	6/19	30/19	6/19	14/19	8/19	10/19	6/19	8/19	9/19
Scrub edge	10/11	13/11	25/11	14/11	19/11	24/11	26/11	21/11	16/11	20/11
Bark and sapwood decay	28/19	16/19	22/19	33/19	26/19	31/19	20/19	22/19	26/19	28/19
Open short sward	9/13	11/13	22/13	12/13	14/13	3/13	5/13	3/13	14/13	10/13
Heartwood decay	8/6	2/6	5/6	6/6	2/6	4/6	4/6	5/6	5/6	3/6

Epiphyte fauna	2/3	2/3	1/3	2/3	2/3	1/3	1/3	1/3	3/3	2/3
Fungal fruiting bodies	2/7	1/7	1/7	3/7		1/7			5/7	2/7
Sandy beaches			1/7							
Reed-fen pools	1/11	2/11	1/11	5/11	2/11					1/11
Slow flowing rivers	¼	¼		2/4						
Undisturbed fluctuating marsh	¼	2/4		¼	2/4					
Sphagnum bog		1/8			1/8					
Exposed sea cliff					1/?					
Stream and river margins						1/6				
TOTAL NUMBER OF HABITATS	12	13	11	12	12	10	8	8		
NO. IN FAVOURABLE STATUS	3	2	6	4	5	3	3	3		

The Knepp 2015 and Butcherlands 2017, the survey results are harder to compare with later surveys due to increased skills and the use of a suction sampler from 2019 onwards.

*Heterogeneity index is a simple index devised by the author. It is simply the total number of unique species divided by the number of ubiquitous species. For example, in the control area, the heterogeneity index was 16.9. Meaning for ever species seen in all eight compartments, there were a further 16.9 species recorded only in that compartment. The score in the proxy treatment was much higher, with 33.4. This suggests that the plots in the control were considerably more similar to one another than those in the proxy plots.

Clearly, the proxy grazed area (P) has the highest proportion of species with status but conversely, the lowest number of species from any survey the author has conducted following this methodology. The former result is down to the quality of the habitat, especially the compartment P5, and the latter down to the majority of the site being closed canopy woodland, limiting diversity.

4.8 - Saproxylic Quality Index (SQI)

There are some 650+ species of beetle that depend on the wood decay process in one form or another but they are difficult to sample in a broad-spectrum survey without consuming huge amounts of survey time for relatively little return. It is far better to target the beetles specifically, through trapping and targeted searches. That said, these beetles were well represented in the survey data and a total of 40 qualifying species were recorded. A minimum of 40 species are required to calculate an SQI.

The SQI for the survey was 513.51 and the Revised Index of Ecological Continuity was 13. The SQI would rank the survey around 46th UK place, the RIEC 177th. The wood clearly has significantly higher value for saproxylics than this. It would be possible for KWT to add to this by compiling historic data, future data and the hanging malaise traps to form a better idea of the

4.9 – Conclusions

This is an exceptional site for invertebrates, with a very high number of rare species and care must be taken to make sure this project enhances the wildlife found here. Many species found in this survey are historically known from the Blean complex, but not this part of the woodland. A SSSI of this nature also deserves surveying in this level of detail to inform its management, not just from a project baseline point of view.

The spider fauna is particularly important and it is perhaps the best woodland site, if not one of the best sites for invertebrates, that the author has surveyed. Especially so at the landscape scale. A sign of success would be the elevation of some of the less well performing compartments to being closer to the better ones. It is clear that open space on this site generates habitat that is rich in invertebrates, both in quality and quantity. This is currently achieved mechanically. It is not clear if this quality will be maintained by livestock alone. However, it may well be that the electricity company have to maintain access to this area. If this is the case, care must be needed to decide whether this plot should be included in future analysis. Closed canopy areas of high forest were far less interesting and a sign of success of this project should be to improve the heterogeneity of the wood and not decrease it.

4.10 – Conclusion for each treatment

The following is a verbal description based on the analyses at the treatment level. Please consult tables 6 and 7 for this section.

4.10.1 – Control area

The control area appeared to be the most homogenous of the three treatments. The stand out compartment by far was C2, an area listed as ‘open’ (although it was transitional to ‘regen’, it was still closer to ‘open’). This held 15 species with status, including two of the rarest species of the survey, ***Pistius truncatus*** and ***Dissoleucas niveirostris***. It held 198 species, beaten only in this treatment by C7 with 200 species. This area of Sweet Chestnut coppice had a rich and diverse managed ride and several embayments along its edge. C8 had the lowest species count of 125, This is an area of high forest, but it had a high proportion of species with status at 8.8%. The highest proportion of species with status though was from C4 (9.2% - higher than the site average). This was a rich area of coppice with an especially rich leaf litter assemblage, something that did appear to be better in coppiced areas. Compartment C5 was the heathiest compartment (listed as ‘open’) but it was a surprisingly poor performing plot, with only 3.7% of species with status, the only other

compartment to have lower than this was C6 (a late stage 'regen' plot) with 3.4% having status.

4.10.2 – Bison area

The stand out compartment here was B2. A large, compartment, recently cleared with early-stage regeneration, bare ground, a rich mixture of plants and structural diversity. This plot actually held the most species of the whole survey, not just the treatment, with 211 species. It also held 16 species with status, the highest of the treatment (a proportion of 7.6% - the 3rd highest of the treatment). The highest proportion with status was from a natural regen plot next to B2, B1. This had a proportion with status of 8.2%. The poorest performing plot in the treatment was B6. This plot held only 114 species; it is a pine plantation but it did not have the lowest number of species with status. The plot with the least species with status (6) and the lowest proportion of species with status (4.5% - much lower than the site and treatment averages) was B3. This is another area of high forest and is more evidence that more light in the woodland is a key factor to improve invertebrate quality.

4.10.3 – Proxy grazers area

The stand out compartment of this treatment (and the stand out compartment of the whole survey) was P5. An area of heathy, regenerating oak with a wealth of flowers including species like Betony, Alder Buckthorn, Common Cat's-ear etc. This area is clearly kept open by management of the trees under the pylon ride and shows how important 'continuity of management' is. The area held 205 species, the highest in the treatment and the second highest of the survey. It held an incredible 23 species with status, the highest of the whole survey (the second highest being B2 mentioned above with 16 species). This translated to the highest proportion of species with tatus of the entire survey, with 11.2%. Considerably higher than the site average. The proxy grazers area was an area of extremes. It had the highest heterogeneity of the survey compared to the other treatments. It had the lowest number of records compared to the other treatments too (see table 7 above). It also held the poorest performing compartment of the entire survey, P3. This held the lowest species total (111), the lowest number of species with status (3) and the lowest proportion of species with status (2.7% - way below the site and treatment average). This area was another area of high forest.

5 – Management recommendations

The following are more principals to guide the project and help Kent Wildlife Trust rationalise this approach to rewilding. The author has worked on dozens of rewilding projects and hundreds of nature reserves and farms and probably has more experience of monitoring rewilding projects than anyone in the country. It is not guaranteed that rewilding will have a positive impact on wildlife, it needs to be fine-tuned, constantly re-evaluated and it's vital to listen to all the specialists concerns who are surveying the site.

5.1 - Permanent open space vs. temporary open space

It is extremely telling that the compartment that held the most species with conservation status and the highest proportion of species with conservation status also happens to be the only 'open' habitat that has regular management through the scrub clearance to keep the pylon clear. P5 has 'habitat continuity' which is something that may be lost through rewilding, so this will be a good test of whether the bison can keep at least some places permanently open, without simultaneously damaging the sward.

Some temporary space is good but it must be complimented by some permanent open space to work. This is similar to rides and coppice coupes. The rides are the true heart and pulmonary system of a coppice cycle, the coupes more like the organs. It is the permanent open space that acts as a donder to the coupes, not other coupes that are often isolated from one another. Therefore, your open space should be conveniently places to feed into temporary open space. However, managing this in a rewilding context is very difficult.

5.2 - Variety in grazing pressure

A key missing driver in many rewilding projects is variability, this would most likely have been driven through the predator/prey relationship. Periods when a site is relaxed and not grazed are as vital as the periods when in it is grazed. This is missing in the UK, the easiest way to achieve this is through having some sub compartments but if this not possible, other options such as No Fence or removing animals during certain periods. It is often wrongly assumed that livestock will always create heterogeneity if left to their own devices. This is absolutely not guaranteed, it is a major function of stocking density and it is very possible to add homogeneity to a site and to damage the sward by assuming this.

5.3 - Being reactive with rewilding

If there are signs that the project is not going in the right direction and it is clear why this is so, it is vital that the project reacts to this and changes the model. There is sometimes in rewilding an assumption that just waiting without changing anything will, over long time periods, result in a better outcome. This is clearly not going to be the case when the missing drivers are obvious. Things that are likely to go wrong in this way are:

- Too hard grazing
- Too light grazing
- All year-round grazing of the same pressure

Interventions are unfortunately shunned by many rewilding projects but this is not a stance that always benefits wildlife. If a driver is missing highlighted by a decline in certain taxa, then it simply the case that your original drivers are incomplete. It is far better to add these in mechanically than it is to abandon them and the species that depend on them, by following a perceived pure form of rewilding. This 'toxic perfectionism' can cause rewilding projects to fail the wildlife they are meant to conserve by focusing too much on the process and not the outcomes. The wildlife outputs are therefore vital to assessing success.

5.4 – Learn from your mistakes

It is very easy to focus on the unexpected gains in rewilding, often called 'emergent properties'. There can be some great conservation success stories but this can give the impression that there are no losers, when there often will be. When talking about 'emergent properties', this should always be accompanied by a balancing discussion regarding 'unintended consequences'. Accepting and recognising losses and failures is the only way rewilding can evolve.

5.5 – Control area

As this area is outside of the rewilding project, it is vital that traditional management and mechanical control continues here.

The reason C7 (a small coppice plot) held the most species in the control area was due to the active management (embayments and ride managed) that were present and continuing this management is vital for this experiment to maintain its integrity as well as for the benefit of the wildlife.

Additional targeted management would be best aimed at C2. This area was the stand out area of this treatment and managing some of this site annually on a rotation to always keep some of this area open is vital for the rare species here to continue to thrive. Bare ground, a sward dominated by Wood Sage, and regenerating Broom and Pedunculate Oak are all key resources for invertebrates here that will be lost in a decade if no management is made here. The presence of *Pistius* alone, here and nowhere else in the project area, warrants this. Achieving some level of ecological continuity here (similar to the pylon ride in P5) will have a profound impact on invertebrates. Starting along the southern edge of this plot and moving north would be ideal while large scale management should be avoided (i.e., never do everything all at once).

A lesser priority would be to work on coppicing some of compartment C4. This was a rich coppice area and would clearly benefit from more light in this area but this is a far lower priority than maintaining permanent open space in C2.

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References and bibliography

Archer, M. E. (2014) *The Vespoid Wasps (Tiphiidae, Mutillidae, Sapygidae, Scoliidae and Vespidae) of the British Isles*. Royal Entomological Society.

Ball, S. & Morris, R. (2015) *Britain's Hoverflies – Second Edition*. WILDGuides.

Barnard, P. & Ross, E. (2012) *The adult Trichoptera (caddisflies) of Britain and Ireland*. Royal Entomological Society.

Bee, L., Oxford, G. & Smith, H. (2017) *Britain's Spiders*. WILDGuides.

Biedermann, R. & Niedringhaus, R. (2009) *The Plant-and Leafhoppers of Germany*. Frund.

Blower, J. G. (1985) *Millipedes*. The Linnean Society.

Booth, R. G. (2009) *Draft Key to British species of* Tachyporus *Gravenhorst (Staphylinidae)*. Unpublished key.

Cox, M. L. (2007) *Atlas of the Seed and Leaf Beetles of Britain and Ireland*. Pisces Publications.

Duff, A. G. (2016) Beetles *of Britain and Ireland Volume 2Cerambycidae to Curculionidae*. West Runton, Norfolk.

Duff, A. G. (2012) Beetles *of Britain and Ireland Volume 1: Sphaeriusiade to Silphidae*. West Runton, Norfolk.

Else, G. R. & Edwards, M. (2018) *Handbook of the Bees of the British Isles*. The Ray Society.

Falk, S. (2015) *Field Guide to the Bees of Great Britain and Ireland*. Bloomsbury.

Foster, G. N., Bilton, D. T. & Friday, L. E. (2014) *Keys to the adults of the water beetles of Britain and Ireland (part 2)*. Royal Entomological Society.

Foster, G. N. & Friday, L. E. (2012) *Keys to the adults of the water beetles of Britain and Ireland (part 1)*. Royal Entomological Society.

Jessop, L. (1986) *Dung Beetles and Chafers Coleoptera: Scarabaeoidea*. Royal Entomological Society.

Joy, N. H. (1932) *A Practical Handbook of British Beetles*. Pisces Conservation.

Kirby, P. (2015) *British Heteroptera keys to terrestrial families other than Miridae*. Unpublished key.

Kirk-Spriggs, A. H. (1996) *Pollen Beetles Coleoptera: Kateretidae and Nitidulidae: Meligethinae*. Royal Entomological Society.

Levey, B. (2010) *British Scraptiidae*. Royal Entomological Society.

Lott, D. A. (2009) *The Staphylinidae (rover beetles) of Britain and Ireland Part 5: Scapidiinae, Piestinae, Oxytelinae*. Royal Entomological Society.

Lott, D. A. & Anderson, R. (2011) The Staphylinidae (rove beetles) of Britain and Ireland Parts 7 & 8: Oxyporinae, Steninae, Euaesthetinae, Pseudopsinae, Paederinae, Staphylininae.

Luff, M. L. (2007) *The Carabidae (ground beetles) of Britain and Ireland*. Royal Entomological Society.

Macadam, C. & Bennett, C. (2010) *A Pictorial Guide to the British Ephemeroptera*. Field Studies Council.

Morris, M. G. (1990) *Orthocerous Weevils Coleoptera Curculionidae (Nemonychidae, Anthribidae, Urodeontidae, Attelabidae and Apionidae)*. Royal Entomological Society.

Morris, M. G. (2008) *True Weevils (Part II) (Coleoptera: Curculionidae, Ceutorhynchinae)*. Royal Entomological Society.

Plant, C. W. (1997) *A key to the adults of British lacewings and their allies*. Field Studies Council.

Roberts, M. J. (1995) *Field Guide to Spiders of Britain and Northern Europe*. Collins.

Rowsan, B., Turner, J., Anderson, R. & Symnondson, B. (2014) *Slugs of Britain and Ireland*. Field Studies Council.

Roy, H., Brown, P. & Lewington, R. (2018) *Field Guide to the Ladybirds of Great Britain and Ireland*. Bloomsbury.

Savage, A. A. (1989) *Adults of the British Aquatic Hemiptera Heteroptera*. Freshwater Biological Association.

Sterling, P. & Parsons, M. (2012) *Field Guide to the Micro Moths of Great Britain and Ireland*. British Wildlife Publishing.

Stubbs, A. & Drake, M. (2001) *British Soldierflies and their Allies*. British Entomological and Natural History Society.

Stubbs, A. E. & Falk, S. J. (2000) *British Hoverflies*. British Entomological and Natural History Society.

Waring, P., Townsend, M. & Lewington, R. (2003) *Field Guide to the Moths of Great Britain and Ireland*. British Wildlife Publishing.

Yeo, P. F. & Corbet, S. A. (1983) *Solitary Wasps*. Pelagic Publishing.

Appendix 1: Grey = Control, Red = Bison, Green = Proxy. Species with status are highlighted in bold, non-native species in red

Taxon group	Species	Status	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Araneae	*Agalenatea redii*			1			1	1				1		1	1								1			
Araneae	*Agelena labyrinthica*						1		1			1		1									1		1	
Araneae	*Agroeca brunnea*		1		1	1				1								1							1	
Araneae	*Agroeca proxima*							1			1												1			
Araneae	*Alopecosa pulverulenta*						1	1	1																	
Araneae	*Amaurobius fenestralis*												1				1									
Araneae	*Anelosimus vittatus*		1	1		1	1	1	1		1	1	1					1		1		1	1		1	
Araneae	*Anyphaena accentuata*		1		1	1							1			1	1	1				1			1	1
Araneae	*Araneus diadematus*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Araneae	*Araneus quadratus*													1												
Araneae	*Araneus triguttatus*			1								1		1		1				1				1		
Araneae	*Araniella cucurbitina*							1	1	1			1	1	1		1						1		1	1
Araneae	***Araniella inconspicua***	**NS**										**1**											**1**			
Araneae	*Araniella opisthographa*									1		1														
Araneae	***Argenna subnigra***	**NS**			**1**																					
Araneae	*Argiope bruennichi*						1					1		1												
Araneae	***Ballus chalybeius***	**NS**	**1**	**1**	**1**	**1**		**1**			**1**		**1**	**1**	**1**	**1**		**1**	**1**	**1**	**1**	**1**	**1**	**1**		**1**
Araneae	*Bathyphantes gracilis*										1				1			1								1
Araneae	*Centromerus dilutus*		1		1		1							1												
Araneae	*Ceratinella brevipes*						1												1	1						
Araneae	*Ceratinella brevis*									1	1						1									
Araneae	*Ceratinella scabrosa*					1															1					
Araneae	*Cheiracanthium erraticum*			1			1	1	1			1		1									1			
Araneae	***Cicurina cicur***	**NS**										**1**			**1**			**1**								
Araneae	*Clubiona brevipes*			1						1																1
Araneae	*Clubiona comta*		1	1	1			1	1	1	1		1	1	1	1	1	1	1	1	1			1		1
Araneae	*Clubiona corticalis*															1	1							1		
Araneae	*Clubiona lutescens*																						1			
Araneae	*Clubiona subtilis*							1						1												
Araneae	*Clubiona terrestris*		1	1	1	1							1		1		1	1		1	1	1		1	1	1
Araneae	*Cnephalocotes obscurus*						1	1						1												
Araneae	***Coelotes terrestris***	**NS**													**1**			**1**								
Araneae	*Cyclosa conica*				1			1	1	1							1			1	1	1				1

Araneae	*Diaea dorsata*		1							1			1				1			1								
Araneae	*Dictyna arundinacea*						1							1														
Araneae	*Dictyna latens*		1	1		1	1	1	1	1		1		1	1				1				1		1		
Araneae	*Dictyna uncinata*																			1								
Araneae	*Diplocephalus cristatus*																			1								
Araneae	*Diplocephalus graecus*									1									1	1								1
Araneae	*Diplocephalus latifrons*																	1	1									
Araneae	*Diplocephalus picinus*		1		1	1			1	1	1		1		1			1	1	1	1	1		1	1			
Araneae	*Diplostyla concolor*						1										1	1	1						1			
Araneae	*Dismodicus bifrons*																		1									
Araneae	*Drapetisca socialis*					1												1			1							
Araneae	*Drassyllus pusillus*						1					1											1					
Araneae	*Dysdera erythrina*									1												1						
Araneae	*Enoplognatha latimana*						1	1						1														
Araneae	*Enoplognatha ovata*		1							1					1		1	1	1	1								
Araneae	*Enoplognatha thoracica*							1				1			1										1			
Araneae	***Entelecara flavipes***	**NS**													**1**													
Araneae	*Episinus angulatus*		1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1		
Araneae	***Episinus maculipes***	**NS**	**1**		**1**	**1**	**1**	**1**		**1**	**1**		**1**			**1**	**1**	**1**	**1**	**1**	**1**	**1**			**1**	**1**		
Araneae	*Eratigena duellica*									1																		
Araneae	*Erigone atra*											1	1			1	1	1			1			1	1	1		
Araneae	*Erigone dentipalpis*			1	1		1					1				1				1			1	1				
Araneae	*Erigonella hiemalis*																		1									
Araneae	*Ero cambridgei*																											1
Araneae	*Ero furcata*				1												1		1									1
Araneae	*Euophrys frontalis*		1	1	1		1		1			1		1			1		1				1					
Araneae	***Euryopis flavomaculata***	**NS**	**1**	**1**		**1**									**1**			**1**		**1**			**1**		**1**	**1**	
Araneae	*Evarcha falcata*		1	1		1	1	1	1			1		1	1	1	1		1	1			1		1	1		
Araneae	*Floronia bucculenta*						1																					
Araneae	*Gibbaranea gibbosa*		1		1									1		1			1	1					1			
Araneae	*Gonatium rubellum*		1		1	1										1	1	1		1	1				1	1		
Araneae	*Gonatium rubens*						1	1							1		1		1				1		1			
Araneae	*Gongylidiellum vivum*			1																								
Araneae	*Gongylidium rufipes*																			1								

Araneae	*Hahnia helveola*														1												
Araneae	*Hahnia montana*		1			1		1					1	1	1					1		1					
Araneae	*Hahnia nava*										1			1													
Araneae	*Haplodrassus signifer*											1															
Araneae	***Haplodrassus silvestris***	**NS, NT**				**1**			**1**	**1**	**1**		**1**		**1**	**1**						**1**	**1**	**1**			
Araneae	*Harpactea hombergi*		1	1							1	1	1		1	1	1	1	1	1							1
Araneae	*Heliophanus cupreus*			1			1		1			1		1	1				1		1		1	1	1		
Araneae	*Heliophanus flavipes*						1					1															
Araneae	*Hypomma cornutum*																						1				
Araneae	***Hypsosinga sanguinea***	**NS**							**1**														**1**				
Araneae	*Labulla thoracica*									1			1									1	1				
Araneae	***Lasaeola tristis***	**NS**		**1**			**1**	**1**	**1**			**1**		**1**					**1**								
Araneae	*Lathys humilis*				1																						
Araneae	*Lepthyphantes minutus*		1		1																						
Araneae	*Linyphia hortensis*		1		1	1	1			1	1		1	1	1		1	1	1		1			1		1	
Araneae	*Linyphia triangularis*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	1	1	
Araneae	*Macrargus rufus*		1																1								
Araneae	*Mangora acalypha*			1		1	1	1	1		1	1		1			1	1	1	1			1	1	1		
Araneae	*Maso sundevalli*		1										1		1			1	1	1	1						
Araneae	***Meioneta mollis***	**NR, NT, S.41**																					**1**				
Araneae	*Meioneta rurestris*				1			1	1			1		1	1								1				1
Araneae	*Meioneta saxatilis*																		1								
Araneae	*Mermessus trilobatus*																										
Araneae	*Metellina mengei*		1	1	1	1		1	1	1	1		1		1	1	1	1	1	1	1	1		1	1	1	
Araneae	*Metellina merianae*								1																		
Araneae	*Metellina segmentata*		1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Araneae	*Micaria pulicaria*											1							1								
Araneae	*Micrargus apertus*				1																						
Araneae	*Micrargus subaequalis*																	1									
Araneae	*Microlinyphia pusilla*											1		1							1					1	
Araneae	***Micrommata virescens***	**NS**		**1**								**1**		**1**	**1**	**1**	**1**						**1**	**1**	**1**		
Araneae	*Microneta viaria*					1		1		1	1		1		1		1	1		1	1	1		1	1	1	
Araneae	*Misumena vatia*			1			1	1	1			1		1			1		1				1		1	1	
Araneae	*Monocephalus fuscipes*										1								1	1							

Araneae	*Neon reticulatus*		1	1	1		1	1			1		1	1	1	1	1	1	1	1	1	1			1	1
Araneae	*Neoscona adianta*											1														
Araneae	*Neottiura bimaculata*			1	1		1		1						1				1			1			1	
Araneae	*Neriene clathrata*		1		1	1	1	1				1	1		1		1	1		1	1				1	1
Araneae	*Neriene emphana*																	1								
Araneae	*Neriene montana*																					1				
Araneae	*Neriene peltata*		1	1	1	1		1		1		1	1		1	1	1	1		1	1	1			1	1
Araneae	*Nigma flavescens*					1							1		1		1	1						1	1	1
Araneae	*Nigma walckenaeri*																							1		
Araneae	*Nuctenea umbratica*								1						1										1	
Araneae	*Obscuriphantes obscurus*												1													
Araneae	*Oedothorax retusus*																		1							
Araneae	*Ostearius melanopygius*																									1
Araneae	*Ozyptila atomaria*		1											1												
Araneae	*Ozyptila simplex*			1								1														
Araneae	*Pachygnatha degeeri*						1												1							
Araneae	*Paidiscura pallens*		1	1	1	1	1	1	1	1	1		1	1		1	1	1		1		1		1	1	
Araneae	*Palliduphantes ericaeus*						1																			
Araneae	*Palliduphantes pallidus*		1		1		1	1													1					
Araneae	*Parasteatoda lunata*											1	1					1		1						
Araneae	*Parasteatoda simulans*																									1
Araneae	*Pardosa hortensis*																						1			
Araneae	*Pardosa nigriceps*						1	1						1												
Araneae	*Pardosa prativaga*											1		1												
Araneae	*Pardosa pullata*								1			1											1			
Araneae	*Pardosa saltans*			1	1			1	1	1	1	1	1	1	1	1	1	1		1	1	1		1	1	1	1
Araneae	*Pelecopsis parallela*						1	1		1												1		1		
Araneae	*Peponocranium ludicrum*						1	1			1	1		1					1							
Araneae	*Philodromus albidus*				1	1	1	1	1	1	1		1			1	1	1				1		1	1	1
Araneae	*Philodromus aureolus*						1		1			1								1						
Araneae	*Philodromus cespitum*						1							1			1						1			
Araneae	*Philodromus collinus*											1														
Araneae	*Philodromus dispar*		1		1	1	1	1	1	1	1	1	1		1	1	1	1		1		1	1	1	1	1
Araneae	***Philodromus longipalpis***	**NS**										**1**											**1**			

Araneae	*Philodromus praedatus*			1										1			1						1		1	
Araneae	*Pholcomma gibbum*							1						1		1			1							1
Araneae	*Pholcus phalangioides*									1																
Araneae	***Phrurolithus minimus***	**NS**	**1**	**1**	**1**	**1**	**1**		**1**		**1**	**1**	**1**	**1**		**1**	**1**	**1**	**1**	**1**	**1**		**1**		**1**	
Araneae	*Phylloneta impressa*						1		1						1											
Araneae	*Phylloneta sisyphia*			1			1							1	1				1				1			
Araneae	*Pisaura mirabilis*			1		1	1	1	1			1		1	1		1		1							
Araneae	***Pistius truncatus***	**NR, CR**		**1**																						
Araneae	*Platnickina tincta*		1	1												1	1					1				
Araneae	*Pocadicnemis juncea*						1							1												
Araneae	*Pocadicnemis pumila*						1												1							
Araneae	*Porrhomma microphthalmum*										1					1										
Araneae	*Robertus arundineti*				1																					
Araneae	*Robertus lividus*														1											
Araneae	*Saaristoa abnormis*																			1						
Araneae	***Salticus zebraneus***	**NS**												1												
Araneae	*Savignia frontata*					1																				1
Araneae	***Scotina celans***	**NS**	**1**	**1**	**1**	**1**	**1**		**1**	**1**	**1**		**1**	**1**	**1**	**1**			**1**	**1**	**1**			**1**	**1**	**1**
Araneae	***Sibianor aurocinctus***	**NS**					**1**					**1**		**1**												
Araneae	*Simitidion simile*			1			1	1	1			1		1	1				1				1	1	1	
Araneae	***Sintula corniger***	**NS**	**1**		**1**	**1**					**1**		**1**							**1**	**1**				**1**	
Araneae	*Stemonyphantes lineatus*											1											1		1	
Araneae	*Talavera aequipes*						1																			
Araneae	***Tapinocyba insecta***	**NS**								**1**														**1**		
Araneae	*Tapinopa longidens*		1																	1						
Araneae	*Tenuiphantes flavipes*		1		1	1		1	1	1	1		1		1	1	1	1	1	1	1	1	1	1		1
Araneae	*Tenuiphantes mengei*						1																			
Araneae	*Tenuiphantes tenuis*			1		1				1		1							1				1	1	1	1
Araneae	*Tenuiphantes zimmermanni*		1	1	1	1		1		1			1		1	1	1	1		1	1	1	1	1	1	1
Araneae	*Tetragnatha montana*							1		1							1	1			1					
Araneae	*Theridion varians*			1	1	1		1	1	1						1			1		1			1		
Araneae	*Tibellus oblongus*													1												
Araneae	*Trochosa ruricola*																				1					1
Araneae	*Trochosa terricola*			1								1	1		1			1					1	1	1	

Araneae	*Walckenaeria acuminata*																			1						
Araneae	***Walckenaeria furcillata***	**NS**				**1**																				
Araneae	***Walckenaeria mitrata***	**NR, VU**																		**1**						
Araneae	***Xerolycosa nemoralis***	**NS**							**1**			**1**											**1**		**1**	
Araneae	*Xysticus cristatus*						1			1		1		1						1			1		1	
Araneae	*Xysticus kochi*											1														
Araneae	*Xysticus lanio*		1	1	1	1		1		1	1	1	1					1				1		1		1
Araneae	*Zilla diodia*		1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1
Araneae	*Zora spinimana*			1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1		1			1
Butterfly	*Aglais io*			1										1						1					1	
Butterfly	*Aphantopus hyperantus*			1			1		1						1			1					1			
Butterfly	*Callophrys rubi*						1		1			1														
Butterfly	***Coenonympha pamphilus***	**NT, S.41**										**1**		**1**									**1**			
Butterfly	*Favonius quercus*			1					1																	
Butterfly	*Gonepteryx rhamni*								1									1					1	1	1	
Butterfly	***Limenitis camilla***	**VU, S.41**																**1**								
Butterfly	*Lycaena phlaeas*											1														
Butterfly	*Maniola jurtina*						1		1			1		1									1			
Butterfly	*Melanargia galathea*																						1			
Butterfly	***Melitaea athalia***	**EN, S.41**					**1**		**1**			**1**		**1**	**1**								**1**	**1**	**1**	
Butterfly	*Ochlodes sylvanus*													1												
Butterfly	*Pararge aegeria*		1	1					1																	
Butterfly	*Pieris napi*											1											1			
Butterfly	*Pieris rapae*						1							1												
Butterfly	*Polyommatus icarus*													1									1			
Butterfly	*Pyronia tithonus*			1			1	1	1		1	1		1	1		1		1				1	1	1	1
Butterfly	*Thymelicus sylvestris*																						1		1	
Butterfly	*Vanessa atalanta*											1		1											1	
Centipede	*Cryptops hortensis*															1						1				
Centipede	*Geophilus flavus*		1												1	1										
Centipede	*Lithobius calcaratus*			1	1									1			1	1			1				1	
Centipede	*Lithobius forficatus*					1				1		1										1		1		1
Centipede	*Lithobius variegatus*				1	1		1		1			1			1			1	1		1				1
Cockroach	***Ectobius pallidus***	**NS**		**1**	**1**	**1**					**1**	**1**			**1**	**1**	**1**						**1**	**1**		**1**

Coleoptera	*Abax parallelepipedus*								1	1																1
Coleoptera	***Acalles ptinoides***	**Nb**	**1**			**1**			**1**	**1**							**1**				**1**				**1**	
Coleoptera	*Acupalpus dubius*			1			1	1						1					1				1		1	
Coleoptera	*Acupalpus meridianus*											1													1	
Coleoptera	*Adalia decempunctata*																	1						1		
Coleoptera	*Agapanthia cardui*											1														
Coleoptera	*Agathidium laevigatum*																							1		
Coleoptera	*Agrilus laticornis*																				1				1	
Coleoptera	*Agriotes acuminatus*																	1			1					
Coleoptera	*Agriotes lineatus*													1												
Coleoptera	*Agriotes pallidulus*			1		1						1		1	1		1	1	1	1	1				1	1
Coleoptera	*Alosterna tabacicolor*																					1				
Coleoptera	*Amara familiaris*																						1			
Coleoptera	*Amara lunicollis*											1														
Coleoptera	*Amara ovata*																	1								
Coleoptera	*Amara plebeja*											1														
Coleoptera	*Ampedus balteatus*				1		1	1	1	1	1			1	1	1			1	1	1			1	1	1
Coleoptera	*Anaspis frontalis*		1	1	1		1				1	1		1									1		1	
Coleoptera	*Anaspis garneysi*							1										1								
Coleoptera	*Anaspis maculata*				1										1	1	1	1				1				1
Coleoptera	*Anaspis pulicaria*							1																		
Coleoptera	*Anaspis regimbarti*				1													1								
Coleoptera	*Anaspis rufilabris*		1													1										
Coleoptera	***Anaspis thoracica***	**NS**						**1**				**1**					**1**								**1**	
Coleoptera	*Andrion regensteinense*			1		1	1	1	1		1	1	1	1												
Coleoptera	***Anisandrus dispar***	**Nb**							**1**																	
Coleoptera	*Anisotoma humeralis*												1													
Coleoptera	*Anoplus plantaris*						1	1	1		1				1	1				1			1	1	1	
Coleoptera	*Anthicus antherinus*			1																						
Coleoptera	*Anthobium atrocephalum*									1						1										
Coleoptera	*Anthobium unicolor*				1					1												1				
Coleoptera	*Anthonomus rubi*													1												
Coleoptera	***Anthribus fasciatus***	**Na**			**1**																					
Coleoptera	*Aphthona euphorbiae*		1		1	1	1			1	1		1				1	1		1				1		1

Coleoptera	*Apion haematodes*											1															
Coleoptera	*Apteropeda orbiculata*																									1	
Coleoptera	*Asaphidion curtum*				1																				1	1	1
Coleoptera	*Athous haemorrhoidalis*		1			1		1				1					1	1			1	1			1	1
Coleoptera	*Badister bullatus*																					1					
Coleoptera	*Bembidion lampros*											1											1		1		
Coleoptera	*Bembidion mannerheimii*			1			1										1	1				1	1			1
Coleoptera	*Bembidion obtusum*						1																				
Coleoptera	*Betulapion simile*																	1									
Coleoptera	*Bolitobius cingulatus*					1																					
Coleoptera	*Bradycellus harpalinus*																	1									
Coleoptera	*Bradycellus ruficollis*						1											1									
Coleoptera	*Byrrhus pilula*										1											1					
Coleoptera	*Byrrhus pustulatus*											1															
Coleoptera	*Byturus tomentosus*			1	1					1			1				1			1					1	1
Coleoptera	*Caenopsis waltoni*						1			1																	
Coleoptera	*Caenorhinus mannerheimii*																1										
Coleoptera	*Cantharis pellucida*																	1	1						1		
Coleoptera	*Cantharis rustica*											1		1								1					
Coleoptera	*Cartodere bifasciata*										1					1			1								
Coleoptera	*Cartodere nodifer*										1		1														
Coleoptera	*Ceutorhynchus obstrictus*				1					1		1		1				1	1	1	1		1		1		
Coleoptera	*Ceutorhynchus pallidactylus*				1																		1				
Coleoptera	*Chrysolina hyperici*											1															
Coleoptera	*Cicindela campestris*						1		1			1		1									1		1		
Coleoptera	*Clivina fossor*			1																							
Coleoptera	***Clytra quadripunctata***	**NS**		**1**												**1**							**1**	**1**		
Coleoptera	*Clytus arietis*								1															1			
Coleoptera	***Coccinella magnifica***	**Na**							**1**		**1**	**1**		**1**									**1**				
Coleoptera	*Coccinella septempunctata*		1	1	1		1		1			1		1	1						1		1	1	1	1
Coleoptera	*Coeliodes rana*									1													1				
Coleoptera	*Coeliodinus rubicundus*					1	1				1					1											
Coleoptera	*Crepidodera aurata*				1				1					1	1						1					
Coleoptera	*Crepidodera aurea*								1									1									

Coleoptera	*Crepidodera fulvicornis*								1								1	1								
Coleoptera	*Cryptocephalus labiatus*			1			1					1		1		1							1	1		
Coleoptera	***Cryptocephalus parvulus***	**NS**																					**1**			
Coleoptera	*Curculio glandium*		1	1		1		1		1	1						1				1		1	1	1	
Coleoptera	*Curculio venosus*												1		1					1						
Coleoptera	*Cychramus luteus*				1											1										
Coleoptera	*Cyphon ochraceus*								1	1			1		1		1	1	1				1	1		
Coleoptera	*Dalopius marginatus*		1			1		1			1		1		1	1	1	1			1	1		1	1	
Coleoptera	*Demetrias atricapillus*							1																		
Coleoptera	*Deporaus betulae*			1		1						1			1		1			1	1		1	1	1	
Coleoptera	*Dinarda maerkeli*													1												
Coleoptera	***Dissoleucas niveirostris***	**RDB1**		**1**																						
Coleoptera	*Dorytomus tortrix*																			1						
Coleoptera	*Dromius quadrimaculatus*																			1						
Coleoptera	*Drusilla canaliculata*		1	1	1	1			1	1	1		1			1			1	1	1	1	1	1	1	1
Coleoptera	*Dyschirius globosus*						1																		1	
Coleoptera	*Enicmus transversus*																								1	
Coleoptera	*Epuraea aestiva*												1													
Coleoptera	*Euophryum confine*																						1		1	
Coleoptera	*Exapion fuscirostre*								1																	
Coleoptera	*Exomias araneiformis*							1	1				1						1			1		1	1	
Coleoptera	*Exomias pellucidus*		1			1				1	1	1	1		1			1			1	1	1	1	1	1
Coleoptera	*Glocianus distinctus*											1														
Coleoptera	*Habrocerus capillaricornis*																	1								
Coleoptera	*Halyzia sedecimguttata*																		1							1
Coleoptera	*Harmonia axyridis*																		1							
Coleoptera	*Harpalus affinis*																						1			
Coleoptera	*Hemicoelus fulvicornis*					1					1															
Coleoptera	*Hylobius abietis*															1										
Coleoptera	***Hypulus quercinus***	**NR**								**1**																
Coleoptera	***Kyklioacalles roboris***	**Nb**				**1**			**1**	**1**								**1**					**1**			
Coleoptera	***Lagria atripes***	**RE**	**1**	**1**		**1**				**1**	**1**							**1**				**1**	**1**			
Coleoptera	*Lampyris noctiluca*				1	1	1	1			1		1		1		1	1	1			1		1		
Coleoptera	*Lathrobium brunnipes*																	1						1		

Coleoptera	*Leiopus sp.*				1																						
Coleoptera	*Leiosoma deflexum*																1										
Coleoptera	*Leistus ferrugineus*						1																				
Coleoptera	*Leptacinus formicetorum*																				1						
Coleoptera	*Leptura quadrifasciata*								1																		
Coleoptera	*Liophloeus tessulatus*			1																							
Coleoptera	*Longitarsus luridus*										1														1		
Coleoptera	*Lordithon lunulatus*		1																								
Coleoptera	*Lordithon thoracicus*																		1								
Coleoptera	***Magdalis cerasi***	**Nb**										**1**															
Coleoptera	*Malachius bipustulatus*			1			1		1			1		1	1				1	1	1	1	1	1	1	1	
Coleoptera	*Malthinus balteatus*				1												1				1						
Coleoptera	*Malthinus flaveolus*		1		1				1								1	1									
Coleoptera	*Malthinus seriepunctatus*		1	1									1		1	1	1					1		1	1		
Coleoptera	*Malthodes fuscus*												1														
Coleoptera	*Malthodes minimus*										1				1												
Coleoptera	*Melanotus castanipes*									1		1															
Coleoptera	*Melanotus sp.*										1															1	
Coleoptera	*Meligethes aeneus*		1				1		1		1		1	1			1			1	1	1	1				
Coleoptera	*Meligethes atratus*			1														1							1		
Coleoptera	*Meligethes obscurus*			1					1		1	1		1	1		1	1	1	1			1	1	1	1	
Coleoptera	*Metopsia clypeata*								1																		
Coleoptera	*Micrelus ericae*						1	1						1													
Coleoptera	*Microcara testacea*								1																		
Coleoptera	*Microlestes minutulus*			1			1					1		1									1				
Coleoptera	***Microrhagus pygmaeus***	**RDB3**	**1**		**1**	**1**				**1**											**1**						
Coleoptera	*Myrrha octodecimguttata*																			1							
Coleoptera	*Nalassus laevioctostriatus*		1			1		1	1	1		1	1		1	1	1	1		1		1	1	1	1	1	
Coleoptera	*Nedyus quadrimaculatus*													1					1								
Coleoptera	*Neocoenorrhinus germanicus*		1								1										1		1	1			
Coleoptera	*Neocoenorrhinus minutus*																					1	1				
Coleoptera	*Nephus redtenbacheri*						1							1													
Coleoptera	*Notiophilus biguttatus*		1		1							1					1	1	1	1				1	1	1	
Coleoptera	*Notiophilus germinyi*											1											1				

Coleoptera	***Notiophilus quadripunctatus***	**NS**									**1**																
Coleoptera	*Ocypus brunnipes*		1																	1					1		
Coleoptera	*Oedemera lurida*						1		1			1												1				
Coleoptera	*Oedemera nobilis*						1		1			1		1										1		1		
Coleoptera	*Olibrus affinis*						1					1		1										1				
Coleoptera	*Olibrus corticalis*											1					1										
Coleoptera	*Olibrus liquidus*										1	1															
Coleoptera	*Olisthopus rotundatus*													1										1			
Coleoptera	*Oomorphus concolor*			1									1						1								
Coleoptera	*Orchesia undulata*									1												1					
Coleoptera	*Orchestes rusci*													1	1					1							
Coleoptera	***Orsodacne cerasi***	**NS**																**1**									
Coleoptera	*Othius angustus*																					1		1			
Coleoptera	*Otiorhynchus singularis*										1				1	1				1							
Coleoptera	*Oulema melanopus*																	1						1	1		
Coleoptera	*Oxypselaphus obscurus*							1	1	1									1					1	1		
Coleoptera	*Paederus littoralis*																							1			
Coleoptera	*Paradromius linearis*						1	1	1						1					1							
Coleoptera	*Pella humeralis*					1																					
Coleoptera	*Philonthus cognatus*				1																			1			
Coleoptera	*Phyllobius argentatus*					1			1				1									1					
Coleoptera	*Pirapion immune*			1			1					1															
Coleoptera	*Pissodes castaneus*													1			1		1								
Coleoptera	*Pityophagus ferrugineus*							1																			
Coleoptera	***Platystomos albinus***	**Nb**						**1**																			
Coleoptera	*Poecilus cupreus*								1					1	1												
Coleoptera	*Pogonocherus hispidulus*									1																	
Coleoptera	*Polydrusus cervinus*		1	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	
Coleoptera	*Polydrusus tereticollis*																				1						
Coleoptera	*Propylea quattuordecimpunctata*											1			1					1				1			
Coleoptera	*Protapion assimile*						1		1																		
Coleoptera	***Protapion difforme***	**Nb**																					**1**				
Coleoptera	*Protapion fulvipes*																1										
Coleoptera	*Protapion trifolii*																							1			

Coleoptera	*Protopirapion atratulum*						1																				
Coleoptera	*Psylliodes chrysocephala*				1																						
Coleoptera	*Psylliodes dulcamarae*																						1				
Coleoptera	*Psyllobora vigintiduopunctata*								1														1	1			
Coleoptera	*Pterostichus madidus*													1	1								1				
Coleoptera	***Pterostichus quadrifoveolatus***	**NS**																						**1**			
Coleoptera	*Ptomaphagus subvillosus*																	1									
Coleoptera	*Pyrochroa coccinea*																		1			1					
Coleoptera	*Quedius lateralis*		1																								
Coleoptera	*Quedius nigriceps*		1			1						1		1	1	1			1					1	1		
Coleoptera	*Quedius persimilis*										1												1				
Coleoptera	*Quedius picipes*			1	1										1								1				
Coleoptera	*Rhagium mordax*			1					1																		
Coleoptera	*Rhagonycha fulva*						1	1	1																		
Coleoptera	*Rhagonycha lignosa*			1	1	1		1		1	1				1	1	1		1	1		1		1	1	1	
Coleoptera	***Rhagonycha translucida***	**NS**	**1**																								
Coleoptera	*Rhyzobius litura*								1			1																
Coleoptera	*Rutpela maculata*			1																	1						
Coleoptera	*Rybaxis longicornis*					1	1	1																1			
Coleoptera	*Scaphidium quadrimaculatum*				1	1																					
Coleoptera	*Scaphisoma agaricinum*		1																			1					
Coleoptera	*Sciodrepoides watsoni*				1																						
Coleoptera	*Scolytus intricatus*																				1						
Coleoptera	*Scymnus auritus*														1												1
Coleoptera	*Scymnus suturalis*		1																								
Coleoptera	*Sepedophilus immaculatus*												1				1							1			
Coleoptera	*Sepedophilus marshami*														1									1			
Coleoptera	*Sepedophilus nigripennis*							1																			
Coleoptera	*Silpha atrata*			1																	1			1			
Coleoptera	*Sitona lineatus*		1	1	1	1	1	1	1	1	1	1		1	1		1		1		1		1	1	1	1	1
Coleoptera	*Sitona striatellus*			1			1		1			1		1						1			1				
Coleoptera	*Stenichnus scutellaris*								1						1	1		1									
Coleoptera	*Stenurella melanura*						1	1	1	1													1		1		
Coleoptera	*Stenus aceris*			1		1	1		1		1		1	1	1	1		1		1			1	1			1

Coleoptera	*Stenus flavipes*												1															
Coleoptera	*Stenus providus*						1	1																				
Coleoptera	*Strophosoma melanogrammum*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1
Coleoptera	*Syntomus foveatus*											1																
Coleoptera	*Syntomus obscuroguttatus*																											1
Coleoptera	*Tachyerges stigma*																		1						1			
Coleoptera	*Tachyporus dispar*			1																								
Coleoptera	*Tachyporus hypnorum*		1				1		1		1	1	1	1					1	1	1	1			1			
Coleoptera	*Tachyporus nitidulus*												1		1													
Coleoptera	*Tachyporus pusillus*																							1				
Coleoptera	*Temnocerus nanus*								1			1				1								1	1			
Coleoptera	***Trachodes hispidus***	**Nb**		**1**											**1**			**1**										**1**
Coleoptera	***Tritoma bipustulata***	**Na**								**1**																		
Coleoptera	*Trixagus dermestoides*			1		1		1							1				1	1								
Coleoptera	***Tychius parallelus***	**Na**					**1**																					
Coleoptera	*Tychius picirostris*											1																
Coleoptera	*Tytthaspis sedecimpunctata*			1		1			1	1	1	1	1	1				1		1		1						
Coleoptera	*Xantholinus gallicus*															1												
Coleoptera	*Xantholinus longiventris*																								1			
Collembola	*Entomobrya albocincta*		1							1			1			1	1					1		1				
Collembola	*Orchesella cincta*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1		
Collembola	*Orchesella villosa*			1		1	1	1	1		1		1	1	1		1	1			1		1	1	1			
Collembola	*Pogonognathellus longicornis*		1	1	1	1	1	1	1	1	1		1	1	1		1	1	1	1			1		1	1		
Crustacean	*Arcitalitrus dorrieni*				1	1																						
Crustacean	*Oniscus asellus*		1						1	1		1	1		1	1				1		1		1	1	1		
Crustacean	*Philoscia muscorum*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Crustacean	*Porcellio scaber*		1	1	1	1	1		1	1		1	1	1	1	1	1		1			1		1	1	1		
Crustacean	*Trichoniscus pusillus agg.*		1	1	1	1				1			1		1		1	1		1	1	1		1	1	1		
Diptera	*Austrolimnophila ochracea*		1															1										
Diptera	*Bibio lanigerus*			1	1	1																1						
Diptera	*Bombylius major*			1								1		1									1	1	1			
Diptera	*Brachypalpoides lentus*																								1			
Diptera	*Chrysops relictus*																						1					
Diptera	*Chrysotoxum bicinctum*							1									1											

Diptera	*Conops flavipes*									1																
Diptera	*Coremacera marginata*			1					1																	
Diptera	*Didea fasciata*														1											
Diptera	*Dioctria baumhaueri*			1					1		1	1			1		1		1	1			1	1	1	1
Diptera	*Dioctria linearis*												1													
Diptera	*Empis tessellata*		1								1	1												1		
Diptera	*Epiphragma ocellare*		1																		1					
Diptera	*Epistrophe eligans*			1																						
Diptera	*Episyrphus balteatus*		1	1	1	1				1	1	1	1	1	1	1	1	1		1	1		1		1	1
Diptera	*Eriothrix rufomaculata*											1											1			
Diptera	*Eristalis intricarius*																				1					
Diptera	*Eristalis nemorum*						1																		1	
Diptera	*Eristalis pertinax*			1		1	1	1	1					1	1				1		1		1		1	
Diptera	*Eristalis tenax*			1				1	1							1										
Diptera	*Eupeodes luniger*						1							1			1									
Diptera	*Ferdinandea cuprea*						1																			
Diptera	***Gymnosoma rotundatum***	**RDB3**																					**1**			
Diptera	*Haematopota pluvialis*								1					1												
Diptera	*Hartigiola annulipes*												1									1				
Diptera	*Helophilus pendulus*							1					1				1								1	1
Diptera	*Helophilus trivittatus*			1			1	1	1								1									
Diptera	*Imantimyia albiseta*																								1	
Diptera	*Jaapiella veronicae*														1											
Diptera	*Limonia nubeculosa*		1		1								1								1					
Diptera	*Linnaemya vulpina*						1	1															1			
Diptera	*Melanostoma mellinum*								1			1		1									1		1	
Diptera	*Melanostoma scalare*			1																						
Diptera	*Meliscaeva auricollis*			1																						
Diptera	*Myathropa florea*											1										1			1	
Diptera	*Neoitamus cyanurus*																		1							
Diptera	*Nephrotoma analis*									1																
Diptera	*Nephrotoma appendiculata*												1													
Diptera	*Nephrotoma flavipalpis*						1																			
Diptera	*Phasia barbifrons*						1																			

Diptera	*Phasia pusilla*																					1				
Diptera	*Phytomyza ilicis agg.*		1		1	1				1			1		1		1	1			1	1		1	1	1
Diptera	*Pipiza noctiluca*																	1								
Diptera	*Pipizella viduata*													1												
Diptera	*Platycheirus albimanus*						1																			
Diptera	*Rhagio lineola*				1				1										1							
Diptera	*Rhagio scolopaceus*																1									
Diptera	***Rhamphomyia marginata***	**RDB - DD**																							**1**	
Diptera	*Scaeva pyrastri*											1														
Diptera	*Scathophaga stercoraria*		1	1											1	1				1						
Diptera	*Sericomyia silentis*							1				1														
Diptera	*Sicus ferrugineus*								1																	
Diptera	*Sphaerophoria scripta*						1		1			1		1									1		1	
Diptera	*Syritta pipiens*								1					1												
Diptera	*Syrphus torvus*														1											
Diptera	*Tabanus bromius*											1					1									
Diptera	*Tipula flavolineata*												1													
Diptera	*Tipula lunata*					1				1	1	1			1		1				1		1	1		1
Diptera	*Tipula paludosa*								1			1		1										1		
Diptera	*Tipula vernalis*														1											
Diptera	*Volucella inanis*						1		1																	
Diptera	*Volucella pellucens*			1	1				1																1	
Diptera	*Volucella zonaria*																						1		1	
False scorpion	*Chthonius ischnocheles*																									1
False scorpion	*Neobisium carcinoides*		1		1	1			1	1			1		1	1	1	1		1		1		1		1
Harvestman	*Dicranopalpus sp.*				1	1	1	1	1		1	1		1	1				1	1				1	1	
Harvestman	*Homalenotus quadridentatus*			1					1																1	
Harvestman	*Leiobunum rotundum*			1		1		1	1	1	1		1	1			1		1				1	1	1	
Harvestman	*Mitopus morio*							1	1				1	1	1		1		1						1	
Harvestman	*Mitostoma chrysomelas*															1					1					
Harvestman	*Nemastoma bimaculatum*			1		1	1	1		1			1					1	1	1	1	1			1	
Harvestman	*Paroligolophus agrestis*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Harvestman	*Platybunus triangularis*		1	1	1					1	1				1	1	1	1	1		1	1			1	1
Harvestman	*Trogulus tricarinatus*												1					1								

Hemiptera	*Acalypta parvula*										1	1					1									
Hemiptera	*Acanthosoma haemorrhoidale*								1																	
Hemiptera	*Acetropis gimmerthalii*											1											1			
Hemiptera	*Adelphocoris lineolatus*			1								1														
Hemiptera	*Aelia acuminata*			1			1	1	1			1		1									1			
Hemiptera	*Alebra albostriella*																							1		
Hemiptera	*Amblytylus nasutus*						1																			
Hemiptera	*Anaceratagallia ribauti*											1														
Hemiptera	*Anthocoris nemorum*																		1		1					
Hemiptera	*Aphrophora alni*				1				1	1	1	1		1	1				1	1	1	1	1	1	1	1	
Hemiptera	*Apolygus spinolae*										1															
Hemiptera	*Aradus depressus*									1																
Hemiptera	*Arboridia ribauti*																		1							
Hemiptera	*Asciodema obsoleta*								1			1								1						
Hemiptera	*Berytinus minor*		1																							
Hemiptera	*Blepharidopterus angulatus*				1						1									1						
Hemiptera	*Campyloneura virgula*				1						1						1			1	1		1			
Hemiptera	*Centrotus cornutus*																1							1		
Hemiptera	***Ceraleptus lividus***	**NS**										1														
Hemiptera	*Cicadella viridis*			1				1	1																	
Hemiptera	*Cixius nervosus*					1									1								1	1		
Hemiptera	*Closterotomus norwegicus*											1														
Hemiptera	*Compsidolon salicellum*											1			1										1	
Hemiptera	*Conomelus anceps*						1	1						1	1											
Hemiptera	*Coreus marginatus*			1			1	1	1			1		1									1			
Hemiptera	*Corizus hyoscyami*													1									1			
Hemiptera	*Cyllecoris histrionius*			1					1		1				1							1	1	1		
Hemiptera	*Cymus claviculus*											1		1												
Hemiptera	*Cymus glandicolor*			1																1						
Hemiptera	*Cymus melanocephalus*						1	1	1					1	1										1	
Hemiptera	*Derephysia foliacea*																		1							
Hemiptera	*Dicyphus epilobii*												1													
Hemiptera	*Dicyphus errans*								1																	
Hemiptera	*Ditropis pteridis*					1		1	1		1			1	1	1	1			1	1			1	1	

Hemiptera	*Dolycoris baccarum*			1			1					1		1		1	1		1		1		1						
Hemiptera	*Drymus brunneus*				1			1							1		1	1	1		1								
Hemiptera	*Drymus ryei*		1	1	1	1	1	1	1		1			1	1	1		1	1	1	1	1	1			1	1		
Hemiptera	*Drymus sylvaticus*			1	1			1	1	1				1	1	1			1	1	1		1						
Hemiptera	*Elasmostethus interstinctus*		1	1	1	1		1		1	1	1			1	1	1	1		1				1					
Hemiptera	*Elasmucha grisea*					1													1	1	1								
Hemiptera	*Eurhadina concinna*																		1										
Hemiptera	*Eurygaster testudinaria*			1			1					1		1	1								1						
Hemiptera	*Euscelis incisus*											1																	
Hemiptera	*Gargara genistae*			1			1		1			1		1									1						
Hemiptera	*Gonocerus acuteangulatus*			1				1		1				1							1		1						
Hemiptera	*Halticus luteicollis*		1		1																				1				
Hemiptera	*Heterocordylus tibialis*			1			1		1			1								1									
Hemiptera	*Heterotoma planicornis*			1			1	1	1			1			1					1					1				
Hemiptera	*Himacerus mirmicoides*											1											1	1					
Hemiptera	*Issus coleoptratus*		1		1			1	1		1		1	1	1		1			1		1	1	1	1				
Hemiptera	*Kleidocerys resedae*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1			
Hemiptera	*Leptopterna dolabrata*						1																						
Hemiptera	*Lopus decolor*						1		1										1										
Hemiptera	*Lygocoris pabulinus*																1												
Hemiptera	***Lygus pratensis***	**RDB3**		**1**					**1**					**1**															
Hemiptera	*Lygus rugulipennis*			1																					1				
Hemiptera	*Malacocoris chlorizans*					1																							
Hemiptera	*Megacoelum infusum*																							1					
Hemiptera	*Megaloceroea recticornis*			1			1																						
Hemiptera	***Megalonotus dilatatus***	**Nb**																					**1**						
Hemiptera	*Metatropis rufescens*															1													
Hemiptera	*Mocydiopsis parvicauda*						1																						
Hemiptera	*Nabis ferus*			1					1			1		1									1		1				
Hemiptera	*Nabis limbatus*						1	1	1																				
Hemiptera	*Nabis rugosus*		1	1			1	1	1			1		1	1		1		1	1			1	1	1				
Hemiptera	*Neophilaenus lineatus*													1															
Hemiptera	*Nysius senecionis*											1																	
Hemiptera	*Oncopsis flavicollis*				1			1							1	1			1				1	1	1	1			

Hemiptera	*Oncopsis subangulata*			1					1																			
Hemiptera	*Orthotylus ericetorum*			1		1	1	1	1		1	1		1										1	1	1	1	
Hemiptera	*Orthotylus marginalis*							1						1								1						
Hemiptera	*Palomena prasina*			1		1	1		1	1		1		1	1		1		1			1	1	1	1		
Hemiptera	*Peritrechus nubilus*		1	1										1							1						
Hemiptera	*Philaenus spumarius*			1				1				1		1								1						
Hemiptera	*Phylus coryli*				1																							
Hemiptera	*Phytocoris longipennis*								1										1									
Hemiptera	*Phytocoris tiliae*																	1										
Hemiptera	*Phytocoris ulmi*					1	1	1				1							1				1		1	1		
Hemiptera	*Phytocoris varipes*			1		1	1	1				1		1	1										1			
Hemiptera	*Pilophorus perplexus*			1				1				1										1						
Hemiptera	*Pithanus maerkelii*					1																						
Hemiptera	*Plagiognathus arbustorum*			1								1																
Hemiptera	*Plagiognathus chrysanthemi*			1				1				1			1							1						
Hemiptera	*Plinthisus brevipennis*			1			1							1														
Hemiptera	*Rhabdomiris striatellus*																	1										
Hemiptera	*Rhopalus subrufus*			1					1					1														
Hemiptera	*Scolopostethus affinis*				1	1										1		1								1	1	
Hemiptera	*Scolopostethus decoratus*			1		1	1	1	1		1			1	1				1				1		1	1		
Hemiptera	*Scolopostethus thomsoni*			1			1								1				1					1				
Hemiptera	*Stenodema calcarata*							1				1																
Hemiptera	*Stenodema laevigata*		1	1	1				1			1	1		1				1	1		1			1			
Hemiptera	*Stenotus binotatus*								1					1	1				1	1									
Hemiptera	*Stictopleurus abutilon*													1														
Hemiptera	*Stictopleurus punctatonervosus*													1									1					
Hemiptera	*Stygnocoris fuligineus*											1																
Hemiptera	*Stygnocoris sabulosus*						1		1		1																	
Hemiptera	*Tachycixius pilosus*					1							1					1				1	1					
Hemiptera	*Taphropeltus contractus*					1			1		1	1			1									1	1			
Hemiptera	*Thamnotettix dilutior*			1																			1					
Hemiptera	*Tingis cardui*											1																
Hemiptera	*Trapezonotus dispar*			1		1			1			1							1									
Hemiptera	*Tremulicerus tremulae*																											1

Hemiptera	*Trigonotylus caelestialium*																						1				
Hemiptera	*Ulopa reticulata*						1	1	1		1			1					1	1			1	1	1		
Hymenopteran	*Andrena nigroaenea*					1																					
Hymenopteran	*Andrena scotica*											1	1														
Hymenopteran	*Andrena subopaca*																1										
Hymenopteran	*Andricus foecundatrix*			1				1															1				
Hymenopteran	*Andricus kollari*												1										1		1		
Hymenopteran	*Anthophora furcata*						1																				
Hymenopteran	*Apis mellifera*			1				1	1			1		1			1						1		1		
Hymenopteran	*Biorhiza pallida*			1	1	1							1										1				1
Hymenopteran	*Bombus hortorum*																						1				
Hymenopteran	*Bombus lapidarius*			1								1							1						1		
Hymenopteran	*Bombus lucorum*			1			1	1	1		1			1											1		
Hymenopteran	*Bombus pascuorum*			1			1		1		1	1		1			1		1				1				
Hymenopteran	*Bombus pratorum*					1	1			1		1				1	1						1		1		
Hymenopteran	*Bombus sylvestris*			1																			1				
Hymenopteran	*Bombus terrestris*		1	1	1	1	1		1		1	1	1	1	1	1			1	1					1	1	
Hymenopteran	*Bombus vestalis*			1					1			1				1	1								1		
Hymenopteran	*Diastrophus rubi*												1														
Hymenopteran	*Diplolepis rosae*								1																		
Hymenopteran	*Formica fusca*			1			1	1	1			1		1	1	1	1	1	1	1		1	1	1	1	1	1
Hymenopteran	*Formica rufa*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Hymenopteran	*Halictus tumulorum*											1															
Hymenopteran	*Hylaeus communis*																								1		
Hymenopteran	*Hylaeus confusus*			1																			1	1			
Hymenopteran	*Lasioglossum laevigatum*													1													
Hymenopteran	*Lasioglossum leucozonium*													1									1				
Hymenopteran	*Lasioglossum punctatissimum*								1																		
Hymenopteran	*Lasius niger*						1		1					1													
Hymenopteran	*Lasius platythorax*						1					1							1								
Hymenopteran	*Lasius sp.*								1																		
Hymenopteran	*Leptothorax acervorum*						1	1			1	1	1	1		1	1	1	1				1	1	1	1	1
Hymenopteran	*Megachile versicolor*																						1				
Hymenopteran	*Myrmecina graminicola*																						1				

Hymenopteran	*Myrmica ruginodis*		1	1	1	1			1	1	1		1		1	1	1	1	1	1	1	1		1	1	1
Hymenopteran	*Myrmica scabrinodis*						1				1			1										1		
Hymenopteran	*Neuroterus quercusbaccarum*		1	1	1			1	1	1			1		1	1	1	1		1	1		1	1	1	1
Hymenopteran	***Philanthus triangulum***	**RDB3**																					**1**			
Hymenopteran	*Sphecodes ephippius*																						1			
Hymenopteran	*Stenamma debile*		1	1	1	1	1			1	1		1		1	1		1		1	1	1	1	1		
Hymenopteran	*Temnothorax nylanderi*		1		1	1		1			1		1	1	1	1	1	1				1	1	1		
Hymenopteran	*Vespula vulgaris*																						1			
Mecoptera	*Panorpa communis*													1												
Mecoptera	*Panorpa germanica*							1		1					1											
millipede	***Choneiulus palmatus***	**NS**																	**1**							**1**
millipede	*Chordeuma proximum*																									1
millipede	***Cylindroiulus londinensis***	**NS**															**1**						**1**			**1**
millipede	*Cylindroiulus punctatus*						1		1							1		1	1						1	1
millipede	*Glomeris marginata*		1		1	1					1	1	1		1	1		1	1	1	1	1	1	1	1	1
millipede	*Polydesmus angustus*		1																	1						
millipede	*Polydesmus denticulatus*																			1						
millipede	***Polyzonium germanicum***	**NS**																**1**					**1**			
millipede	*Tachypodoiulus niger*																		1	1						1
mollusc	*Cepaea nemoralis*														1			1								
mollusc	*Clausilia bidentata*		1															1								
mollusc	*Columella aspera*													1												
mollusc	*Discus rotundatus*		1	1	1	1			1	1	1	1	1		1	1	1	1		1		1		1		1
mollusc	*Euconulus cf. fulvus*					1																				
mollusc	*Helicigona lapicida*									1														1		
mollusc	*Lehmannia marginata*		1	1									1		1	1						1		1		
mollusc	*Limax maximus*									1								1								
mollusc	*Monacha cantiana*								1																	
mollusc	*Oxychilus alliarius*																1		1							
mollusc	***Phenacolimax major***	**NS**		**1**																						
Moth	*Acleris ferrugana/notana*								1										1							
Moth	*Acrobasis repandana*																						1	1		
Moth	*Acronicta psi*								1				1													
Moth	*Acronicta rumicis*						1																			

Moth	*Adela reaumurella*						1		1	1																		
Moth	*Aethalura punctulata*								1												1							
Moth	*Agonopterix ocellana*																		1									
Moth	*Agriphila inquinatella*			1								1		1	1								1					
Moth	*Agriphila straminella*										1	1			1		1								1			
Moth	*Alabonia geoffrella*		1	1	1	1		1		1	1		1			1	1	1	1	1	1		1		1	1		
Moth	***Anania funebris***	**Na, S.41**																					**1**					
Moth	*Anania lancealis*																1											
Moth	*Ancylis geminana*										1	1		1														
Moth	***Ancylis obtusana***	**Nb**																							**1**	**1**		
Moth	***Apoda limacodes***	**Nb**									**1**																	
Moth	*Aporophyla*													1														
Moth	*Argyresthia bonnetella*				1																							
Moth	*Argyresthia brockeella*							1	1		1				1				1	1								
Moth	*Argyresthia semitestacella*												1															
Moth	*Asthena albulata*				1																1							
Moth	*Autographa gamma*		1	1			1		1			1		1									1	1				
Moth	*Blastobasis lacticolella*					1																						
Moth	*Cabera exanthemata*												1										1				1	
Moth	*Cabera pusaria*								1		1		1			1	1		1		1			1			1	
Moth	*Calliteara pudibunda*																		1									
Moth	*Caloptilia betulicola*							1																				
Moth	*Campaea margaritaria*																		1									
Moth	*Camptogramma bilineata*																						1					
Moth	*Carcina quercana*			1	1								1				1											
Moth	*Celypha lacunana*		1			1				1		1	1		1		1	1	1		1	1			1	1		
Moth	*Chrysoteuchia culmella*			1										1														
Moth	*Cidaria fulvata*			1																								
Moth	*Clostera curtula*						1							1									1					
Moth	*Crambus pascuella*											1																
Moth	*Crambus perlella*																						1					
Moth	*Cyclophora punctaria*																						1					
Moth	*Cydia splendana*			1																	1			1				
Moth	***Dasycera oliviella***	**Na**		**1**						**1**		**1**																

Moth	*Deltote pygarga*																									1
Moth	*Diaphora mendica*															1										
Moth	*Drepana falcataria*					1																				
Moth	*Eilema complana*					1																	1			
Moth	*Eilema depressa*			1																						
Moth	*Eilema lurideola*	1									1		1										1			
Moth	*Emmelina monodactyla*		1																							
Moth	*Endotricha flammealis*	1		1	1				1										1					1	1	1
Moth	*Epagoge grotiana*													1							1	1		1		
Moth	*Epinotia cruciana*											1														
Moth	*Epinotia ramella*							1													1					
Moth	*Epinotia solandriana*															1										
Moth	*Eriocrania*		1		1	1	1	1	1	1	1	1		1	1			1	1		1			1		
Moth	*Eudemis profundana*				1					1						1										
Moth	*Eupithecia vulgata*									1																
Moth	*Eupoecilia angustana*																			1						
Moth	*Gypsonoma dealbana*				1			1											1							
Moth	*Hemithea aestivaria*																			1						
Moth	*Hydrelia flammeolaria*																		1							
Moth	*Hydriomena furcata*																	1								
Moth	*Idaea aversata*																					1				
Moth	*Idaea biselata*		1		1			1	1	1			1		1		1			1	1	1		1		
Moth	*Idaea fuscovenosa*										1											1				
Moth	*Idaea trigeminata*			1	1							1					1					1				
Moth	*Incurvaria masculella*																1									
Moth	*Incurvaria pectinea*											1										1				
Moth	*Jodis lactearia*				1			1		1						1	1							1		
Moth	*Lasiocampa quercus*		1			1							1													
Moth	*Lobesia reliquana*									1																
Moth	*Lomographa temerata*						1	1																		
Moth	*Lycophotia porphyrea*					1	1															1				
Moth	*Macaria notata*																			1						
Moth	*Macrothylacia rubi*		1										1													
Moth	*Mesoleuca albicillata*																				1					

Moth	*Micropterix aruncella*							1							1	1										
Moth	*Micropterix calthella*																		1							
Moth	*Miltochrista miniata*										1					1			1						1	
Moth	*Nematopogon schwarziellus*									1	1								1				1			
Moth	*Nematopogon swammerdamella*												1					1			1	1				
Moth	*Nemophora degeerella*												1													
Moth	*Noctua janthe*																					1				
Moth	*Noctua pronuba*																				1					
Moth	*Nomophila noctuella*											1		1												
Moth	*Notocelia rosaecolana*																					1				
Moth	*Notocelia uddmanniana*																								1	
Moth	*Operophtera brumata*									1																
Moth	*Orgyia antiqua*			1							1						1		1							
Moth	*Orthosia cerasi*			1									1		1							1		1		
Moth	*Parornix*																					1				
Moth	*Petrophora chlorosata*				1		1	1	1		1			1		1			1				1			
Moth	*Phigalia pilosaria*																				1					
Moth	*Phlogophora meticulosa*			1																						
Moth	*Phycita roborella*			1										1												
Moth	*Phyllonorycter coryli*																	1			1	1				
Moth	*Polyploca ridens*								1						1											
Moth	*Pseudoips prasinana*												1													
Moth	*Pseudopanthera macularia*										1	1		1	1		1		1							
Moth	*Psyche casta*			1	1					1			1													
Moth	*Ptycholoma lecheana*																						1	1		
Moth	*Pyrausta purpuralis*													1												
Moth	*Rhopobota naevana*										1											1				
Moth	***Schrankia taenialis***	**Nb**																		**1**						
Moth	*Scopula floslactata*				1	1		1			1						1		1							
Moth	*Selenia dentaria*							1																		
Moth	*Stigmella aurella*		1		1	1			1	1					1		1	1		1		1				1
Moth	*Stigmella microtheriella*																	1								
Moth	***Synanthedon vespiformis***	**Nb**																					1			
Moth	*Taleporia tubulosa*									1												1				

Moth	*Thera obeliscata*		1																			1				
Moth	*Tinea semifulvella*																									1
Moth	*Tischeria ekebladella*		1	1				1					1									1	1	1	1	
Moth	*Tortrix viridana*									1															1	
Moth	*Tyria jacobaeae*											1														
Moth	*Ypsolopha nemorella*									1			1													
Moth	*Ypsolopha ustella*					1				1																
Moth	*Zeiraphera isertana*														1			1						1		
Neuoptera	*Chrysopa perla*						1		1														1		1	
Neuoptera	*Chrysoperla carnea group*		1	1		1	1		1		1		1	1		1	1	1		1	1			1		
Neuoptera	*Dichochrysa prasina*													1												
Neuoptera	*Dichochrysa ventralis*			1					1					1					1							
Neuoptera	*Hemerobius humulinus*																				1					
Neuoptera	*Hemerobius lutescens*				1																					
Neuoptera	*Hemerobius stigma*																									1
Neuoptera	*Micromus variegatus*			1																						
Odonata	*Aeshna cyanea*						1					1														
Odonata	*Aeshna grandis*						1					1							1			1				
Odonata	*Aeshna mixta*			1			1		1		1	1		1		1			1			1		1		
Odonata	*Anax imperator*			1			1					1		1												
Odonata	*Enallagma cyathigerum*						1					1										1				
Odonata	*Orthetrum cancellatum*								1																	
Odonata	*Sympetrum sanguineum*						1	1																		
Odonata	*Sympetrum striolatum*						1					1		1		1			1			1	1	1		
Orthopteran	*Chorthippus brunneus*			1			1	1				1		1								1				
Orthopteran	*Chorthippus parallelus*						1	1	1		1	1		1								1		1		
Orthopteran	*Conocephalus fuscus*			1			1	1						1												
Orthopteran	*Leptophyes punctatissima*		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1
Orthopteran	*Meconema thalassinum*		1	1	1	1			1	1	1			1	1		1	1			1	1		1		1
Orthopteran	*Metrioptera roeselii*					1	1					1		1								1		1		
Orthopteran	***Omocestus rufipes***	**NS**																1								
Orthopteran	*Omocestus viridulus*											1														
Orthopteran	*Phaneroptera falcata*			1																						
Orthopteran	*Pholidoptera griseoaptera*				1		1	1				1		1								1		1		

Orthopteran	*Tetrix undulata*											1		1										1	1		
Plecoptera	*Nemoura cinerea*					1												1									
Ticks & mites	*Ixodes ricinus*										1													1		1	
Ticks & mites	*Phytoptus avellanae*		1			1												1									
Trichoptera	*Glyphotaelius pellucidus*		1		1													1		1	1						
Trichoptera	*Grammotaulius nigropunctatus*																	1			1						
Trichoptera	*Limnephilus affinis*									1						1		1			1						
Trichoptera	*Limnephilus auricula*		1			1	1			1	1																1
Trichoptera	*Limnephilus centralis*																	1	1		1						
Trichoptera	*Limnephilus marmoratus*																									1	
Trichoptera	*Limnephilus sparsus*					1												1									