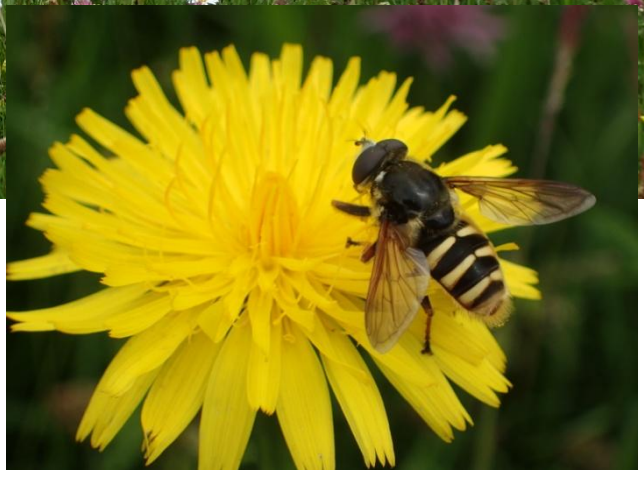
Invertebrate survey

of

Eycott Hill CWT Reserve

2019 - 2020

Final Report



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Invertebrate survey of Eycott Hill CWT Reserve 2019 - 2020 - Final Report

October 2020

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Summary

This survey of insects on Eycott Hill CWT Reserve was commissioned as part of the Eycott Hill Project. This is a follow up to a survey conducted in 2014. The 2014 survey concentrated on the high invertebrate conservation interest of the mire system and established that Eycott Hill supports a significant community of rare and specialist insects associated with the complex system of mires on the site. By contrast, the present survey focuses primarily on the newly created/restored habitats resulting from management work over the last 6 years. The aim is to provide some baseline data for the ongoing monitoring of the invertebrate interest of the nature reserve. Some options for further enhancement of invertebrate habitat are offered for consideration.

751 records of 343 invertebrate species identified as a result of the survey have been collated to date. In combination with the invertebrate survey of 2014, this gives a combined total of 1588 records of 459 invertebrate taxa recorded on the Eycott Hill Reserve.

20 species with a conservation designation have been recorded in the present survey, bringing the combined total of Designated species for the two surveys to 31. One RDB1 Endangered species (the bog cranefly *Idioptera linnei*), two RDB2 Vulnerable species (the Marsh Fritillary butterfly and the hoverfly *Parhelophilus consimilis*), and 14 nationally scarce species have been recorded during the present survey, including the first Cumbrian record of the upland planthopper *Dicranotropis divergens*.

The results indicate that whilst the insect communities in the sample areas still broadly reflect the previous species-poor grassland conditions, there is evidence of additional communities establishing around the developing habitats that have been newly created. This is particularly evident in the numbers of pollinators in the flower-rich hay meadows and the aquatic species that have colonised the new ponds. An impressive 8 species of dragonfly are already present at the new scrapes along Naddles Beck.

Incidental recording on the mire system indicates that the mires maintain their high conservation value for invertebrates and remain the most significant invertebrate feature on the site. Analysis of the combined data from the 2014 and 2019/20 surveys returns a 'Favourable Condition' for the *Sphagnum* bog invertebrate assemblage on the mires comprising the Eycott Hill SSSI. Furthermore, Eycott Hill achieves national significance for this assemblage.

Large numbers of Small Pearl-bordered Fritillary across the site suggest that the population of this species has increased over the last 6 years. This apparent increase may be in response to the ditch blocking and extensive cattle grazing regime that has taken place. It is also true that good weather conditions during the flight period in recent years have favoured populations of early summer butterflies.

The most significant individual record of the survey is perhaps the sighting of a single Marsh Fritillary butterfly in the area of ditch blocking in the south west corner of the reserve. It is assumed that this is a dispersal from one of the reintroduced populations in north Cumbria, although it is some miles from the nearest known site. Marsh Fritillaries are largely sedentary, but occasionally an individual may disperse further later in the season when females may lay further batches of eggs. This raises the exciting possibility that Marsh Fritillaries could naturally establish on Eycott Hill.

Marsh Fritillary, Eycott Hill, 2 June 2020 © S M Hewitt

Contents

Introduction

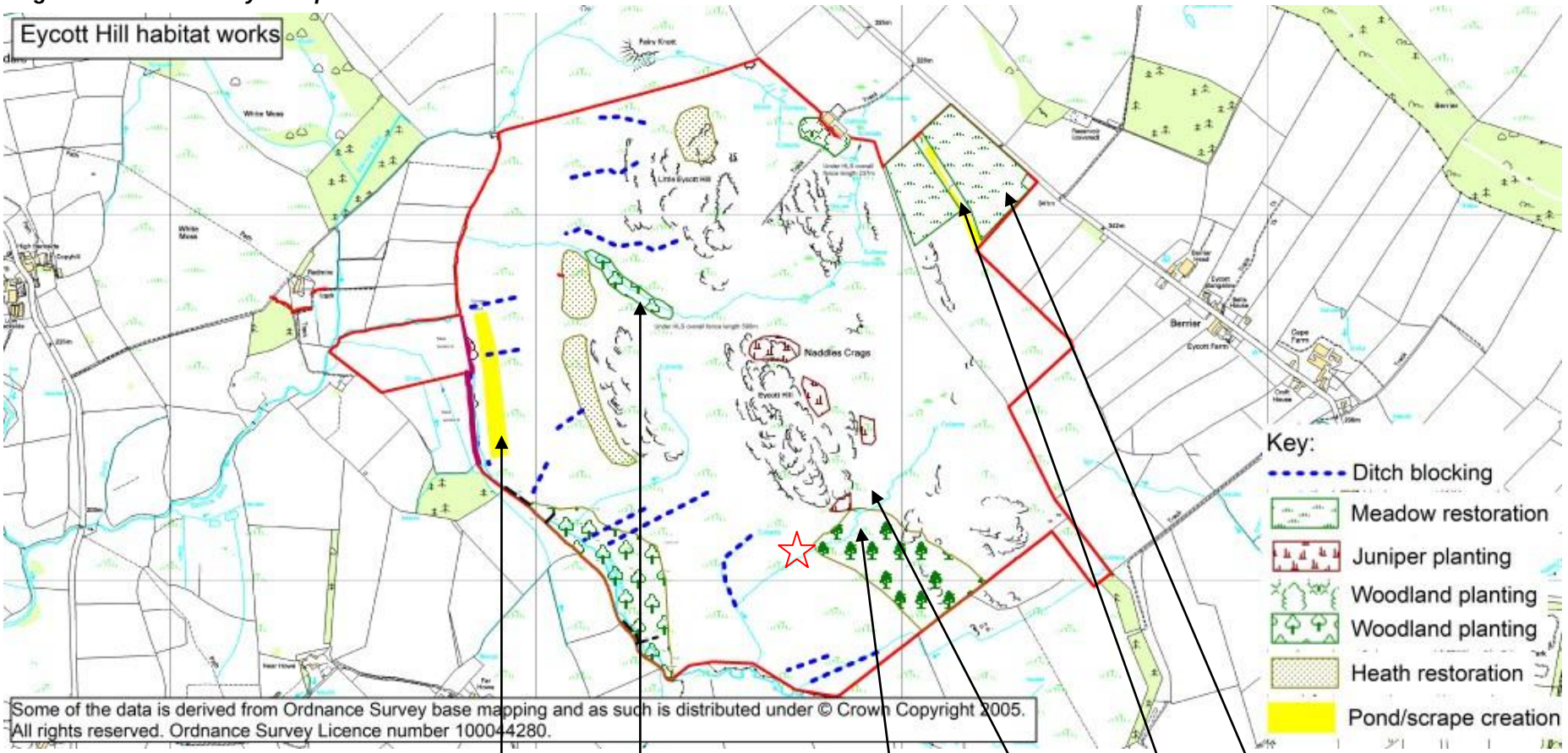
A survey of invertebrates was commissioned by CWT in 2014 as part of a study gathering information on the wildlife of land purchased by CWT at Eycott Hill, Berrier, near Penrith. The focus of that survey was to establish whether any species of conservation interest occur on the site. In 2019 a repeat survey of the invertebrates of the site was requested. Following discussion, it was decided the new survey should concentrate on the newly created habitats that have been established over the last six years, with the aim of developing some baseline information on the new insect communities that are beginning to establish.

Survey methodology

Invertebrates were surveyed using sweep-netting and hand-searching techniques on 8 August and 23 September 2019; and 16 April, 27 April, 28 May, 2, 9 and 18 June, 16 and 21 July and 14 August 2020. Some of the beetles and craneflies were identified by John Read and John Parker respectively.

The 2014 survey found the mires to be of high conservation interest for invertebrates. These areas have not changed very much and it was not deemed a priority to resurvey the mires areas at this stage. The field work focused instead on the newly created habitats of 1) the hay meadows at the upper end of the site, 2) the ponds below the upper hay meadow, 3) the new tree planting around the gills on the westward slopes and 4) the new scrapes along Naddles Beck at the lower western boundary of the site. Some incidental recording was also conducted at additional points across the site. The locations of these survey compartments is indicated in Figure 1.

Figure 1. ***Insect Survey Compartments*** **2019 - 20**



KEY

☆ Marsh Fritillary sighting

Naddles Beck scrapes/ponds

Northern Gill Woodland Planting

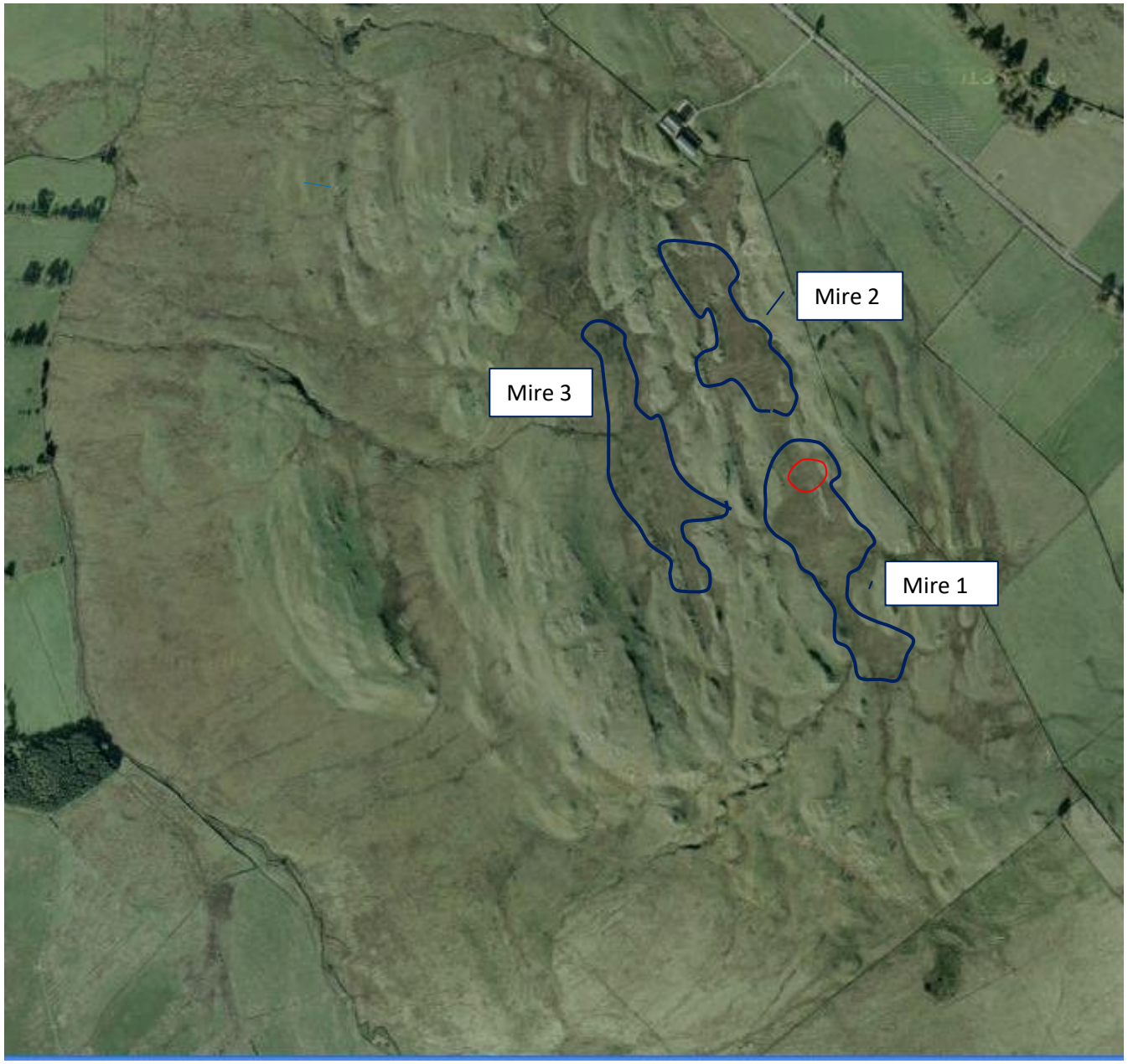
Southern Woodland Planting & gill

Heathy slope with Juniper planting

Hay Meadow Ponds

Hay Meadows

Figure 2. ***Aerial photograph of the site indicating the different areas of mire referred to in this survey***



Results

751 records of 343 invertebrate taxa have been identified as a result of the survey in 2019/20. In combination with the invertebrate survey of 2013/14, this gives a combined total of 1564 records of 459 invertebrate taxa recorded on the Eycott Hill Reserve.

20 species with a conservation designation have been recorded in the present survey, bringing the combined total of Designated species for the two surveys to 31. One RDB1 (Endangered) species, two RDB2 (Vulnerable) species, and 14 nationally scarce species have been recorded during the survey. One UK Biodiversity Action Plan (monitoring only) species, Broom Moth, without any national rarity status was recorded during the survey. Two Scottish Biodiversity List species without any national rarity status were also recorded and although they have no designation within England, the northern geographic position of Cumbria means that Scottish species designations are nevertheless of interest in a Cumbrian context. These designated species are listed in Table 1 and accounts of each species are presented below.

Table 1. ***Designated species identified from different compartments as part of the survey in 2019/20***

Species	Designated status	Eycott Hill, s.w. Corner	Hay Meadows	N. Gill woodland planting	S. Woodland planting	Mire 1	Mire 2	Mire 3	Naddles Beck Scrapes	Hay Meadow Ponds
Agonum ericeti	Notable-B					●				
Broom Moth	BAP-2007(monitoring only)					●				
Cyphon kongsbergensis	Nationally Scarce					●				
Dicranotropus divergens	Notable-B				●					
Dictya umbrarum	Notable					●				
Donacia obscura	Notable-A					●				
Donacia vulgaris	Scottish Biodiversity List								●	
Eristalis rupium	Notable					●			●	
Helochares punctatus	Nationally Scarce					●			●	
Idioptera linnei	Endangered					●	●	●		
Marsh Fritillary	Vulnerable, BAP-2007	●								
Molophilus propinquus	Notable								●	
Mountain Bumble Bee	Scottish Biodiversity List		●			●				
Neoascia geniculata	Notable							●		
Parhelophilus consimilis	Vulnerable						●			
Phylidorea abdominalis	Notable					●	●			
Renocera striata	Notable					●				
Small Heath	Near Threatened, BAP-2007	●	●		●	●			●	
Tricyphona unicolor	Notable			●	●					●
Small Pearl-bordered Fritillary	Near Threatened, BAP-2007	●			●			●	●	
No. Designated spp./compartment		**3**	**2**	**1**	**4**	**12**	**3**	**3**	**6**	**1**

Table 1 shows that the great majority of rare and scarce species recorded on Eycott Hill are associated with the mire system. The results indicate that whilst the insect communities in the new habitat sample areas still broadly reflect the previous species-poor grassland conditions, there is evidence of new communities establishing around the developing new habitats that have been created. This is particularly evident in the numbers of pollinators in the flower-rich hay meadows and the aquatic species that have colonised the new ponds, with an impressive 8 species of dragonfly already present at the new scrapes along Naddles Beck. Accounts of the findings in each survey compartment are presented below.

Appendix 1 lists all species identified in the present survey from each survey compartment. Notes on the lifecycles and ecology of all species recorded in the survey is given in Appendix 1.

Species accounts for Designated species

Idioptera linnei a cranefly Diptera Tipulidae RDBGB.ENDANGERED

A cranefly with patterned wings, found in mosses and lakeside marshes. Its biology is unknown but the larvae probably live in the marsh soil. Adults have been recorded from May to July. It is recorded from a few localities in northern England (Cheshire, Westmorland and Yorks.), with five of its records being prior to 1938.

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Restricted to acidic *Sphagnum* bogs, this species is very localised on the mires at Eycott Hill, being found in numbers only on restricted areas of mires 1 and 2 as identified on the site map. Recently recorded from a number of high quality acid valley mires in Cumbria – Wan Fell, Cliburn Moss, Parkgate Tarn and Black Moss Pool. It has probably been lost from Black Moss Pool due to degradation of the habitat. ***A single specimen was swept from Mire 1 on 8 August 2019 and it was numerous on a new area of the mire on 28 May 2020 (see figure 2).***

Parhelophilus consimilis a hoverfly Diptera Syrphidae RDBGB.VULNERABLE

A black and yellow hoverfly which breeds in pools, the aquatic larvae probably living between the leaf sheaths of Typha. The few records are widespread, including south and southwest England, the Norfolk Broads, the Lincolnshire coast, South Wales and south-western Scotland. Single specimens of this species were swept off the mires on Eycott hill on 12 and 16 June 2014.

Diptera Review (Falk, 1991)
DISTRIBUTION Records are few though widely dispersed in southern England (notably the south west), the Norfolk Broads, the Lincolnshire coast, South Wales and the Galloway coastal belt of south west Scotland. Whilst most records are coastal, inland records are present such as those from the Watford area of Hertfordshire, and Radnorshire in Wales.
HABITAT It seems to favour pools which are transitional between bog and fen, often in association with Typha.

ECOLOGY Larvae aquatic and of the rat-tailed maggot type, possibly living between the leaf sheaths of Typha. Adults recorded from May to August.
STATUS Post 1960 records from nine sites: Crymlyn Bog, Glamorganshire (1980), with a very long history stretching back to 1906), a site on the Gwent levels (1980); Aberithan Bog, Radnorshire (1982); Llyn Hafodol, Anglesey (1987); Cassiobury Park (several records in 1986) and possibly nearby at Brickets Wood (determination correct, date needs checking), both in Hertfordshire; Little Matlock Wood, Derbyshire (1987); Gordon Moss, Berwickshire (1988); Carrick Pools and Newnham Moss, Kirkcudbrightshire (1979). There is the possibility of further sites existing and the close resemblance to commoner species of the genus may have led to some under recording.
THREAT The drainage of suitable marshland for agricultural improvement, afforestation and industrial coastal developments (at Crymlyn). Also pollution from agricultural run-off and industry (Crymlyn). Over enthusiastic clearance of Typha.
MANAGEMENT Maintain a stable regime with Typha, any necessary management being on rotation to ensure continuity of a good population of Typha.

Marsh Fritillary a butterfly Lepidoptera Nymphalidae RLGB.VULNERABLE

The Marsh Fritillary was once widespread in Britain and Ireland but has declined severely over the last century, a decline mirrored throughout Europe. Its populations are highly volatile and the species probably requires extensive habitats or habitat networks for its long term survival**. It was a considerable surprise to see and photograph a single individual of this Vulnerable butterfly in the marshy grassland below the Southern Woodland Compartment at NY3876529085 on 2 June 2020.** It is assumed that this is a dispersal from one of the reintroduced populations in north Cumbria as a result of the very fine weather during May, although it is some miles from the nearest known site.

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The Marsh Fritillary was once widespread in north Cumbria but by 2004 the last remaining Cumbrian colony had dwindled to just two larval webs. These were taken into captivity to form the basis for a captive breeding and habitat restoration programme that has now seen the successful re-establishment of this butterfly at several sites in the north of the county.

Marsh Fritillaries form close-knit colonies on discrete patches of suitable habitat. The population structure consists of a metapopulation made up of number of local populations connected by dispersal. The metapopulation structure enables the species to survive and recolonise after individual local population extinctions, caused by parasitism or temporary over-exploitation of the foodplant. Adult butterflies are on the wing in late May and June and females, which are mated shortly after emergence, lay batches of c.300 eggs on the foodplant Devil's-bit Scabious *(Succisa pratensis).*The larvae initially feed together in webs on the foodplant, only dispersing in the final instar. The larval webs occur in swards of 8-25 cm height. The adults are sedentary, frequently moving no more than a few tens of metres, although a few may disperse further later in the season when females may lay further batches of eggs. Such movements of several kilometres have been reported elsewhere and natural colonisation of new sites is now being noticed in north Cumbria following the successful re-introduction of the butterfly and it is assumed that this is the source of the occurrence on Eycott Hill. The individual photographed on 2 June does appear to be a female

going by the shape of the abdomen and this raises the exciting possibility that Marsh Fritillaries may naturally establish on Eycott Hill.

MANAGEMENT AND CONSERVATION *(Butterfly Conservation factsheet)* The overall aim is to produce an uneven patchwork of short and long vegetation by the end of the grazing period, between 8 and 25 cm high on damp grassland. Extensive grazing by cattle or ponies in spring and summer is ideal on wetter sites, although autumn/winter grazing or all-year grazing can also be suitable. In general, a low stocking rate over a longer period is preferable. Stocking rates may also need to vary between different sites and between years. On most low productivity sites, stocking rates should not exceed 0.2-0.3 livestock units/ha/year. On seasonally grazed sites, roughly 1 cow every hectare (2.5 acres) for three months per year is recommended. Grazing animals should be removed if the drier areas become shorter than 8cm or if the ground is too wet. Proven systems include: hardy breeds of suckler cow, either pure bred or crossed with continentals; Holstein Friesian dairy replacements or stores; hardier beef stores, such as Welsh Black or Belted Galloway; and native ponies, such as Exmoor or Dartmoor. Sheep grazing is generally unsuitable because they quickly remove large food-plants used for egg-laying. However very extensive or occasional sheep grazing may be acceptable though requires careful monitoring.

Small Pearl-bordered Fritillary a butterfly Lepidoptera Nymphalidae RLGB.Lr (NT)

Fairly widespread throughout Cumbria, but commoner in the south. The caterpillars feed on violets growing in damp grassy situations. Adults were numerous across the site in 2020 and appeared more abundant and widespread than during the 2014 survey. This apparent increase may be in response to the ditch blocking and altered grazing regime that has taken place in the last six years. It is also true that good weather conditions during the flight period in recent years have favoured populations of early summer butterflies

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Small Heath a butterfly Lepidoptera Nymphalidae RLGB.Lr (NT)

This dainty little pale brown and orange butterfly is widespread throughout Cumbria, particularly on the fells of the Lake District, south Cumbria and the Howgills. It is rather less frequently recorded in the Pennines, Solway plain and Border uplands in the north and east of the county. The caterpillars feed on fine grasses and the butterfly is often found on short, sheep-grazed grasslands of the fells, as well as coastal grasslands. Adults can be seen from May through to September. Adults were widespread and numerous across the site in 2020.

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Cyphon kongsbergensis a beetle Coleoptera Scirtidae Notable/Na

Found in *Sphagnum* bogs. This species has been recorded from poorly drained, low level moorland. Occurs mainly in open bogs, though also from wooded margins of bogs. Larvae of *Cyphon* species are semi-aquatic in wet moss. Adults have been recorded in July and August. ***Specimens were swept off Mire 1 on 8 August 2019.***

Coleoptera Reviews, Pt 1. (Hyman/Parsons, 1992)
DISTRIBUTION: Recorded from Carmarthenshire, Cardiganshire, Montgomeryshire, Merionethshire, Caernarvonshire, West Inverness and West Ross from 1970 onwards.
STATUS: Recorded new to Great Britain in 1981 from Westerness. Now recorded from seven vice-counties, though only known from Wales and western Scotland. This species is difficult to identify and may be confused with other members of the genus. Consequently, the exact status of this species is hard to assess.
THREATS: Drainage for reasons such as agricultural improvement and development. Falling water tables because of water abstraction and river engineering schemes may also threaten this species.
MANAGEMENT & CONSERVATION: Water tables should be maintained at high levels.

Donacia obscura a reed beetle Coleoptera Chrysomelidae Notable/Na

6-8mm long metallic greenish bronze reed beetle. Larvae develop at the roots of club rushes Scirpus and sedges Carex in lakes, ponds, bogs and fens. Formerly widespread throughout Britain, but now restricted to a small number of sites, most in Scotland but with isolated populations in Wales. ***Specimens of this beetle were swept from Mire 1 on 28 May 2020***.

Coleoptera Reviews, Pt 1. (Hyman/Parsons, 1992).
DISTRIBUTION: Recorded from Dorset, West Sussex, Berkshire, East Suffolk, East Norfolk, West Gloucestershire, Caernarvonshire, Cheshire, Cumberland, Dumfriesshire, Kirkcudbrightshire, Lanarkshire, Moray, East Inverness & Nairn, Argyll Main, Mid Ebudes and West Ross before 1970 and Warwickshire, Staffordshire, Radnorshire, Carmarthenshire, Caernarvonshire, Denbighshire, Westmorland & North Lancashire,
South Aberdeenshire, East Inverness & Nairn, Argyll Main and South Ebudes from 1970 onwards.
HABITAT & ECOLOGY: Aquatic and semi-aquatic habitats in uplands, fens and woodlands, such as freshwater lakes and ponds. Phytophagous. Associated with club-rushes, sedges, especially bottle sedge Carex rostrata, and possibly water-lilies (Nymphaeaceae). Larvae probably develop at the roots of the foodplants. Adults are found on emergent vegetation and have been recorded from April to July.
STATUS: Status revised from RDB 2 (Vulnerable) in Shirt (1987). Old records indicate that this species had a scattered distribution through southern England, parts of Wales and north to West Ross in Scotland. Recently recorded from Carmarthenshire, north to South Ebudes in Scotland.
THREATS: Drainage for reasons such as agricultural improvement and development is the primary cause of the loss of fens. Falling water tables because of water abstraction, the infilling of lakes and ponds, water pollution and natural succession may also threaten this species.
MANAGEMENT & CONSERVATION: Water tables should be maintained at high levels. Water bodies should be isolated from sources of pollution and eutrophication. Clearance may be needed to maintain open conditions, this should be undertaken on a rotational basis and be aimed at maintaining aquatic plant populations.

Agonum ericeti **a ground beetle** **Coleoptera** **Carabidae** **Notable/Nb**

A 6.5 – 8mm long brilliantly metallic golden-green predatory ground beetle living in *Sphagnum* bogs. It is widely distributed but very local, although it can be abundant where found. ***One specimen was photographed on Mire 1 on 28 May 2020.***

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Eristalis rupium **a hoverfly** **Diptera** **Syrphidae** **Notable**

A hoverfly of lush marshes and meadows with abundant flowers in upland valleys. Larvae in organic rich water. Scotland, N England and Wales. ***Adults were noted nectaring on flowers on Mire 1 on 23 September 2019 and by Naddles Beck on 18 June 2020.***

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Diptera Review (Falk, 1991).
DISTRIBUTION Recorded widely in the hilly areas of Wales, northern England and Scotland.
HABITAT Upland areas with a preference for lush marshy spots with plenty of flowers either in sheltered valley bottoms and forest glades or more rarely in exposed situations up to 300m.
ECOLOGY Larvae aquatic, probably in pools, but whether acidic or basic conditions are required is unknown, though pH may be an important factor. The larvae are of the 'rat tailed maggot' type. Adults recorded from June to September.
STATUS Very local, but not infrequent in upland areas with in excess of 45 known post 1960 sites. It can occur in local abundance.
THREAT The drainage of upland bogs and marshes for improved pastureland and for afforestation.
MANAGEMENT Maintain a high, stable water level in marshy areas, ensuring the presence of pools and ditches for the larvae and a rich and varied surrounding vegetation. Such sites should not be heavily grazed.

Molophilus propinquus **a cranefly** **Diptera** **Limoniidae** **Notable**

Cranefly found on sandy banks of streams and ditches. Larvae probably develop in damp sand. Widespread but very local, mainly in the north and west. ***One specimen was collected from the Naddles Beck Scrapes on 2 June 2020.***

Diptera Review (Falk, 1991).
DISTRIBUTION Records scattered widely in England, Wales and Scotland, most numerous for Scotland and North Wales.
HABITAT Moist sandy banks of streams and ditches, either shaded or open.
ECOLOGY Larvae probably develop in wet sandy soil of the above locations. Adults recorded from May to July.

STATUS About 15 known post 1960 sites scattered widely.
THREAT Disturbance and drainage of sandy banks through canalisation and ditching; also excessive trampling of banks and pollution such as agricultural run-off.
MANAGEMENT Maintain sandy stream and ditch banks in a natural state free from excessive disturbance.

Phylidorea abdominalis a cranefly Diptera Tipulidae Notable

Cranefly, extremely local with scattered records in England, Wales and Scotland from bogs and poor fens. Larvae probably develop in wet peat. Adults recorded from May to August. ***Specimens were swept off mires 1 and 2 in the present survey.***

Neoascia geniculata a hoverfly Diptera Syrphidae Notable

A hoverfly of ditches, ponds and lakes with lush vegetation, especially Glyceria. Larvae probably detritus feeders in waterlogged soil. Widely distributed but always very local. ***A single specimen was swept from Mire 3 on 18 June 2020.***

Diptera Review (Falk, 1991).
DISTRIBUTION Records scattered widely in England, Wales and Scotland including Orkney.
HABITAT Marshes and water margins where there is lush emergent vegetation such as Glyceria.
ECOLOGY Larvae probably living in wet mud or vegetation as detritus feeders. Adults recorded from April to October and visit flowers such as forget-me-not and fool's celery Apium nodiflorum.
STATUS Widespread but very local with about 35 known post 1960 sites, and not infrequent in the Scottish Highlands and parts of northern England (Yorkshire, Cheshire).
THREAT The destruction of wetland habitats through drainage for agriculture or intensive forestry and the removal of marginal vegetation from ditches and ponds; pollution such as agricultural run-off; mis-management of water levels with subsequent scrub invasion and a loss of breeding sites.
MANAGEMENT Maintain a high, stable water level and employ rotational ditch and pond management if necessary to ensure all successional stages are present every year.

Dicranotropis divergens a planthopper Hemiptera Delphacidae Nationally Scarce
A scarce, montane planthopper found in wet upland grassland. Said to be restricted to Scotland, although there are records for North Wales on the NBN Atlas. M***ales and females were found together with the more common*** **D. hamata** ***in the southern woodland planting exclosure on 2 June 2020.***

D. divergens was also collected on Eycott Hill in the 2014 survey and these finds appear to be the first record of the species in Cumbria.

Helochares punctatus a water beetle Coleoptera Hydrophilidae Nationally Scarce

A medium sized water beetle. Local species typically found in acidic pools on moorland. Widespread in suitably acidic conditions. ***The species was found in Mire 1 and Naddles Beck Scrapes***.

Dictya umbrarum a snail-killing fly Diptera Sciomyzidae Notable

Snail-killing fly found around ponds and in marshes. Larvae are vigorous aquatic predators which feed on *Lymnaea* spp. in the lab. Multivoltine. ***This species was present in numbers on Mire 1 on 28 May 2020***.

Diptera Review (Falk, 1991).
DISTRIBUTION Records widely dispersed in upland areas in the north of England and Scotland extending to North Wales and isolated records from the south west, especially the New Forest and Dorset bogs.
HABITAT Marshes, bogs and vegetation around ponds and lakes; also dune slacks in North Wales and at Culbin Sands, Elgin. Most localities are on peat, where adults are typically found in association with flushes.
ECOLOGY Larvae probably parasitoids of aquatic pulmonate snails and have been reared in laboratory conditions using Lymnaea palustris and L. tomentosa. Adults recorded from May to September.
STATUS About 50 post 1960 sites, mainly from northern upland areas, though still present in small numbers in the New Forest.
THREAT The drainage of wetlands for agriculture or intensive forestry; pollution such as agricultural run-off; complete or extensive clearance of marginal vegetation from water edges such as through river improvement schemes and the ditching of streams; recreational pressure on dunes; mis-management of water levels with a loss of breeding sites and subsequent scrub invasion.
MANAGEMENT Prevent any drainage of sites and ensure a range of vegetation types including ditches, ponds and their marginal vegetation. Prevent scrub invasion though isolated shrubs or areas of carr may be beneficial.

Renocera striata a snail-killing fly Diptera Sciomyzidae Notable/Nb

A snail-killing fly. The larval biology is unknown, but American species of this genus are predators of pea mussels (Sphaeriidae). Adults usually found in peatland flushes. Most records are from a small area of Speyside and Deeside with one recent English record from Cumbria. ***A specimen was swept from Mire 1 on 28 May 2020.***

Diptera Review (Falk, 1991).
DISTRIBUTION Most records apply to sites along the River Spey in Elgin and Easterness between Insh and Grantown. It has also been recorded from Rather Heath, Westmorland (1984); Aberithan Turbary, Radnorshire (1987), and records from Whixall Moss, Shropshire (1957) and a site in Westmorland require checking.
HABITAT Riverside fen and marsh, mainly in upland areas.
ECOLOGY Biology unknown, larvae possibly develop as parasitoids of aquatic molluscs such as pea mussels (Sphaeriidae). Adults recorded from May to August.
STATUS Highly restricted, though locally frequent along the Spey Valley with about 15 known post 1960 sites. The Westmorland and Radnorshire records are also recent.
THREAT The drainage of wetland areas for agriculture or intensive forestry; complete or extensive clearance of marginal vegetation from water edges such as through river improvement schemes and the ditching of streams; pollution such as agricultural run-off; mis-management of water levels with a loss of breeding sites and subsequent scrub invasion.
MANAGEMENT Prevent any drainage of sites, ensuring a range of vegetation types including ponds, ditches and their marginal vegetation. Prevent scrub invasion, though some isolated shrubs or areas of carr may be useful.

Tricyphona unicolor **a cranefly** **Diptera** **Pediciidae** **Nationally Scarce**

A cranefly found by small streams and flushes, usually in shady situations. Upland areas seem to be preferred. Biology unknown, although the larvae are probably semi-aquatic in wet mud or moss. A scattered distribution, more frequent in the Scottish Highlands. ***This species was recorded by the gills in the northern gill woodland planting (27 April 2020) and the southern woodland planting (2 June 2020) and also at the Hay Meadow Ponds on 9 June 2020.***

Ceramica pisi **Broom moth** **Lepidoptera** **Noctuidae** **UK BAP**

The Broom Moth is found in all of Europe, East across the Palearctic to Siberia and the Russian Far East. In the north, it is found far beyond the Arctic Circle and in the South to North Spain. In the Alps, it is found up to heights of up to 2,000 metres. Listed in the UK BAP 2007 for monitoring purposes only. ***A larva was noted on Mire 1 on 23 September 2019.***

Donacia vulgaris **a reed beetle** **Coleoptera** **Chrysomelidae** **Scot.Biodiv.List**

A metallic green reed beetle with purple patches on the elytra. The larvae feed at the roots of Typha and the adult beetles graze the leaves. Seldom abundant but quite widespread in the southern half of England. ***A specimen was swept from emergent vegetation by the Naddles Beck Scrapes on 2 June 2020.***

Bombus monticola **Mountain Bumblebee** **Hymenoptera** **Apiidae** **Scot.Biodiv.List**

A small bumblebee with a dull yellow band on the thorax and the tip of the abdomen bright orange. Also known as the Bilberry Bumblebee, this species is generally found on bilberry moorland at altitude in north and western Britain. ***Individuals were seen nectaring at flowers in the Hay Meadow and on Mire 1 on 28 May, and again in the Hay Meadow on 2 June 2020.***

Analysis

Analysis of invertebrate assemblages using *Pantheon*

The data from the survey were analysed using *Pantheon. Pantheon* is a database tool developed by Natural England and the Centre for Ecology & Hydrology to analyse invertebrate sample data. The analyses supported by *Pantheon* help improve understanding of the resources and structures used by invertebrates within the sample locations and aid their conservation.

Users import lists of invertebrates (called "samples") into *Pantheon*, which then matches the species to the preferred name in the UK Species inventory before analysing the sample, attaching associated habitats and resources, assemblage types (adapted from the Invertebrate Species-habitat Information System (ISIS)), habitat fidelity scores and other information against them. The analysis then displays a lot of this data as numerical scores. This information can be used to determine site quality by revealing whether the species list is indicative of good quality habitat, inform on species ecology and assist in management decisions by revealing the key ecological resources.

Not all the macro-invertebrate taxa are included in the *Pantheon* database. To date over c13,000 species have been typed, this being about a quarter of the total macro-invertebrate fauna (estimated at 37,000). It remains limited to those taxa and families where there is enough ecological information to give a fair level of coding accuracy. These include species such as beetles, flies, true bugs, moths, bees and many more.
Pantheon has been developed from ISIS (Invertebrate Species-habitat Information System), which was born from a requirement for Natural England to undertake monitoring. Its original purpose was to use strict survey protocols to sample for notified invertebrate assemblages (e.g. a dead wood assemblage recognised in a SSSI citation).See Drake *et al.* (2007) and Lott, (2008) for further detail on ISIS.

The following explanation of ISIS reporting is taken from Lott (2008): ISIS is a computer application for recognising invertebrate assemblage types in species lists collected at scales ranging from management compartment to landscape character area. The assemblage types are labelled in terms that relate to their favoured habitats in order to make them accessible to non specialists. However, they are actually defined by lists of characteristic species that are generally found together in nature. Two levels are recognised in the classification. Broad Assemblage Types (BAT, now replaced by the term **Habitat**) are comprehensive series of assemblage types that are characterised by more widespread species. They can be expressed in lists from a wide range of sites. **Specific Assemblage Types** (SATs) are characterised by ecologically restricted species and are generally only expressed in lists from sites with conservation value.

SATs have intrinsic value for nature conservation and are designed to be used in setting invertebrate conservation objectives on SSSIs. They can be selected as features of interest when they are well expressed in existing data. The "**% of national species pool**" score can be used to do this when a large body of data exists for a SSSI. A score of over 10% for most wetland SATs and over 6% for most terrestrial SATs indicates that it is of national significance.

Explanation of *Pantheon* report column headings:

SAT	Specific Assemblage Types (SATs) are characterised by ecologically restricted species and are generally only expressed in lists from sites with conservation value
Habitat	comprehensive series of assemblage types that are characterised by more widespread species. They can be expressed in lists from a wide range of sites.
No. spp.	number of species belonging to the relevant assemblage type recorded in the survey.
Condition	'favourable' indicates that the threshold score for favourable condition of the relevant assemblage type has been reached.
% of national species pool	Percentage of the full list of characteristic species for an assemblage type represented by the number of species (No. spp.) for that assemblage type recorded during the survey. High scores suggest that the sample includes a high proportion of characteristic species, which can be an indicator of quality. Scores of between 10-20% may indicate good quality; scores of 21%+ certainly suggest a good proportion of characteristic species. Caution should be applied when the total number of species coded to any given category is low (10 or less) or are coded to categories that do not necessarily indicate quality (e.g. ubiquitous, synanthropic).
No. Species with Conservation status	Number of species with a threat and rarity status from published reviews
SQI	Species Quality Indices. Quality indicators such as this have been used in the past on a number of assemblages (dead wood and riparian). Each species recorded from the sample is given a Species Quality Score (SQS) based on its conservation status (see table in Appendix 1). The SQI is equal to the sum of all SQSs in any given resource, divided by the number of species. This score will then be multiplied by 100 to give a 3 figure value without decimal places (e.g.100 rather than a 1.00). Any SQI score derived from a small number of species should be treated with caution. It is suggested that scores derived from 15 or less species should not be used.

Once a SAT has been identified as a feature of interest the "**No. spp**." score can be used as a measure of species richness.

Some important invertebrate assemblages on SSSIs do not fit into the schedule of SATs and have to be covered by the more comprehensive broad assemblage type (Habitat) classification (Lott 2008). The conservation value of **Habitat**s is expressed by a **SQI score**, based on the species conservation status. **Habitat**s are wide-ranging assemblages which can produce different rarity scores in different biotopes. This makes it difficult to prescribe thresholds for conservation significance cross the whole **Habitat**. The **Habitat % representation** score may be better suited as an assemblage attribute for condition monitoring, especially when dealing with small units. The habitat representation score is the proportion of species coded to the subject habitat as a percentage of the total sample. It is affected by small changes in habitat and so is sensitive to habitat diversity. A low score is not necessarily a bad score. Effective targets may involve relative targets for two or more BATs which naturally compete with each other (Lott 2008).

Further explanation of Pantheon scoring systems is given in Appendix 4.

The Pantheon results are given below using combined data from the 2014 and 2019/20 surveys.

Table 2. Pantheon *Habitat Scores for Eycott Hill using including 2013/14 and 2019/20 survey data*

Number of species	459
Number of species with habitat scores	407
Rarity score (SQI)	126
Conservation statuses	
GB Conservation Status (old & new)	1 [RDB 1]; 1 NA; 3 Nb; 6 Notable; 8 NS; 1 RDB 1; 1 RDB 2; 2 RDB 3
GB Red List	172 LC; 2 NT; 1 VU
Legal Protection	1 Legal Protection
Section 41 Priority Species	3 Section 41 Priority Species
Section 41 Priority Species - research only	2 Section 41 Priority Species - research only
Scores	
acid mire	9 acid mire obligates, 6 acid mire specialists, 19 acid mire preferential
calcareous grassland	1 High, 2 Moderate, 5 Low
coarse woody debris	4 facultative xylophages, 3 probable xylophages, 5 probable xylophages/non xylophages, 3 non xylophages
ERS (Coleoptera)	1 ERS associated
grazing marsh - salinity	30 Freshwater species tolerant of only mildly brackish water
grazing marsh - status	1.13
seepage (acid-neutral)	4 seepage specialists, 4 seepage associates
seepage (calcareous)	3 seepage specialists, 1 seepage associates
seepage (soft rock cliff)	1 seepage specialists, 1 seepage associates
seepage (woodland)	3 seepage obligates, 3 seepage specialists, 4 seepage associates

Table 2 gives the *Pantheon* derived habitat scores across the site. Of the 459 taxa recorded during the surveys of 14 and 2019/20, 407 have *Pantheon* habitat scores. The site as a whole gets a Species Quality Index (or Rarity Score) of 126. Table 3 puts this in context with other Cumbrian sites that have been surveyed for invertebrates in recent years. There are 34 species associated with acid mire, 8 species associated with calcareous grassland, 15 species associated with dead wood, 1 species associated with exposed riverine sediments (ERS) and varying numbers of species associated with different types of seepage.

Table 3. *Cumbrian sites surveyed for insects in recent years, ranked by SQI*

Site	SQI	No. Scoring Spp	Year of survey
Bowness Common SSSI	166	61	2014
Seathwaite Wd, Borrowdale	163	101	2014
Skiddaw SSSI	153	113	2016
Haverigg Haws SSSI	149	199	2018
Glasson Moss SSSI	146	114	2014
North Walney SSSI	145	170	2018
Eycott Hill SSSI (mires)	140	167	2014 & 2019/20
Sandscale Haws SSSI	138	241	2018
Hodbarrow SSSI	129	200	2018
Glenamara Pk., Patterdale	127	107	2003
Eycott Hill NR	126	407	2014 & 2019/20
Yewbarrow Woods, Rusland	122	498	2003
Argill Woods SSSI	120	246	2019
Wedholme Flow	120	89	2014
Orton Moss SSSI	119	584	2012/13

If conservation value is judged by the number of rare species present on a site then this will be affected by the amount of survey work conducted. The SQI score is intended to account for recording effort in assessing the invertebrate conservation value of a site. However sites containing a high value habitat within a matrix of diverse but lower quality habitats will have its SQI dragged down by the diversity of widespread species in addition to the specialists of the high quality habitat. The higher scoring sites in Table 4 are generally sites containing uniformly high quality habitat, or where the surveys from which the data are generated focussed on particular high quality areas of the wider sites. Thus, the SQI for the whole of Eycott Hill Reserve is lowered by the range of common and widespread species found across the range of habitats present on the site. If just the invertebrate data on the mire complex within the Eycott Hill SSSI is analysed then a significantly higher SQI of 140 is generated from 167 scoring species.

Table 4. ***Species Quality Indices for broad biotopes represented on Eycott Hill***

Broad biotope	No. of species	% representation	Species with conservation status	SQI
wetland	202	7	20	147
open habitats	168	4	6	105
tree-associated	61	2	2	109

Table 4 shows that for broad biotopes, the wetland habitats on Eycott Hill deliver the highest SQI, with open habitats and tree-associated biotopes trailing some way behind.

Table 5. ***Habitat types represented on Eycott Hill NR, ranked by SQI***

Broad biotope	Habitat	No. of species	% of national pool	Species with conservation status	SQI
wetland	peatland	115	10	16	164
wetland	marshland	74	9	3	119
wetland	running water	36	4	1	114
tree-associated	shaded woodland floor	46	4	2	112
tree-associated	wet woodland	30	12	1	109
wetland	wet woodland	30	11	1	109
open habitats	tall sward & scrub	152	6	3	104
open habitats	short sward & bare ground	12	<1	2	*
tree-associated	arboreal	10	<1		*
tree-associated	decaying wood	5	<1		*
wetland	lake	4	3	1	*
open habitats	upland	3	2		*

** Low number of representative species (<15) makes the SQI unreliable*

Table 5 shows that, with a SQI of 164, the peatland habitat on Eycott Hill is of significantly higher conservation value for invertebrates than other habitats present on the site.

Table 6. ***Specific Assemblage Types (SATs) represented on Eycott Hill NR***

SAT	No. of species	% of national pool	Species with conservation status	Reported condition
Sphagnum bog	13	12	6	Favourable
scrub-heath & moorland	7	2	1	Unfavourable (7 of 9 species)
rich flower resource	4	2		Unfavourable (4 of 15 species)
scrub edge	3	1		Unfavourable (3 of 11 species)
open short sward	3	2	1	Unfavourable (3 of 13 species)
moss & tussock fen	3	7	3	Unfavourable (3 of 6 species)
bark & sapwood decay	2	<1		Unfavourable (2 of 19 species)
reed-fen & pools	2	2		Unfavourable (2 of 11 species)
undisturbed fluctuating marsh	1	3	1	Unfavourable (1 of 4 species)
open water in acid mire	1	5	1	Unfavourable (1 of 5 species)

Discussion of results and analysis for survey compartments

The data used to generate Table 6 indicates that the *Sphagnum* bog invertebrate assemblage on Eycott Hill reaches the quality required for an SSSI to meet the **'favourable condition'** standard for this feature. Furthermore, the "**% of national species pool**" score of 12% indicates that the *Sphagnum* bog on Eycott Hill is of national significance for its invertebrate community. This is the only SAT on the site that achieves the 'Favourable Condition' standard, although the 'scrub-heath & moorland' SAT is only two species short of meeting Favourable Condition within this dataset. Other SATs on the site are presently each represented by just one, two or three species. It will be interesting to monitor how this representation changes over time as the habitats develop under conservation management.

Eycott Hill as a whole gets a Species Quality Index (or Rarity Score) of 126. Table 3 shows that this is a low to middling score compared with other Cumbrian sites. This is due to the diversity of common species occurring on the variety of habitats across the site. It is to be hoped that as these newly created habitats develop the SQI for the site will improve. When just the mires within the SSSI on Eycott Hill are considered, they deliver a significantly higher SQI of 140.

Wetland habitats on Eycott Hill are collectively of significantly greater invertebrate conservation value than are the other broad biotopes present (Table 4). Peatlands are the most important of the wetland habitats present, followed by marshland and running water (Table 5). The number of species listed for tree-associated habitats of 'shaded woodland floor' and 'wet woodland' in Table 6 may be somewhat misleading as a number of insects associated with wet woodland in southern Britain are also found on wet moorland in the north and uplands.

The insect communities found in each of the sample areas in 2019/20 are discussed below.

Hay Meadows


1


2


3


4

The newly created hay meadows provide a rich nectar source, attracting numerous pollinating insects and their predators.
Several species of bumblebee were observed, including the local Mountain Bumblebee *(Bombus monticola)*[1].
Sawflies were particularly abundant in the early summer with 10 species recorded, including *Tenthredo arcuata* [2].
16 different species of hoverfly have been identified in the meadows, including *Sericomyia silentis* [3] and *Helophilus pendulus* [5]. These two species develop as 'rat-tailed maggots' in water-logged soils, using their long 'tails' as snorkels reaching up to the surface through which they breath. Another hoverfly present in the meadows, *Eristalis abusivus* is more usual in coastal districts, though it can be found inland. They are associated with the edge of cattle-grazed pools and ditches, suggesting that shallow water and wet mud is the favoured substrate for the larvae which are also of the rat-tail type.
Soldier beetles enjoy flower-rich sites and four species were found, including *Cantharis pellucida* [4].
A healthy population of the Chimney Sweeper moth[6] has established. This local species is found in tall, flower-rich grassland, where its larvae feed on the flowers and seeds of Pignut.


6


5

Hay Meadow Ponds


1


2


3


4

The new ponds have been rapidly colonised by several species of aquatic insect.

Azure Damselflies and Large Red Damselflies [1] are both present in numbers. It was exciting to find several Broad-bodied Chaser dragonflies [2 & 3] hatching out of one of the ponds on 28 May 2020. This is an interesting observation as this species is spreading north but is still rare in Cumbria and is only just beginning to get established in the county.

Several species of long-legged flies (Dolichopodidae) were swept from the marshy vegetation around the pools. These metallic green, predatory flies are associated with wetland situations. *Argyra elongata*, a very local species associated with the muddy margins of pools, was an interesting find with only a handful of other Cumbrian locations. A single adult was swept on 9 June 2020.

The bare mud around the ponds is a good hunting ground for the shorebug *Saldula saltatoria* [4].

The muddy pond edges also provide suitable conditions for the development of some craneflies and 8 species have been identified from this area to date.

North Woodland Planting & Gill

The tree planting has been successful and the trees are growing well. However the insects recorded here are still largely of the community associated with open marshy grassland and stream edges.

The sawfly *Claremontia tenuicornis* was recorded here. Its larvae feed on the leaves of *Filipendula* and *Alchemillas*. Two more sawflies of the genus *Dolerus* were also swept in this area: *D. cothurnatus* feeds as larvae on *Equisetum* spp. and *D. nigratus*, which develops on grasses.

Two species of predatory dancefly (Empididae) were swept from the foliage of the saplings. These were *Rhamphomyia stigmosa*, which is associated with the vegetated margins of trickling streams on boggy ground and *Rhamphomyia tibialis*, an early spring species flying in the vicinity of bushes. It is widespread, but with a western and northern distribution. Another Empid fly, *Clinocera stagnalis,* is associated with wet muddy water margins and was swept from the stream.

Two long-legged flies (Dolichopodidae) *Campsicnemus curvipes* and *C. loripes* swept here are also common species associated with muddy water margins.

The water cricket *Velia caprai* [1] was found skating on the surface of the stream here and on water bodies elsewhere across the site. This water bug is associated with rather fast-flowing rivers and streams, where it lives in colonies in backwaters and pools, but it is also found on slow-flowing and still waters, particularly on upland pools.

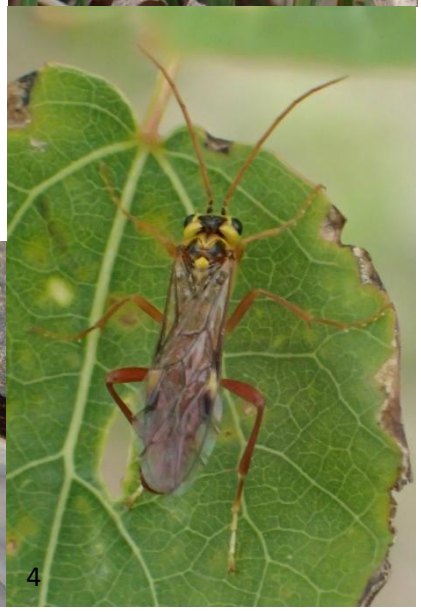
South Woodland Planting & Gill


1


2


3

The tree planting is developing well and although the invertebrate fauna is still largely comprised of species of open grassland communities there are some scrub and wood edge species beginning to appear. *Platypalpus verralli* and *P. minutus* (Hybotidae) are small predatory flies found on trees and bushes. *Empis nigripes* (Empididae) is common in early summer at woodland edges, hedgerows and in gardens. The sawfly *Rhogogaster viridis* feeds on alder as a larva.
Small Pearl-bordered Fritillaries [1] were frequent in the marshy ground in the gill. Small Copper and Small Heath butterflies were also present. It was pleasing to find a small colony of Green Hairstreak [2] on the slope by the gill. This butterfly feeds on bilberry as a larva and there was a small amount of the foodplant among the rocks here. The caterpillar of the Brown Silver-line moth [3] feeds on bracken, as do the larvae of the sawflies *Aneugmenus padi* and *Strongylogaster multifasciata*.
Numerous other insects recorded here are typical of grassland and stream sides . The sawfly *Tenthredopsis litterata* [4] develops on grasses, particularly Cocksfoot. *Tipula maxima* [5] is Britain's largest cranefly. It's larvae are semi aquatic in the muddy margins of streams.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Heathy slope and Juniper Planting

The rocky slopes with dry grassland and sparse heather have been planted with patches of Juniper. The insect fauna is as yet apparently unaffected by the small juniper bushes and still reflects the grassland and heathy nature of the vegetation.

Small Copper [1] caterpillars feed on sorrel and this butterfly prefers light soils with bare ground on which it can bask and hold territory.

The Mottled Grasshopper *(Myrmeleotettix maculatus)* [2] is a local species of dry heathland and coastal dunes. The Common Green Grasshopper *(Omocestus viridulus)* [3] is found in a wide range of different grasslands and is much more common.

The tiny, black plantbug *Chlamydatus wilkinsoni* is a northern and western species in Britain, typical of well-drained upland grasslands with fine, short grasses.

A cuckoo wasp observed here was probably the Ruby-tailed Wasp (*Chrysis ignita* agg.) This species is a cleptoparasite in the nests of *Ancistrocerus* spp. of mason wasps and is found around sunny walls and rocky outcrops where the mason wasps build their nests in the crevices.

The Downlooker Fly *(Rhagio scolopaceus)* [5] is a widespread and common species the larvae of which live in peaty soil and rotten wood. It is frequent across the whole site.

Naddles Beck Scrapes


1


2


3


4

The new scrapes along Naddles Beck at the foot of the hill on the western boundary of the Reserve have been colonised by a range of aquatic and liminal invertebrates.

The bare muddy margins provide hunting ground for the predatory beetles *Elaphrus cupreus* [1] and *E. riparius* [2]. The spring flying cranefly *Tipula lateralis* [3] lays its eggs in the wet mud and its larvae are aquatic in streams and ponds. The nationally scarce *Molophilus propinquus* was also found here. This northern and western cranefly is associated with sandy banks of streams and ditches where its larvae probably develop in damp sand.

Water boatmen *(Notonecta obliqua)*, lesser water boatmen (Corixidae) and water beetles have colonised the ponds, whilst Common Pondskaters (*Gerris lacustris)* skim across the surface.

Dragonfly (Odonata) nymphs, such as those of the Common Darter [5], lurk among the aquatic vegetation and adults of various species were on the wing. An impressive 8 species of Odonata were identified in and around the scrapes during the survey. Among these, Broad-bodied Chasers [4] were holding territories, mating and ovipositing at one of the ponds.

The reed beetles *Donacia vulgaris* and *Plateumaris discolor* occur on reeds by the ponds. The lush flowery margins of the scrapes and beck provide nectar sources for a range of flying insects, including the bumblebee-mimicking hoverfly *Volucella bombylans* [6] and the Large Skipper butterfly [7]. The gall fly *Urophora stylata* was swept here and is an uncommon species in Cumbria.


7


6


5

Mires

Although the mires were not a focus of the present survey and were only visited briefly on three occasions, they nonetheless account for the majority of the Designated species recorded, with 10 species identified during the survey.

Management work in the last six years has raised water levels slightly and these cursory samples suggest that the invertebrate interest of the mires is maintained and perhaps enhanced.

The Endangered cranefly *Idioptera linnei* [1] was present in numbers on a new area of Mire 1. Nationally Scarce species such as the reed beetle *Donacia obscura,* the ground beetle *Agonum ericeti* [2] and the snail-killing fly *Dictya umbrarum* were refound on Mire 1.

1

2

Some possible options for further enhancements of invertebrate habitat

A few thoughts on additional initiatives that might benefit invertebrates on the site are given here for consideration. I do not have experience in conservation management and so these observations are suggestions for consideration only and are not exhaustive. Figure 3 indicates some possible locations for interventions to enhance invertebrate habitat.

The new habitat restoration and creation initiatives and wider conservation management across the site already appear to be delivering positive benefits for invertebrates. Long term monitoring will provide valuable information on how invertebrate populations and diversity are responding to these conservation management regimes.

Much of Eycott Hill Reserve consists of grasslands of one type or another. The variety of invertebrates in grassland communities is equal or greater than the diversity of plant species. The richest grassland sites support large and interesting invertebrate communities (Kirby 1992). Diverse vegetation structure is key to increasing invertebrate interest in grassland sites. Ideally a range of biotopes from bare ground and short turf to tall grass, tussocks and scattered scrub will be present, providing a range of nectaring, feeding, nesting, hunting, basking and over-wintering resources. Topographically varied sites such as Eycott Hill offer maximum opportunities for an intimate mix of grassland types and structure and resulting invertebrate diversity. Warm, free-draining south-facing slopes, sheltered damp hollows and cooler north-facing slopes all contribute to the mix. Where plants are able to flower and set seed they provide further niches for invertebrates and marginal areas and boundary wall and hedges can provide additional resources.

The dry grassland area is now managed through extensive cattle grazing. This element of the Reserve has been rather side-lined in invertebrate surveys conducted to date and it would be useful to asses this aspect of the wildlife on the Reserve to establish a baseline fauna for use in ongoing monitoring. Sunny south-facing slopes are particularly important for invertebrates requiring warm, thinly vegetated free-draining slopes. The tilted beds of Eycott lava provide numerous such situations and some of these areas have a mixed thin vegetation cover of Heather and Thyme mixed with grasses and various herbs. These areas may already be responding positively to the new grazing regime that has been initiated. There is however not much bare ground (other than solid rock) where insects might hunt, bask and nest. On some south-facing slopes where the vegetation is thicker and of no particular interest, **there might be an opportunity to strip off some small patches of turf and to dig out some nesting banks to encourage solitary bees**.

Scattered Scrub provides shelter, feeding, nectaring, nesting and over-wintering sites for many insects and can greatly increase the invertebrate diversity on grasslands. The scrub/grassland boundary is particularly valuable, especially where it has a sunny aspect. The extensive area of pasture on Eycott Hill may provide the **opportunity to establish some small exclosures of thorn scrub to increase resources and structural diversity for invertebrates** in areas where the grassland is more uniform and of lower conservation value.

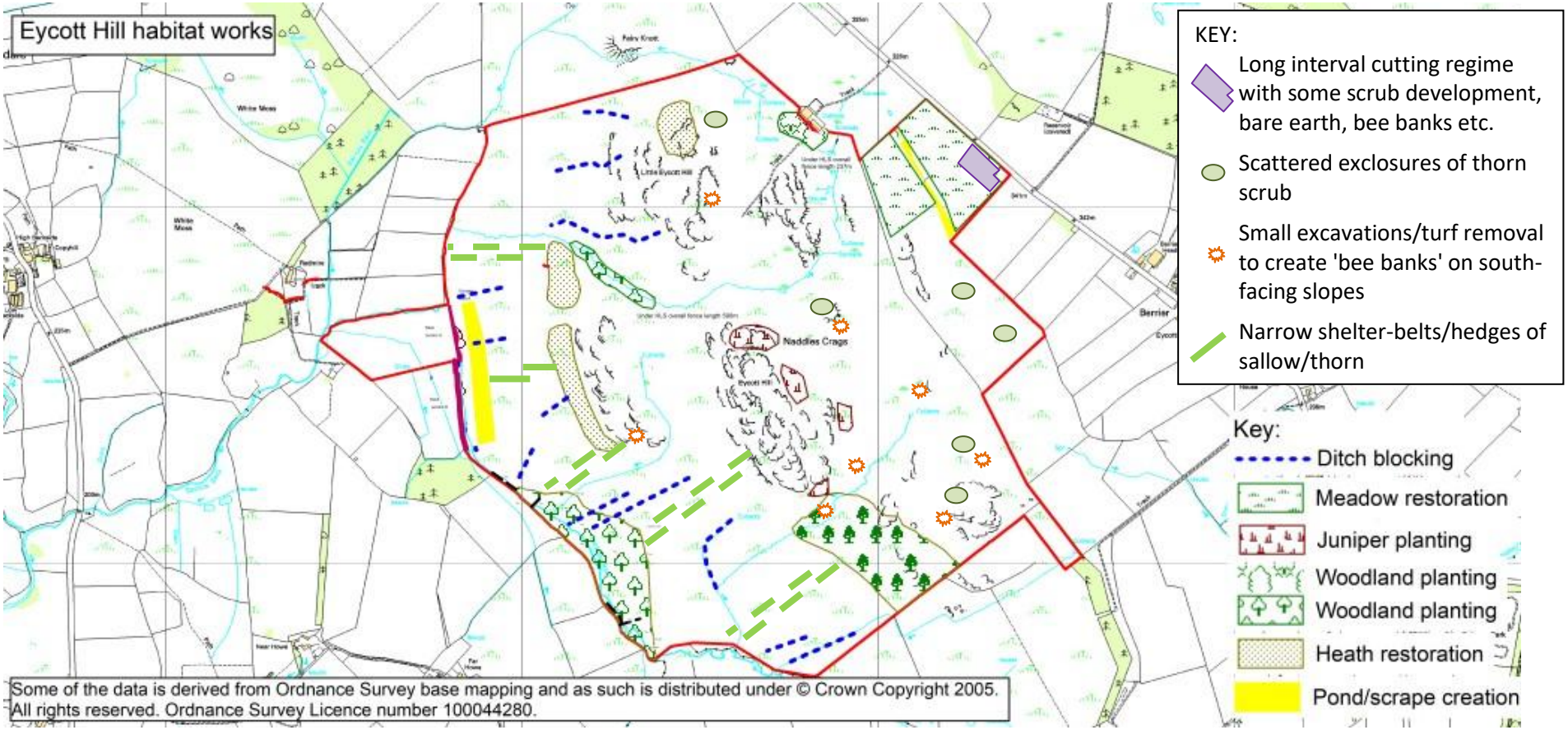
Management for hay production is, in itself, not ideal for invertebrates. The uniformly tall vegetation is unsuitable for species requiring short turf or bare ground and it is cut before many insects of tall grassland communities are able to complete their lifecycles. Hay meadows do however support large numbers of insects nectaring in this flower-rich habitat, although these are often of a limited range of relatively common species. **The greatest value of hay meadows for invertebrate is realised where they are part of a wider landscape of unimproved grassland, which is often relatively poor in nectar sources**. The two types of management thus complement each other with one providing the nectar source for adult insects and the other providing the resources for larvae and over-wintering stages. Leaving the field margins uncut will also

allow some insect species to maintain populations. **It is therefore recommended that management of the hay meadows continues as it is presently constituted.**

The area of grassland immediately below the visitor car park appears too rough to cut for hay and this area offers an **opportunity to take some more proactive actions for invertebrates** to complement the management of the hay meadows and pasture across the rest of the site. A cutting regime could be introduced to **leave some of the area uncut on a 3 year cycle to provide habitat for insects that develop and overwinter in seed heads and dead stems.** Some areas could be cut several times through the year to maintain a short sward, although this might be too demanding on courses to achieve and it may be that careful grazing at particular times of year will be a more effective form of management. There is some **developing gorse and thorn scrub and this could be allowed to develop further**. The rubble-filled sink holes provide further structural diversity and **some small areas of turf stripping could provide bare ground for invertebrates.** Finally, **the creation of artificial bee banks in this area could be a positive enhancement of the insect habitat resource** and, if successful, provide opportunities for interpretation adjacent to the car park.

The extensive area of unimproved wet grassland on the western flanks of Eycott Hill, running down to Naddles Beck supports a strong population of Small Pearl-bordered Fritillary butterflies. There is a good population of Devil's-bit Scabious, the flowers of which provide an attractive nectar source for several local wetland insects. The scabious leaves are also the food source of the caterpillars of the nationally Vulnerable Marsh Fritillary butterfly, one individual of which was observed here during the survey. This area appears to be responding positively to the extensive grazing by cattle and this is the preferred method of management for Marsh Fritillaries. The slope is quite exposed however and **there may be some benefit in creating some more sheltered areas by establishing some narrow shelter-belts or hedges of sallow or thorn** running east west down the slope. These wind breaks could consist of staggered, overlapping strips so as not to impede movement of insects, cattle or people whilst providing shelter from northerly winds

Figure 3. ***Site plan indicating suggestions for further enhancements to invertebrate habitat that might be considered***



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APPENDIX 1. All invertebrates recorded in each sample compartment during the survey

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Araneae											
Araneidae											
Araneus diadematus									●		
Araneus quadratus							●		●		
Coleoptera											
Aphodiidae											
Aphodius prodromus										●	
Apionidae											
Perapion curtirostre			●								●
Perapion violaceum			●				●				
Protapion apricans			●								
Protapion assimile			●		●						
Cantharidae											
Cantharis cryptica					●						
Cantharis figurata			●		●					●	●
Cantharis flavilabris			●					●			●
Cantharis nigricans					●						
Cantharis pallida										●	
Cantharis pellucida			●		●						
Malthodes marginatus											●
Rhagonycha fulva		●	●								
Rhagonycha limbata			●		●						●
Carabidae											
Agonum ericeti	Notable-B						●				
Agonum muelleri										●	
Bembidion aeneum										●	
Bembidion femoratum										●	
Elaphrus cupreus										●	
Elaphrus riparius										●	
Poecilus versicolor										●	
Pterostichus nigrita										●	
Chrysomelidae											
Altica lythri							●				
Chrysolina polita										●	

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Donacia obscura	Notable-A						●				
Donacia vulgaris	Scottish Biodiversity List									●	
Galerucella sp.							●	●			
Galerucella sagittariae							●				
Galerucella tenella							●				
Hydrothassa marginella			●								●
Longitarsus luridus			●								
Luperus longicornis										●	
Neocrepidodera ferruginea								●			
Neocrepidodera transversa										●	
Oulema obscura											●
Phaedon armoraciae											●
Phratora vulgatissima				●							
Plateumaris discolor							●	●		●	
Coccinellidae											
Aphidecta obliterata								●	●		
Coccidula rufa								●			●
Coccinella 7-punctata			●		●				●		
Cryptophagidae											
Telmatophilus caricis										●	
Curculionidae											
Anthonomus brunnipennis			●				●	●			
Hypera nigrirostris			●								
Limnobaris dolorosa							●	●			
Phyllobius argentatus			●		●			●			●
Phyllobius glaucus					●						
Phyllobius pomaceus			●								
Phyllobius pyri			●	●	●						●
Phyllobius roboretanus			●								
Rhinoncus leucostigma			●								
Sitona lepidus								●			
Strophosoma melanogrammum							●				
Dascillidae											
Dascillus cervinus		●									●

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Dytiscidae											
Agabus bipustulatus								●			●
Hydroporus angustatus											●
Hydroporus memnonius			●								
Ilybius fuliginosus										●	●
Elateridae											
Agriotes pallidulus					●						
Ctenicera cuprea					●		●				
Denticollis linearis										●	
Gyrinidae											
Gyrinus substriatus										●	●
Hydrophilidae											
Cercyon impressus			●								
Helochares punctatus	NS-excludes						●			●	
Helophorus aequalis							●			●	●
Helophorus brevipalpis										●	●
Helophorus grandis											●
Helophorus obscurus											●
Kateretidae											
Brachypterus glaber										●	
Brachypterus urticae			●								
Kateretes rufilabris					●					●	
Nitidulidae											
Meligethes aeneus			●					●		●	
Oedemeridae											
Oedemera lurida					●						
Scirtidae											
Cyphon coarctatus			●		●						
Cyphon hilaris			●				●	●			
Cyphon kongsbergensis	NS-excludes						●				
Cyphon padi				●	●		●			●	
Cyphon palustris			●							●	●
Cyphon variabilis				●			●			●	
Odeles marginata					●						

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Scraptiidae											
Anaspis rufilabris										●	
Staphylinidae											
Mycetoporus sp.								●			
Oxytelus laqueatus					●						
Philonthus politus					●						
Stenus bifoveolatus										●	
Stenus canaliculatus										●	
Stenus cicindeloides			●				●			●	●
Stenus flavipes											●
Stenus fulvicornis			●								
Stenus nitidiusculus				●							
Stenus pubescens										●	
Stenus similis			●								
Stenus tarsalis			●								
Tachyporus sp.			●								
Dermaptera											
Forficulidae											
Forficula auricularia		●									●
Diptera											
Bibionidae											
Dilophus febrilis			●								
Dilophus femoratus					●	●					
Conopidae											
Sicus ferrugineus			●								
Dolichopodidae											
Argyra diaphana										●	
Argyra elongata											●
Campsicnemus curvipes				●							
Campsicnemus loripes				●			●				
Campsicnemus scambus											●
Dolichopus atratus			●		●		●	●	●	●	
Dolichopus brevipennis										●	
Dolichopus pennatus										●	
Dolichopus plumipes			●		●					●	●

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Dolichopus simplex										●	
Dolichopus trivialis			●								
Dolichopus urbanus					●					●	
Dolichopus vitripennis							●				
Hercostomus nigripennis			●					●			
Sympycnus pulicarius											●
Empididae											
Clinocera stagnalis				●							
Empis digramma			●		●						
Empis livida			●							●	
Empis nigripes			●		●						
Empis opaca			●								●
Empis stercorea										●	●
Empis tessellata			●		●						●
Empis verralli										●	
Rhamphomyia gibba			●								
Rhamphomyia stigmosa				●	●		●			●	●
Rhamphomyia subcinerascens			●							●	
Rhamphomyia tibialis				●							
Hybotidae											
Bicellaria vana			●								
Hybos femoratus										●	
Platypalpus agilis			●		●						
Platypalpus longicornis					●						
Platypalpus minutus					●						
Platypalpus notatus			●								
Platypalpus pallidiventris			●								
Platypalpus verralli					●						
Trichina clavipes					●						
Limoniidae											
Dicranomyia distendens							●				
Dicranophragma nemorale					●						
Erioconopa trivialis		●		●						●	●
Erioptera flavata		●					●	●			

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Erioptera fuscipennis										●	
Erioptera fusculenta										●	
Helius longirostris							●				
Idioptera linnei	RedList GB Pre94-EN						●				
Molophilus ater										●	
Molophilus ochraceus					●						
Molophilus propinquus	Notable									●	
Neolimnomyia adjuncta								●			
Phylidorea abdominalis	Notable						●	●			
Phylidorea ferruginea							●			●	●
Phylidorea fulvonervosa					●					●	●
Phylidorea squalens							●			●	
Lonchopteridae											
Lonchoptera lutea					●						
Opomyzidae											
Opomyza germinationis			●		●		●			●	
Pediciidae											
Tricyphona immaculata			●	●	●		●			●	●
Tricyphona unicolor	Notable			●	●						●
Rhagionidae											
Chrysopilus cristatus								●			
Rhagio scolopaceus		●	●		●	●				●	●
Scathophagidae											
Pogonota barbata							●	●			
Scathophaga stercoraria			●	●			●		●	●	●
Sciomyzidae											
Dictya umbrarum	Notable						●				
Ilione albiseta			●								
Pherbina coryleti										●	
Renocera striata	Notable						●				
Tetanocera arrogans										●	
Tetanocera elata								●			
Tetanocera ferruginea					●		●				●
Tetanocera fuscinervis					●		●	●		●	

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Tetanocera robusta								●			●
Tetanocera silvatica							●				
Stratiomyidae											
Beris vallata			●								
Microchrysa cyaneiventris					●						
Microchrysa flavicornis					●						
Syrphidae											
Cheilosia albipila				●							
Cheilosia albitarsis			●								●
Cheilosia illustrata			●								
Eristalis abusivus			●								
Eristalis horticola			●						●		
Eristalis intricarius			●						●		
Eristalis nemorum			●								
Eristalis pertinax					●					●	●
Eristalis rupium							●			●	
Eristalis tenax			●				●		●		
Eupeodes corollae			●				●				
Helophilus pendulus			●				●		●	●	●
Melanogaster hirtella			●		●	●			●	●	
Melanostoma mellinum		●	●		●					●	
Neoascia geniculata	Notable								●		
Neoascia tenur							●	●	●		
Parhelophilus consimilis	Vulnerable							●			
Pipizella viduata									●		
Platycheirus albimanus			●								
Platycheirus angustatus			●		●					●	
Platycheirus clypeatus			●								
Platycheirus europaeus					●						
Platycheirus manicatus			●								
Platycheirus ramsarensis					●				●		
Rhingia campestris			●				●			●	●
Sericomyia silentis			●				●		●		
Sphaerophoria sp.			●								

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Sphaerophoria interrupta			●								
Sphaerophoria scripta			●								
Syritta pipiens					●						
Syrphus vitripennis			●								
Trichopsomyia flavitarsis									●		
Volucella bombylans										●	
Xylota segnis			●								
Tabanidae											
Haematopota pluvialis			●					●			
Tachinidae											
Tachina fera							●				
Tephritidae											
Tephritis leontodontis			●								
Tephritis neesii			●					●			
Urophora stylata										●	
Xyphosia miliaria					●			●			
Tipulidae											
Prionocera turica								●			
Tipula lateralis										●	
Tipula luna					●					●	●
Tipula maxima					●						
Tipula oleracea										●	
Tipula paludosa								●			
Tipula pruinosa										●	
Tipula unca										●	
Tipula varipennis					●						●
Tipula vernalis			●			●				●	●
Tipula vittata										●	
Ulidiidae											
Herina frondescentiae					●	●				●	
Hemiptera											
Anthocoridae											
Anthocoris nemoralis					●						
Anthocoris nemorum					●						

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Aphrophoridae											
Neophilaenus exclamationis		●									
Neophilaenus lineatus		●	●				●				
Philaenus spumarius		●	●				●		●		
Cicadellidae											
Aphrodes bicincta							●				
Cicadella viridis			●				●	●	●		●
Macrosteles laevis		●									
Macustus grisescens					●						
Oncopsis subangulata					●						
Streptanus sordidus											●
Eupteryx notata					●						
Cixiidae											
Cixius nervosus					●						
Tachycixius pilosus					●			●			
Delphacidae											
Dicranotropis divergens	Notable-B				●						
Dicranotropis hamata					●						
Gerridae											
Gerris lacustris										●	
Lygaeidae											
Cymus glandicolor									●		
Stygnocoris sabulosus		●									
Miridae											
Capsus ater			●								
Chlamydatus wilkinsoni						●					
Closterotomus norwegicus			●								
Leptopterna dolabrata			●								
Leptopterna ferrugata		●	●		●					●	
Lygocoris lucorum			●								
Lygus rugulipennis			●								
Lygus wagneri			●								
Orthotylus ericetorum							●				
Pachytomella parallela		●	●					●			

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Pithanus maerkelii		●	●				●		●		
Plagiognathus arbustorum			●								●
Plagiognathus chrysanthemi			●								
Polymerus palustris							●	●			
Stenodema calcarata			●		●						●
Stenodema holsata			●		●		●	●	●		●
Stenotus binotatus		●	●								●
Teratocoris sp.							●				
Trigonotylus ruficornis		●	●						●		
Nabidae											
Nabis flavomarginatus			●								●
Nabis limbatus							●	●			
Notonectidae											
Notonecta obliqua										●	
Saldidae											
Saldula saltatoria										●	●
Tingidae											
Tingis cardui			●								
Veliidae											
Velia caprai				●							
Hymenoptera											
Apidae											
Bombus lapidarius		●	●								
Bombus lucorum			●		●						
Bombus monticola	Scottish Biodiversity List		●				●				
Bombus pascuorum			●				●		●		●
Bombus terrestris			●								
Cephidae											
Calameuta pallipes					●						
Chrysididae											
Chrysis ignita						●					
Cimbicidae											
Abia sericea							●				

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Tenthredinidae											
Ametastegia equiseti								●			
Ametastegia glabrata										●	
Aneugmenus padi					●						
Athalia cordata			●								
Claremontia tenuicornis				●							
Dolerus aeneus			●			●				●	●
Dolerus cothurnatus				●							●
Dolerus ferrugatus										●	
Dolerus gonager					●						●
Dolerus nigratus				●							
Dolerus picipes			●		●	●					
Empria pallimacula										●	
Empria tridens			●								
Eutomostethus luteiventris			●		●					●	●
Euura clitellata			●								
Euura vaga										●	
Pachyprotasis rapae			●		●						
Rhogogaster scalaris					●						
Selandria serva										●	●
Stethomostus fuliginosus										●	
Strongylogaster multifasciata					●						
Tenthredo arcuata			●								
Tenthredo atra											●
Tenthredo mesomela			●								
Tenthredo notha			●								
Tenthredopsis litterata					●						
Tenthredopsis nassata			●		●					●	●
Tenthredopsis ornata					●						
Lepidoptera											
Erebidae											
Ruby Tiger							●		●		
Geometridae											
Common Carpet					●						

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Chimney Sweeper			●		●						
Brown Silver-line					●						
Hesperiidae											
Large Skipper										●	
Lycaenidae											
Green Hairstreak					●				●		
Small Copper			●		●	●					
Common Blue										●	
Noctuidae											
Silver Y			●								
Broom moth	England NERC S.41						●				
Large Yellow Underwing									●		
Nymphalidae											
Peacock		●	●	●							
Small Totoiseshell			●		●						●
Ringlet		●						●			
Small Pearl-bordered Fritillary	RedList GB post2001-NT				●				●	●	
Small Heath	RedList GB post2001-NT	●	●		●	●	●			●	
Marsh Fritillary	RedList GB post2001-VU	●									
Meadow Brown		●	●								
Red Admiral		●	●								
Painted Lady			●						●		
Pieridae											
Orange tip				●	●					●	
Green-veined White			●							●	●
Saturniidae											
Emperor moth								●			
Tortricidae											
Epiblema scutulana agg.					●						
Mecoptera											
Panorpidae											
Panorpa communis			●		●						
Panorpa germanica						●					

Taxa	Status	Eycott Hill	Hay meadows	N. Gill Woodland planting	S. Woodland Planting	Heathy slope with Juniper	Mire 1	Mire 2	Mire 3	Naddles Beck & scrapes	Hay Meadow Ponds
Megaloptera											
Sialidae											
Sialis lutaria					●						
Odonata											
Aeshnidae											
Southern Hawker											●
Common Hawker								●			
Coenagrionidae											
Azure Damselfly			●							●	●
Common Blue Damselfly										●	
Large Red Damselfly			●		●		●			●	●
Lestidae											
Emerald Damselfly											●
Libellulidae											
Broad-bodied Chaser										●	●
4-spot Chaser			●					●		●	●
Black Darter							●	●			●
Common Darter										●	
Orthoptera											
Acrididae											
Mottled Grasshopper						●					
Common Green Grasshopper		●			●	●			●	●	

Total No. Spp./compartment		**25**	**130**	**21**	**93**	**13**	**65**	**43**	**30**	**104**	**73**

APPENDIX 2. Species account for all insects recorded during the 2019-20 survey

Species Accounts are generated from the Recorder 3 software package developed by JNCC an in some cases these accounts may now be out of date.

Pyrrhosoma nymphula Large Red Damselfly Odonata Coenagriidae Common

A large, red damselfly with black legs. Breeds in all types of still and flowing water and is tolerant of acidic, slightly brackish and mildly polluted conditions. Often one of the first colonisers at new ponds. Widespread and common in Britain as far north as Orkney, but scarce in some counties with extensive chalk (notably Wiltshire). It has declined in the intensively cultivated areas of the eastern counties, such as the Fens. Pyrrhosoma is one of the few genera confined to the Palaearctic region. P. nymphula is widespread in Europe, although more local around the Mediterranean and absent from some of the larger Mediterranean islands. Its range extends into Asia and southwards to Morocco.

Enallagma cyathigerum Common Blue Damselfly Odonata Coenagriidae Common

A blue damselfly which breeds in all types of still and slow flowing water where there is abundant marginal vegetation, although not usually very small water bodies. Widespread and common north to Orkneys and Shetland and occurring at higher altitudes than other damselflies. On Scottish Lochs it is often the only damselfly present. It readily colonises new ponds and is often one of the first species to appear. It is a holarctic species occurring east to Mongolia and west to N. America. It is found throughout Europe, although it becomes more local in the Mediterranean region.

Coenagrion puella Azure Damselfly Odonata Coenagriidae Common

A blue damselfly which breeds in all types of still and slow flowing water with abundant emergent vegetation. Widespread and common in England and Wales, and the southern-central lowlands of Scotland. Reaching its northern limit around Forth-Clyde line. It is scarce or absent in chalk districts and in some of the intensively agricultural areas of eastern England and is seldom found at moderate to high altitudes. It is a widespread species in Europe, but absent from most of Scandinavia, and its range extends eastwards to the Caspian Sea.

Lestes sponsa Emerald Damselfly Odonata Lestidae Common

Metallic green damselfly. The genus is easily recognised because of its habit of resting with its wings held half open. Breeds in all types of still, lowland water with abundant emergent vegetation, and occasionally in well vegetated, slow-flowing streams. Widespread and common in the lowlands including many of the Scottish islands, although rather more local in much of the English Midlands. It is a widespread species in the Palaearctic northwards to southern Norway, south to the Pyrenees and eastwards to Japan, although it is absent or local in several Mediterranean countries.

Aeshna juncea Common Hawker Odonata Aeshnidae Common

A large blue hawker dragonfly. The male has a mixture of blue spots and yellow marks on a dark-brown to black background. It breeds in acidic, oligotrophic bog pools, lakes and ponds and occasionally in slow flowing sections of upland streams. The acidic nature of its breeding sites restricts its distribution to upland and heathland areas of Britain and within such areas it is common and widespread. It is absent or very scarce in the east midlands, East Anglia and south-east of England. It is a holarctic species which occurs widely through northern and central Europe, east to Siberia and Japan and west to Alaska, Canada and the northern USA.

Libellula depressa Broad-bodied Chaser Odonata Libellulidae Common

A very broad-bodied, flattened dragonfly with a pale blue abdomen in the mature male and a large black patch at the base of each wing. It breeds in well-vegetated ponds, lakes, canals, and ditches, but is one of the first dragonflies to colonise newly created ponds and will breed in small garden ponds. It can tolerate mildly polluted conditions. In the south-west it occasionally breeds in peat pools. It is widely, but thinnly distributed though southern Britain, becomming scarce in the north Midlands. It has conspicuously declined in eastern England, from the Fens to Yorkshire, but there have been some signs of a recovery in recent years. It occurs throughout Europe north to northern Scandinavia and east to the Middle East and western Asia.

Libellula quadrimaculata Four-spotted Chaser Odonata Libellulidae Common

A medium sized dragonfly with a broad brown abdomen and with four well marked dark spots on each pair of wings. It breeds in a wide range of still-water habitats from grazing level ditches to bog pools and lochans in upland areas. It is widespread throughout Britain and Ireland as far north as Orkney, but is scarce or absent from apparently suitable areas of the Pennines and north-east England. It is a holarctic species which extends throughout Europe, though scarce in the extreme north and south, and ranges eastwards to Japan and west to N. America.

Sympetrum striolatum Common Darter Odonata Libellulidae Common

A small, red, darter dragonfly which breeds in a wide range of still to slow flowing water bodies including ditches, ponds, lakes, peat pools, and, occasionally, slow flowing streams and rivers. It is a widespread species in Britain, but there is uncertainty over the status of S. nigrescens from which it may or may not be distinct. It appears that neither favour upland areas, but, if S. nigrescens is a distinct species, it replaces S. striolatum in Scotland. S. striolatum is widespread in Europe, except in the extreme north, and extends eastwards to Japan. It also occurs in northern Africa.

Sympetrum danae Black Darter Odonata Libellulidae Common

The smallest "true dragonfly" (Anisopteran) in Britain and the only one with an entirely black abdomen in mature males. It breeds in boggy pools, old peat cuttings and the margins of acid, oligotrophic ponds and lakes where there is an abundance of emergent rushes or sedges. Larvae live in mats of vegetation, such as Sphagnum carpets, and can survive tempoarary drying out of their habitat. It tends to be restricted by its habitat to moorland or heathland and is, therefore, widespread in the north and west, but restricted to heathland districts in the south and rare or absent in much of eastern Britain. It is a circumboreal, holarctic species which occurs throughout northern Europe, across Asia to Japan and in N. America. It is very restricted in southern Europe, occurring as relict populations in mountain areas such as the Pyrenees and Alps.

Omocestus viridulus Common Green Grasshopper Orthoptera Acrididae Common

A medium-sized grasshopper, variably coloured but usually predominantly green. It is found in a wide range of grassland situations, and is generally common over the whole of Britain, though extremely local in some parts of the south-east.

Myrmeleotettix maculatus Mottled Grasshopper Orthoptera Acrididae Common

Grasshopper found in dry places on heathland, moorland (especially in areas which have been burnt), sand dunes and sometimes at the top of the beach. Rather local in the north and in the midlands.

Cymus glandicolor a stiltbug Hemiptera Berytinidae Common

Widely distributed in England and Wales, but commoner in the south, this bug feeds on sedges (Carex spp.). It is generally found in wetlands and at water margins, but has also occurred on sand dunes and chalk downland.

Nabicula limbata Marsh Damselbug Hemiptera Nabidae Common

A common predatory damselbug throughout the British Isles, occurring in a wide range of habitats though particularly frequent in damp grassland, marshy places and tall herb and scrub vegetation at woodland edges and rides. Eggs are laid singly or in groups of up to 5 from mid-August until early November, in the stems of grasses and other plants. They overwinter and hatch in the second half of May. The larvae are unusual in that they pass through only four instars before reaching adulthood from early July onwards. The eggs are parisitized by a fairy fly Polynema gracile but the adult bug is known to kill ichneumons, moths, flies, other bugs and even spiders.

Anthocoris nemoralis a flower bug or bloodsucking bug Hemiptera Cimicidae Common

Very common and widely distributed: a predator, generally found on trees and shrubs. No particular habitat associations.

Anthocoris nemorum Common Flower Bug Hemiptera Cimicidae Common

Very common and widely distributed predatory bug in Britain. It is generally found on low vegetation, though it has no particular habitat associations. The adults hibernate under bark and amongst leaf litter, moving to a variety of plants, including sallows, in March or April. It is a predator which feeds on aphids, psyllids and other small invertebrates and occasionally on leaves. The white eggs are laid in leaves and hatch in late May or early June. There is one generation a year in northern Britain and two in the south, with adults found from June to September, according to area. Pairing occurs in autumn and most males die before the onset of winter, so it is mostly fertilized females which overwinter.

Chlamydatus wilkinsoni a plantbug or grassbug Hemiptera Miridae Nr ýLocal

A northern and western species, frequent in Scotland but elsewhere confined to uplands. It is generally to be found on the ground amongst short grass.

Orthotylus ericetorum a plantbug or grassbug Hemiptera Miridae Common

A widely distributed and common plant bug throughout Britain, on heather (Calluna vulgaris) and heaths (Erica spp.).

Pithanus maerkeli a plantbug or grassbug Hemiptera Miridae Common

A widely distributed and common plant bug throughout Britain, found in grassy places in a wide range of habitats; partly predacious.

Lygus wagneri a plantbug or grassbug Hemiptera Miridae Local ýCommon

Common and widely distributed in the north and west of Britain, where it occurs in a wide range of habitats. Very much more local, and probably confined to woodland rides, in the south and east.

Polymerus palustris a plantbug or grassbug Hemiptera Miridae Local

Widely distributed but local in much of Britain, feeding on marsh bedstraw Galium palustre in marshes and wet grassland.

Capsus ater **a plantbug or grassbug** **Hemiptera** **Miridae** **Common**

A common and widely distributed plant bug which is found throughout Britain. It is a grass-feeder, found in a wide range of grassland types in woodland rides and clearings and in grassy patches in other habitats. It is a ready coloniser, quickly appearing in newly created grasslands. Unlike most capsid bugs it does not feed principally on the buds and flowers of its hosts but at the lower parts of the stem. The eggs are laid in batches of 3 to 30 in late June and July between the sheathing leaf base and the grass stem. Fertile eggs begin to develop at once, the yolk plug forming after two weeks, but development soon stops and the eggs enter diapause and overwinter. Winter frosts break the diapause and the eggs hatch in May and June. The purple-red larva completes its development in around four weeks, and reaches adulthood by early July, to be seen until mid August. There are two colour forms of the adult, entirely black or with the head, pronotum and part of the legs brown or red-brown.

Stenodema calcaratum **a plantbug or grassbug** **Hemiptera** **Miridae** **Common**

A very common grassbug, found on grasses in a wide range of habitat types throughout Britain.

Stenodema holsatum **a plantbug or grassbug** **Hemiptera** **Miridae** **Common**

A grassbug, distributed throughout most of Britain, but far commoner in the north and west and decidedly rare in parts of the south-east. Found on grasses in a wide range of usually damp habitats.

Trigonotylus ruficornis **a plantbug or grassbug** **Hemiptera** **Miridae** **Common**

A common grassbug throughout Britain in dry, grassy places in a range of habitats including moorland, dry neutral grassland and saltmarsh. The eggs overwinter between the stems and leaf bases of grasses, particularly Creeping Bent. The adult is found from June until early September, occasionally surviving until October. It is nearly always macropterous, especially the male, and often flies. During pairing the male becomes completely immobilised.

Leptopterna ferrugata **a plantbug or grassbug** **Hemiptera** **Miridae** **Common**

A common meadow bug throughout Britain which feeds on grasses in dry places, including both calcareous and acidic grassland. The eggs overwinter in the hollow centres of the stems of red fescue and other grasses. They hatch in mid May and the pinkish larva reaches the adult stage in late June or early July. The male is always macropterous whereas the female is usually brachypterous, with intermediate forms occurring.

Saldula saltatoria **Common Shorebug** **Hemiptera** **Saldidae** **Common**

A common and universally distributed species in Britain, found in almost all wet habitats from river and lake margins to saltmarshes, the edges of upland dystrophic pools and small temporarily flooded hollows. Predacious.

Velia caprai **Water Cricket** **Hemiptera** **Veliidae** **Common**

Widely distributed and common throughout Britain. A water surface bug: particularly associated with rather fast-flowing rivers and streams, where it lives in colonies in backwaters and pools, but also found on slow-flowing and still waters, particularly on upland pools.

Gerris lacustris **Common Pondskater** **Hemiptera** **Gerridae** **Common**

A widely distributed and generally common pondskater throughout Britain, found on almost any type of still or slow-flowing water. A rapid coloniser of newly available habitats.

Notonecta obliqua a backswimmer Hemiptera Notonectidae Common
A widely distributed waterboatman throughout Britain, found in acid pools and at higher altitudes, where there is some aquatic vegetation. Predacious.

Philaenus spumarius Cuckoo-spit Insect Hemiptera Cercopidae Common
A small (5.3 - 6.9mm.) froghopper, very variably patterned in brown, black and white. Larvae develop in froth lumps on a wide range of plants. Found throughout Britain and generally abundant throughout the summer on a wide variety of trees and low plants.

Neophilaenus lineatus a froghopper Hemiptera Cercopidae Common
A small (4.6 - 6.8mm.) brown froghopper feeding on grasses in a wide range of habitats. There is some variation according to foodplant and habitat: some populations on Molinia are particularly dark; sand dune populations tend to be particularly large and pale. Generally distributed and common throughout Britain.

Cicadella viridis a leafhopper Hemiptera Cicadellidae Common
A bright green and black leafhopper, 6 - 8.4mm long, found on grasses and rushes in marshy places. Widely distributed throughout Britain and generally common.

Sialis lutaria Alder Fly Neuroptera Sialidae Common ýCommon
The commonest of the British alder flies, found near ponds and sluggish streams where there is an abundance of silt. Larvae are aquatic and predacious, living amongst mud and detritus. Adults occur chiefly in May and June. Common and widely distributed.

Elaphrus cupreus a ground beetle Coleoptera Carabidae Local ýCommon
Bronze ground beetle with conspicuous purple ocellate depression on the elytra (8-9.5mm). Common in marshland and on bare mud at the side of fresh water over much of Britain.

Elaphrus riparius a ground beetle Coleoptera Carabidae Local ýCommon
Smallish (6.5-8mm) greenish bronze ground beetle living in marshland and on bare mud or shingle at the sides of rivers and lakes. Widespread and locally common over much of Britain.

Agonum ericeti a ground beetle Coleoptera Carabidae Notable/Nb
6.5-8mm long, brilliant metallic golden green, predatory ground beetle. Lives in Sphagnum bogs. Widely distributed but very local although abundant where found.

Agabus bipustulatus a water beetle Coleoptera Dytiscidae Common
A common and widely distributed black water beetle, found in a very wide range of water body types all over the country.

Gyrinus substriatus a whirligig Coleoptera Gyrinidae Common
The common whirligig beetle. Abundant in all types of still water throughout Britain.

Dascillus cervinus Orchid beetle Coleoptera Dascillidae Local
A large grey-brown beetle whose larvae feed on plant roots, including orchids. The adults can be found on flowers in grassslands in the early summer and are sometimes abundant. Widespread but local.

Cyphon kongsbergensis a marsh beetle Coleoptera Scirtidae Na

<No species account available>

Ctenicera cuprea a click beetle Coleoptera Elateridae Common

Dimorphic metallic purple and orange click beetle developing at roots of moorland grasses. An upland, northern and western species where it sometimes becomes a pest of sheep pasture. Rather local in the lowlands.

Cantharis cryptica a soldier beetle Coleoptera Cantharidae Common

7-8mm long red and red-brown soldier beetle. Adults commonly on flowers, the larvae among grass and low herbage. Very common in most habitats in Britain.

Cantharis figurata a soldier beetle Coleoptera Cantharidae Local

9-11mm long reddish brown soldier beetle. Larval biology unknown, though presumably predatory in leaf and grass litter. Adults are often found on flowers. Most frequently recorded in marshland, including saltmarshes, although also recorded elsewhere. Apparently very local, although difficulties in identification between this and the common C. rufa and C. decipiens mean that it is likely to be under-recorded.

Cantharis nigra a soldier beetle Coleoptera Cantharidae Common

A black or red and black soldier beetle 5 to 7mm. long. Adults are found on vegetation and flowers in early summer. Larvae develop in the soil and amongst litter.

Cantharis nigricans a soldier beetle Coleoptera Cantharidae Common

6-7mm long grey and black soldier beetle. Predatory. Adults most frequently on umbel flowers, larvae in grass litter, under stones etc. Very common in most habitats throughout Britain.

Cantharis pellucida a soldier beetle Coleoptera Cantharidae Common

Large black/grey and red soldier beetle. Mainly grassland, road verges etc. Adults on flowers, especially hogweed. Larvae are carnivorous among the grass litter. Common.

Rhagonycha limbata a soldier beetle Coleoptera Cantharidae Common

6mm long yellowish brown and black soldier beetle. Predatory, usually found on umbels and composite flowers. Larvae predatory, probably in soil or among grass roots. Very common throughout Britain.

Aphidecta obliterata a ladybird Coleoptera Coccinellidae Common

Small light brown ladybird with no spots but a 'w' shaped mark on the thorax. Aphidophagous and generally common, although not usually a garden or arable ground species.

Coccinella septempunctata Seven-spot Ladybird Coleoptera Coccinellidae Common

6.5-8mm long red ladybird with 7 black spots. Gardens, hedgerows etc. Larvae aphidophagous. Very common, often with vast immigrations from the continent.

Oedemera lurida a thick-legged flower beetle Coleoptera Oedemeridae Nr

A dull metallic-green elongate beetle. The larvae develop in plant stems and the adults are usually found on flowers, particularly umbels and hawthorns. In the south it can be quite common but more unusual north of the Midlands.

Donacia obscura a leaf beetle Coleoptera Chrysomelidae Na

6-8mm long metallic greenish bronze reed beetle. Larvae develop at the roots of club rushes Scirpus and sedges Carex in lakes, ponds, bogs and fens. Formerly widespread throughout Britain, but now restricted to a smell nuober of sites, most in Scotland but with isolated populations in Wales.

Donacia vulgaris a leaf beetle Coleoptera Chrysomelidae Nr

A metallic green reed beetle with purple patches on the elytra. The larvae feed at the roots of Typha and the adult beetles graze the leaves. Seldom abundant but quite widespread in the southern half of England.

Plateumaris discolor a leaf beetle Coleoptera Chrysomelidae Common

7-9mm metallic reed beetle, very variable in colouration, black to metallic gold or purple. Larvae feed at the roots of Eriophorum in peaty standing water. Widespread and common in the uplands on moorland and bog, local on wetter areas of lowland heaths. Now thought to be not a true species, only a form of Plateumaris sericea.

Galerucella sagittariae a leaf beetle Coleoptera Chrysomelidae Local

6mm long brown leaf beetle feeding on foliage of various aquatic plants. Widespread but local.

Galerucella tenella a leaf beetle Coleoptera Chrysomelidae Common

A small yellowish-brown leaf beetle, 3 to 4mm. long, which feeds on a number of wetland plants. Widely distributed and generally common.

Altica lythri a leaf beetle Coleoptera Chrysomelidae Common

5mm long bright metallic blue flea beetle feeding on Epilobium sp and other members of the Onagraceae, in particular Circaea lutetiana. Widely distributed and generally common.

Sitona lepidus a weevil Coleoptera Curculionidae Common

A 4-5.5mm long weevil, covered in brownish scales. Associated with leguminous plants, including clovers. Larvae develop in root nodules, adults feed on the leaves. Widely distributed and common.

Limnobaris dolorosa a weevil Coleoptera Curculionidae Unknown

There are two species of Limnobaris recognised in Britain: L. pilistriata and L.t-album. Some European authorities do not consider these to be true species and place them as varieties of L.dolorosa (pers. comm. A.P.Fowles).

Anthonomus brunnipennis a weevil Coleoptera Curculionidae Local

Very local weevil feeding on the leaves of Potentilla palustris and possibly other species of Potentilla.

Panorpa communis a scorpion fly Mecoptera Panorpidae Common

A scorpion-fly, of distinctive appearance with flexible red-tipped abdomen, elongate face and boldly black-marked wings. Larvae live in tunnels or cells in the soil. The adults are found in a wide range of habitats, typically amongst rank or scrubby vegetation in places such as hedgerows, wood margins, nettle beds and bramble thickets. Adults are both predacious and scavenging. It occurs on a wide range of soils, and is widely distributed and generally common throughout Britain.

Panorpa germanica a scorpion fly Mecoptera Panorpidae Common

A scorpion-fly, of distinctive appearance with flexible red-tipped abdomen, elongate face and boldly black-marked wings. The larvae live in tunnels or cells in the soil. The adults are found in a wide range of habitats, usually amongst rank or scrubby vegetation in such sites as woodland rides and edges, hedgerows, nettle

beds and bramble patches. The adults are both predacious and scavenging. It occurs on a wide range of soils, and is widely distributed and common throughout Britain.

Ochlodes silvanus Large Skipper Lepidoptera Hesperiidae Local

A very common butterfly in southern Britain but is more local in the very northernmost part of England and rare in Scotland, except the South West. It frequents rough grassland, wasteground and woodland rides with a preference for ungrazed south-facing slopes and can tolerate a high proportion of scrub, though it does not like more open, grazed turf. The eggs are laid singly under the blades of soft grasses, particularly bromes and yorkshire fog, Holcus lanatus, and hatch after two to three weeks. The caterpillar eats its egg shell on hatching before constructing a shelter by drawing together the edges of a grass blade with strands of silk. It leaves the shelter to feed by night and for short periods during the day, and hibernates within the shelter when almost full grown in autumn. In spring it re-commences feeding and later pupates in a tent of grass blades spun together with silk. The adult butterfly flies from mid-June to mid August but the temperature for flying has to be 15(s+1Uo(s0UC and above. Courtship is normally 3-4 metres up on scrub or trees and involves a great deal of communication with the antennae. Mowing or grazing is damaging to this species as it needs a continuity of tussocks and clumps of the larval foodplants. Although it is tolerant of scrub this could shade out its foodplant grasses if it becomes too dominant.

Pieris napi Green-veined White Lepidoptera Pieridae Common

A widespread and common butterfly throughout Britain, absent only from the extreme north. It shows much local variation, for example the Irish race has a very heavy suffusion of grey scaling and in Scotland and northern England the females have a more buff ground colour. It frequents a variety of habitats but is most common in open woodland and grassland. The eggs are laid singly on crucifers including rape, cuckoo-flower, hedge mustard and horse radish. The caterpillar feeds beneath the leaves before pupating on the foodplant or a nearby fence or post. It overwinters as a pupa and there are 2-3 broods a year from April until October.

Anthocharis cardamines Orange Tip Lepidoptera Pieridae Common

A common butterfly throughout much of Britain except northern Scotland. It has been in decline in northern England since the mid-1960's but this has now reversed and the butterfly is expanding beyond its previous range and is now more widespread than previously. Only the male has orange tips to the forewings, in the female the corresponding area is greenish-grey. It favours damp meadows and woodland fringes where the eggs are laid on crucifers, particularly hedge mustard, cuckoo flower, charlock and honesty. The caterpillar feeds on these throughout the summer, eating the seed pods rather than the foliage, and it is a noted cannibal. It overwinters as a triangular pupa which is attached to a stem by silk threads and a girdle round the centre to hold it in position. There is usually a single brood which flies from late April until June, although a second brood sometimes occurs in southern England.

Callophrys rubi Green Hairstreak Lepidoptera Lycaenidae Local

The larva usually feeds on Vaccinium myrtillus on moorlands, Helianthemum nummularium on calcareous grassland and any species of Ulex on southern acidic and neutral soils. Many other foodplants have been noted. Southern and western England, Wales and western Scotland, more local in eastern Britain.

Lycaena phlaeas Small Copper Lepidoptera Lycaenidae Common

A common butterfly throughout Britain wherever its foodplant grows but it favours areas with light soils. The adult butterfly can be active in temperatures as low as 10(s+1Uo(s0UC and the male selects a basking spot for his territory, often on a stony path or bare soil, which he fiercly guards, seeing off other males who invade his 'patch' and pursuing any passing females. Ragwort is the favoured nectar-source, particularly in the autumn brood, and roosting takes place on dead seed heads of grasses. The eggs are laid very

selectively on fresh growth of sorrels and sometimes docks and hatch after about one or one and a half weeks. The slug-like caterpillar feeds by day and rests at the base of the foodplant. At first it only eats the cuticle, in grooves from beneath the leaves, but later the whole leaf is eaten. There are two broods a year, flying between May and July and from August to October, and in the second generation the caterpillar overwinters close to the base of the foodplant. It pupates on the foodplant, attatched by strands of silk. This butterfly can suffer from its foodplants becoming over-run with grasses and needs plenty of bare and exposed areas to form suitable, discrete colonies.

Polyommatus icarus Common Blue Lepidoptera Lycaenidae Common

A common butterfly throughout Britain except in Shetland and occurs in colonies which vary in size depending on the suitability of the habitat. Commons, heaths and hillsides with low vegetation are its preferred habitats, though old disused quarries, railway cuttings and shingle coastlines are also popular. It is very colonial but wanders a great deal and new colonies are often formed within several kilometres of an exsisting population. Mating takes place on a sturdy stem of any low-growing plant and communal roosting often occurs on the flower or seed heads of various plants. The eggs are laid singly near the stalks of the larval foodplants which is usually bird's-foot trefoil, but occasionally black medick, clovers and other leguminous plants are used. The young caterpillar feeds only on the cuticle until half grown, when flowers and seed pods are also eaten, and the second brood overwinters when small in the base of the foodplant, resuming feeding in spring. Although generally a nocturnal feeder it has been observed feeding by day. The pupa is formed in a flimsy cocoon at the base of the foodplant, and is probably often buried by ants as both larva and pupa are attractive to them. There are two broods in the south, flying in May and June and from mid-August until October, whereas in northern England and Scotland there is a single brood in July and August. Because bird's-foot trefoil is a rapid coloniser of disturbed ground this butterfly can often benefit from grass cutting, although it is rarely found on uniformly short turf and requires a mixture of turf heights.

Vanessa atalanta Red Admiral Lepidoptera Nymphalidae Migrant

An immigrant butterfly from North Africa which reaches most of Britain in late spring. It will breed here and produces a home-grown generation in late summer which is seen into October but does not usually survive the winter. In the autumn generation, the adult is attracted to fallen fruit and budleja flowers. The eggs are laid on the upperside of stinging nettle leaves and the young caterpillar binds the edges of a leaf together with strands of silk and feeds within this tent. Several leaves are bound together to form a pupation tent and the caterpillar suspends itself before pupating inside.

Cynthia cardui Painted Lady Lepidoptera Nymphalidae Migrant

Migrant that is unable to over winter. Common some years, more or less absent in others. Gardens, waste ground etc. Larvae feed on thistle.

Aglais urticae Small Tortoiseshell Lepidoptera Nymphalidae Common

A widespread and common butterfly, sometimes abundant throughout Britain, and is first seen in early spring after having hibernated from the previous autumn in houses, sheds and outbuildings. It flies until May and its offspring appear in late June and July and producing the autumn brood which flies from August to October and then hibernates. The eggs are laid in untidy batches beneath the leaves of stinging nettle and the young caterpillar spins a protective communal silken web and feeds on surrounding leaves. New webs are formed as areas are defoliated and are also used for basking in the sunshine and roosting. When almost fully grown it feeds seperately before suspending from a stem or nearby fence to pupate, though it is often parasitised by tachinid flies.

Inachis io Peacock Lepidoptera Nymphalidae Local ýCommon

A resident butterfly and probably also a partial migrant within Britain except for the far north, being a non-breeding visitor in parts of Scotland. However, it is very common and widespread in central and southern England and is found early in the year, sometimes in February, having overwintered from the previous autumn in outbuidings and hollow trees, but it does not reach sexual maturity until late April. The single generation emerges in late July and is a common sight in gardens, particularly on budlleja flowers. It feeds until late autumn, when suitable overwintering sites are found. The eggs are laid in untidy batches underneath leaves of stinging nettle and the caterpillar is at first communal and lives in a silken web on the foodplant, forming new webs as required and using their protection for roosting and moulting. When almost fully grown it feeds in small groups outside the web and roosts under a leaf, before suspending from nearby vegetation to pupate.

Boloria selene Small Pearl-bordered Fritillary Lepidoptera Nymphalidae Local

Widely distributed, though it has contracted westwards over the last century. Now mainly found in southern and western England, much of Wales and Scotland, and a few colonies still surviving in eastern and central England. The larva feeds on Viola riviniana in the south and V. canina in the north, though other Viola spp. are eaten. It frequents woodlands, damp meadows, coastal cliffs and moorland.

Eurodryas aurinia Marsh Fritillary Lepidoptera Nymphalidae Vulnerable

Another species of fritillary that has declined, now apparently extinct from the eastern half of its former range, although there are several reintroduced colonies in this area. It frequents boggy meadows and calcareous grassland, though is unusual on the latter habitat, the larva feeding on Succisa pratensis, and occasionally occurring in huge numbers.

Maniola jurtina Meadow Brown Lepidoptera Satyridae Common

A very common to abundant butterfly throughout Britain, inhabiting almost any habitat and utilising even minimal areas of grassland to breed. It survives best in grasslands with a good mosaic of different turf heights and where scattered, mixed scrub is in proximity. It is never abundant on short-cropped sites and rarely common in swards dominated by tall, dense, coarse grasses. In poorer habitats it has more eye-spot markings which distract predators, as longer flights are often necessary to locate suitable breeding areas. The adult flies in temperatures of 13C and above and, unlike most butterflies, it will fly in dull and sometimes rainy weather, even in the evening. The eggs are laid on shorter turf, females seemingly preferring the junction of areas of long and short grass, and hatch after two to three and a half weeks. The caterpillar will feed on any species of grass through the summer and autumn before overwintering, but early instars prefer fine grasses before moving on to coarser ones. It roosts by day at the base of the plant, ascending at night to feed, and curls up and falls to the ground when disturbed. When fully grown in spring it spins a silken pad on a grass stem and pupates. The adult then has a staggered emergence period from mid June to late summer and is often seen until late September. Bramble, thistles, ragworts and knapweeds are the favoured nectar plants. Roosting takes place in long grasses and on tall flower heads. The adults are often found carrying red mites.

Coenonympha pamphilus Small Heath Lepidoptera Satyridae Common

A butterfly that is common on rough grassland throughout most of Britain. Larvae on coarse grasses.

Epirrhoe alternata Common Carpet Lepidoptera Geometridae Common

Generally distributed and common, double brooded in the south and flying in May and June and in August and September but only single brooded in northern England and Scotland, where the adults fly in June. The caterpillars feed on bedstraws, including cleavers, Galium aparine, and overwinter as pupae.

Odezia atrata Chimney Sweeper Lepidoptera Geometridae Local

Widespread throughout mainland Britain though very local in southern England and East Anglia. It is found on chalk downland, limestone hills and damp grassy meadows where the single generation flies in sunshine in June and July, resting with wings outstretched when the sun is obscured. The caterpillars feed on pignut, Conopodium majus, in spring and overwinter as pupae.

Petrophora chlorosata Brown Silver-line Lepidoptera Geometridae Common

Common and widespread throughout Britain in heathy places, wood edges, etc wherever its foodplant, bracken, grows in profusion. It overwinters as pupae and the single generation flies in May and June.

Phragmatobia fuliginosa Ruby Tiger Lepidoptera Arctiidae Common

A widespread and locally common moth in most habitats throughout the British Isles as far north as Orkney. Usually there is a single generation of moths in May and June and occasionally they fly in sunshine and run rapidly over herbage. The caterpillars feed on a wide range of herbaceous plants in summer and overwinter when full grown. After hibernation they do not feed but pupate in closely-spun silk cocoons amongst debris. Occasionally they do not overwinter but produce a small second brood in September.

Noctua pronuba Large Yellow Underwing Lepidoptera Noctuidae Common

The Large Yellow Underwing occurs commonly throughout the British Isles, though mostly in lowland habitats. The single generation flies from July to September and large numbers of immigrants sometimes swarm on the south coast. They roost by day on or close to the ground and when disturbed scuttle wildly on the ground. displaying the brightly-coloured hindwings. The caterpillars feed on a wide range of wild and cultivated herbs throughout the winter, spending a lot of time below ground, where they pupate in late spring.

Ceramica pisi Broom Moth Lepidoptera Noctuidae Common

A moth which is widely distributed and sometimes common throughout the British Isles, flying in June and July in a variety of woody habitats. The eggs are a rounded and dome-shaped and are laid on a variety of plants, including broom, bramble, sweet gale, dog-rose, sallow and bracken. The caterpillar is various shades of brown with wide, yellow stripes on the back and sides and feeds in August and September, often during the day. The pupa is quite slender, reddish brown and shiny.

Autographa gamma Silver Y Lepidoptera Noctuidae Common

Mainly a migrant moth, most abundant in southern and eastern England but, reaching all the British Isles where it breeds to produce an autumn generation. Adults can be found from late January, when large swarms have been known from North Africa, but May is more typical. They sometimes return south for the winter but, although overwintering moths have also been recorded, the early stages cannot survive the cold and so die with the first frosts. The moths mostly feed during the day and at dusk. The caterpillars feed on low growing plants and can sometimes be a pest on cultivated crops and garden plants, especially kale and peas. Pupation takes place in loose cocoons among leaves.

Tipula varipennis a cranefly Diptera Tipulidae Common

A cranefly with very interesting ecology. In the south it is confined to woodland, especially woodland edge. In the uplands it occurs in some places in grassland up to 800m and it has also been found on small islands such as Foula. Larvae in soil.

Tipula (Beringotipula) unca a cranefly Diptera Tipulidae Common

A common cranefly of wet woodland and marshes. Larvae in soil.

Tipula vernalis a cranefly Diptera Tipulidae Common

A spring cranefly of dry or moist grassland, mainly confined to lowland areas. Larvae in soil. Common.

Tipula lateralis a cranefly Diptera Tipulidae Common

A common and widespread cranefly which is found in both lowland and upland areas and occurs by streams, ponds and other water margins, including seepages in fields and on coastal cliffs. The female's ovipositor is noticably small and the larva is aquatic. There are usually two generations each year, one in spring which flies in April and May and one in autumn which flies in September. The adults avoid shaded situations.

Tipula pruinosa a cranefly Diptera Tipulidae Local

A dark coloured cranefly which is well camouflaged on patches of dark peaty soil in marshes and meadows. Found especially on marshy soil near streams. Larvae semi-aquatic.

Tipula oleracea a cranefly Diptera Tipulidae Common

One of the most common craneflies in marshes, wet pastures and water margins. Though regarded as a pest species, it rarely occurs in sufficient numbers to cause significant damage nowadays and many records are probably misidentifications of the closely related T. paludosa, which occurs in farmland and has benefitted from field drainage. The larva feeds on roots. The flight period extends from April to early November, with peaks in May to June and from mid September to October. The wings are brown along the front with brown stigma but otherwise plain grey and the body is a uniform pale brown. The wings of the female are as long as her abdomen.

Tipula paludosa a cranefly Diptera Tipulidae Common

One of the commonest craneflies in Britain, is sometimes a pest in grassland where the larva feeds on roots and seems to have benefitted from the trends to drain and 'improve' grassland. However, economic damage mainly arises when grassland is first ploughed and cereals are sown, due to the high density of larvae ('leatherjackets') present in the soil and available to attack the cereal roots. The larva can also be a pest in garden lawns, bowling greens, golf courses etc., but rarely presents a noticable problem, it and avoids the driest soils and the wettest marshes, otherwise it is ubiquitous. The flight period peaks from late July, often in September, with the latest records usually in early October. The adults are strongly attracted to light, often accidently entering buildings, and have plain grey wings with brown front margins and stigma and the body is pale brown. The wings of the female are shorter than her abdomen, which often has a rusty tinge.

Tipula luna a cranefly Diptera Tipulidae Common

A large grey cranefly of very wet meadows, marshes and carr. Common.

Tipula maxima a cranefly Diptera Tipulidae Local

Britain's largest cranefly. A spectacular species with whose wings are marked with dark brown and span 2 inches or more. Larvae are semi-aquatic in the margins of streams with shallow muddy edges, or in marshes. Adults are locally abundant, especially in woodland.

Tipula vittata a cranefly Diptera Tipulidae Local

A large cranefly with a striped abdomen and marked wings. Larvae aquatic in the muddy margins of streams. Adults in meadows, woods and coastal cliffs.

Tricyphona immaculata a cranefly Diptera Tipulidae Common

A typical cranefly of marshes, fens and water margins.

Tricyphona unicolor a cranefly Diptera Tipulidae Notable/Nb

A cranefly found by small streams and flushes, usually in shady situations. Upland areas seem to be preferred. Biology unknown, though the larvae are probably semi-aquatic in wet mud or moss. A scattered distribution, though particularly frequent in the Scottish Highlands.

Idioptera lineata a cranefly Diptera Tipulidae RDB1

A cranefly with patterned wings, found in mosses and lakeside marshes. Its biology is unknown but the larvae probably live in the marsh soil. Adults have been recorded from May to July. It is recorded from a few localities in northern England (Cheshire, Westmorland and Yorks), with five of its records being prior to 1938.

Limnophila ferrugin a cranefly Diptera Tipulidae Common

A rather small cranefly found in marshes, fens, carr and the margins of ponds and lakes. It is usually found in fairly eutrophic or mineral-rich situations and the larvae is semi-aquatic. The flight period is from April through to September and the adult has an ochreous, shiny thorax with a brownish-orange abdomen and light brown legs.

Limnophila (Phylidorea) squalens a cranefly Diptera Tipulidae Local

A grey cranefly, larvae semi-aquatic in bogs. Common in the North and West on boggy ground but very local in eastern England.

Phylidorea fulvonervosa a cranefly Diptera Tipulidae Common

An orange cranefly. Larvae semi-aquatic. Frequent in bogs, marshes and at water margins, although it avoids very acid situations.

Neolimnomyia (Brachylimnophila) a cranefly Diptera Tipulidae Common

A cranefly with larvae in moist soil, common and widespread in marshes and wet woods. Limnophila nemoralis of earlier workers represents a complex of at least four species.

Erioptera fuscipennis a cranefly Diptera Tipulidae Common

A small blackish cranefly which is often abundant about muddy areas in marshes and at water margins.

Erioptera fusculenta a cranefly Diptera Tipulidae Common

A cranefly which occurs at muddy areas in marshes and pond and ditch margins. Usually on mineral soils with a neutral or mildly calcareous character. Larvae assumed to be in wet soil.

Erioptera trivialis a cranefly Diptera Tipulidae Common

A common and generally distributed small cranefly which is generally grey, sometimes with yellow shoulders. The praescutum has a distinct narrow, dark brown median stripe. Occurs in wet meadows, seepages and boggy ground, and the muddy edges of ditches and ponds. Larvae probably in wet soil. The flight period is from April until October.

Molophilus ater a cranefly Diptera Tipulidae Nr

A cranefly of moorlands, especially about moist areas of peat with Juncus squarmosus or J. effusus flushes. Larvae in wet peat. Probably occurs throughout the northern and western upland areas of Britain, but also on lowland heath where it is very local in the south-east.

Molophilus ochraceus a cranefly Diptera Tipulidae Common

A cranefly of wet woodlands. Larvae presumed to live in wet soil.

Molophilus propinquus a cranefly Diptera Tipulidae Notable/Nb

Cranefly found on sandy banks of streams and ditches. Larvae probably develop in damp sand. Widespread but very local, mainly in the north and west.

Microchrysa cyaneiventris a soldier fly Diptera Stratiomyidae Common

A small, shining green and black soldier fly. Larvae breed in rotting vegetation including compost heaps. Widespread and common.

Microchrysa flavicornis a soldier fly Diptera Stratiomyidae Common

A small soldier fly which is common throughout the British Isles in grassland, woodland edge, hedgerows and gardens. Larvae in rotting vegetable material and commonly occur in compost heaps. Has also been recorded breeding under moss on tree trunks and in dung. The adult is rather small and irredescent green with yellow or reddish legs and antennae.

Rhagio scolopacea a snipe fly Diptera Rhagionidae Common

A widespread and common 'downlooker fly' in wooded areas. The long, whitish larva lives in soil, rotting wood and ground litter (where it also pupates), feeding on the larvae of other insects. The adult, which flies from May until July, is a slim, yellow black banded, predatory fly with brown clouded wing markings and typically sits facing downwards on a tree trunk or similar perch, from where it makes short flights at passing prey.

Haematopota pluvialis a horse fly Diptera Tabanidae Common

Common Clegg. Greyish, biting fly found in damp localities. Female bites man and other mammals. Larvae in wet soil, often congregated beneath dung. Common throughout Britain and distressingly abundant in the west where conditions are most suitable - somewhat local in parts of eastern England.

Platypalpus agilis a dance fly Diptera Empididae Common

A tiny predatory fly. A typical early spring species on ground vegetation. Often very abundant. Very common and widely distributed.

Platypalpus longicornis a dance fly Diptera Empididae Common

Very common and widespread throughout mainland Britain. Adults are tiny black flies with yellow legs and long antennae and run around on leaves and among grasses from April to October. They are carnivorous with inflated mid femora armed with double rows of spines, into which the curved tibiae fit,

and usually prey on flies (including other empids). Larvae unknown, but probably predatory in soil or leaf litter.

Platypalpus minutus a dance fly Diptera Empididae Common

A small predatory fly found on the foliage of bushes in scrub and woodland edge situations. Larval biology unknown. Widespread and common.

Platypalpus verralli a dance fly Diptera Empididae Common

Small predatory fly found on trees and bushes. Widespread and fairly common.

Hybos femoratus a dance fly Diptera Empididae Common

A black empidid fly, larval biology unknown, the predatory adults are common throughout Britain.

Trichina clavipes a dance fly Diptera Empididae Common

A small black empidid fly with yellow legs, larval biology unknown, the predatory adults are common throughout Britain.

Rhamphomyia subcinerascens a dance fly Diptera Empididae Local

A very early spring empidid, possibly overlooked because of its early flight period. Males fly singly in the open, in bushy situation, often making horizontal darts at passing flies. Widespread but uncommon.

Rhamphomyia tibialis a dance fly Diptera Empididae Local

Large predatory empidid. Early spring species flying in the vicinity of bushes. Widespread, but possibly western and northern in distribution.

Rhamphomyia gibba a dance fly Diptera Empididae Local

A small black empidid fly, larval biology unknown, adults local throughout Britain.

Empis digramma a dance fly Diptera Empididae Common

A largish, yellow, predatory fly found in grassy places where it preys on other flies such as Rhingia. Collin (1961) states that it 'is by no means a common British species', although it does appear to be widely distributed.

Empis stercorea a dance fly Diptera Empididae Common

A largish predatory fly which is abundant in rough grassland

Empis livida a dance fly Diptera Empididae Common

Large, predatory fly typically seen visiting flowers in mid-summer. Common and widespread.

Empis opaca a dance fly Diptera Empididae Local

Large empidid found in early summer in upland valleys. Appears to have a rather short flight period, so possibly overlooked. Widespread and not uncommon in Scotland, rather uncommon in England and wales.

Empis verralli a dance fly Diptera Empididae Common

A predatory empidid fly typically found around scrub, hedgerows or woodland edge in spring an early summer. A common species on higher ground in Scotland and northern England, but scarce or absent from England south of Yorkshire.

Empis tessellata a dance fly Diptera Empididae Common

The largest British empid fly and easily recognised because there is no other closely allied species in Britain. It was originally described from North Africa but occurs widely throughout Europe and the British Isles and is often common. The adult visits flowers from May to July. Its thorax has three dark stripes, the abdomen is tessellated with a narrow dorsal stripe appearing brownish black viewed from behind and yellowish grey when viewed from the front and the wings are yellowish brown. A variety sometimes occurs where the legs are very pale as opposed to the usual dark legged form.

Empis nigripes a dance fly Diptera Empididae Common

A small predatory fly which is very abundant in early summer in woodland edge, hedgerow and gardens.

Clinocera stagnalis a dance fly Diptera Empididae Common

Predatory fly which 'skates' over the water surface in ponds, ditches and slow flowing streams. Larval biology unknown, but presumed to be predatory. Widespread and common.

Dolichopus atratus a dolichopodid fly Diptera Dolichopodidae Local

A metallic green fly, larval biology unknown, adults found in bogs, common in this habitat throughout Britain.

Dolichopus brevipennis a dolichopodid fly Diptera Dolichopodidae Local

Metallic green fly with conspicuous enlarged front tarsi in the male which resemble ping-pong bats. Larval biology unknown. Adults typically in wet situations. Locally abundant, perhaps more frequent in the north and west.

Dolichopus plumipes a dolichopodid fly Diptera Dolichopodidae Common

A metallic green predatory fly, widely distributed and generally common in wet places.

Dolichopus simplex a dolichopodid fly Diptera Dolichopodidae Common

A metallic green fly, larval biology unknown, adults common in wetland habitats throughout Britain.

Dolichopus urbanus a dolichopodid fly Diptera Dolichopodidae Common

A metallic green fly, larval biology unknown, adults common in wetland habitats throughout Britain.

Argyra diaphana a dolichopodid fly Diptera Dolichopodidae Common

A small silvery fly frequently seen sitting on leaves in woodland edge, scrub and hedgerow situations, especially near water.

Argyra elongata a dolichopodid fly Diptera Dolichopodidae Local

Silvery coloured fly the male of which flies to and fro over the muddy edges of pools or muddy paths in woods flashing silver as he turns. Widespread but very scarce.

Campsicnemus curvipes a dolichopodid fly Diptera Dolichopodidae Common

A small, predacious long-legged fly, common and widely distributed and occurring on the surface of mud, including saltmarshes. The adult can be found all year round. The male has long, spine-like bristles on the hind femora and a brownish yellow face while the front coxae of the female are mainly or entirely dark with a darker yellow clypeus.

Campsicnemus loripes a dolichopodid fly Diptera Dolichopodidae Common

Fairly common in damp places and on surface of mud.

Campsicnemus scambus a dolichopodid fly Diptera Dolichopodidae Common

Common on the surface of mud, including in saltmarshes.

Sympycnus desoutteri a dolichopodid fly Diptera Dolichopodidae Common

A small (1.75-2mm), predacious long-legged fly which is widely distributed and common in wet places throughout Britain. The flight period extends from May to November and the adult is brownish-green. S. desoutteri (= annulipes) is now considered a synonym of S. pulicarius on the Continent (Meuffels, 1981).

Lonchoptera lutea a pointed-wing fly Diptera Lonchopteridae Common

A widespread and very common, small, yellowish fly found in wetlands and in grassy and damp, shady places, throughout the British Isles. The larva resemble small woodlice in shape, lives under dead leaves and in decaying vegetable matter and is oval, flattened and with a poorly developed head and protruding appendages. Pupation takes place in two stages, the first, pre-pupal, stage within the larval skin. The adult flies from April until October. The male genitalia are very prominent and turned under the abdomen, extending for about half its length. The adults are small, long-legged, yellowish-grey (but somewhat variable) flies with long, pointed wings and run in a rapid, jerky manner.

Melanostoma mellinum a hoverfly Diptera Syrphidae Common

Small black and yellow hoverfly found in grassy places. One of the commonest hoverflies throughout Britain. The larvae are predatory on aphids.

Platycheirus albimanus a hoverfly Diptera Syrphidae Common

Small grey and black hoverfly. Hedgerows, woodland margins, gardens etc. The larvae are predatory on aphids. One of the commonest hoverflies and with a very long flight period. This is the species long known as P. albimanus (F.).

Platycheirus angustatus a hoverfly Diptera Syrphidae Common

Small, narrow, black and yellow hoverfly. Damp grassland and marshes, sometimes drier grassland. Widespread in suitable localities, but possibly more abundant in the south.

Platycheirus clypeatus sens. str a hoverfly Diptera Syrphidae Common

Small black and yellow hoverfly. Damp grassland, marshes and bogs. The larvae are predatory on aphids. One of the commonest hoverflies in wet localities throughout Britain. However, 'clypeatus' sen. auctt. has recently been shown to consist of three species: clypeatus sens. str., europeus and occultus, so that pre-1990 records should be regarded with caution.

Platycheirus europaeus a hoverfly Diptera Syrphidae Local

A small black and yellow hoverfly. Only recognised as a distinct species in 1990, one of three new species recognised in the P. clypeatus/P. angustatus complex. Not uncommon in some parts of the country but the distribution pattern nationally is not yet known.

Platycheirus manicatus a hoverfly Diptera Syrphidae Common

Smallish, black and yellow hoverfly. Dry grassland, especially on calcareous or neutral soils. The larvae are predatory on aphids. Widespread and common in suitable localities.

Platycheirus ramsarensis a hoverfly Diptera Syrphidae Local

A small black and yellow hoverfly found in a variety of wetland habitats. Possibly associated with upland base-poor regions, but too recently described for its ecology to be known in detail.

Eupeodes corollae a hoverfly Diptera Syrphidae Common

Black and yellow hoverfly. One of the commonest hoverflies in gardens, grassland, hedgerows and woodland edge. Large scale movements, both within Britain and to and from the continent, are well documented. Larvae predatory on aphids. Widespread and abundant.

Sphaerophoria menthastri a hoverfly Diptera Syrphidae Local

A hoverfly found in grasslands and landslipped coastal cliffs. It is rarely seen in numbers although widely distributed. The larvae are predatory on aphids.

Sphaerophoria scripta a hoverfly Diptera Syrphidae Common

An elongate, yellow and black hoverfly which is widely distributed and generally common, often abundant and found most commonly on open grassland. In some years the resident population is boosted by migration from the continent. The larva feeds on aphids on herbaceous plants. The flight period is from May through to October and the adult is a common sight feeding from flowers or flying about and resting on leaves, often as mated pairs.

Syrphus vitripennis a hoverfly Diptera Syrphidae Common

A migratory hoverfly widespread and abundant in Britain. The larva is aphidophagous on herbaceous plants. The adult is a black and yellow hoverfly which commonly visits flowers and flies from March to November. Specimens in which the bands on tergites 3 and 4 are divided into lunulate spots should be referred to var. strandi, which could yet prove to be a seperate species.

Cheilosia albipila a hoverfly Diptera Syrphidae Nr ýLocal

An early, wetland hoverfly with larvae feeding in the stem bases of Cirsium palustre. Widespread, but local.

Cheilosia albitarsis a hoverfly Diptera Syrphidae Common

A small black hoverfly with white tips to the legs. It is common throughout the British Isles in marshes, damp meadows and woodland clearings, often found on flowers of buttercups Ranunculus bulbosus or R. repens. On the wing from April to July but most common in the second half of May. Adults have been observed showing ovipositing behaviour on Ranunculus bulbosus and the larvae are thought to feed on the roots of this plant.

Rhingia campestris a hoverfly Diptera Syrphidae Common

A medium-sized hoverfly, dark brown with an orange-red abdomen, and with a conspicuous rostrum and long proboscis which enable it to feed from long tubular flowers. Larvae develop in cow dung. Widely distributed and generally common.

Chrysogaster hirtella a hoverfly Diptera Syrphidae Common

A small dark hoverfly found in the richer types of marshes and water margins with emergent vegetation. The larvae are aquatic and have modified hind spiracles for penetrating the air spaces within aquatic and semi-aquatic plants such as Typha and Glyceria. Adults often seen visiting umbels. Common and widespread.

Neoascia geniculata a hoverfly Diptera Syrphidae Notable/Nb

Hoverfly of ditches, ponds and lakes with lush vegetation, especially Glyceria. Larvae probably detritus feeders in waterlogged soil. Widely distributed but always very local.

Neoascia tenur a hoverfly Diptera Syrphidae Local

A widespread hoverfly which is often very abundant by standing water in richer types of marshy vegetation. The larvae are probably semi-aquatic.

Eristalis abusivus a hoverfly Diptera Syrphidae Local

A medium-sized brownish hoverfly with variable orange markings on the abdomen. A wetland species, most frequent in coastal districts but also with sporadic inland records. Larvae have been recorded from mud at the edge of a pond. Widely distributed, perhaps more frequent in the south.

Eristalis horticola a hoverfly Diptera Syrphidae Common

A brown and yellow hoverfly coloured to mimic a honey bee. Found throughout Britain but more local in the north. Larval habitat not known. Adults tends to occur most frequently in wooded districts.

Eristalis intricarius a hoverfly Diptera Syrphidae Common

A medium sized, bee mimic hoverfly found in a variety of habitats, but most typically seen hovering high up in woodland clearings, glades or edges, especially near marshy areas. Larvae are of the rat-tailed maggot type and have been found in drains and ponds rich in organic matter. Widespread and common.

Eristalis nemorum a hoverfly Diptera Syrphidae Common

A medium-sized brown and orange hoverfly. Larvae are of the rat-tailed maggot type, and live in water where decaying vegetation is present. Widely distributed and generally common.

Eristalis pertinax a hoverfly Diptera Syrphidae Common

A large brown and orange hoverfly. Larvae are of the rat-tailed maggot type, and live in foul water, decaying vegetation, etc. Widely distributed and generally common.

Eristalis rupium a hoverfly Diptera Syrphidae Notable/Nb

Hoverfly of lush marshes and meadows with abundant flowers in upland valleys. Larvae in organic rich water. Scotland, N England and Wales.

Eristalis tenax a hoverfly Diptera Syrphidae Common

A large brown and orange hoverfly. Larvae are of the rat-tailed maggot type, and develop in foul water, rotting vegetation, etc. Widely distributed and generally common.

Helophilus pendulus a hoverfly Diptera Syrphidae Common

A common and widespread hoverfly which occurs in Ireland and as far north as Shetland. The larva is a rat-tailed maggot with a long and telescopically extensible breathing tube which enables it to breathe whilst submerged in situations such as farmyard drains, very wet manure and very wet, old sawdust. The adult is a brightly-marked, black and yellowish hoverfly which may occur in numbers around muddy puddles, ditches and the shallow margins of ponds, but it is a notable wanderer and can be found well away from water. The flight period is between April and October.

Pipizella varipes a hoverfly Diptera Syrphidae Nr

A relatively common but elusive hoverfly found on dry chalk or limestone grassland, sea cliff slipages, coastal shingle, woodland rides and sand dunes. It has been found associated with the root aphid,

Anuraphis subterranea, attended by ants (Lasius niger) on Pastinaca sativa, ovipositing on the stems just above ground level. Other associations with root aphids on rosebay suggests a wide host range. The small, black adult has a particular liking for bedstraw flowers, but also visits other low-growing flowers and can sometimes be seen flying very low among short grass or bare earth, mimiking a small black wasp as it searches for flowers. Flies in two peak periods, late May and early August.

Trichopsomyia flavitarsis a hoverfly Diptera Syrphidae Common

A hoverfly which is relatively common in the Scottish Highlands on moorland and wet heath. Rather more local in the south where suitable habitat occurs, including coastal landslips. The larvae are predatory on aphids.

Sericomyia silentis a hoverfly Diptera Syrphidae

A large black and yellow hoverfly of heaths and bogs. Common in the north and west, though scarce in eastern England. Larvae are aquatic in shallow pools and ditches, or in boggy ground.

Volucella bombylans a hoverfly Diptera Syrphidae Common

A bumblebee mimic hoverfly, larvae scavengers in the nests of social wasps.

Syritta pipiens a hoverfly Diptera Syrphidae Common

Small hoverfly which is widespread and very common throughout Britain, though rarer in remote areas of Scotland. Occurs in urban areas, rough meadows, along hedgerows and in marshy situations. The larva develops in compost, manure, silage and other rotting organic matter. The adult is a small hoverfly with rather distinctive, swollen hind legs and is often seen at flowers. In flight it mimics a solitary wasp but its precision flying and hovering between jerky, darting flights makes it a typical hoverfly. The male is extremely territorial, darting and driving out any straying males and performing a courtship dance to females, which involves moving in an arc and flashing the silver markings on face, thorax and abdomen in the sunshine. The flight period extends from March to October, often with peaks in July and August.

Xylota segnis a hoverfly Diptera Syrphidae Common

Orange and black hoverfly which resembles an Ichneumon wasp. Adults are characteristically seen running about, or sunbathing, on leaves in hedgerows and woodland - rarely at flowers. Wet, very rotten dead wood is the usual breeding site, but a variety of wet decomposing vegetable matter (eg. sawdust, decomposed silage) has been recorded. Widespread and usually common in or near woods.

Urophora stylata a gall fly Diptera Tephritidae Common

A picture-winged fly with a black and yellow body and dark brown stripes on the wings. The larvae live in a hard gall formed in the flower head of thistles *(Cirsium vulgare, C. arvense and Carduus nutans).* Widespread and fairly common in southern Britain north to Yorkshire.

Tephritis leontodontis a gall fly Diptera Tephritidae Common ýLocal

A picture-winged fly which forms a gall in the capitulum of Leontodontis autumnalis and L. hispidus. Occurs throughout the British Isles and common in Scotland. Range: Europe and North Africa.

Tephritis neesi a gall fly Diptera Tephritidae Common ýLocal

A picture winged fly whose larvae attack the flower head of Leucanthemum species. Occurs throughout the British Isles, but commonest in southern England.

Xyphosia miliaria a gall fly Diptera Tephritidae Common

A widespread and common picture-winged fly which occurs throughout the British Isles and extends over most of the Palaearctic region, except the south. Its larva lives in the flower heads of marsh thistles, Cirsium palustre, creeping thistle, C. arvense, woolly thistle, C. eriophorum, and burdock, Arctium vulgare, causing a gall, and spins its cocoon from pappus hairs. There are two generations a year and the adult flies from May to July and from late July to September.

Herina frondescentiae a fly Diptera Otitidae Local

A tiny black fly with heavily black striped wings. Characteristically found in damp grassland.

Dictya umbrarum a snail-killing fly Diptera Sciomyzidae Notable/Nb

Snail-killing fly found around ponds and in marshes. Larvae are vigorous aquatic predators which feed on Lymnaea spp. in the lab. Multivoltine.

Ilione albiseta a snail-killing fly Diptera Sciomyzidae Common

Snail-killing fly. Larvae are predators of aquatic snails. Adults found in a wide variety of wetland situations including bogs providing that conditions are not very acid. Widespread and common.

Pherbina coryleti a snail-killing fly Diptera Sciomyzidae Common

A common snail-killing fly of wet places.

Renocera striata a snail-killing fly Diptera Sciomyzidae Notable/Nb

A snail-killing fly. The larval biology is unknown, but American species of this genus are predators of pea mussels (Sphaeriidae). Adults usually found in peatland flushes. Most records are from a small area of Speyside and Deeside with one recent English record from Cumbria.

Tetanocera arrogans a snail-killing fly Diptera Sciomyzidae Nr ýLocal

Snail-killing fly found along the margins of a range of freshwater habitats. Larvae are terrestrial predators attacking various snails.

Tetanocera elata a snail-killing fly Diptera Sciomyzidae Common

A widespread and very common snail-killing fly which is found in all types of terrestrial habitat, particularly on vegetation bordering ponds or streams and in marshes. The eggs are laid singly or in small batches and hatch after a few weeks. The larva is a specialist predator of slugs, attaching itself to the body of a passing slug and first feeding on its mucus before piercing the skin and killing it within 2 days. The adult is found from June to September.

Tetanocera ferruginea a snail-killing fly Diptera Sciomyzidae Common

A snail-killing fly which occurs in a variety of wetland areas. The eggs are laid singly or in small groups and hatch after 3-10 days. The larva then attacks and eats living or freshly killed water snails, living aquatically and resting on the water surface when not feeding. The pupal stage varies in length according to time of year, summer pupae emerging after only a few days while later ones overwinter. The adult is found from May through to October.

Tetanocera robusta a snail-killing fly Diptera Sciomyzidae Common

Snail killing fly. Adults are found in a variety of eutrophic-mesotrophic wetlands. Larvae are predators of aquatic snails. Widespread and common in wetland situations.

Tetanocera silvatica a snail-killing fly Diptera Sciomyzidae Common

Snail killing fly. Adults typically in carr woodland and flushes. Larvae are predators of aquatic snails left exposed by falling water levels. Widespread and common in suitable situations.

Tetanocera fuscinervis a snail-killing fly Diptera Sciomyzidae Nr ýLocal

Snail killing fly found in a range of freshwater habitats. Larvae are general predators of aquatic pulmonate snails.

Opomyza germinationis a fly Diptera Opomyzidae Common

Small fly with strongly marked wings. The larvae of this family are stem borers in grasses. Extremely abundant in grassy places throughout Britain north to Orkney. Larvae feed within the stems of many common grasses. There is a single generation per year. Adults emerge in June, lay eggs on the soil near host plants from September to November and third instar larvae overwinter.

Tachina fera a parasitic fly Diptera Tachinidae Common

<No species account available>

Pogonota barbata a dung fly Diptera Scathophagidae Nr ýLocal

Fly usually found in acid bogs. Males are remarkable in appearance with long tufts of yellow hair on the genitalia and the underside of the head. Larvae probably predatory in wet rotting vegetation. Very local in northern and western Britain, more common in Scotland.

Scathophaga stercoraria a dung fly Diptera Scathophagidae Common

The common yellow dung fly is a widespread and usually abundant predatory fly which breeds in dung, especially fresh cow-dung but a wide variety of other sorts can be used. Males are typically covered in long golden-yellow fur whilst females are dirty green. Males spend most of their time near the breeding sites but females disperse widely into all habitats to hunt smaller flies and regularly hunt on the surface of ponds. It has been recorded as feeding on the yellow meadow ant, Lasius flavus, and feeding on flies trapped in spiders' webs. Both sexes feed on insects which visit cow pats and not infrequently they attack the solitary wasp Mellinus arvensis, which hunts flies in the same place; in these instances the wasp often overcomes the dung fly and carries it away to feed to its larvae.

Calameuta pallipes a sawfly Hymenoptera Cephidae Common

A sawfly widely distributed in England and Wales and occurring as far north as central Scotland. Adults can be found from May to July. Larvae have not been recorded so the foodplant is not known.

Abia sericea a clubhorned sawfly Hymenoptera Cimbicidae Local

Sawfly, larvae on Succisa and Knautia.

Strongylogaster lineata a sawfly Hymenoptera Tenthredinidae Unknown

<No species account available>

Aneugmenus padi a sawfly Hymenoptera Tenthredinidae Common

Sawfly. Widespread and common on Bracken

Selandria serva **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**

6mm long sawfly. Black with bright orange abdomen. Larvae feed on various grasses, sedges and rushes in marshy places. Widespread and common.

Dolerus aeneus **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**

A very common sawfly.

Dolerus cothurnatus **a sawfly** **Hymenoptera** **Tenthredinidae** **Local**

A wetland sawfly associated with Equisetum. Local.

Dolerus ferrugatus **a sawfly** **Hymenoptera** **Tenthredinidae** **Unknown**

<No species account available>

Dolerus gonager **a sawfly** **Hymenoptera** **Tenthredinidae** **Unknown**

<No species account available>

Dolerus nigratus **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**

<No species account available>

Dolerus picipes **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**

<No species account available>

Empria tridens **a sawfly** **Hymenoptera** **Tenthredinidae** **Unknown**

<No species account available>

Ametastegia equiseti **a sawfly** **Hymenoptera** **Tenthredinidae** **Local**

A sawfly. Benson says throughout Britain but Sheppard only has records north to the Midlands.

Ametastegia glabrata **a sawfly** **Hymenoptera** **Tenthredinidae** **Local**

Elongate sawfly, black with bright red legs and black hind feet. Larvae on Ranunculus. Benson describes as previously local but becoming more common throughout southern England.

Eutomostethus luteiventris **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**

A widespread sawfly.

Stethomostus fuliginosus **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**

Sawfly. Larvae fed on Rannunculus scleratus. Widespread.

Claremontia tenuicornis **a sawfly** **Hymenoptera** **Tenthredinidae**

<No species account available>

Tenthredopsis litterata **a sawfly** **Hymenoptera** **Tenthredinidae** **Unknown**

<No species account available>

Tenthredopsis nassata **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**

A sawfly. Widespread and common.

Tenthredopsis tesselata **a sawfly** **Hymenoptera** **Tenthredinidae** **Unknown**

<No species account available>

Rhogogaster viridis **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**
A sawfly. Widespread and common.

Tenthredo arcuata **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**
A widespread and common sawfly.

Tenthredo atra **a sawfly** **Hymenoptera** **Tenthredinidae** **Unknown**
<No species account available>

Tenthredo mesomelas **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**
One of the most widespread and abundant sawflies throughout Britain.

Pachyprotasis rapae **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**
<No species account available>

Pachynematus clitellatus **a sawfly** **Hymenoptera** **Tenthredinidae** **Unknown**
<No species account available>

Pachynematus vagus **a sawfly** **Hymenoptera** **Tenthredinidae** **Common**
A sawfly. Widespread. Possibly a species complex.

Chrysis ignita **a rubytail wasp** **Hymenoptera** **Chrysididae** **Common**
A ruby tailed wasp which is a cleptoparasite in the nests of Eumenids, recorded hosts include Ancistrocerus parietum and A. scoticus. A widespread and common species wherever suitable host-nesting areas occur. There are considerable taxonomic problems with this species and it is considered by many authors to be a species complex, but it has also been suggested that the considerable variation results from seasonal and host related factors.

Bombus lucorum **White-tailed Bumble Bee** **Hymenoptera** **Apidae** **Common**
A common black, white and yellow bumblebee found in gardens and hedgerows. It often breeds in old vole nests. Only the young fertilized queen survives the winter, having hibernated in a protected place such as in a hole or under moss. She emerges in spring and starts up her own colony, making pots of wax and pollen into which the first eggs are laid. When these hatch the queen provides them with honey whilst making storage cells for honey and more cells for further eggs. After about three weeks the first infertile females (workers) emerge and take over the nectar and pollen gathering and cell building, while the queen concentrates on egg laying. Eventually both female and male bees are produced as well as more workers and a large colony will support several hundred bees. Towards the end of summer male and female bumblebees fly out and mate. The male is not allowed to re-enter the nest after mating and soon dies. The fertilized queen starts searching for a safe place to hibernate and the workers and old queen die with the first frosts or spell of cold weather.

Bombus terrestris **Buff-tailed Bumble Bee** **Hymenoptera** **Apidae** **Common**
One of our commonest larger bumblebees and widespread and common north to the central lowlands of Scotland. It is black and golden in colour with a white or buff tail and nests below ground. Only the young fertilized queen survives the winter, having hibernated in a protected place such as in a hole or under moss. She emerges in spring and starts up her own colony or may attempt to usurp the queen of an existing colony and take it over. Such attempts end in the death of one or both queens. She makes pots of wax and pollen into which the first eggs are laid and when these hatch provides them with honey whilst making

storage cells for honey and more cells for further eggs. After about three weeks the first infertile females (workers) emerge and take over the nectar and pollen gathering and cell building, while the queen concentrates on egg laying. The larva is reared on pollen and nectar, which are carried on large pollen sacs on the back legs and in the stomach respectively. Early spring workers are often much smaller than those of later broods when there are more copious levels of food available. The male, which is recognisable by his longer antennae, appear in summer and towards the end of summer male and female bumblebees fly out and mate. The male is not allowed to re-enter the nest after mating and soon dies. The fertilized queen starts searching for a safe place to hibernate and the workers and old queen die with the first frosts or spell of cold weather.

Bombus lapidarius Large Red Tailed Bumble Bee Hymenoptera Apidae Local

A common bumblebee of gardens and hedgerows. It is mainly black with a red tail and the male has a broad yellow collar. The nests are often under stones. Only the young fertilized queen survives the winter, having hibernated in a protected place such as in a hole or under moss. She emerges in spring and starts up her own colony or may attempt to usurp the queen of an existing colony and take it over. Such attempts end in the death of one or both queens. She makes pots of wax and pollen into which the first eggs are laid and when these hatch provides them with honey whilst making storage cells for honey and more cells for further eggs. After about three weeks the first infertile females (workers) emerge and take over the nectar and pollen gathering and cell building, while the queen concentrates on egg laying. The larva is reared on pollen and nectar, which are carried on large pollen sacs on the back legs and in the stomach respectively. Early spring workers are often much smaller than those oflater broods when there are more copious levels of food available. The male, which is recognisable by his longer antennae, appear in summer and towards the end of summer male and female bumblebees fly out and mate. The male is not allowed to re-enter the nest after mating and soon dies. The fertilized queen starts searching for a safe place to hibernate and the workers and old queen die with the first frosts or spell of cold weather.

Bombus monticola Mountain Bumble Bee Hymenoptera Apidae Common

Small bumble bee with dull yellow thorax and bright orange tail. Mainly on bilberry moorland at high altitude. Northern and western species.

Bombus pascuorum Common Carder Bee Hymenoptera Apidae Common

Widely distributed, common and often abundant bumblebee. The adult is a small, largely tawny insect with variable amounts of black. There are two forms occurring in the north and south, which overlap and interbreed in northern England and north Wales. The coat is thin and rather 'scruffy' looking. It is a surface-nesting bumblebee which constructs its nest in cavities such as old mouse runs and in tangles of vegetation. Its colonies are few in numbers of individuals. Only the young fertilized queen survives the winter, having hibernated in a protected place such as in a hole or under moss. She emerges in spring and starts up her own colony or may attempt to usurp the queen of an existing colony and take it over. Such attempts end in the death of one or both queens. She makes pots of wax and pollen into which the first eggs are laid and when these hatch provides them with honey whilst making storage cells for honey and more cells for further eggs. After about three weeks the first infertile females (workers) emerge and take over the nectar and pollen gathering and cell building, while the queen concentrates on egg laying. The larva is reared on pollen and nectar, which are carried on large pollen sacs on the back legs and in the stomach respectively. Early spring workers are often much smaller than those oflater broods when there are more copious levels of food available. The male, which is recognisable by his longer antennae, appear in summer and towards the end of summer male and female bumblebees fly out and mate. The male is not allowed to re-enter the nest after mating and soon dies. The fertilized queen starts searching for a safe place to hibernate and the workers and old queen die with the first frosts or spell of cold weather, though it is one of the latest surviving bees at the end of autumn.

APPENDIX 3. List of all species with *Pantheon* attributes

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Araneus diadematus	Araneae	Araneidae	1		predator	predator						
Araneus quadratus	Araneae	Araneidae	1		predator	predator						
Salticus scenicus	Araneae	Salticidae	1		predator	predator						
Aphodius prodromus	Coleoptera	Aphodiidae	1		coprophagous	does not feed	open habitats	tall sward & scrub	dung & carrion >> dung, soil humidity >> variable humidity			
Perapion curtirostre	Coleoptera	Apionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			
Perapion violaceum	Coleoptera	Apionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			
Protapion apricans	Coleoptera	Apionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Trifolium
Protapion assimile	Coleoptera	Apionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Trifolium
Cantharis bicolor	Coleoptera	Cantharidae										
Cantharis cryptica	Coleoptera	Cantharidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> sward/field layer			Arthropoda
Cantharis figurata	Coleoptera	Cantharidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> sward/field layer, soil humidity >> wet		acid mire: C	

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Cantharis flavilabris	Coleoptera	Cantharidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> sward/field layer, soil humidity >> variable humidity			
Cantharis nigricans	Coleoptera	Cantharidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> sward/field layer, soil humidity >> variable humidity			
Cantharis pallida	Coleoptera	Cantharidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> sward/field layer, soil humidity >> variable humidity			
Cantharis pellucida	Coleoptera	Cantharidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> sward/field layer, soil humidity >> variable humidity			
Cantharis rufa	Coleoptera	Cantharidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> sward/field layer, soil humidity >> variable humidity			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Malthodes marginatus	Coleoptera	Cantharidae	1				tree-associated	decaying wood	conifer or broadleaved >> broadleaved only, dead trunks & branches >> trunks & branches, sapwood & bark decay >> bark & cambium	A212		Fagales
Rhagonycha fulva	Coleoptera	Cantharidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> sward/field layer			Arthropoda
Rhagonycha limbata	Coleoptera	Cantharidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> sward/field layer, soil humidity >> variable humidity			
Agonum ericeti	Coleoptera	Carabidae	4	NS	predator	predator	wetland	peatland	sphagnum/moss lawn, wet/damp peat	W312	acid mire: A	
Agonum gracile	Coleoptera	Carabidae	1		predator	predator	wetland	peatland	deep litter, sphagnum/moss lawn		acid mire: C	
Agonum muelleri	Coleoptera	Carabidae	1		predator	predator	open habitats	short sward & bare ground	habitats >> litter & ground layer, soil humidity >> damp			
Bembidion aeneum	Coleoptera	Carabidae	1		predator	predator	wetland	marshland	drawdown zone: mud/shallow litter			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Bembidion femoratum	Coleoptera	Carabidae	1		predator	predator	wetland	running water			ERS (Coleoptera): 2	
Elaphrus cupreus	Coleoptera	Carabidae	1		predator	predator	tree-associated; wetland	marshland; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, humidity >> wet, shadiness >> heavy shade			
Elaphrus riparius	Coleoptera	Carabidae	1		predator	predator	wetland	running water	drawdown zone: mud/shallow litter			
Poecilus versicolor	Coleoptera	Carabidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> damp			
Pterostichus diligens	Coleoptera	Carabidae	1		predator	predator	wetland	peatland	deep litter, wet/damp peat		acid mire: C	
Pterostichus melanarius	Coleoptera	Carabidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> variable humidity			
Pterostichus nigrita	Coleoptera	Carabidae	1		predator	predator	wetland	marshland	drawdown zone: mud/shallow litter			Arthropoda
Pterostichus rhaeticus	Coleoptera	Carabidae	1				open habitats			F003	acid mire: B	
Pterostichus strenuus	Coleoptera	Carabidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> variable humidity			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Altica lythri	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Epilobium
Cassida rubiginosa	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Cirsium
Chrysolina polita	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Urtica dioica
Donacia obscura	Coleoptera	Chrysomelidae	4	NS	herbivore	herbivore	wetland	lake; peatland	lakeside emergent/aquatic vegetation, shallow freshwater pond >> aquatic: well vegetated, wetland vegetation	W311	acid mire: C	Rhynchospora
Donacia vulgaris	Coleoptera	Chrysomelidae	1		herbivore	herbivore	wetland	lake; marshland	lakeside emergent/aquatic vegetation, shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Sparganium, Typha
Galerucella	Coleoptera	Chrysomelidae										
Galerucella sagittariae	Coleoptera	Chrysomelidae	1		herbivore	herbivore	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Nymphaeaceae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Galerucella tenella	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> wet			Asteraceae
Gastrophysa viridula	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Asteraceae
Hydrothassa marginella	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Ranunculus
Longitarsus luridus	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Asteraceae
Luperus longicornis	Coleoptera	Chrysomelidae	1				open habitats			F001, F003		
Neocrepidodera ferruginea	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Asteraceae
Neocrepidodera transversa	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Asteraceae
Oulema obscura	Coleoptera	Chrysomelidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Poaceae
Phaedon armoraciae	Coleoptera	Chrysomelidae	1		herbivore	herbivore	wetland	marshland	wetland vegetation			Plantae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Phratora vulgatissima	Coleoptera	Chrysomelidae	1			herbivore	tree-associated	arboreal	canopy, conifer or broadleaved >> broadleaved only, foliage >> leaves and/or stems, terrestrial aspect >> larvae ground active/pupate in soil			
Plateumaris discolor	Coleoptera	Chrysomelidae	1		herbivore	herbivore	wetland	peatland	deep litter, shallow freshwater pond >> aquatic: well vegetated		acid mire: C	Carex
Plateumaris rustica	Coleoptera	Chrysomelidae	4	NS	herbivore	herbivore	wetland	marshland	wetland vegetation			Carex, Sparganium
Prasocuris phellandrii	Coleoptera	Chrysomelidae	1		herbivore	herbivore	wetland	marshland	wetland vegetation			Caltha
Aphidecta obliterata	Coleoptera	Coccinellidae	1		predator	predator	tree-associated	arboreal	canopy, foliage			Aphididae, Fagales
Coccidula rufa	Coleoptera	Coccinellidae	1		predator	predator	wetland	peatland	deep litter			Arthropoda
Coccinella septempunctata	Coleoptera	Coccinellidae	1									
Telmatophilus caricis	Coleoptera	Cryptophagidae										
Anthonomus brunnipennis	Coleoptera	Curculionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> wet			
Gymnetron beccabungae	Coleoptera	Curculionidae	4	NA	herbivore	herbivore	wetland	running water	flow >> slow flow			Veronica beccabunga
Hypera nigrirostris	Coleoptera	Curculionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry		calcareous grassland: Low	

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Limnobaris dolorosa	Coleoptera	Curculionidae	1		herbivore	herbivore	wetland	peatland	wetland vegetation			Carex
Phyllobius argentatus	Coleoptera	Curculionidae	1		herbivore	herbivore	tree-associated	arboreal	canopy, conifer or broadleaved >> broadleaved only, foliage >> leaves and/or stems, terrestrial aspect >> larvae ground active/pupate in soil			
Phyllobius glaucus	Coleoptera	Curculionidae	1		herbivore	herbivore	tree-associated	arboreal	canopy, conifer or broadleaved >> broadleaved only, foliage >> leaves and/or stems, terrestrial aspect >> larvae ground active/pupate in soil			
Phyllobius pomaceus	Coleoptera	Curculionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> soil & roots, habitats >> sward/field layer, soil humidity >> damp			
Phyllobius pyri	Coleoptera	Curculionidae	1		herbivore	herbivore	tree-associated	arboreal	canopy, conifer or broadleaved >> broadleaved only, foliage >> leaves and/or stems, terrestrial aspect >> larvae ground active/pupate in soil			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Phyllobius roboretanus	Coleoptera	Curculionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> soil & roots, habitats >> sward/field layer, soil humidity >> variable humidity		calcareous grassland : Low	Asteraceae
Phyllobius virideaeris	Coleoptera	Curculionidae										
Rhinoncus leucostigma	Coleoptera	Curculionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			
Sitona lepidus	Coleoptera	Curculionidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> soil & roots, habitats >> sward/field layer, soil humidity >> damp			Trifolium
Strophosoma melanogrammum	Coleoptera	Curculionidae	1		herbivore	herbivore	tree-associated	arboreal	canopy, foliage >> leaves and/or stems			
Dascillus cervinus	Coleoptera	Dascillidae	1		herbivore	does not feed	open habitats	tall sward & scrub	habitats >> soil & roots, soil humidity >> variable humidity		calcareous grassland : Low	Poaceae
Agabus affinis	Coleoptera	Dytiscidae	1		predator	predator	wetland	peatland	base status >> acid, shallow freshwater pond, sphagnum/moss lawn	W312	acid mire: B	
Agabus bipustulatus	Coleoptera	Dytiscidae	1		predator	predator	wetland	marshland	shallow freshwater pond		grazing marsh - salinity: 0, grazing marsh - status: 1	

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Hydroporus angustatus	Coleoptera	Dytiscidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Hydroporus erythrocephalus	Coleoptera	Dytiscidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated, springs & caves		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Hydroporus memnonius	Coleoptera	Dytiscidae	1		predator	predator	tree-associated; wetland	peatland; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, shallow freshwater pond >> aquatic: sparsely vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda, Plantae
Hydroporus tristis	Coleoptera	Dytiscidae	1		predator	predator	wetland	peatland	base status >> acid, shallow freshwater pond, sphagnum/moss lawn	W312	acid mire: C, grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Hydroporus umbrosus	Coleoptera	Dytiscidae	1		predator	predator	wetland	peatland	base status >> base, shallow freshwater pond >> aquatic: well vegetated			Arthropoda

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Ilybius fuliginosus	Coleoptera	Dytiscidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Actenicerus sjaelandicus	Coleoptera	Elateridae	1		herbivore	does it feed?	wetland	peatland	deep litter		acid mire: C	
Agriotes pallidulus	Coleoptera	Elateridae	1		herbivore	does not feed	open habitats	tall sward & scrub	habitats >> soil & roots, soil humidity >> variable humidity			
Athous haemorrhoidalis	Coleoptera	Elateridae	1		herbivore	does not feed	open habitats	tall sward & scrub	habitats >> soil & roots, soil humidity >> variable humidity			
Cidnopus aeruginosus	Coleoptera	Elateridae	1		herbivore	does not feed	open habitats	tall sward & scrub	habitats >> soil & roots, soil humidity >> damp			Asteraceae
Ctenicera cuprea	Coleoptera	Elateridae	1				open habitats			F003		
Denticollis linearis	Coleoptera	Elateridae	1			does not feed?	tree-associated	decaying wood	conifer or broadleaved, sapwood & bark decay >> bark & cambium			Fagales
Hypnoidus riparius	Coleoptera	Elateridae	1		predator	predator	open habitats; wetland	running water; tall sward & scrub	habitats >> soil & roots, soil humidity >> damp			Arthropoda
Gyrinus substriatus	Coleoptera	Gyrinidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: sparsely vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Anacaena globulus	Coleoptera	Hydrophilidae	1		saprophagous	predator	wetland	marshland	drawdown zone: mud/shallow litter, shallow freshwater pond >> aquatic: sparsely vegetated		coarse woody debris: d/e, grazing marsh - salinity: 0, grazing marsh - status: 1	
Anacaena lutescens	Coleoptera	Hydrophilidae	1		predator	predator	wetland	peatland	shallow freshwater pond, wet/damp peat		acid mire: C, coarse woody debris: d/e, grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Cercyon impressus	Coleoptera	Hydrophilidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer			
Enochrus coarctatus	Coleoptera	Hydrophilidae	1		predator	predator	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 2	Arthropoda
Helochares punctatus	Coleoptera	Hydrophilidae	1		predator	herbivore	wetland	lake; peatland	lakeside emergent/aquatic vegetation, shallow freshwater pond, sphagnum/moss lawn	W312	acid mire: A, grazing marsh - salinity: 0, grazing marsh - status: 3	Arthropoda

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Helophorus aequalis	Coleoptera	Hydrophilidae	1		predator	herbivore	wetland	marshland	shallow freshwater pond		grazing marsh - salinity: 0, grazing marsh - status: 1	
Helophorus brevipalpis	Coleoptera	Hydrophilidae	1		predator	herbivore	wetland	marshland	shallow freshwater pond		grazing marsh - salinity: 0, grazing marsh - status: 1	
Helophorus flavipes	Coleoptera	Hydrophilidae	1		predator	herbivore	wetland	lake; peatland	lakeside emergent/aquatic vegetation, shallow freshwater pond, sphagnum/moss lawn		acid mire: C, grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Helophorus grandis	Coleoptera	Hydrophilidae	1		predator	herbivore	wetland	marshland	shallow freshwater pond		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Helophorus obscurus	Coleoptera	Hydrophilidae	1		predator	herbivore	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	
Brachypterus glaber	Coleoptera	Kateretidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Asteraceae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Brachypterus urticae	Coleoptera	Kateretidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Asteraceae
Kateretes rufilabris	Coleoptera	Kateretidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Asteraceae
Meligethes aeneus	Coleoptera	Nitidulidae										
Oedemera lurida	Coleoptera	Oedemeridae	1		predator	predator	open habitats	tall sward & scrub	habitats >> sward/field layer			
Cyphon coarctatus	Coleoptera	Scirtidae	1				wetland				coarse woody debris: c	
Cyphon hilaris	Coleoptera	Scirtidae	1		algivore	saprophagous	wetland	peatland	deep litter, shallow freshwater pond >> aquatic: well vegetated		acid mire: C	
Cyphon kongsbergensis	Coleoptera	Scirtidae	4	NS	algivore	saprophagous	wetland	peatland	shallow freshwater pond, sphagnum/moss lawn	W312	acid mire: A	
Cyphon padi	Coleoptera	Scirtidae	1		algivore	saprophagous	wetland	peatland	shallow freshwater pond		acid mire: C	
Cyphon palustris	Coleoptera	Scirtidae	1		algivore	saprophagous	wetland	running water	unmodified fast flowing streams			
Cyphon variabilis	Coleoptera	Scirtidae	1		algivore	saprophagous	wetland	marshland	shallow freshwater pond			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Microcara testacea	Coleoptera	Scirtidae	1		saprophagous	saprophagous	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			
Odeles marginata	Coleoptera	Scirtidae	1		saprophagous	saprophagous	wetland	running water	unmodified fast flowing streams		coarse woody debris: c	
Anaspis rufilabris	Coleoptera	Scraptiidae	1		predator	nectivore	tree-associated	decaying wood	conifer or broadleaved >> broadleaved only, dead trunks & branches >> trunks & branches, flowers (adult), sapwood & bark decay >> bark & cambium	A212		
Anotylus rugosus	Coleoptera	Staphylinidae	1		saprophagous	saprophagous	wetland	marshland	drawdown zone: mud/shallow litter			
Eusphalerum minutum	Coleoptera	Staphylinidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity		acid mire: C, coarse woody debris: d/e	Asteraceae
Hygronoma dimidiata	Coleoptera	Staphylinidae	1		saprophagous	saprophagous	wetland	peatland	deep litter			
Mycetoporus	Coleoptera	Staphylinidae										
Philonthus politus	Coleoptera	Staphylinidae	1		predator	predator	open habitats	tall sward & scrub	dung & carrion, soil humidity >> variable humidity			Mammalia
Proteinus atomarius	Coleoptera	Staphylinidae	1									

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Quedius curtipennis	Coleoptera	Staphylinidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> variable humidity			
Quedius maurorufus	Coleoptera	Staphylinidae	1		predator	predator	wetland	running water	drawdown zone: mud/shallow litter			
Stenus bifoveolatus	Coleoptera	Staphylinidae	1		predator	predator	wetland	peatland	deep litter			
Stenus canaliculatus	Coleoptera	Staphylinidae	1		predator	predator	wetland	marshland	drawdown zone: mud/shallow litter			
Stenus cicindeloides	Coleoptera	Staphylinidae	1		predator	predator	wetland	peatland	deep litter, wetland vegetation			
Stenus clavicornis	Coleoptera	Staphylinidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> variable humidity		coarse woody debris: d/e	
Stenus flavipes	Coleoptera	Staphylinidae	1		predator	predator	tree-associated; wetland	shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade			
Stenus fulvicornis	Coleoptera	Staphylinidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> variable humidity			
Stenus impressus	Coleoptera	Staphylinidae	1									
Stenus juno	Coleoptera	Staphylinidae	1		predator	predator	wetland	marshland	drawdown zone: mud/shallow litter			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Stenus latifrons	Coleoptera	Staphylinidae	1		predator	predator	wetland	peatland	wetland vegetation			
Stenus nitidiusculus	Coleoptera	Staphylinidae	1		predator	predator	wetland	peatland	deep litter, wetland vegetation			
Stenus niveus	Coleoptera	Staphylinidae	4	Nb	predator	predator	wetland	peatland	sphagnum/moss lawn, wet/damp peat	W312	acid mire: C	
Stenus pubescens	Coleoptera	Staphylinidae	1		predator	predator	wetland	marshland	wetland vegetation			
Stenus similis	Coleoptera	Staphylinidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> damp			
Stenus tarsalis	Coleoptera	Staphylinidae	1		predator	predator	wetland	marshland	drawdown zone: mud/shallow litter			
Stenus umbratilis	Coleoptera	Staphylinidae	1		predator	predator	wetland	peatland	sphagnum/moss lawn, wet/damp peat	W312		
Tachyporus	Coleoptera	Staphylinidae										
Forficula auricularia	Dermaptera	Forficulidae	1									
Triogma trisulcata	Diptera	Cylindrotomidae	8	RDB 3	saprophagous	does not feed	wetland	peatland	base status >> acid-neutral, sphagnum/moss lawn, wet/damp peat	W312	seepage (acid-neutral): B	
Argyra diaphana	Diptera	Dolichopodidae	1		predator	predator	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, woodland stream			Arthropoda, Fagales
Argyra elongata	Diptera	Dolichopodidae	4	NS	predator	predator	open habitats	tall sward & scrub				Arthropoda
Campsicnemus curvipes	Diptera	Dolichopodidae	1		predator	predator	wetland	running water				Arthropoda

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Campsicnemus loripes	Diptera	Dolichopodidae	1		predator	predator	tree-associated; wetland	peatland; shaded woodland floor; wet woodland	base status >> acid, conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, wet/damp peat			Arthropoda, Fagales
Campsicnemus scambus	Diptera	Dolichopodidae	1		predator	predator	tree-associated; wetland	peatland; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, wet/damp peat			Arthropoda, Fagales
Chrysotus gramineus	Diptera	Dolichopodidae	1		saprophagous	predator	wetland	marshland; running water	drawdown zone: mud/shallow litter			Arthropoda
Dolichopus atratus	Diptera	Dolichopodidae	1		predator	predator	wetland	peatland	base status >> acid, sphagnum/moss lawn, wet/damp peat	W312	acid mire: B	Arthropoda
Dolichopus atripes	Diptera	Dolichopodidae	1		predator	predator	wetland	peatland	base status >> acid, wet/damp peat		acid mire: C	Arthropoda
Dolichopus brevipennis	Diptera	Dolichopodidae	1		predator	predator	wetland	marshland; peatland	wet/damp peat			Arthropoda
Dolichopus pennatus	Diptera	Dolichopodidae	1		predator	predator	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, woodland stream			Arthropoda, Fagales

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Dolichopus plumipes	Diptera	Dolichopodidae	1		predator	predator	wetland	marshland	drawdown zone: mud/shallow litter			Arthropoda
Dolichopus simplex	Diptera	Dolichopodidae	1		predator	predator	wetland	marshland; peatland	drawdown zone: mud/shallow litter			Arthropoda
Dolichopus trivialis	Diptera	Dolichopodidae	1		saprophagous	predator	wetland	marshland; running water	drawdown zone: mud/shallow litter			Arthropoda
Dolichopus urbanus	Diptera	Dolichopodidae	1		predator	predator	wetland					Arthropoda
Dolichopus vitripennis	Diptera	Dolichopodidae	1		predator	predator	wetland	peatland	base status >> acid, wet/damp peat		acid mire: B	Arthropoda
Hercostomus nigripennis	Diptera	Dolichopodidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> unknown			
Hercostomus nigriplantis	Diptera	Dolichopodidae	4		predator	predator	open habitats	tall sward & scrub	habitats >> sward/field layer			Arthropoda
Sympycnus pulicarius	Diptera	Dolichopodidae	1		predator	predator	wetland	marshland; peatland	drawdown zone: mud/shallow litter			Arthropoda
Syntormon pumilus	Diptera	Dolichopodidae	1		predator	predator	wetland	marshland; peatland	deep litter, wet/damp peat, wetland vegetation			
Syntormon tarsatus	Diptera	Dolichopodidae	4		predator	predator	wetland	peatland	base status >> acid, wet/damp peat			
Clinocera fontinalis	Diptera	Empididae	1		predator	predator	wetland	peatland				Arthropoda
Clinocera stagnalis	Diptera	Empididae	1		predator	predator	wetland					Arthropoda
Empis digramma	Diptera	Empididae	1		predator	predator	open habitats	tall sward & scrub	habitats >> sward/field layer			Arthropoda
Empis livida	Diptera	Empididae	1		predator	predator	open habitats	tall sward & scrub	habitats >> sward/field layer			Arthropoda

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Empis nigripes	Diptera	Empididae	1		predator	predator	open habitats	tall sward & scrub	habitats >> unknown, soil humidity >> dry			Arthropoda
Empis opaca	Diptera	Empididae	1		predator	predator	open habitats	tall sward & scrub	habitats >> sward/field layer			Arthropoda
Empis punctata	Diptera	Empididae	1		predator	predator	open habitats	tall sward & scrub	habitats >> unknown, soil humidity >> dry			Arthropoda
Empis stercorea	Diptera	Empididae	1		predator	predator	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only			Arthropoda, Fagales
Empis tessellata	Diptera	Empididae	1		predator	predator	open habitats	tall sward & scrub	habitats >> sward/field layer			Arthropoda
Empis verralli	Diptera	Empididae	1		predator	predator	open habitats	tall sward & scrub; upland	habitats >> sward/field layer, soil humidity >> dry	F001		Arthropoda
Hemerodromia raptoria	Diptera	Empididae	1		predator	predator	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, woodland stream			Arthropoda, Fagales
Rhamphomyia gibba	Diptera	Empididae	1		predator	predator	open habitats; tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, humidity >> damp, shadiness >> heavy shade, woodland habitat >> undergrowth	F001		Arthropoda, Fagales, Plantae
Rhamphomyia stigmosa	Diptera	Empididae	1		predator	predator	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, woodland habitat			Diptera, Plantae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Rhamphomyia subcinerascens	Diptera	Empididae	1		predator	predator	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, woodland habitat			Diptera, Plantae
Rhamphomyia tibialis	Diptera	Empididae	1		predator	predator	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, woodland habitat			Diptera, Plantae
Notiphila dorsata	Diptera	Ephydridae	1		herbivore		wetland	marshland; peatland	shallow freshwater pond >> aquatic: well vegetated			Poales
Scatella stagnalis	Diptera	Ephydridae	1		algivore		wetland	marshland; peatland	drawdown zone: mud/shallow litter, shallow freshwater pond >> temporary water dependant			Algae
Bicellaria vana	Diptera	Hybotidae	1		predator		tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only			Arthropoda, Fagales
Hybos culiciformis	Diptera	Hybotidae	1		predator	predator	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, woodland habitat			Diptera, Plantae
Hybos femoratus	Diptera	Hybotidae	1		predator	predator	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, woodland habitat			Diptera, Plantae
Platypalpus agilis	Diptera	Hybotidae	1		predator	predator	open habitats; tree-associated	shaded woodland floor; tall sward & scrub	habitats >> litter & ground layer			Arthropoda, Plantae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Platypalpus longicornis	Diptera	Hybotidae	1		predator	predator	open habitats; tree-associated	shaded woodland floor; tall sward & scrub	conifer or broadleaved >> broadleaved only, habitats >> litter & ground layer, habitats >> sward/field layer			Arthropoda, Fagales
Platypalpus minutus	Diptera	Hybotidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, habitats >> unknown			Arthropoda
Platypalpus verralli	Diptera	Hybotidae	1		predator	predator	open habitats; tree-associated; wetland	peatland; shaded woodland floor; tall sward & scrub; wet woodland	base status >> acidic, conifer or broadleaved >> broadleaved only, habitats >> litter & ground layer, habitats >> sward/field layer, humidity >> wet, shadiness >> heavy shade			Arthropoda, Fraxinus
Trichina clavipes	Diptera	Hybotidae	1		predator	predator	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, woodland habitat			Diptera, Plantae
Dicranomyia autumnalis	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	peatland	base status >> acid-neutral			
Dicranomyia morio	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland; running water	drawdown zone: mud/shallow litter, flow >> slow flow			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Dicranophragma nemorale	Diptera	Limoniidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, seepages >> base rich seepage, seepages >> woodland seepage, shadiness >> heavy shade, woodland stream			Fagales, Plantae
Eloeophila submarmorata	Diptera	Limoniidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, humidity >> wet, shadiness >> heavy shade, woodland stream		seepage (calcareous): B, seepage (woodland): B	Betula
Erioconopa trivialis	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland; peatland	base status >> acid-neutral, sphagnum/moss lawn, wet/damp peat, wetland vegetation			
Erioptera flavata	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland; peatland	base status >> acid-neutral, wet/damp peat, wetland vegetation			
Erioptera fuscipennis	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	peatland	wet/damp peat, wetland vegetation			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Erioptera fusculenta	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	peatland	wet/damp peat, wetland vegetation			
Erioptera lutea	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland; peatland; running water	drawdown zone: mud/shallow litter, wetland vegetation			
Gonomyia dentata	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	peatland	base status >> acid, wet/damp peat			
Helius flavus	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland; peatland	wetland vegetation			
Helius longirostris	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland	drawdown zone: mud/shallow litter, shallow freshwater pond		coarse woody debris: e	
Idioptera linnei	Diptera	Limoniidae	16	RDB 1	saprophagous	does not feed	wetland	peatland	base status >> acid, sphagnum/moss lawn, wet/damp peat	W312	acid mire: A	
Molophilus ater	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	peatland	base status >> acid, wet/damp peat		acid mire: A	
Molophilus medius	Diptera	Limoniidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, humidity >> wet, shadiness >> heavy shade, woodland stream		coarse woody debris: e	Fagales

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Molophilus obscurus	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland; peatland	drawdown zone: mud/shallow litter		seepage (calcareous): C	
Molophilus occultus	Diptera	Limoniidae	1		saprophagous	does not feed	tree-associated; wetland	peatland; shaded woodland floor; wet woodland	base status >> acid, conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, sphagnum/moss lawn, wet/damp peat		acid mire: C, seepage (acid-neutral): C	Fagales
Molophilus ochraceus	Diptera	Limoniidae	1		saprophagous	does not feed	tree-associated; wetland	peatland; shaded woodland floor; wet woodland	base status >> acid-neutral, conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, wet/damp peat			Fagales
Molophilus propinquus	Diptera	Limoniidae	4	Notable	saprophagous	does not feed	wetland	peatland				
Neolimnomyia filata	Diptera	Limoniidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, humidity >> wet, seepages >> neutral/acid seepage, seepages >> shaded seepage, seepages >> unshaded seepage,		seepage (woodland): B	Fagales, Plantae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Ormosia hederae	Diptera	Limoniidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, flow >> slow flow, humidity >> wet, shadiness >> heavy shade, woodland stream			Fagales
Paradelphomyia senilis	Diptera	Limoniidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, flow >> slow flow, humidity >> wet, shadiness >> heavy shade, woodland stream		seepage (woodland): A	Fagales
Phylidorea abdominalis	Diptera	Limoniidae	4	Notable	saprophagous	does not feed	wetland	peatland	base status >> acid-neutral, wet/damp peat, wetland vegetation		acid mire: A	
Phylidorea ferruginea	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland; peatland	base status >> acid-neutral, wet/damp peat, wetland vegetation		coarse woody debris: d	
Phylidorea fulvonervosa	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland; peatland	base status >> acid, wetland vegetation			
Phylidorea squalens	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	peatland	base status >> acid, sphagnum/moss lawn, wet/damp peat	W312	acid mire: B	
Pilaria	Diptera	Limoniidae										

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Pilaria decolor	Diptera	Limoniidae			saprophagous	does not feed	wetland	peatland	base status >> acid-neutral, wetland vegetation			
Pilaria discicollis	Diptera	Limoniidae	1		saprophagous	does not feed	tree-associated; wetland	marshland; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, humidity >> wet, shadiness >> heavy shade			Fagales
Pilaria meridiana	Diptera	Limoniidae	4	Notable	saprophagous	does not feed	wetland	marshland; peatland	base status >> base, drawdown zone: mud/shallow litter	W221		
Pseudolimnophila lucorum	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland; peatland	wetland vegetation			
Symplecta pilipes	Diptera	Limoniidae	1		saprophagous	does not feed	wetland	marshland	drawdown zone: mud/shallow litter, shallow freshwater pond			
Tasiocera fuscescens	Diptera	Limoniidae	4	[RDB 1]	saprophagous	does not feed	tree-associated; wetland	shaded woodland floor	conifer or broadleaved >> broadleaved only, humidity >> damp, seepages >> base rich seepage, shadiness >> light shade			Plantae
Lonchoptera lutea	Diptera	Lonchopteridae	1		saprophagous	saprophagous	open habitats	tall sward & scrub	habitats >> litter & ground layer			
Mesembrina meridiana	Diptera	Muscidae										

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Opomyza germinationis	Diptera	Opomyzidae	1		herbivore	saprophagous	open habitats	tall sward & scrub	habitats >> soil & roots, habitats >> sward/field layer, soil humidity >> dry			Brachypodium, Poaceae
Dicranota claripennis	Diptera	Pediciidae	1		saprophagous	does not feed	wetland	running water	seepages >> neutral/acid seepage, seepages >> unshaded seepage, unmodified fast flowing streams		coarse woody debris: e	
Pedicia rivosa	Diptera	Pediciidae	1		saprophagous	does not feed	wetland					
Tricyphona immaculata	Diptera	Pediciidae	1		saprophagous	does not feed	wetland	marshland; peatland	base status >> acid, sphagnum/moss lawn, wet/damp peat		acid mire: C, coarse woody debris: d/e	
Tricyphona unicolor	Diptera	Pediciidae	4	Notable	saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, seepages >> neutral/acid seepage, seepages >> shaded seepage, shadiness >> heavy shade, woodland stream		seepage (woodland): A	Fagales, Sphagnum
Pericoma trivialis	Diptera	Psychodidae										
Szaboiella hibernica	Diptera	Psychodidae										
Ptychoptera minuta	Diptera	Ptychopteridae	1		saprophagous	does not feed	wetland	marshland; peatland	wet/damp peat, wetland vegetation	W314		

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Ptychoptera paludosa	Diptera	Ptychopteridae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, humidity >> wet, seepages >> shaded seepage, shadiness >> heavy shade, unmodified fast flowing streams, woodland stream		seepage (woodland): C	Fagales
Chrysopilus cristatus	Diptera	Rhagionidae	1		saprophagous	saprophagous	tree-associated; wetland	peatland; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, wet/damp peat, wetland vegetation		coarse woody debris: c	Fagales
Rhagio scolopaceus	Diptera	Rhagionidae	1			saprophagous	open habitats	tall sward & scrub	habitats >> soil & roots, soil humidity >> damp			Arthropoda
Cordilura pudica	Diptera	Scathophagidae	1		herbivore	predator	wetland	peatland	base status >> acid, wetland vegetation			Carex
Pogonota barbata	Diptera	Scathophagidae	1		predator	predator	wetland	peatland	base status >> acid, sphagnum/moss lawn, wet/damp peat			Arthropoda
Scathophaga stercoraria	Diptera	Scathophagidae	1		predator	predator	open habitats	tall sward & scrub	dung & carrion >> dung, soil humidity >> damp			Bos, Diptera

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Dictya umbrarum	Diptera	Sciomyzidae	4	Notable	parasitoid	saprophagous	wetland	peatland	base status >> acid, shallow freshwater pond >> aquatic: well vegetated, wet/damp peat, wetland vegetation			Mollusca
Euthycera fumigata	Diptera	Sciomyzidae	1		parasitoid	saprophagous	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> damp			Mollusca
Hydromya dorsalis	Diptera	Sciomyzidae	1		parasitoid	saprophagous	wetland	marshland	base status >> acid, shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Lymnaeidae
Ilione albiseta	Diptera	Sciomyzidae	1		parasitoid	saprophagous	wetland	marshland; peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Mollusca
Pherbellia schoenherri	Diptera	Sciomyzidae	1		parasitoid	saprophagous	wetland	marshland; peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Succinea
Pherbina coryleti	Diptera	Sciomyzidae	1		parasitoid	saprophagous	wetland	marshland	base status >> acid, shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Asteraceae, Discus

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Renocera pallida	Diptera	Sciomyzidae	1		parasitoid	saprophagous	tree-associated; wetland	peatland; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Animalia, Fagales
Renocera striata	Diptera	Sciomyzidae	4	Notable	parasitoid	saprophagous	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation	W313		Pisidium
Tetanocera arrogans	Diptera	Sciomyzidae	1		parasitoid	saprophagous	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation	W314		Mollusca
Tetanocera elata	Diptera	Sciomyzidae	1		parasitoid	saprophagous	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			Mollusca
Tetanocera ferruginea	Diptera	Sciomyzidae	1		parasitoid	saprophagous	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Mollusca

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Tetanocera freyi	Diptera	Sciomyzidae	8	RDB 3	parasitoid	saprophagous	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation	W313		Mollusca
Tetanocera fuscinervis	Diptera	Sciomyzidae	1		parasitoid	saprophagous	wetland	peatland	base status >> acid, shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Mollusca
Tetanocera hyalipennis	Diptera	Sciomyzidae	1		parasitoid	saprophagous	tree-associated; wetland	marshland; peatland; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, shallow freshwater pond >> aquatic: well vegetated			Fagales, Mollusca
Tetanocera robusta	Diptera	Sciomyzidae	1		parasitoid	saprophagous	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			Mollusca
Tetanocera silvatica	Diptera	Sciomyzidae	1		parasitoid	saprophagous	tree-associated; wetland	peatland; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, shallow freshwater pond >>			Fagales, Mollusca

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Microchrysa cyaneiventris	Diptera	Stratiomyidae	1		saprophagous	phytosaprophagous	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> damp			
Microchrysa flavicornis	Diptera	Stratiomyidae	1		coprophagous	phytosaprophagous	open habitats	tall sward & scrub	dung & carrion >> dung, soil humidity >> damp			
Cheilosia albipila	Diptera	Syrphidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> wet			Cirsium palustre
Cheilosia albitarsis	Diptera	Syrphidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> soil & roots, habitats >> sward/field layer, soil humidity >> damp			Ranunculus repens
Cheilosia bergenstammi	Diptera	Syrphidae	1		herbivore	nectivore	open habitats	short sward & bare ground; tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			Senecio
Cheilosia fraterna	Diptera	Syrphidae	1		herbivore	nectivore	wetland	peatland				Cirsium palustre
Cheilosia illustrata	Diptera	Syrphidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			Heracleum
Cheilosia pubera	Diptera	Syrphidae	4	NS	herbivore	nectivore	wetland	peatland	base status >> acid, wetland vegetation			Potentilla palustris
Eristalis abusivus	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: sparsely vegetated		seepage (acid-neutral): C	

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Eristalis arbustorum	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: sparsely vegetated			
Eristalis horticola	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: sparsely vegetated			
Eristalis intricarius	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: sparsely vegetated			
Eristalis nemorum	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: sparsely vegetated			
Eristalis pertinax	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: sparsely vegetated			
Eristalis rupium	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: sparsely vegetated		seepage (acid-neutral): B	
Eristalis tenax	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	rich flower resource	nectar and/or pollen, shallow freshwater pond >> aquatic: sparsely vegetated			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Eupeodes corollae	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Aphididae
Helophilus pendulus	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland				
Lejogaster metallina	Diptera	Syrphidae	1		saprophagous	nectivore	tree-associated; wetland	peatland; running water; shaded woodland floor; wet woodland	base status >> acid-neutral, conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, humidity >> wet, seepages >> neutral/acid seepage, seepages >> unshaded seepage, shadiness >> heavy shade, shallow freshwater pond >> aquatic: well vegetated, wetland vegetation, woodland stream		seepage (acid-neutral): B	Fagales
Melanogaster hirtella	Diptera	Syrphidae	1		herbivore	nectivore	wetland	marshland; peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation		seepage (calcareous): B	Typha
Melanostoma mellinum	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity-damp			Arthropoda

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Melanostoma scalare	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> damp			Arthropoda
Neoascia geniculata	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			
Neoascia meticulosa	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			
Neoascia podagrica	Diptera	Syrphidae	1		saprophagous	nectivore	wetland		wetland vegetation			
Neoascia tenur	Diptera	Syrphidae	1		saprophagous	nectivore	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated, wetland vegetation			
Parhelophilus consimilis	Diptera	Syrphidae	4	NS	saprophagous	nectivore	wetland	peatland		W313		
Pipizella viduata	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> soil & roots, soil humidity >> dry			Aphididae, Formicidae
Platycheirus albimanus	Diptera	Syrphidae	1		predator	nectivore						Aphididae
Platycheirus angustatus	Diptera	Syrphidae	1		predator	nectivore	open habitats; wetland	tall sward & scrub	habitats >> unknown, soil humidity >> damp			Aphididae
Platycheirus clypeatus	Diptera	Syrphidae	1		predator	nectivore	open habitats; wetland	tall sward & scrub	habitats >> unknown, soil humidity >> variable humidity			Arthropoda

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Platycheirus europaeus	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> unknown, soil humidity >> damp			Aphididae
Platycheirus granditarsus	Diptera	Syrphidae	1		predator	nectivore	wetland	marshland; peatland	wetland vegetation			Aphididae
Platycheirus manicatus	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> unknown, soil humidity >> dry			
Platycheirus podagratus	Diptera	Syrphidae	1		predator	nectivore	wetland	peatland	base status >> acid, wetland vegetation			Aphididae
Platycheirus ramsarensis	Diptera	Syrphidae	1		predator	nectivore	wetland	peatland; running water	base status >> acid, seepages >> neutral/acid seepage, seepages >> unshaded seepage, wetland vegetation		seepage (acid-neutral): B	Aphididae
Platycheirus rosarum	Diptera	Syrphidae	1		predator	nectivore	tree-associated; wetland	marshland; peatland; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, wetland vegetation			Aphididae, Fagales
Platycheirus scambus	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> unknown, soil humidity >> damp			Aphididae
Rhingia campestris	Diptera	Syrphidae	1		coprophagous	nectivore	open habitats	tall sward & scrub	dung & carrion >> dung, soil humidity >> damp			
Sericomyia silentis	Diptera	Syrphidae	1			nectivore	wetland	peatland	base status >> acid, wet/damp peat		seepage (acid-neutral): C	

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Sphaerophoria	Diptera	Syrphidae										
Sphaerophoria interrupta	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> soil & roots, soil humidity >> damp			Aphididae
Sphaerophoria scripta	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Aphididae
Syritta pipiens	Diptera	Syrphidae	1		saprophagous	nectivore	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> damp			
Syrphus vitripennis	Diptera	Syrphidae	1		predator	nectivore	tree-associated	arboreal	canopy >> scrub at wood edge/glade, flowers (adult)			Aphididae, Fagales
Trichopsomyia flavitarsis	Diptera	Syrphidae	1		predator	nectivore	wetland	peatland	wetland vegetation			Livia juncorum
Volucella bombylans	Diptera	Syrphidae	1		predator	nectivore	open habitats	tall sward & scrub	nests >> bumble bee nests, soil humidity >> dry			Bombus, Vespula
Xylota segnis	Diptera	Syrphidae	1		saprophagous	phytosaprophagous	tree-associated	decaying wood	bark & cambium >> beneath tight bark, conifer or broadleaved >> broadleaved only, dead trunks & branches >> freshly dead, flowers (adult)		coarse woody debris: c	Fagales
Chrysops sepulcralis	Diptera	Tabanidae	8	NS	predator	haematophagous	wetland	peatland	sphagnum/moss lawn, wet/damp peat	W312	acid mire: A	Mammalia
Haematopota pluvialis	Diptera	Tabanidae	1		predator	haematophagous	wetland	peatland				Mammalia
Tachina fera	Diptera	Tachinidae										

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Tephritis leontodontis	Diptera	Tephritidae	1		herbivore	nectivore	open habitats	tall sward & scrub	base status >> acidic, habitats >> sward/field layer, soil humidity >> damp			Leontodon hispidus, Scorzoneroides autumnalis
Tephritis neesii	Diptera	Tephritidae	1		herbivore	nectivore	open habitats	short sward & bare ground; tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Leucanthemum
Urophora stylata	Diptera	Tephritidae	1		herbivore	nectivore	open habitats	short sward & bare ground; tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Cirsium
Xyphosia miliaria	Diptera	Tephritidae	1		herbivore	nectivore	open habitats	short sward & bare ground; tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			Cirsium
Prionocera pubescens	Diptera	Tipulidae	8	RDB 2	saprophagous	does not feed	wetland	peatland	base status >> acid, sphagnum/moss lawn		acid mire: A	
Prionocera turcica	Diptera	Tipulidae	1		saprophagous	does not feed	wetland	marshland; peatland	base status >> acid, sphagnum/moss lawn		acid mire: C	
Tipula fulvipennis	Diptera	Tipulidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, humidity >> damp, humidity >> wet, shadiness >> heavy shade, unmodified fast flowing streams, woodland		seepage (woodland): C	Fagales, Plantae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Tipula lateralis	Diptera	Tipulidae	1		saprophagous	does not feed	wetland	running water	drawdown zone: mud/shallow litter, unmodified fast flowing streams		seepage (calcareous): B, seepage (soft rock cliff): B, seepage (woodland): B	
Tipula luna	Diptera	Tipulidae	1		herbivore		wetland	marshland; peatland; running water	drawdown zone: mud/shallow litter, wetland vegetation			
Tipula luteipennis	Diptera	Tipulidae	1		saprophagous	does not feed	wetland	marshland; peatland; running water	drawdown zone: mud/shallow litter		seepage (woodland): C	
Tipula maxima	Diptera	Tipulidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, drawdown zone: mud/shallow litter, humidity >> wet, shadiness >> heavy shade, unmodified fast flowing streams, woodland stream		seepage (acid-neutral): C, seepage (soft rock cliff): C, seepage (woodland): C	Fagales
Tipula oleracea	Diptera	Tipulidae	1		herbivore	does not feed	wetland	peatland			coarse woody debris: d	
Tipula paludosa	Diptera	Tipulidae	1		herbivore	does not feed	open habitats	tall sward & scrub	habitats >> soil & roots, soil humidity >> dry			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Tipula pruinosa	Diptera	Tipulidae	1		herbivore	does not feed	wetland	marshland; peatland	wet/damp peat, wetland vegetation			
Tipula submarmorata	Diptera	Tipulidae	1		saprophagous	does not feed	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, humidity >> damp, woodland habitat >> woodland litter			Plantae
Tipula subnodicornis	Diptera	Tipulidae	1		saprophagous	does not feed	wetland	peatland; running water	base status >> acid, drawdown zone: mud/shallow litter, seepages >> neutral/acid seepage, seepages >> unshaded seepage, sphagnum/moss lawn, wet/damp peat		acid mire: A, seepage (woodland): A	Sphagnum
Tipula unca	Diptera	Tipulidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> heavy shade, woodland stream			Fagales
Tipula variicornis	Diptera	Tipulidae	1		saprophagous	does not feed	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, humidity >> wet, shadiness >> light shade, woodland habitat >> woodland litter			Plantae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Tipula varipennis	Diptera	Tipulidae	1		saprophagous	does not feed	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, humidity >> damp, shadiness >> light shade, woodland habitat >> woodland litter			Plantae
Tipula vernalis	Diptera	Tipulidae	1		herbivore	does not feed	open habitats	tall sward & scrub	habitats >> soil & roots, habitats >> sward/field layer, soil humidity >> damp			Asteraceae
Tipula vittata	Diptera	Tipulidae	1		saprophagous	does not feed	tree-associated; wetland	running water; shaded woodland floor; wet woodland	conifer or broadleaved >> broadleaved only, humidity >> wet, seepages >> shaded seepage, seepages >> unshaded seepage, shadiness >> heavy shade, unmodified fast flowing streams, woodland stream		coarse woody debris: d	Fagales
Herina frondescentiae	Diptera	Ulidiidae	1			saprophagous	open habitats; wetland	tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Anthocoris nemoralis	Hemiptera	Anthocoridae	1		predator	predator	tree-associated	arboreal	canopy, conifer or broadleaved >> broadleaved only			Acari, Aphididae, Fagales
Anthocoris nemorum	Hemiptera	Anthocoridae	1									
Neophilaenus exclamationis	Hemiptera	Aphrophoridae	1		herbivore		open habitats	short sward & bare ground	habitats >> sward/field layer	F112	calcareous grassland: Moderate	Poaceae
Neophilaenus lineatus	Hemiptera	Aphrophoridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Poaceae
Philaenus spumarius	Hemiptera	Aphrophoridae	1									
Aphrodes bicincta	Hemiptera	Cicadellidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer		calcareous grassland: High	Poaceae
Cicadella viridis	Hemiptera	Cicadellidae	1		herbivore	herbivore	wetland		wetland vegetation			Juncus
Macrosteles laevis	Hemiptera	Cicadellidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			
Planaphrodes bifasciata	Hemiptera	Cicadellidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Poaceae
Streptanus sordidus	Hemiptera	Cicadellidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			Poaceae
Cixius nervosus	Hemiptera	Cixiidae	1				tree-associated	arboreal	canopy, foliage			
Tachycixius pilosus	Hemiptera	Cixiidae	1									

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Criomorphus albomarginatus	Hemiptera	Delphacidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			
Dicranotropis divergens	Hemiptera	Delphacidae	4	Nb			open habitats			F003		
Dicranotropis hamata	Hemiptera	Delphacidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity			Poaceae
Javesella discolor	Hemiptera	Delphacidae	1		saprophagous	herbivore	tree-associated	shaded woodland floor	conifer or broadleaved >> broadleaved only, humidity >> damp, shadiness >> light shade, woodland habitat >> undergrowth			Plantae
Javesella dubia	Hemiptera	Delphacidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			Poaceae
Struebingianella lugubrina	Hemiptera	Delphacidae	1		herbivore	herbivore	wetland		wetland vegetation			Glyceria
Gerris (Gerris) lacustris	Hemiptera	Gerridae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: sparsely vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Cymus glandicolor	Hemiptera	Lygaeidae	1		herbivore	herbivore	wetland	marshland			calcareous grassland : Low	Carex
Pachybrachius fracticollis	Hemiptera	Lygaeidae	1		herbivore	herbivore	wetland	peatland	wetland vegetation			Eriophorum

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Stygnocoris sabulosus	Hemiptera	Lygaeidae	1		herbivore	herbivore	open habitats	tall sward & scrub	base status >> base rich, calcareous substrates >> chalk, habitats >> litter & ground layer, habitats >> sward/field layer, soil humidity >> dry, soil type >> sand			Asteraceae
Capsus ater	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Poaceae
Chlamydatus wilkinsoni	Hemiptera	Miridae	1				open habitats			F003		
Closterotomus norwegicus	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Asteraceae, Trifolium, Urtica
Cyrtorhinus caricis	Hemiptera	Miridae	1		predator	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			Carex, Juncus
Dicyphus stachydis	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Stachys sylvatica
Dicyphus pallicornis	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Digitalis
Leptopterna dolabrata	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			Poaceae
Leptopterna ferrugata	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Poaceae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Lygus rugulipennis	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Chenopodium album, Rumex, Urtica
Lygus wagneri	Hemiptera	Miridae	1			herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Asteraceae
Orthotylus ericetorum	Hemiptera	Miridae	1				open habitats			F003		
Pachytomella parallela	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	short sward & bare ground	habitats >> sward/field layer, soil humidity >> dry	F112	calcareous grassland : Low	
Pithanus maerkelii	Hemiptera	Miridae	1		predator	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> damp			Arthropoda
Plagiognathus arbustorum	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Urtica
Plagiognathus chrysanthemi	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	short sward & bare ground	habitats >> sward/field layer, soil humidity >> dry			Asteraceae
Polymerus palustris	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Galium
Stenodema calcarata	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Poaceae
Stenodema holsata	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub; upland	habitats >> sward/field layer, soil humidity >> damp			
Stenodema laevigata	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, damp			Poaceae

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Stenotus binotatus	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Poaceae
Teratocoris	Hemiptera	Miridae										
Teratocoris caricis	Hemiptera	Miridae	4	Nb	herbivore	herbivore	wetland	marshland	wetland vegetation			Plantae
Teratocoris saundersi	Hemiptera	Miridae	1		herbivore	herbivore	wetland	marshland	wetland vegetation			Bolboschoenus maritimus
Trigonotylus ruficornis	Hemiptera	Miridae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			
Nabis limbatus	Hemiptera	Nabidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> damp			Arthropoda
Nabis flavomarginatus	Hemiptera	Nabidae	1		predator	predator	open habitats	tall sward & scrub	habitats >> litter & ground layer, soil humidity >> damp			Arthropoda
Notonecta obliqua	Hemiptera	Notonectidae	1		predator	predator	wetland	peatland	shallow freshwater pond >> aquatic: sparsely vegetated		acid mire: C, grazing marsh - salinity: 0, grazing marsh - status: 2	Arthropoda
Saldula saltatoria	Hemiptera	Saldidae	1		predator	predator	wetland	marshland	drawdown zone: mud/shallow litter			Arthropoda
Dictyla convergens	Hemiptera	Tingidae	1		herbivore	herbivore	wetland	marshland				Myosotis scorpioides
Tingis cardui	Hemiptera	Tingidae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity:damp			Cirsium

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Velia caprai	Hemiptera	Veliidae	1		predator	herbivore	wetland	running water			grazing marsh - salinity: 0, grazing marsh - status: 1	
Bombus lapidarius	Hymenoptera	Apidae	1		nectivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity	F002		
Bombus lucorum sensu lato	Hymenoptera	Apidae										
Bombus monticola	Hymenoptera	Apidae	1		nectivore	nectivore	open habitats	tall sward & scrub; upland		F002, F003		
Bombus pascuorum	Hymenoptera	Apidae	1		nectivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry	F002		Asteraceae
Bombus terrestris	Hymenoptera	Apidae	1		nectivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> variable humidity	F002		
Calameuta pallipes	Hymenoptera	Cephidae										
Chrysis ignita	Hymenoptera	Chrysididae	1			nectivore	tree-associated	decaying wood	dead trunks & branches >> trunks & branches, flowers (adult)			Fagales
Abia sericea	Hymenoptera	Cimbicidae										
Ametastegia equiseti	Hymenoptera	Tenthredinidae										
Ametastegia glabrata	Hymenoptera	Tenthredinidae										
Aneugmenus padi	Hymenoptera	Tenthredinidae										

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Brachythops flavens	Hymenoptera	Tenthredinidae										
Claremontia tenuicornis ?	Hymenoptera	Tenthredinidae										
Dolerus aeneus	Hymenoptera	Tenthredinidae										
Dolerus asper	Hymenoptera	Tenthredinidae										
Dolerus cothurnatus	Hymenoptera	Tenthredinidae										
Dolerus ferrugatus	Hymenoptera	Tenthredinidae										
Dolerus germanicus	Hymenoptera	Tenthredinidae										
Dolerus gonager	Hymenoptera	Tenthredinidae										
Dolerus madidus	Hymenoptera	Tenthredinidae										
Dolerus nigratus	Hymenoptera	Tenthredinidae										
Dolerus picipes	Hymenoptera	Tenthredinidae										
Empria liturata	Hymenoptera	Tenthredinidae										
Empria pallimacula	Hymenoptera	Tenthredinidae										
Empria tridens	Hymenoptera	Tenthredinidae										
Eutomostethus luteiventris	Hymenoptera	Tenthredinidae										
Euura clitellata	Hymenoptera	Tenthredinidae										
Euura lichtwardti	Hymenoptera	Tenthredinidae										
Euura vaga	Hymenoptera	Tenthredinidae										
Pachyprotasis rapae	Hymenoptera	Tenthredinidae										
Rhogogaster viridis	Hymenoptera	Tenthredinidae										
Selandria serva	Hymenoptera	Tenthredinidae										

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Stethomostus fuliginosus	Hymenoptera	Tenthredinidae										
Strongylogaster multifasciata	Hymenoptera	Tenthredinidae										
Tenthredo arcuata	Hymenoptera	Tenthredinidae										
Tenthredo atra	Hymenoptera	Tenthredinidae										
Tenthredo mesomela	Hymenoptera	Tenthredinidae										
Tenthredo notha	Hymenoptera	Tenthredinidae										
Tenthredopsis litterata	Hymenoptera	Tenthredinidae										
Tenthredopsis nassata	Hymenoptera	Tenthredinidae										
Tenthredopsis ornata	Hymenoptera	Tenthredinidae										
Arctia caja	Lepidoptera	Erebidae	1	Section 41 Priority Species - research only	herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Asteraceae
Parasemia plantaginis	Lepidoptera	Erebidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry		calcareous grassland: Moderate	Asteraceae
Phragmatobia fuliginosa	Lepidoptera	Erebidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Asteraceae
Colostygia pectinataria	Lepidoptera	Geometridae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Galium
Epirrhoe alternata	Lepidoptera	Geometridae	1		herbivore	nectivore	open habitats	tall sward & scrub	sward/ fieldlayer			

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Gandaritis pyraliata	Lepidoptera	Geometridae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Galium
Odezia atrata	Lepidoptera	Geometridae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Conopodium
Petrophora chlorosata	Lepidoptera	Geometridae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			
Xanthorhoe montanata	Lepidoptera	Geometridae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer, soil humidity >> dry			Galium
Ochlodes sylvanus	Lepidoptera	Hesperiidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Brachypodium pinnatum, Brachypodium sylvaticum, Dactylis glomerata, Molinia caerulea
Callophrys rubi	Lepidoptera	Lycaenidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Cornus sanguinea, Cytisus scoparius, Erica tetralix, Genista tinctoria, Helianthemum nummularium, Lotus corniculatus, Rhamnus cathartica, Vaccinium myrtillus

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Lycaena phlaeas	Lepidoptera	Lycaenidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Rumex acetosa, Rumex acetosella, Rumex obtusifolius
Polyommatus icarus	Lepidoptera	Lycaenidae	1		herbivore	nectivore	open habitats	short sward & bare ground	habitats >> sward/field layer			Lotus corniculatus, Lotus pedunculatus, Medicago lupulina, Ononis repens, Trifolium dubium, Trifolium repens
Autographa gamma	Lepidoptera	Noctuidae	1		herbivore	nectivore						
Ceramica pisi	Lepidoptera	Noctuidae	1	S41 RO	herbivore	nectivore						
Noctua pronuba	Lepidoptera	Noctuidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Asteraceae
Ochropleura plecta	Lepidoptera	Noctuidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Plantago, Rumex
Aglais io	Lepidoptera	Nymphalidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Humulus lupulus, Urtica dioica, Urtica urens
Aglais urticae	Lepidoptera	Nymphalidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Plantae, Urtica dioica, Urtica urens

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Aphantopus hyperantus	Lepidoptera	Nymphalidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Brachypodium sylvaticum, Dactylis glomerata, Deschampsia cespitosa, Elytrigia repens, Plantae
Boloria selene	Lepidoptera	Nymphalidae	1	NT; S41	herbivore	nectivore	open habitats	short sward & bare ground	habitats >> sward/field layer			Viola palustris, Viola riviniana
Coenonympha pamphilus	Lepidoptera	Nymphalidae	1	NT; S41	herbivore	nectivore	open habitats	short sward & bare ground	habitats >> sward/field layer, soil humidity >> dry	F112		Poaceae
Euphydryas aurinia	Lepidoptera	Nymphalidae	1	Legal Protection; S41; VU	herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Knautia arvensis, Scabiosa columbaria, Succisa pratensis
Maniola jurtina	Lepidoptera	Nymphalidae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Brachypodium sylvaticum, Dactylis glomerata, Helictotrichon pubescens
Vanessa atalanta	Lepidoptera	Nymphalidae	1		herbivore	nectivore						Humulus, Humulus lupulus, Parietaria judaica, Urtica, Urtica dioica, Urtica urens

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Vanessa cardui	Lepidoptera	Nymphalidae	1		herbivore	nectivore						Cirsium, Echium vulgare, Malva, Urtica, Urtica dioica
Anthocharis cardamines	Lepidoptera	Pieridae	1		herbivore	nectivore	open habitats	tall sward & scrub	habitats >> sward/field layer			Alliaria petiolata, Arabis hirsuta, Barbarea vulgaris, Brassica rapa, Cardamine amara, Cardamine pratensis, Plantae, Sinapis arvensis, Sisymbrium officinale
Pieris napi	Lepidoptera	Pieridae	1		herbivore	nectivore	open habitats					Alliaria petiolata, Brassica oleracea, Cardamine amara, Cardamine pratensis, Raphanus raphanistrum , Rorippa nasturtium-aquaticum, Sinapis arvensis, Sisymbrium officinale, Tropaeolum majus
Crombrugghia laetus	Lepidoptera	Pterophoridae			herbivore	nectivore						Bellis perennis
Saturnia pavonia	Lepidoptera	Saturniidae	1									

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Panorpa communis	Mecoptera	Panorpidae	1		saprophagous	saprophagous	open habitats	tall sward & scrub	habitats >> sward/field layer			
Panorpa germanica	Mecoptera	Panorpidae	1		saprophagous	saprophagous	open habitats	tall sward & scrub	habitats >> sward/field layer			
Sialis lutaria	Megaloptera	Sialidae	1		predator	unknown	wetland	running water	drawdown zone: mud/shallow litter, flow >> slow flow, wetland vegetation		grazing marsh - salinity: 0, grazing marsh - status: 1	
Aeshna cyanea	Odonata	Aeshnidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Aeshna juncea	Odonata	Aeshnidae	1		predator	predator	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated		acid mire: C, grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Coenagrion puella	Odonata	Coenagrionidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Enallagma cyathigerum	Odonata	Coenagrionidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Pyrrhosoma nymphula	Odonata	Coenagrionidae	1		predator	predator	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Lestes sponsa	Odonata	Lestidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Libellula depressa	Odonata	Libellulidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Libellula quadrimaculata	Odonata	Libellulidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Sympetrum danae	Odonata	Libellulidae	1		predator	predator	wetland	peatland	shallow freshwater pond >> aquatic: well vegetated, sphagnum/moss lawn	W312	acid mire: B, grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Sympetrum striolatum	Odonata	Libellulidae	1		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda

Species	Order	Family	SQS	Status	Larval feeding guild	Adult feeding guild	Broad biotope	Habitat	Resources	Specific assemblage type	Habitat score	Associations
Sympetrum striolatum	Odonata	Libellulidae	4		predator	predator	wetland	marshland	shallow freshwater pond >> aquatic: well vegetated		grazing marsh - salinity: 0, grazing marsh - status: 1	Arthropoda
Leiobunum rotundum	Opiliones	Phalangiidae	1		predator	predator	tree-associated	arboreal	canopy >> scrub at wood edge/glade, conifer or broadleaved >> broadleaved only, foliage			Aphididae, Coccidae, Fagales
Myrmeleotettix maculatus	Orthoptera	Acrididae	1		herbivore	herbivore	open habitats	short sward & bare ground	habitats >> litter & ground layer, soil humidity >> dry			
Omocestus viridulus	Orthoptera	Acrididae	1		herbivore	herbivore	open habitats	tall sward & scrub	habitats >> sward/field layer			

Appendix 4

Pantheon Scoring systems

One of the principal aims of Pantheon is to help assess sample quality for nature conservation purposes. Absolute certainty over site quality cannot be properly resolved without a systematic and comparable survey of all sites throughout England. As one is not forthcoming in the foreseeable future, caution should be applied when interpreting results. Despite this, evaluation is possible with high quality survey data and site inventories, and, in particular, if there is comparable data from other sites to hand.

It should also be noted that:

- a long species list may indicate a rich site or a well-worked site; just because a site has a long list does not necessarily mean it is a rich site;
- representation across taxonomic groups in biotopes, habitats and their nested resources is very variable (e.g. a list of moths sampled from a wetland will show a very different output from a list of beetles). Care should be taken with samples consisting of limited taxonomic groups;
- a list with a high proportion of rare species may indicate a site that supports an unusually high proportion of rare species (a high quality site) or a site that is quite average but has been well-worked or a site where nobody has made much effort to record the common species;
- a site may be important for invertebrates by virtue of a single rare species with a very restricted distribution (e.g. Tadpole Shrimp, New Forest Burnet) though it may appear not to be a high quality site if looking at measures such as species richness, Species Quality Indices, or number of species with a conservation status.

The scoring systems below make use of species richness, threat status, rarity and characteristic species for each broad biotope, habitat and resource.

More work is required to refine these scores and produce benchmarks and site ranking. The four current scoring systems are described below.

1. Count – the number of species within each category

This is the simplest of all the scores. Low counts may mean that SQI scores (see section 4 below) are not reliable. High counts can be used to assign quality based purely on species richness.

2. Conservation Status – threat and rarity status from published reviews

The conservation status of species is complicated by the fact that there are two different systems in place – an ‘old’ system, that combines both threat and rarity, and a ‘new’ system that separates these. New reviews replace the old conservation status. The conservation status is also used to generate the Species Quality Indices (see section 4 below).

Sample quality can simply be derived from the overall number of species with a conservation status, and the number of species within each type of status.

Please note - some statuses are reported in square brackets. This is to indicate that these are considered out of date and should be used with caution.

The ‘New’ system is a two-pronged approach that separates rarity from threat. Threat is calculated using internationally recognised post-2001 IUCN criteria:

- EX - Extinct
- RE - Regionally Extinct
- CR - Critically Endangered

- CR(PE) - Critically Endangered (Possibly Extinct)
- EN - Endangered
- VU - Vulnerable
- NT - Near Threatened
- DD - Data Deficient
- LC - Least Concern
- NA - Not Assessed
- NE - Not Evaluated

The spiders and micro-moths are marked with a p before the status, to indicate that these are provisional statuses.

Two groups of flies (Empidoidea and some Nematocera and Aschiza) were assessed using post-1994 IUCN criteria. The abbreviations for these are in brackets.

Rarity is calculated using the Great Britain Rarity Status:

- Nationally Rare - Those which have been recorded from between 1-15 British hectads (10 km x 10 km squares) within a given date class where there is reasonable confidence that exhaustive recording would not find them in more hectads.
- Nationally Scarce - Those which have been recorded from between 16-100 hectads within a given date class where there is reasonable confidence that exhaustive recording would not find them in more hectads.

Species can have a status in both the threat and rarity categories above (e.g. *Carabus intricatus* is both Near Threatened and Nationally rare).

The 'old' system - species having been evaluated using the pre-1994 criteria:

- Extinct - Listed as RDB App or Extinct
- RDB 1 - Endangered
- RDB 2 - Vulnerable
- RDB 3 - Rare
- RDB K - Insufficiently Known
- RDB I - Indeterminate
- Na - Notable A
- Nb - Notable B
- Notable - Notable or Nationally Scarce
- NR (marine) - Nationally Rare (marine species)
- NS (marine) - Nationally Scarce (marine species)
- Unknown - A few micromoths are listed as status Unknown
- None - Not rare or scarce
- Not reviewed - The taxon was not assessed for rarity in the review
- New to Britain - Recently added to the British list and not yet reviewed, but it is still rare as far as we know
- Not native - The taxon is thought not to be native

3. % representation (Percentage Representation)

For any given broad biotope, habitat or resource, % rep is calculated by:

- the number of species in that resource in the sample / the total number of species in that resource in the Pantheon database

E.g. if sample X had 30 saltmarsh species and Pantheon has 302 saltmarsh species in total, then the % representation = 30/302 = 10%.

High scores suggest that the sample includes a high proportion of characteristic species, which can be an indicator of quality. Scores of between 10-20% may indicate good quality; scores of 21%+ certainly suggest a good proportion of characteristic species. Caution should be applied when the total number of species coded to any given category is low (10 or less) or are coded to categories that do not necessarily indicate quality (e.g. ubiquitous, synanthropic).

4. SQI - Species Quality Indices

Quality indicators such as this have been used in the past on a number of assemblages (dead wood and riparian). Each species recorded from the sample are given a Species Quality Score (SQS) based on their conservation status (see table below). However, where there is robust recent information to show that the official status is no longer appropriate, the SQS assigns a rare or scarce status using the more recent information (see note below table). The source of this information is given in the Source of Rarity column.

The SQI is equal to the sum of all SQSs in any given resource, divided by the number of species. This score will then be multiplied by 100 to give a 3 figure value without decimal places (e.g.100 rather than a 1.00).

Any SQI score derived from a small number of species should be treated with caution. It is suggested that scores derived from 15 or less species should not be used.

Status and Description	Species Quality Score	Old reviews	New review IUCN Threat		New review rarity
Species that have no Great Britain Rarity Status. This includes widespread species, even if they are classed as IUCN threatened. NOTE 1	1	None, RDB 4, RDB - Endemic	LC, NE, NA, DD, NT, VU, EN, CR, CR(PE)	and	None, Introduced.
Species currently classed as Nationally Scarce but not threatened. NOTE 2	4	RDB I, RDB K, N, Na, Nb	NA, NE, LC, DD, NT	and	NS
Species currently classed as Nationally Rare but not threatened. NOTE 3	8	RDB 2, RDB 3	LC, NE, NA, DD, NT.	and	NR
Species currently classed as Nationally Rare or Scarce that are also considered IUCN Vulnerable. NOTE 4	8	*Not applicable*	VU	and	NS, NR
Species currently classed as Nationally Rare or Scarce that are also considered IUCN Endangered. NOTE 4	16	RDB 1, RDB - App	EN	and	NS, NR
Species currently classed as Nationally Rare or Scarce that are also considered IUCN Critically Endangered, Critically Endangered (Provisionally Extinct), Regionally Extinct, Extinct in the Wild, or Extinct. NOTE 5	32	*Not applicable*	CR, CR(PE), RE, EW, EX	and	NS, NR, Extinct