

# **Species Status**

No. 9

A review of the scarce and  
threatened flies of Great Britain

Part 6: Hoverflies  
family Syrphidae

by

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and

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Further information on the JNCC Species Status project can be obtained  
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# **1. Introduction to the series**

## **1.1. The Species Status Assessment series**

This publication is one of a series produced under the auspices of the Species Status Assessment project initiated by JNCC in 1999. The project established the means by which the statutory conservation agencies, in partnership with voluntary conservation organisations and leading specialists, assign conservation statuses to British species. It aims to work towards assessing the status of all native species against standard criteria based on the internationally accepted guidelines developed by the International Union for Conservation of Nature and Natural Resources (IUCN) (see IUCN, 2001, 2003).

Comparisons are facilitated by assessing all taxa to the same standards. This is not without difficulty because species have a variety of life and reproductive strategies. Status assessments are prepared on the basis of the best available information for the group concerned, recognising that this will vary according to the intensity of recording and study, the majority of which is carried out by volunteer naturalists.

Assessments are produced as Red Lists or as broader National Reviews of taxonomic groups of species. Both types of publication provide an audit trail of the assessment. To enable assessments to reach as many practitioners as possible, the texts are made freely available via the JNCC website (<http://www.jncc.gov.uk/>).

## **1.2. The Red List system**

The Red List system was initiated by IUCN in 1966 with the publication of the first Mammal Red Data Book. Since then Red Lists, and more detailed Red Data Books, have been published that deal with many plants, fungi and animals at global, regional, country, and even local scales. The aim has been to identify those species at greatest risk from extinction and to identify the critical factors responsible, so that action may be taken to improve the chances of these species surviving in the long term.

In Britain the first published Red Data Book endorsed by a statutory conservation agency was by Perring and Farrell (1977, 2<sup>nd</sup> edition published 1983), dealing with vascular plants. The Red Data Book for insects, edited by Shirt, was published in 1987, with volumes dealing with other animal and plant groups appearing thereafter. The geographic range is normally Great Britain, and hence excludes Northern Ireland as well as the Isle of Man and the Channel Isles. Only one volume has a combined treatment for Britain and Ireland, that by Stewart and Church (1992) for stoneworts, although separate statuses were provided.

The British Red List of vascular plants has had a full update twice (Wigginton, ed. 1999, Cheffings and Farrell, 2005) following the production by the IUCN of a new, quantitative approach to threat assessment (IUCN, 1994, 2001, 2003). The recent Red List of British Odonata (Daguet *et al*, eds., 2008) and reviews of Diptera (Falk and Crossley, 2005, Falk and Chandler, 2005) have continued to follow the revised IUCN guidelines.

## **1.3. Status assessments other than Red Lists for species in Britain**

Conservation assessments that are broader in scope than the traditional Red Data Books and Red Lists have been produced. These assessments add GB-specific categories based on restricted distribution rather than risk. The term Nationally Scarce, originally coined for plants, is applied to species that are known to occur in 16 to 100 ten-km squares (or hectads). Early assessments of invertebrate taxa used the term Nationally Notable and, for some taxa this category was further split into Notable A (Na) for species occurring in 16 to 30 hectads and Notable B (Nb) for those occurring in 31 to 100 hectads. A further category that has a very specific application is that of 'Nationally Rare'. This category is only used for plant and lichen species that occur in 15 or fewer hectads in Britain and is used in SSSI designation and Common Standards Monitoring.

The restricted distribution categories have now been standardised to Nationally Rare (used only for

plants and lichens) and Nationally Scarce (used for all taxa including plants and lichens), without further subdivision. The GB system of assessing **rarity** based solely on distribution is used alongside the IUCN criteria which, although they also use measures of geographical extent, are concerned with assessing **threat**.

Publications that compile information about Red List species are known as Red Data Books and usually cover broad taxonomic groups (e.g. insects). Publications that include information about both Red Listed and Nationally Scarce species are known as National Reviews. The latter are usually produced for a more restricted taxon group (e.g. dragonflies or water beetles). Both types of publication contain individual species accounts that include information about their biology, distribution and status as well as threats to the species and their conservation needs.

#### **1.4. Species Status Assessment and conservation action**

Making good decisions to conserve species should primarily be based upon an objective process of determining the degree of threat to the survival of a species, in the present exercise by assigning the species to one of the IUCN threat categories. This assessment of threats to survival should be separate and distinct from the subsequent process of deciding which species require action and what activities and resources should be allocated.

When making decisions as to which species should be treated as priorities for conservation action, factors to be considered other than IUCN threat category include: the likely chances of recovery being achieved; the cost of achieving recovery (and whether sources of funding are available or likely to be available); the benefits to other threatened species of a recovery programme; the fit of a recovery programme with other conservation activities (including conservation actions to be taken for habitats); the likely gains for the profile of conservation; and the relationship and fit between national and international obligations. Under the UK Biodiversity Action Plan (JNCC & Defra 2012) a list of priority species was identified as a focus for conservation effort. This priority list comprises 943 species of principal importance and is listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006). In addition, certain species are legally protected in Great Britain under legislation such as the Wildlife and Countryside Act 1981, and British wildlife legislation is overlaid by international directives such as the Habitats Directive (Directive 92/42/EEC). For some species groups, threat assessments and rarity assessments also underlie the criteria used for protected site selection, and these species can then constitute protected interest features on the site.

## 2. Introduction to the review of hoverflies

The first account of threatened British Diptera was included in the *British Red Data Books: 2. Insects* (Shirt, 1987). This listed 827 species of Diptera of which 56 belonged to the hoverflies, family Syrphidae. Data sheets were given for just 25 of these (10 Endangered and 15 Vulnerable). This was followed by the publication of *A review of the scarce and threatened flies of Great Britain (Part 1)* (Falk, 1991) which presented data sheets for all scarce and threatened species from the better-known families of British Diptera including the hoverflies. Table 1 (page 10) shows the number of species assigned to each status category by these works.

JNCC adopted revised IUCN Guidelines (IUCN, 1994) in 1995, subsequently updated (IUCN, 2001), making it necessary to revise the status of all species. In addition, much new information has become available since the publication of Shirt (1987) and Falk (1991). This present volume is therefore one of a series which updates the statuses assigned to British Diptera. The status assigned to many species by the earlier reviews has been revised and at the same time the nomenclature has been brought up to date in accordance with the latest checklist. Appendix 2 (page 126) lists all species assigned to status categories by this and the previous reviews and shows all the changes that have occurred in both the names of species and status categories.

This review deals with the hoverflies as defined by Stubbs & Falk (2002). The latest Diptera check list (Chandler, 2012) lists 280 British species in the family Syrphidae. Some uncertain taxa listed by Stubbs & Falk (2002) and the few subsequent changes are considered here increasing the total to 284 species although two of these (*Paragus constrictus* and *Pipiza festiva*) have only been found in Ireland and are not considered here. Recent literature and information submitted to the Hoverfly Recording Scheme and the Scottish Hoverfly Mapping Scheme (see Malloch Society website: [www.mallochsociety.org.uk](http://www.mallochsociety.org.uk)) up to January 2014 has been taken into account.

### 2.1. Format of the data sheets

Information on each species is given in a standard form. The data sheets are designed to be self-contained in order to enable site managers to compile species-related information on site files; this is the reason for the repetition that occurs between the species accounts.

### 2.2. Information on the data sheets

#### 2.2.1. The species' name

Nomenclature is intended to be as up to date as possible. Where the name differs from that used by Shirt (1987) or Falk (1991) or from the most recent hoverfly check list (Stubbs & Falk, 2002) the previous name is indicated, with citation of any relevant references. A recent colour identification guide to hoverflies (Ball & Morris, 2013) provides additional detail for some species and includes supplementary information on the ecology of some hoverflies.

#### 2.2.2. Identification

Since 1983, the standard work on hoverfly identification has been *British Hoverflies: an illustrated identification guide* (Stubbs & Falk, 2002). This guide is sufficiently comprehensive to allow identification of the current British fauna, but there are regular additions, meaning that even the most recently revised version will become dated fairly quickly. Additional continental species are best referred to in Veen (2004). An increasing amount is known about larval habits and life histories and Rotheray (1993) provides keys to known larvae.

#### 2.2.3. Distribution

Records held in the database of the Hoverfly Recording Scheme form the basis for determining the distribution, both as maps and as detailed data on occurrence by vice-county and hectads. These data can be accessed through the NBN Gateway ([www.searchnbn.net](http://www.searchnbn.net)) and therefore individual records have not been listed. Maps accompanying the species accounts in this report comprise the most recent data and

revise those published by Ball & Morris (2000) and Ball *et al.* (2011). The Hoverfly Recording Scheme website [www.hoverfly.org.uk](http://www.hoverfly.org.uk) includes regularly updated maps that reflect the most recent data.

The distribution maps show the hectads (10km squares) of the National Grid in which the species has been recorded. Open circles (○) represent hectads from which all records are before 1980, closed circles (●) hectads with records only from 1980 onwards and closed squares (■) hectads with records both before and after 1980.

#### **2.2.4. Habitat**

Current knowledge of the habitats favoured by the majority of hoverflies is relatively good, at least in comparison with many other families of flies. There have been various attempts to use hoverflies as habitat indicators (Stubbs, 1982; Whiteley, 1987; Morris, 1998) and these have been noted where appropriate. Whilst we can be relatively certain about the habitat associations of the majority of hoverflies there are some for which larvae have yet to be found and our knowledge is limited to a broad description such as *Calluna* heathland or Culm grassland. These gaps in our knowledge offer continuing opportunities for study and better elucidation of the biology of scarce and threatened hoverflies.

#### **2.2.5. Ecology**

The larval stages of hoverflies occupy a wide range of niches, including rotting timber, stems, leaves bulbs, roots and rhizomes, dung, sap runs, and the nests of ants, bees and social wasps. Other species have free-living larvae that are predaceous upon aphids, Lepidoptera and Coleoptera larvae. A third group have aquatic larvae which are filter feeders. Many of these are of the “rat-tailed” type which have the end of the body prolonged into a telescopic breathing tube. Larval biology is generally well known, and the larvae of over 60% of the British fauna have been described. The most comprehensive guide to hoverfly larvae is by Rotheray (1993) and there is a detailed compendium of prey associations of world Syrphidae by Rojo *et al.* (2003) which has been used to provide additional pointers where there are gaps in our knowledge of prey associations in the UK. In recent years, the ecology of some of the most enigmatic species has been worked out, for example that of *Blera fallax*, but larvae of others such as *Chrysotoxum octomaculatum* and *Eristalis cryptarum* have proved to be elusive. Rotheray & Gilbert (2011) provide much additional information on the natural history of the family. However, there is much more to be done and even some relatively common species are very poorly known, so the inquisitive recorder can find a great deal to investigate close to home.

#### **2.2.6. Status**

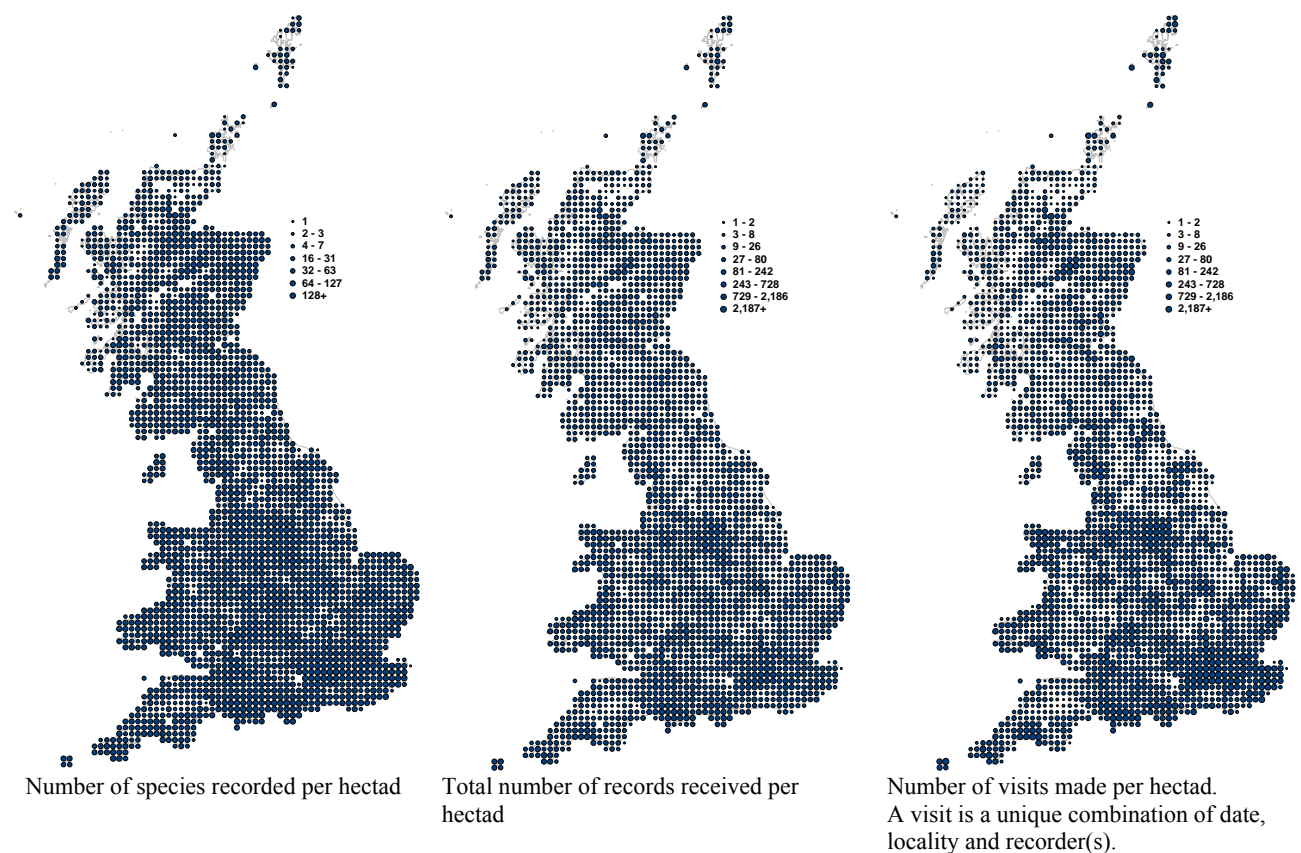
It is upon this statement that the status category is based. This can be assessed in two ways: first, the scarcity of a species as indicated by the available records, and second, the association of a species with a particular type of habitat which itself may be scarce and/or threatened to some degree. The process of assigning species to the various categories is discussed more fully in section 5.

Assessments of status can only be based on available records, which are unlikely to be comprehensive in the majority of cases. They also reflect the recording behaviour of a limited number of dipterists over the years, and it has been necessary to make assumptions from the available records in order to arrive at the best estimate of the likely national distribution of each species.

In the case of the Syrphidae, our knowledge of distribution is comparatively good compared to most other invertebrates. We have been able to base judgements on the numbers of hectads (formerly termed “10km squares”) from which species have been recorded since 1980, together with assessment of trends in occurrence. Species recently added to the British list cause considerable difficulty determining whether they should be included in this review, as do those for which there are no localities with a constant run of records. There are a number of widely distributed species that we suspect to be more widespread than the available records currently indicate. Deciding upon a cutoff point for these species was difficult. There are eight species that we have concluded would qualify for inclusion within the various threat categories, but there is insufficient data upon which a judgement can be made. The Data Deficient category has been used.

The greatest problems lie in determining which species should fall into the category Nationally Scarce. This is defined as “species occurring in 100 or fewer hectads of the British National Grid”. In the case of hoverflies, discounting known migrants and vagrants, there are 106 species falling within this threshold. Of these, some such as *Cheilosia ranunculi* and *Platycheirus ramsarensis* are recently recognised species that have already been recorded from numerous hectads and we can be reasonably certain will prove to be more widely distributed. Other recent discoveries, such as *Heringia senilis* and *Platycheirus aurolateralis* are recorded from only a small number of hectads, but insufficient time has elapsed since their discovery for enough recording to have taken place on which to make a judgement.

Contributors to the Recording Scheme have visited 2,728 (95%) of the 2,863 hectads that include some land in Great Britain since 1980. However, this coverage is markedly uneven and recording effort tends to be concentrated in the south and midlands (Figure 1).



**Figure 1.** Coverage achieved by the Hoverfly Recording Scheme from 1980 onwards.

We have taken account of the difficulty of identification, the degree to which the genus is recorded and whether there is coincidence between a species occurrence and high or low levels of recording effort. For these reasons, the northern and western species, *Megasyrphus erraticus* (96 hectads) and *Microdon myrmicae* (99 hectads) have been excluded from the Nationally Scarce category because they are very close to the threshold (100 hectads), but are probably under recorded and therefore considered very likely to exceed it as recording proceeds. Others such as *Anasimyia lunulata* and *Lejops vittatus* have been judged not to be as seriously threatened as trends in frequency of occurrence might suggest, because their habitats have received very little attention from recorders since the beginning of the 1990s. There is a further cohort, especially some members of the genus *Cheilosia* and of the tribe Pipizini, that are perceived as “difficult” and avoided by many recorders. Consequently, a number of species in these taxa have been judged to be less scarce than the numbers of hectads from which they have been recorded might seem to suggest.



### **2.2.7. Threats**

It is those human activities that result in the loss of sites or that change the nature of habitats that are most likely to pose the greatest threats to insect populations. Where specific threats might arise they are mentioned, otherwise the statements attempt to summarise in general terms those activities which are considered most likely to put populations of these flies at risk. Where known sites have the benefit of statutory protection (e.g. they occur on National Nature Reserves (NNRs)) this is noted.

There remain a number of ongoing threats that, although not specifically alluded to, continue to affect the conservation of hoverflies as part of Great Britain's wildlife resource. In the past 60 years there have been huge changes in the way in which the countryside is managed. Urbanisation continues apace, road widening has destroyed historic hedgerows, grasslands have been improved or converted into arable, woodlands have been felled and heathlands converted to housing estates. This was apparent at the time of earlier reviews and captured in broad terms such as loss of woodlands, hedgerows, heathlands and grasslands.

Climate change has potentially profound implications for hoverfly habitat as it can be expected to lead to significant changes in the coming century. In south-eastern England the predictions are for much more arid environments that are unsuitable for many of the hoverflies that occur there today. The degree to which these species will be able to move is uncertain and this in turn makes it very difficult to predict with any certainty what the prognosis is for their conservation. Equally, there are others such as *Cheilosia sahlbergi* and *Platycheirus melanopsis* whose mountain habitat is likely to be severely squeezed and whose future is difficult to predict. We are uncertain just how serious these threats will be and to what degree this should be reflected in the statuses allocated. It is therefore possible that some statuses will have to be reviewed further as these changes become more apparent.

Today, sites designated as SSSI or as Special Areas of Conservation, Special Protection Areas and Ramsar Sites are largely safe, but loss of suitable habitat continues in the case of undesignated habitat and in terms of pressures on the wider countryside. Changes in the abundance of even the "commoner" hoverflies in the wider countryside are likely to reflect these pressures. In the case of the scarce and threatened hoverflies, it should therefore be taken for granted that such wider countryside changes continue to impart pressures that lead to fragmentation and loss of individual populations.

We can offer more detailed thoughts on key impacts on many scarce and threatened hoverflies, including the possible implications of climate change and the need for society to respond through changing land management and coastal and fluvial flood risk management. Nitrification through excessive agricultural application and resulting "diffuse pollution" of watercourses and groundwater is now a matter of considerable concern. In addition, atmospheric nitrogen input to grasslands and oligotrophic aqueous environments is a growing issue.

### **2.2.8. Management and conservation**

Preventative measures and positive action designed to maintain populations are suggested where these are known or can reasonably be inferred. Inevitably, in many cases this section tends to be generalised, identifying practices that have been found to favour those aspects of the habitat with which the species may be associated. Kirby (2001) and Fry & Lonsdale (1991) provide further, more detailed, information on the management of habitats for the conservation of invertebrates.

### **2.2.9. Published sources**

Literature references that refer to the previous conservation status of the species in Britain, or that have contributed information to the Data Sheet, are cited here.

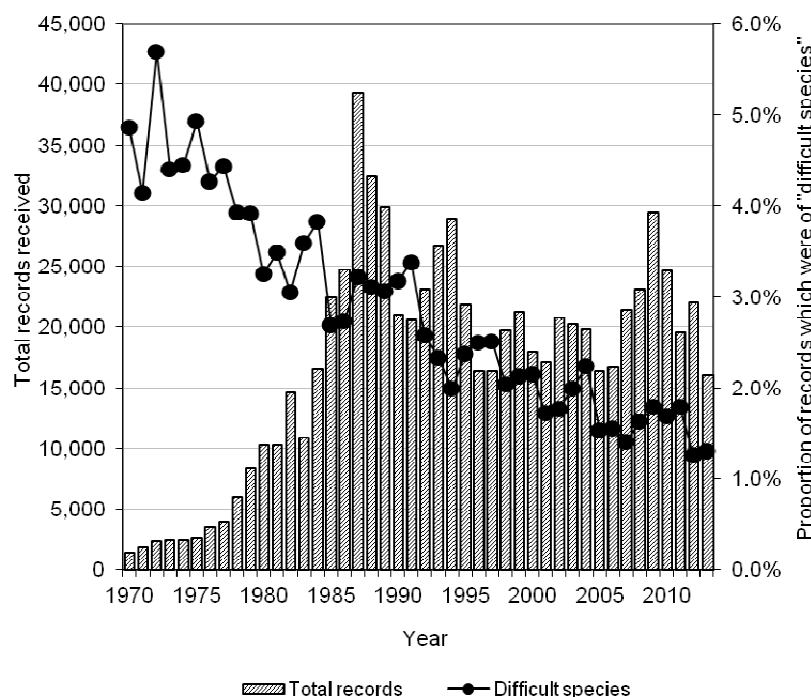
### 3. Methods and sources of information

The data used in this review have been compiled over the forty-two years since the inception of the Hoverfly Recording Scheme in 1976. During this period, the Scheme has assembled over 800,000 records that are held in the *Recorder 2002* software package and are also accessible through the NBN Gateway. These data have been submitted by more than 2,000 recorders. Whilst the database contains records dating back to 1824, no comprehensive attempt has been made to abstract data from museum collections or early literature; these are projects that are under consideration but are unlikely to be achieved in the immediate future. The database does, however, contain those records compiled from literature review and museum visits by Steven Falk during preparation of the first National Review (Falk, 1991) and also some records extracted by individual museum curators and one or two County Recorders (e.g. Dorset and Somerset) from such sources.

Since 1976, contributions to the Hoverfly Recording Scheme have fluctuated. There was intense activity in the mid-1980's, after the publication of the first user-friendly guide to hoverflies (Stubbs & Falk, 1983, revised and updated in 2002) and in the run-up to the publication of an atlas (Ball & Morris, 2000). The most productive year was 1987 when over 32,000 records were reported. Analysis of data submitted to the scheme suggests that levels of hoverfly recording dropped off after 1995, a time that coincided with a change in emphasis within the scheme from data assembly to preparations for publication of the first provisional atlas (Ball & Morris, 2000). Since 2004 there has been renewed effort to assemble data and encourage recording and an updated atlas was published by Ball *et al.* in 2011. The priority given to training new hoverfly recorders has increase considerably over the last few years and this is now bearing fruit with a noticeable upturn in good quality datasets submitted. However it is possible to detect several long term trends (which are probably not confined to hoverfly recording):

- i. There has been a gradual decline in the proportion of records submitted for those species that we would regard as more difficult to identify; this is depicted in Figure 2. A plausible reason for this trend is that there have been changes in the make-up of the suit of contributors to the scheme. In the 1980s and 1990s hoverflies were a popular group amongst many of the most active and competent dipterists. Interest has subsequently waned as these dipterists have moved on to new challenges such as the Empidoidea, Tachinidae, Tephritidae and Tipulidae, all of which have active recording schemes and have been the subject of master-classes run by Dipterists Forum. This sort of maturation is to be expected as dipterists tend not to be collectors; their interest lies broadly in seeing new species, assembling biological information and contributing to the active recording schemes. There is therefore more excitement to be had out of taking on a previously unfamiliar family.
- ii. There has been a change in the nature of natural history recording amongst amateur naturalists, with much greater emphasis on recording without collection of voucher material. The arrival of digital photography may be a further factor as the numbers of photographs submitted as corroboration of a record has certainly increased. This has led to proportional increases in the data submitted for readily identifiable species but a reduction in effort for more difficult species that can only be identified from voucher material. It remains to be seen whether some of these recorders mature in the same way as past generations of dipterists, but on current evidence that does not seem likely because many are strongly averse to the collection of specimens.
- iii. Anecdotal evidence amongst hoverfly enthusiasts suggests that year-on-year hoverfly numbers are dropping. For example, in the 1980s a favourite lure for hoverflies was Hogweed *Heracleum sphondylium*, yet today there are frequent reports of absences of flies from Hogweed flowers (Morris, 2005b). The reasons for this decline have yet to be properly investigated, but it may be that hoverfly numbers have genuinely declined. An alternative possibility is that drought may affect the level of nectar production by flowers such as Hogweed, thereby reducing its effectiveness as a lure. Our impression is that Hogweed and other umbellifers can still attract good numbers of hoverflies in northern and western Britain where rainfall is greater but that droughts in southern and

eastern Britain, where the majority of hoverfly recorders are based, may have impacted upon hoverfly numbers (Morris, 2005a).



**Figure 2.** Numbers of records received by the Hoverfly Recording Scheme each year since 1970 and the proportion which are of species considered to be difficult to identify.

Coverage of Great Britain for hoverflies is very good in comparison with most other invertebrates. See the Hoverfly Recording Scheme web-site ([www.hoverfly.org.uk](http://www.hoverfly.org.uk)) for up-to-date coverage maps. However, coverage is poor in the more remote areas of the west coast and far north of Scotland and thin over most upland regions including most Scottish uplands the Pennines, mid-Wales and the Devon moors. Even so, we believe that some perceived limitations in the Recording Scheme dataset may actually be real on the ground, for example the restricted occurrence of *Epistrophe eligans* in Scotland, whilst others such as *Orthonevra geniculata* and *Cheilosia pubera* are likely to be much more widespread in northern and upland areas than current data suggests (Morris, 2005c).

**Table 1. Number of species allocated to RDB and Notable status in Shirt (1987) (RDB only), Falk (1991), and this review.** Note: the status categories in this review, using the IUCN (2001) criteria, are **not equivalent** to those on the same line in this table from Shirt (1987) and Falk (1991), with the exception of Notable/Nationally Scarce category.

Status	Shirt (1987)	Falk (1991)	Status in this Review	This Review
			Critically Endangered	4
RDB 1	10	10	Endangered	3
RDB 2	17	13	Vulnerable	6
RDB 3	29	16	Near Threatened	10
RDB K	-	-	Data Deficient	9
Notable	-	65	Nationally Scarce	50
<b>TOTAL</b>	<b>56</b>	<b>104</b>		<b>82</b>

## 4. Criteria for including species in the review

### 4.1. The IUCN threat categories and selection criteria

The previously published review of scarce and threatened Diptera (Falk, 1991) employed the Red Data Book criteria used in the British Insect Red Data Book (Shirt, 1987) with the addition of the category RDBK (Insufficiently Known) after Wells, Pyle & Collins (1983). In addition, the status category Nationally Notable (now termed Nationally Scarce) was used by Falk (1991) as defined by Eversham (1983). The original IUCN criteria for assigning threat status used in these publications had the categories *Endangered*, *Vulnerable*, and *Rare*, which were defined rather loosely and without quantitative qualifiers. The application of these categories was largely a matter of subjective judgement, and it was not easy to apply them consistently within a taxonomic group or to make comparisons between groups of different organisms. The deficiencies of the old system were recognised internationally, and in the mid-1980s proposals were made to replace it with a new approach which could be more objectively and consistently applied. In 1989, the IUCN's Species Survival Commission Steering Committee requested that a new set of criteria be developed to provide an objective framework for the classification of species according to their extinction risk. The first, provisional, outline of the new system was published in Mace & Lande (1991). This was followed by a series of revisions, and the final version adopted as the global standard by the IUCN Council in December 1994. The guidelines were recommended for use also at the national level. In 1995, JNCC endorsed their use as the new national standard for Great Britain, and subsequent British Red Data Books (Church *et al.*, 1996; Wigginton, 1999; Church *et al.*, 2001) have used these revised IUCN criteria. Following further minor revisions to the IUCN guidelines the 2001 IUCN Red List Categories and Criteria are now used as the global and GB standard (IUCN, 2001).

A brief outline of the revised IUCN criteria and their application is given below, but it is important that users of the new system refer to the published document (IUCN, 2001) which gives a full explanation, and contains many qualifying remarks. Further, for regional reviews such as this one for Great Britain, the IUCN regional guidelines have been followed (IUCN, 2003). The definitions of the categories are given in Figure 3 and the hierarchical relationship of the categories in Figure 4.

**EXTINCT (EX)**

A taxon is Extinct when there is no reasonable doubt that the last individual has died.

**EXTINCT IN THE WILD (EW)**

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

**CRITICALLY ENDANGERED (CR)**

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E\*

**ENDANGERED (EN)**

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E\*

**VULNERABLE (VU)**

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E\*

**NEAR THREATENED (NT)**

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

**LEAST CONCERN (LC)**

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

**DATA DEFICIENT (DD)**

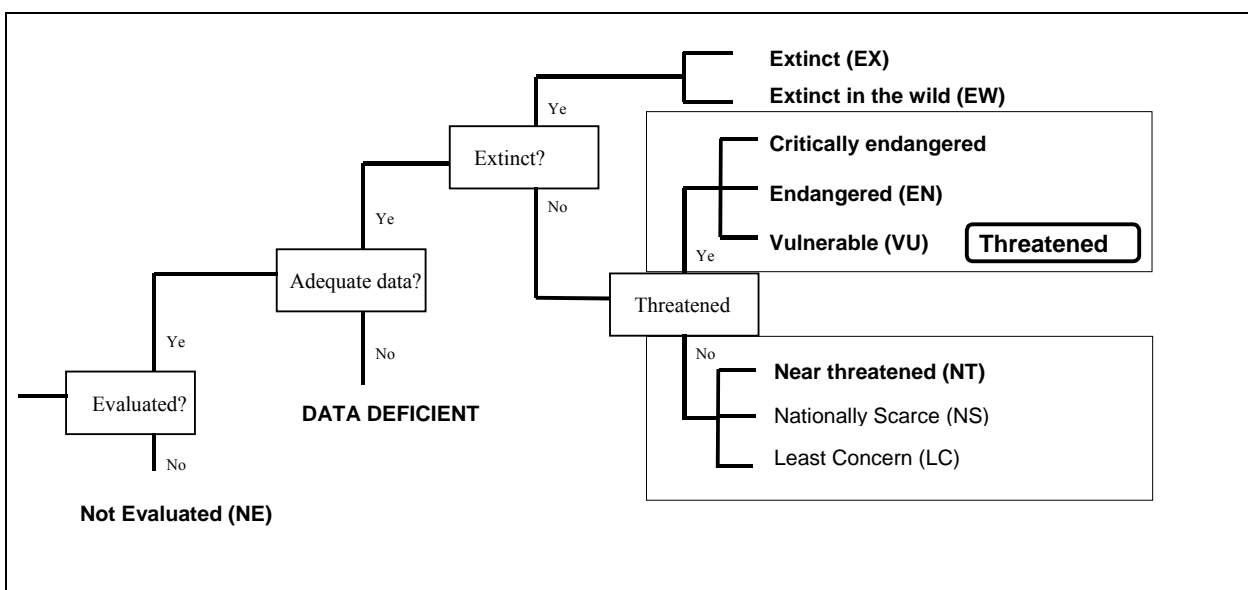
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

**NOT EVALUATED (NE)**

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

**Figure 3.** Definitions of IUCN threat categories (from IUCN, 2001) (see also Appendix 1).

The *Endangered* (EN) and *Vulnerable* (VU) categories are differently defined to those used in previous IUCN guidelines (i.e. IUCN 1994 and earlier), and species in one of these threat categories in the old system will not necessarily be in the same category now. Most species deemed to be '*Rare*' in the old system have been assigned to the *Near Threatened* (NT) category in the new system, although on the basis of the new criteria, some are now regarded as *Vulnerable*. The *Least Concern* (LC) category represents all other species, including the most widespread and ubiquitous (they are not listed in this review).



**Figure 4.** Hierarchical relationships of the categories (Figure adapted from IUCN (2001) *Red List Categories*).

At the national level, countries are permitted to refine the definitions for the non threatened categories and to define additional ones of their own. In this review we have established one extra category and defined Near Threatened to establish a national standard. The *Near Threatened* category is defined as: species occurring in 15 or fewer hectads, but which are not threatened (i.e. not qualifying as *Critically Endangered*, *Endangered* or *Vulnerable*). The *Nationally Scarce* category is defined as – species occurring in 16-100 hectads, but which are not *Threatened*, or *Near Threatened*.

Taxa listed as *Critically Endangered*, *Endangered* or *Vulnerable* are defined as Threatened (Red List) species. For each of these threat categories there is a set of five main criteria A-E (an additional sub-criterion for the *Vulnerable* category), and several sub-criteria all of which have qualifying thresholds. The qualifying thresholds within the criteria A-E differ between threat categories (Appendix 1).

### *The application of the revised IUCN criteria*

The revised IUCN criteria have more quantitative elements than the previous criteria, although these can be difficult to apply where there are limited data on abundance and distribution for the group concerned. However, subjective assessments are still required as, for example, in predicting future trends and judging the quality of the habitat. Thus, a taxon need not meet all the criteria A-E, but is allowed to qualify for a particular threat category on any single criterion.

The guidelines emphasise that a precautionary principle should be adopted when assigning a taxon to a threat category, and this should be the arbiter in borderline cases. The threat assessment should be made on the basis of reasonable judgement, and it should be particularly noted that it is not the worst-case scenario which will determine the threat category to which the taxon will be assigned.

## **4.2. Nationally Scarce**

**Definition.** Species which are not included within the IUCN threat categories and are estimated to occur less than 100 hectads of the Ordnance Survey national grid in Great Britain (formerly termed “Nationally Notable” by Falk, 1991). It should be noted that Nationally Scarce is not a threat category, but rather an estimate of the extent of distribution of these species.

## 5. Species not included

The following species were included in earlier reviews (Shirt, 1987; Falk, 1991), but are not included here for the reasons stated in the following table.

Scientific name	Shirt, 1987	Falk, 1991	Reason excluded
<i>Brachyopa insensilis</i> Collin, 1939		Notable	144 post-1980 hectads Larvae much more readily found than adults but still under-recorded. Has proved to be widespread and frequent in sap-runs on Horse Chestnut, often in urban areas.
<i>Brachypalpus laphriformis</i> (Fallén, 1817)	Rare	Notable	122 post-1980 hectads. Has proved to be more widespread than was previously thought.
<i>Cheilosia soror</i> (Zetterstedt, 1843)		Notable	217 post-1980 hectads. Currently increasing in frequency.
<i>Criorhina asilica</i> (Fallén, 1816)		Notable	168 post-1980 hectads.
<i>Criorhina ranunculi</i> (Panzer, 1804)		Notable	291 post-1980 hectads.
<i>Didea alneti</i> (Fallén, 1817)	Endangered	Endangered	1 post-1980 hectad. We believe this to be a vagrant which may be prone to eruptions from northern boreal areas where it is common (like Crossbill <i>Loxia curvirostra</i> or Waxwing <i>Bombycilla garrulus</i> ). Evidence suggests that it occasionally manages to breed (usually in conifer plantations), but does not persist for more than a year or two.
<i>Didea fasciata</i> Macquart, 1834		Notable	348 post-1980 hectads.
<i>Epistrophe diaphana</i> (Zetterstedt, 1843)		Notable	164 post-1980 hectads – range expanding northwards and westwards.
<i>Eristalis rupium</i> Fabricius, 1805		Notable	190 post-1980 hectads. A northern and western species which is probably still under-recorded.
<i>Eumerus ornatus</i> Meigen, 1822		Notable	143 post-1980 hectads.
<i>Eupeodes bucculatus</i> (Rondani, 1857) (as <i>Metasyrphus latilunulatus</i> (Collin) in Falk, 1991)		Notable	116 post-1980 records – a conifer woodland species thought to be more widespread. Stubbs & Falk (2002) considers that this is a species complex. If this confirmed, then the status of the new, as yet unnamed, taxa listed by these authors may need to be considered separately.
<i>Eupeodes lapponicus</i> (Zetterstedt, 1838) (as <i>Metasyrphus lapponicus</i> (Zetterstedt) in Falk, 1991)		Notable	10 post-1980 hectads. We believe this to be a vagrant. Very few, records at widespread, coastal localities. <i>Eupeodes</i> species A is very possibly a temperature-related form of <i>E. lapponicus</i> .
<i>Lejogaster tarsata</i> (Megerle in Meigen, 1822)		Notable	107 post-1980 hectads.

<i>Megasyrphus erraticus</i> (Linnaeus, 1758) (as <i>Eriozona erratica</i> (Linnaeus, 1758) in Stubbs & Falk, 2002; <i>Megasyrphus annulipes</i> (Zetterstedt, 1838) in Falk, 1991)		Notable	96 post-1980 hectads. A species of conifer woodlands in the north and west which can be difficult to detect amongst the common <i>Syrphus</i> species. Probably still under-recorded although there is some evidence of decline in frequency over the past couple of decades.
<i>Melanogaster aerea</i> (Loew, 1843) (as <i>Chrysogaster macquarti</i> Loew in Shirt, 1987 and Falk, 1991)	Rare	Notable	123 post-1980 hectads. A northern and western species that is probably still under-recorded.
<i>Melanostoma</i> form A sensu Stubbs, 1983		Notable	9 post-1980 hectads. Research by MacGowan <i>et al.</i> (1997) suggested that this is a higher altitude variety of the common <i>M. mellinum</i> .
<i>Meligramma trianguliferum</i> (Zetterstedt, 1843) (as <i>Melangyna triangulifera</i> (Zetterstedt) in Falk, 1991)		Notable	159 post-1980 hectads.
<i>Microdon myrmicae</i> Schönrogge, Barr, Wardlaw, Napper, Gardner, Breen, Elmes, & Thomas, 2002		Notable (as <i>M. mutabilis</i> )	99 post-1980 hectads. This species was split from <i>M. mutabilis</i> and most records attributed to that species are now believed to refer to <i>M. myrmicae</i> . Has proved widespread in the west of Britain and can readily be recorded by searching for larvae in ant nests. Recent field experience suggests it will prove to be much more widespread.
<i>Neoascia geniculata</i> (Meigen, 1822)		Notable	180 post-1980 hectads.
<i>Neoascia obliqua</i> Coe, 1940	Rare	Notable	161 post-1980 hectads.
<i>Orthonevra brevicornis</i> Loew, 1843	Rare	Notable	163 post-1980 hectads.
<i>Orthonevra geniculata</i> Meigen, 1830	Rare	Notable	118 post-1980 hectads. Northern & western species.
<i>Pipizella virens</i> (Fabricius, 1805)		Notable	225 post-1980 hectads
<i>Platycheirus podagratus</i> (Zetterstedt, 1838)		Notable	128 post-1980 hectads. A northern and western species which is probably still under-recorded.
<i>Rhingia rostrata</i> (Linnaeus, 1758)	Vulnerable	Rare	209 post-1980 hectads. This is a rapidly expanding species which has become widespread and often abundant in the Sussex Weald, parts of South Wales and the West Midlands. There have also been recent records from the East Midlands (Bedfordshire, Leicestershire and Northamptonshire).
<i>Sphegina verecunda</i> Collin, 1937		Notable	235 post-1980 hectads.
<i>Volucella inanis</i> (Linnaeus, 1758)		Notable	424 post-1980 hectads. Showing a strong expansion in range.



<i>Volucella inflata</i> (Fabricius, 1794)		Notable	313 post-1980 hectads. Some evidence of increase in range.
<i>Volucella zonaria</i> (Poda, 1761)		Notable	386 post-1980 hectads. Showing a strong expansion in range.
<i>Xanthandrus comtus</i> (Harris, 1780)	Vulnerable	Notable	211 post-1980 hectads.
<i>Xylota florum</i> (Fabricius, 1805)		Notable	165 post-1980 hectads.
<i>Xylota jakutorum</i> Bagachanova, 1980 (as <i>X. coeruleiventris</i> Zetterstedt in Shirt, 1991)		Notable	291 post-1980 hectads. Believed to be confined to Scottish native pinewoods in the 19 <sup>th</sup> Century, but has expanded into conifer plantations and is still expanding its range south-eastwards.

There are 17 species (and two taxa of uncertain status) that occur in 100 hectads or less, but which we do not believe should be listed as Nationally Scarce. The rationale for these exclusions is given as follows:

Species	Number of post-1980 Hectads	Rationale for exclusions
<i>Cheilosia caerulescens</i> (Meigen, 1822)	18	This species has been added to the British list recently (Collins & Halstead, 2008). The larva is a leaf miner of Houseleeks ( <i>Sempervivum</i> sp.) which has spread rapidly north and west across Europe in recent decades, mainly utilising <i>S. tectorum</i> growing in gardens. Judging by the experience in Belgium and Holland, it can be expected to spread rapidly and become widespread in urban gardens in the UK.
<i>Dasysyrphus friuliensis</i> van der Goot, 1960	36	This is part of a complex of species around <i>D. venustus</i> whose taxonomy is currently under review. It is not clear whether this will continue to be regarded as a distinct species. Difficult to identify. Scottish distribution is very uncertain.
<i>Dasysyrphus hilaris</i> (Zetterstedt, 1843)	33	The taxonomic status of this “species” is very uncertain and it is possibly only a colour form of <i>D. venustus</i> . Very few people are prepared to identify it!
<i>Dasysyrphus pauxillus</i> (Williston, 1887)	3	Discovered in the Norfolk Breckland in 2010 (Rabbats, 2010), this species is one of the <i>D. pinastri</i> complex. Difficult to identify. Like the <i>D. venustus</i> complex, statuses will need to be reviewed once the taxonomic revision has been published and records can be re-assessed.
<i>Eristalis similis</i> (Fallén, 1817)	12	Currently believed to be an occasional vagrant. This species has recently become established in parts of the near continent and may do so here. If that happens, its status will need to be reassessed.
<i>Eupeodes goeldlini</i> Mazánek, Láška & Bičík	2	This species has been added to the British list very recently (Speight <i>et al.</i> , 2007) from a specimen taken in Dorset in August 2007. This is part of the <i>E. bucculatus</i> species complex and investigation of its relationship to forms X and Y of Stubbs & Falk (2002) is needed. No basis on which to assess its status as yet.
<i>Eupeodes lundbecki</i> (Soot-Ryen, 1946)	13	Believed to be a vagrant.
<i>Helophilus affinis</i> Wahlberg, 1844	1	A single record of this boreal species; probably a vagrant.
<i>Heringia senilis</i> Sack, 1938	8	This species has only been recognised as distinct from <i>H. heringi</i> in Britain (Jones, 2002) recently, but it is not accepted as a distinct species by many European authors. Very difficult to identify and few records as yet.

<i>Platycheirus aurolateralis</i> Stubbs, 2002	14	A very recent split from the <i>Platycheirus scutatus</i> complex (Stubbs, 2002) with few, rather widespread records as yet. Difficult to identify with certainty.
<i>Platycheirus europaeus</i> Goeldlin de Tiefenau, Maibach & Speight, 1990	95	A recent split from the <i>P. clypeatus</i> species complex which is proving to be widespread especially in Scotland and with a rapidly growing number of records.
<i>Scaeva albomaculata</i> (Macquart, 1842)	0	This is believed to be a vagrant from southern Europe where it is common. Just two records in 1938 and 1949.
<i>Scaeva mecogramma</i> (Bigot, 1860)	0	This is another common Mediterranean species which has occurred just once in Britain in 1905. The locality is believed to have been near Dalkieth, Edinburgh, so it may have been accidentally imported rather than arriving under its own steam as a true vagrant.
<i>Sphaerophoria</i> form A <i>sensu</i> Stubbs & Falk, 1983	1	A single specimen which may be merely a form of <i>S. interrupta</i> . Further searches have revealed no more specimens so its taxonomic status remains very uncertain.
<i>Sphaerophoria</i> species B <i>sensu</i> Stubbs & Falk, 1983	0	Single male specimen taken in 1976 in Kent. It has very distinctive male genitalia, but further searches have failed to produce any more material. Taxonomic status remains very uncertain.
<i>Syrphus nitidifrons</i> Becker, 1921	2	This species has been added to the British list very recently (Parker, 2010) from a single specimen taken in Dorset. Since its initial discovery, at least three other widely dispersed localities have been reported. It has been expected in Britain for some time is likely to be a vagrant, but could become established in the future.
<i>Trichopsomyia lucida</i> (Meigen, 1822)	1	This species has been added to the British list very recently (Speight, 2006) from a single specimen found in London. No basis on which to assess its status as yet.
<i>Xanthogramma stackelbergi</i> Violovitsch, 1975	6	This species was split from <i>X. pedissequum</i> by Stubbs (2012) and very few records are yet available. It appears to be less frequent in collections than <i>X. pedissequum</i> , but it will be some time before its status can be assessed.

## 6. The future

The IUCN criteria for threat categories concentrate on imminent danger of local extinction which hopefully applies to very few species, whilst the criterion for “Nationally Scarce” relates to a small geographic distribution within Great Britain, without taking any account of trends, whether for increase or decline. However, in relation to the Convention on Biological Diversity and the processes of Biodiversity Action Planning that have stemmed from it, far more attention has been focussed in recent years on species (and habitats) which are declining even if they are not currently scarce or rare. This focuses attention on species that are potentially in trouble whilst they are still widespread so that remedial action has the potential to keep them from becoming rare enough to figure in a review such as this.

Decline of a species can best be detected by systematic monitoring of the sort exemplified by the Breeding Bird Survey or Butterfly Monitoring Scheme. No such widespread and systematic surveillance of hoverflies has been undertaken to date, although Alan Stubbs has suggested (and tested) a transect based method for monitoring the abundance of hoverflies in gardens (Stubbs, 1991). Unfortunately this has not been widely taken up.

The Hoverfly Recording Scheme represents an *ad hoc* collation of observations from many recorders using a variety of methods. As such, it is subject to year on year variations in both the amount of recording effort, its geographical extent and the amount to which different habitats are visited. Most records relate only to the presence of a species at a particular date and location, observers rarely attempt to measure abundance even qualitatively. Nevertheless, the sheer quantity of data received tends to even out some of these biases and it may be possible to discern, at least crudely, trends over time in the geographical extent of species and the frequency with which they are reported. Stuart Ball has developed methods to extract such trends from general biological recording schemes and these were reported in Ball *et al.* (2011).

Based on this sort of analysis, there are some species of hoverfly, listed in Table 3, which, although they are too widespread to be considered Nationally Scarce, do seem to be declining in the frequency with which they are reported to the Recording Scheme (Ball *et al.*, 2011). These are species which we should perhaps be paying some attention to. If the apparent declines are sustained, action may be needed.

**Table 3.** Species which are too widespread to qualify as Nationally Scarce, but appear to be declining.

Species	Number of post-1980 hectads	Species	Number of post-1980 hectads
<i>Anasimyia lineata</i>	421	<i>Lejogaster metallina</i>	947
<i>Brachypalpoides lentus</i>	354	<i>Leucozona glaucia</i>	884
<i>Cheilosia lasiopa</i>	291	<i>Melangyna cincta</i>	375
<i>Chrysogaster cemiteriorum</i>	388	<i>Meliscaeva cinctella</i>	1,069
<i>Chrysotoxum cautum</i>	310	<i>Neoascia meticulosa</i>	430
<i>Criorhina berberina</i>	566	<i>Neoascia podagrica</i>	1,532
<i>Dasysyrphus tricinctus</i>	628	<i>Parhelophilus frutetorum</i>	313
<i>Dasysyrphus venustus</i>	806	<i>Platycheirus fulviventris</i>	423
<i>Didea fasciata</i>	348	<i>Platycheirus manicatus</i>	1,433
<i>Epistrophe grossulariae</i>	993	<i>Platycheirus scutatus</i>	1,323
<i>Eristalinus sepulchralis</i>	774	<i>Riponnensia splendens</i>	622
<i>Eristalis abusivus</i>	416	<i>Sphaerophoria philanthus</i>	412
<i>Eristalis horticola</i>	1,324	<i>Sphegina elegans</i>	388
<i>Eumerus funeralis</i>	457	<i>Xylota sylvarum</i>	825
<i>Eumerus strigatus</i>	402		

## 7. Acknowledgements

This review is based upon data supplied by a wide range of amateur and professional entomologists over a period of 30 years. There are too many to mention individually, but everyone's contribution is greatly appreciated.

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## 8. Species listed by status category

In this list the species are given in taxonomic order within status categories.

<b>Extinct</b>	
<b>none</b>	
<b>Critically Endangered</b>	
<i>Blera fallax</i> (Linnaeus, 1758)	<i>Callicera aurata</i> (Rossi, 1790)
<i>Eristalis cryptarum</i> (Fabricius, 1794)	<i>Callicera rufa</i> Schummel, 1842
<i>Myolepta potens</i> (Harris, 1780)	<i>Chalcosyrphus eunotus</i> (Loew, 1873)
<i>Paragus albifrons</i> (Fallén, 1817)	<i>Chamaesyrphus scaevoides</i> (Fallén, 1817)
<b>Endangered</b>	<i>Cheilosia barbata</i> Loew, 1857
<i>Chrysotoxum octomaculatum</i> Curtis, 1837	<i>Cheilosia carbonaria</i> Egger, 1860
<i>Chrysotoxum vernale</i> Loew, 1841	<i>Cheilosia chrysocoma</i> (Meigen, 1822)
<i>Hammerschmidtia ferruginea</i> (Fallén, 1817)	<i>Cheilosia cynocephala</i> Loew, 1840
<b>Vulnerable</b>	<i>Cheilosia mutabilis</i> (Fallén, 1817)
<i>Callicera spinolae</i> Rondani, 1844	<i>Cheilosia nebulosa</i> Verrall, 1871
<i>Chamaesyrphus caledonicus</i> Collin, 1940	<i>Cheilosia nigripes</i> (Meigen, 1822)
<i>Cheilosia ahenea</i> (von Rosser, 1840)	<i>Cheilosia pubera</i> (Zetterstedt, 1838)
<i>Cheilosia sahlbergi</i> Becker, 1894	<i>Cheilosia velutina</i> Loew, 1840
<i>Melangyna ericarum</i> (Collin, 1946)	<i>Chrysotoxum elegans</i> Loew, 1841
<i>Sphaerophoria potentillae</i> Claussen, 1984	<i>Didea intermedia</i> Loew, 1854
<b>Near Threatened</b>	<i>Epistrophe melanostoma</i> (Zetterstedt, 1843)
<i>Caliprobola speciosa</i> (Rossi, 1790)	<i>Eumerus sabulorum</i> (Fallén, 1817)
<i>Cheilosia semifasciata</i> Becker, 1874	<i>Eupeodes nielsenii</i> (Dušek & Láška, 1976)
<i>Doros profuges</i> (Harris, 1780)	<i>Eupeodes nitens</i> (Zetterstedt, 1843)
<i>Lejops vittatus</i> (Meigen, 1822)	<i>Ferdinandea ruficornis</i> (Fabricius, 1775)
<i>Melangyna barbifrons</i> (Fallén, 1817)	<i>Heringia brevidens</i> (Egger, 1865)
<i>Microdon devius</i> (Linnaeus, 1761)	<i>Heringia latitarsis</i> (Egger, 1865)
<i>Paragus tibialis</i> (Fallén, 1817)	<i>Heringia pubescens</i> (Delucchi & Pschorn-Walcher, 1955)
<i>Platycheirus melanopsis</i> Loew, 1856	<i>Mallota cimbiciformis</i> (Fallén, 1817)
<i>Platycheirus amplius</i> Curran, 1927	<i>Melanostoma dubium</i> (Zetterstedt, 1837)
<i>Sphaerophoria loewi</i> Zetterstedt, 1843	<i>Meligramma euchromum</i> (Kowarz, 1885)
<b>Data Deficient</b>	<i>Meligramma guttatum</i> (Fallén, 1817)
<i>Cheilosia psilophthalma</i> Becker, 1874	<i>Microdon analis</i> (Macquart, 1842)
<i>Cheilosia</i> species B	<i>Myolepta dubia</i> (Fabricius, 1805)
<i>Cheilosia uviformis</i> Becker, 1894	<i>Neoscia interrupta</i> (Meigen, 1822)
<i>Epistrophe ochrostoma</i> (Zetterstedt, 1849)	<i>Parasyrphus nigratarsis</i> (Zetterstedt, 1843)
<i>Helophilus groenlandicus</i> (Fabricius, 1780)	<i>Parhelophilus consimilis</i> (Malm, 1863)
<i>Heringia verrucula</i> (Collin, 1931)	<i>Pelecocera tricineta</i> Meigen, 1822
<i>Microdon mutabilis</i> (Linnaeus, 1758)	<i>Pipiza lugubris</i> (Fabricius, 1755)
<i>Orthonevra intermedia</i> Lundbeck, 1916	<i>Pipizella maculipennis</i> (Meigen, 1822)
<i>Sphaerophoria bankowskiae</i> (Goeldlin de Tiefenau, 1989)	<i>Platycheirus discimanus</i> Loew, 1871
<b>Nationally Scarce</b>	<i>Platycheirus immarginatus</i> (Zetterstedt, 1849)
<i>Anasimyia interpuncta</i> (Harris, 1776)	<i>Platycheirus perpallidus</i> Verrall, 1901
<i>Anasimyia lunulata</i> (Meigen, 1822)	<i>Platycheirus sticticus</i> (Meigen, 1822)
<i>Brachyopa bicolor</i> (Fallén, 1817)	<i>Pocota personata</i> (Harris, 1780)
<i>Brachyopa pilosa</i> Collin, 1939	<i>Psilota anthracina</i> Meigen, 1822
	<i>Sphaerophoria virgata</i> (Linnaeus, 1758)
	<i>Triglyphus primus</i> Loew, 1840
	<i>Xylota abiens</i> Meigen, 1822
	<i>Xylota tarda</i> Meigen, 1822
	<i>Xylota xanthocnema</i> Collin, 1939

## 9. Criteria used for assigning species to threatened categories

Scientific name	Status	Criteria used
<i>Blera fallax</i> (Linnaeus, 1758)	CRITICALLY ENDANGERED	B2a + b(i&iii); C2a(i); D
<i>Callicera spinolae</i> Rondani, 1844	VULNERABLE	D1 + D2
<i>Chamaesyphus caledonicus</i> Collin, 1940	VULNERABLE	D2
<i>Cheilosia ahenea</i> (von Rosser, 1840)	VULNERABLE	D1+ D2
<i>Cheilosia sahlbergi</i> Becker, 1894	VULNERABLE	B2ab(iii)
<i>Chrysotoxum octomaculatum</i> Curtis, 1837	ENDANGERED	B1ab(ii)
<i>Chrysotoxum vernale</i> Loew, 1841	ENDANGERED	B1ab(ii)
<i>Eristalis cryptarum</i> (Fabricius, 1794)	CRITICALLY ENDANGERED	B2b(iii, v), c(ii, iii)
<i>Hammerschmidtia ferruginea</i> (Fallén, 1817)	ENDANGERED	B2a, B2c
<i>Melangyna ericarum</i> (Collin, 1946)	VULNERABLE	D2
<i>Myolepta potens</i> (Harris, 1780)	CRITICALLY ENDANGERED	D
<i>Paragus albifrons</i> (Fallén, 1817)	CRITICALLY ENDANGERED	B2a, B2b(i)(ii)
<i>Sphaerophoria potentillae</i> Claussen, 1984	VULNERABLE	D2
<b>NEAR THREATENED</b>		
<i>Caliprobola speciosa</i> (Rossi, 1790)	6 hectads, no evidence of current decline (close to meeting criterion for VULNERABLE D2)	
	The following species are close to qualifying for VULNERABLE under criterion B1 (extent of occurrence under 20,000 km <sup>2</sup> ), but are not judged to currently meet the necessary criteria for a) fragmentation, b) decline or c) extreme fluctuations	
<i>Cheilosia semifasciata</i> Becker, 1874	24 hectads, highly restricted habitat makes it vulnerable	
<i>Doros profuges</i> (Harris, 1780)	21 hectads, decline or loss from historic sites, lack of recent records from some well established sites suggest continuing decline	
<i>Lejops vittatus</i> (Meigen, 1822)	18 hectads, some evidence of decline but may be due to under-recording	
<i>Melangyna barbifrons</i> (Fallén, 1817)	17 hectads, some evidence of decline but may be due to under-recording	
<i>Microdon devius</i> (Linnaeus, 1761)	21 hectads, some evidence of decline due to lack of management	
<i>Paragus tibialis</i> (Fallén, 1817)	20 hectads, highly restricted heathland habitats continue to be under pressure	
<i>Platycheirus melanopsis</i> Loew, 1856	25 hectads, high altitude species potentially threatened by climate change	
<i>Platycheirus amplus</i> Curran, 1927	11 hectads, no evidence of current decline	
<i>Sphaerophoria loewi</i> Zetterstedt, 1843	13 hectads, habitat vulnerable to sea level rise	

## **9.1. The data sheets**

The data sheets are given in alphabetical order by scientific name. Individual species can be found by looking up the generic or specific names (including synonyms used in Shirt (1987) and Falk (1991)) in the index.

*Anasimyia interpuncta* (Harris, 1776)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004)

**Distribution** *A. interpuncta* is confined to south-east England. The majority of the records are concentrated in Cambridgeshire and Norfolk with localised records from the grazing marshes along the inner Thames Estuary and on the East Sussex coast. Sites along the Thames include Rainham Marshes, Ingrebourne Marshes and Barking Creek, and East Sussex sites include the grazing marshes at Pett Levels and Lewes Marshes. It has recently been discovered in the Somerset Levels. Occurs widely in central and Northern Europe.

**Habitat** This is a wetland species that is known from classic fenland sites such as Wicken and Woodwalton fens, but it has also been recorded from the Nene Washes and other localities along the River Nene. The majority of sites appear to be discrete wetlands with still water, but the distribution map suggests that its occurrence in East Anglia follows some major river systems.

**Ecology** The larvae of this genus are 'long-tailed', a modification that allows the animal to breathe whilst living entirely submerged. To date this species' larvae have not been found, but the occurrence of adults in fenland, especially where Reed Sweet-grass *Glyceria maxima* is abundant, points to an association with rotting submerged vegetation. Larvae of others within the genus have been shown to occur within the leaf sheaths of Bulrushes *Typha* and it seems likely that *A. interpuncta* larvae will be found in similar circumstances within as yet unknown emergent plants. The adults fly from April until August, possibly comprising a full generation together with a partial second generation. They are regular flower visitors and have been noted at flowers such as Marsh-marigold *Caltha palustris*.

**Status** Over the past 25 years, this species has been found more widely than was known at the time of Shirt (1987) and Falk (1991). There are 29 post-1980 hectads and no indication of a change in distribution, suggesting that populations are currently stable; as a result the status has been revised from Rare to Nationally Scarce.

**Threats** This is a wetland species that is potentially at risk from drainage and abstraction projects and may be adversely affected by changing rainfall patterns if climate change projections for eastern England prove to be correct. Some localities are coastal and there is the possibility that some of these sites may be lost as coastlines are realigned to accommodate the effects of sea level rise and the need to deliver more sustainable flood management schemes. Conceivably, some coastal grazing marsh sites could be adversely affected by intensification of grazing regimes that reduce the extent ditch margin vegetation, or by intensified ditch management that removes excessive lengths of ditch vegetation.

**Management and conservation** Maintenance of water levels within existing fenland and grazing marsh regimes is a priority, as is the maintenance of fringes of tall emergent vegetation. On grazing marshes, ditches should be managed on a long-enough rotation to allow the maintenance of all seral stages including sections heavily invaded by tall emergent plants such as *Typha*, *Sparganium* and *Glyceria*.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).





*Anasimyia lunulata* (Meigen, 1822)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** The stronghold of this species appears to be wetlands within the coastal belt of west Wales. There are occasional records in western Scotland and scattered records through the English midlands and on the heathlands of Dorset (Studland Heath) and Surrey (Thursley Common). Many of the latter are old; suggesting that there have been localised extinctions. Occurs widely in central and Northern Europe.

**Habitat** This is a wetland species that is known from valley bogs and regenerating cut-over peat bogs. Adults are rarely found far from the water's edge, and are known to visit Marsh-marigold *Caltha palustris*, Bogbean *Menyanthes trifoliata* and white umbels.

**Ecology** The larvae of this genus are 'long-tailed', a modification that allows the animal to breathe whilst living entirely submerged. To date this species' larvae have not been found, but those of other members of the genus are associated with rotting submerged vegetation, but this species is found in more acid localities than is typical for other members of the genus.

**Status** There are 40 post-1980 records, most of which were made during the Welsh Peatland Invertebrate Survey in the late 1980s. There are only five post-1990 records from wide-ranging localities: Studland (1990), Warwickshire (1991), Morfa Bychan (1993), Dartmoor (1995) and South Uist (1999). However, we believe that this apparent severe decline reflects the lack of recent recording activity in this habitat and is consequently not to be relied upon. Therefore the existing status of Nationally Scarce remains appropriate.

**Threats** Drainage of acid mires and other nutrient-poor peatlands; declining rainfall in lowland England as a result of climate change, leading to scrub encroachment; intensification of grazing around wetland margins. In lowland England, nutrient enrichment of poor fens through diffuse pollution from excessive agricultural application of nitrates may be an issue. Elsewhere, deposition of atmospheric nitrogen may be an issue to be aware of.

**Management and conservation** Maintenance of traditional water levels within active wetlands is essential. Where water levels decline, scrub encroachment and development of damp woodland is likely, so in such situations scrub clearance is an essential component of measures to restore wetland biotopes. Measures to limit or reverse nitrification of watercourses may be necessary.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



*Blera fallax* (Linnaeus, 1758)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Although formerly known from a number of localities in Aberdeenshire, Moray and Inverness-shire, this species is now restricted to Strathspey in Scotland centred on the area between Aviemore in the south and Grantown in the north. There have been records from only 4 hectads since 1980. Recent surveys (2003-2008) by the Malloch Society have confirmed its presence at only two sites in the same hectad where they have been the subject of study by a PhD student (2010). In Europe, *B. fallax* is declining and probably under threat.

**Habitat** Restricted to mature pine plantations in Strathspey.

**Ecology** The larvae have been found in wet rot-holes associated with the heart rot decay of Scots Pine *Pinus sylvestris* caused by the pine heart rot fungus *Phaeolus schweinitzii*. Existing populations breed in wet pockets of decay in large pine stumps (minimum surface diameter about 40 cm). As decay proceeds wet areas dry out, thus fresh inputs are needed to ensure new breeding sites are available. Larvae of several different size classes have been found occupying the same cavity suggesting that the larval life is prolonged, extending over several years. Adults appear to have rather a short flight period and have been found around pine stumps or visiting flowers such as Wild Raspberry *Rubus idaeus* and possibly Rowan *Sorbus aucuparia*.

**Status** This was a Biodiversity Action Plan priority species that was the subject of detailed studies by the Malloch Society. Their work has shown that its situation is parlous, with populations confined to two localities in Strathspey where perhaps as few as twenty pine stumps support inhabited rot holes. The total population is likely to be in the low hundreds of larvae producing only a handful of adults in any one year. There are indications that *B. fallax* is also declining in Europe. Qualifies as Critically Endangered under criterion B2 because the area of occupancy is less than 10km<sup>2</sup> since it occurs at only two small sites where around 20 stumps are used for breeding; these sites are at some distance apart and are therefore fragmented (B2a). A continuing decline has been observed (B2b) from four hectads around 1980 to one currently. This species may also qualify under C2a(i) i.e. continuing decline and fewer than 50 mature individuals at each sub-population. Criterion D (fewer than 50 mature individuals) also applies because the number of adult females flying in any one year is probably less than 10.

**Threats** The lack of continuity of suitable larval sites is the main threat to this species. This may have arisen in part from the lack of large old trees infected by the heart rot fungus in the very few sites at which this species has occurred in the past, but the situation is now critical. Less than 10% of large stumps in the remaining breeding sites have suitable wet pockets of decay and there are very few trees or stumps of sufficient size where new wet pockets of decay might develop. Since the population of *B. fallax* is so small, collecting by hoverfly enthusiasts may also present a threat.

**Management and conservation** Trials by the Malloch Society have shown that artificial rot holes can be created by cutting holes into pine stumps. Such artificial breeding sites were occupied within 12 months, suggesting that direct action to create suitable habitat is possible. This species was included within the SNH "Species Action Framework" and as a result considerable research and management work is underway with the ultimate view of stabilising existing populations and establishing five or more sustainable local populations within Strathspey.



This is one of the few hoverflies that may be vulnerable to collecting and it may require statutory protection.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (2001), Rotheray & MacGowan (2000), Rotheray & MacGowan (2004), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Brachyopa bicolor* (Fallén, 1817)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). The larvae are illustrated and keyed to genus in Rotheray (1993).

**Distribution** Widely distributed across southern England as far north as Northamptonshire and Shropshire. The majority of records are from the New Forest with scattered single records from a number of other sites. Widespread in Europe.

**Habitat** This is a woodland and parkland species, and many but by no means all records are from ancient woodland such as The New Forest and Windsor Great Park.

**Ecology** The larvae are filter feeders on yeasts and bacteria and have been found within sap runs on Oak and Beech. Historically there has been a belief that its main association was with sap runs on Goat Moth *Cossus cossus* infested trees. Adults are normally found in close association with sap runs, although the sap run may not be immediately obvious. In addition to Oak *Quercus* and Beech *Fagus*, adults have been noted in association with sap runs on Birch *Betula* and Horse Chestnut *Aesculus*, and with Lime *Tilia* (with no apparent sap run). Males can sometimes be found hovering in sunlit spots close to tree trunks.

**Status** It has been recorded from 43 post-1980 hectads, and although widely distributed it is rarely noted as more than the occasional single individual. In recent years, the numbers of localities away from the New Forest, its traditional stronghold, at which it has been recorded has increased noticeably, suggesting that it may be expanding its range. The wide distribution, low frequency of repeat records and number of post-1980 squares suggests that this species is more widely distributed than was formerly believed, and consequently its status has been revised down from Rare to Nationally Scarce.

**Threats** If the perceived association with *Cossus* infested trees is correct, then the decline in such trees is a matter of concern. In the New Forest, such trees have been heavily affected by woodpecker activity. In parkland and suburban situations, trees with sap runs are sometimes felled because they believed to be dangerous. Similar timber hygiene programmes in woodland offer the same threat to this species and the wider guild of invertebrates associated with sap runs.

**Management and conservation** Long-term continuity of habitat is essential if this and other sap-run species are to flourish. Where discontinuity of woodland age classes is apparent, efforts to resolve this are needed (this is especially true in some parklands). Loss of old woodland habitat within the wider countryside, and loss of connectivity between suitable habitats remain matters of concern, especially as the degree to which isolated hedgerow trees may contribute suitable habitat is unclear.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



*Brachyopa pilosa* Collin, 1939

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). The larvae are illustrated and keyed to genus in Rotheray (1993).

**Distribution** This species has a curiously disjunct distribution with two distinct populations; one in southern England as far north as Peterborough, and west to south Wales; the other is centred upon the Moray Firth. In southern England there would appear to be a significant concentration of populations on the Chalk. Distributed through central Europe and Scandinavia.

**Habitat** This is a woodland species; most frequently Beech woodland, but also woodland with White or Grey poplar.

**Ecology** The larvae are filter feeders within sap runs and within fermenting sap under the bark of recently felled trees (especially Beech *Fagus*). There is a record of a puparium found under a flake of bark on a Beech trunk. Adults fly from April to July and are rarely if ever found any distance from their breeding sites and are usually noted in the vicinity of distinct sap runs on trunks or cut stumps. They may also be found on exposed trunks of recently fallen Beech trees up until the point where fermenting sap has dried up and the bark becomes cracked and desiccated. Although normally associated with Beech, adults have been noted in numbers in association with fallen White or Grey Poplar *Populus*.

**Status** This species is recorded from 63 post-1980 hectads. Analysis of the numbers of records suggests a decline over the past 25 years, but this is likely to be at least partly due to declining recorder effort in areas that are known strongholds (e.g. Surrey). This species is therefore accorded the status of Nationally Scarce, which is unchanged from that given in Falk (1991).

**Threats** The seemingly close association of *B. pilosa* with Beech means that it is potentially vulnerable to the impact of climate change if scenarios identified by the MONARCH project prove to be correct. Even now, there is some evidence of ancient Beech trees succumbing to the effects of drought over the past 15 years. The loss of continuity of aged trees is therefore a matter of concern. Woodland hygiene and the removal of large fallen boughs and trees are further issues that may need to be resolved, especially in areas where there is public access.

**Management and conservation** Efforts may be needed on some sites to address the issue of long-term continuity of age structure amongst Beech trees. Elsewhere, avoidance of woodland tidying and the removal of fallen timber is essential.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Berry, *et al.* (2005), Falk (1991), Harrison, *et al.* (2003), McLean & Stubbs (1990), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).



*Caliprobola speciosa* (Rossi, 1790)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larvae are keyed and illustrated by Rotheray (1993).

**Distribution** This species is confined to two localities; the New Forest and Windsor Great Park. There is an old record from Staffordshire with very limited data on the Hoverfly Recording Scheme database, reports of occurrence in Derbyshire and South Yorkshire are not supported on the HRS database. There is also a recent record of a visual sighting from a locality close to Esher in Surrey, that looks right in terms of habitat. So far, repeat visits to obtain confirmation have proved fruitless. Widespread in Europe north to Denmark and south to Italy.

**Habitat** This species is associated with Beech woods on sandy soils.

**Ecology** The larvae have been found in the rotting roots of dead Beech *Fagus* trees which form a wet mushy “porridge”. Adults are regular flower visitors, but are most frequently encountered investigating the bases of trees and large stumps. Reports from entomologists working rotting timber indicate that adults are readily attracted to the scent of rotting timber. Adults have been taken in some numbers in Malaise traps operated in Windsor Forest.

**Status** This species is known from 6 post-1980 hectads. Recording at the key sites is rather sporadic and there was a gap in records from the late 1990s to the mid 2000s. However, there have been several recent records from a number of recorders confirming that the species continues to be present. Given the long-term continuity of records from these two sites, we believe that the status of Near Threatened is appropriate.

**Threats** The close association of *C. speciosa* with Beech means that it is potentially vulnerable to the impact of climate change if scenarios identified by the MONARCH project prove to be correct. Even now, there is some evidence of ancient Beech trees succumbing to the effects of drought over the past 15 years. The loss of continuity of aged trees is therefore a matter of concern. Woodland hygiene and use of stump grinding in outlying areas around the two centres of population have the potential to limit opportunities for this species to spread.

**Management and conservation** Efforts may be needed to address the issue of long-term continuity of age structure amongst beech trees. Efforts to educate local authority arboricultural officers in surrounding areas may help to publicise the importance of subterranean rotting timber for a guild of scarce hoverflies and especially for *C. speciosa*.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Berry, *et al.* (2005), Falk (1991), Harrison, *et al.* (2003), Rotheray (1993), Stubbs & Falk (2002).





*Callicera aurata* (Rossi, 1790) (as *Callicera aenea* (Fabricius, 1777) in Falk, 1991)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Occurs north as far as southern Scotland, but most frequent south of the Thames, in Devon, Dorset, Hampshire, Berkshire, Surrey and Sussex. There are apparent concentrations of records in North Wales and in Derbyshire and South Yorkshire. There are other widely scattered records, but *C. aurata* appears to be largely a southern and western species with little representation in eastern England and the English Midlands.

**Habitat** This is a woodland and parkland species that is associated with over-mature trees.

**Ecology** The larvae are filter-feeders that inhabit water-filled rot holes and have been found in rot holes in Beech and Birch. Adults are rarely encountered, but have been recorded from a variety of flowers, including Hawthorn *Crataegus*, *Cotoneaster*, species of Scabious *Scabiosa*, umbellifers such as Hogweed *Heracleum sphondylium* and Ivy *Hedera helix*. They fly from June to September, with a peak in June, and late-flying examples might be mistaken for *C. spinolae*. Work in Europe using Malaise traps to investigate the dispersal of saproxylic species suggests that females at least are very mobile and can occur well away from breeding habitat. British records from unlikely localities, such as a suburban garden in Wolverhampton, tend to corroborate this.



**Status** *C. aurata* is recorded from 77 post-1980 hectads. The increasing frequency and more widespread distribution of records since earlier reviews shows that this species is by no means as scarce as was formerly believed. Recent reports from Surrey suggest that it has been more abundant in recent years than it was during the period of intensive recording from 1985 to 1995, and this observation may be indicative that *C. aurata* has benefited from recent hot summers. Given these observations, its status has therefore been revised from Rare to Nationally Scarce.

**Threats** The association with rot holes in older trees means that loss of continuity of aged trees is potential a matter of concern at some locations. This is a species that might be encountered in urban parks and so arboricultural practices such as cavity filling (with cement) could contribute to a reduction in possible breeding opportunities.

**Management and conservation** Efforts may be needed to address the issue of long-term continuity of age structure amongst trees in old woodlands and parklands. Education of local authority arboricultural officers may help to publicise the importance of rot holes for rot hole hoverflies.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Little & Rotheray (2007), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).

*Callicera rufa* Schummel, 1842

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larvae keyed and illustrated by Rotheray (1993).

**Distribution** Caledonian pine forests and pine plantations across the Scottish Highlands. This species has been the subject of detailed studies by the Malloch Society that have shown *C. rufa* to occur in the majority of locations in northern Scotland where ancient Scots Pine *Pinus sylvestris* occurs. In recent years it appears to have been extending its range as conifer plantations are clear felled and breeding sites are created in the residual stumps. At the time of writing there are indications that this range extension has accelerated with recent reports from England (Nottinghamshire, 2009; Shropshire, 2011-13 and Bedfordshire, 2011).

**Habitat** This is a characteristic species of Caledonian pine forests but has also been found to occur in Pine, Larch and Spruce plantations when the trees are sufficiently mature to providing breeding holes. Colonisation of holes in stumps after plantations have been felled has been noted during the last decade and this seems to be the situation at the English sites.

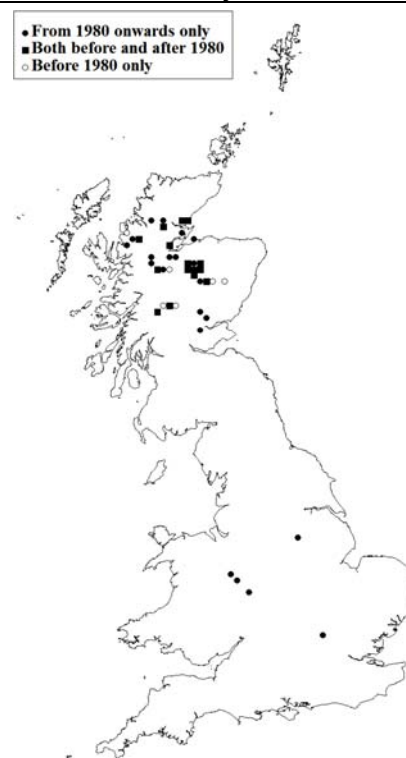
**Ecology** The larvae are associated with water-filled rot holes in cavities in Pine *Pinus*, Spruce *Picea* and Larch *Larix*. There are a variety of reports of puparia found within fissures in Pine bark near such holes. Adults are very elusive and the majority of records are of larvae, but those records that do exist show this species to fly between June and August. Adults, especially females, are probably very mobile and recent extensions of range suggest dispersal from core Caledonian Forest locations into plantations within northern Scotland.

**Status** There are 36 post-1980 hectads, most of which arise from detailed studies by the Malloch Society. The data are therefore robust enough to determine that this species is much more widespread than was thought at the time of previous reviews. Its status has therefore been revised from Rare to Nationally Scarce.

**Threats** The association with rot holes in older trees means that loss of continuity of aged trees is a matter of concern. This is particularly true where there is a discontinuity of age classes due to past management within Caledonian pine forests.

**Management and conservation** Re-establishment of continuity of age classes within stands of Scots Pine is essential. Evidence of larval breeding sites in Larch and Spruce suggest that this species may be accommodated in localities where these trees are allowed to reach post-maturity. The species readily occupies artificial rot holes and these can be used to accommodate this species when natural holes are scarce.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Jones (2011, 2012), McGowan & Rotheray (2006), Rotheray (1993), Rotheray & McGowan (1990, 2000), Stubbs & Falk (2002).





Order DIPTERA

Family SYRPHIDAE

*Callicera spinolae* Rondani, 1844

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This species is confined to East Anglia, with recent records from Cambridgeshire, Essex, Norfolk and Suffolk. Stubbs & Falk (2002) also mention Hertfordshire, but we have been unable to trace this record.

**Habitat** This is a woodland and parkland species that seems to be associated with trees in an open landscape rather than closed canopy woodland. One of the known sites is an old deer park; another is an urban park.

**Ecology** The larvae inhabit rot holes and have been found in Beech *Fagus*, Horse Chestnut *Aesculus* and Field Maple *Acer* in England, and from Poplar *Populus* in Russia. It is noteworthy that trees bearing rot holes in which larvae have been found are not necessarily large or ancient. Larvae have also been found in heart rot extending a long way into the tree, potentially making them more difficult to find than other *Callicera* larvae. The records indicate that this is a species which has a tendency to turn up at new sites for a period of years and then disappear again. This suggests that it may be quite mobile and populations may not necessarily remain at the same locality.

**Status** There are 10 post-1980 hectads on the Hoverfly Recording Scheme database. This was a Biodiversity Action Plan Priority Species. The majority of recent records have been from a single locality in Cambridgeshire, and efforts to locate new sites as part of the work to fulfil the Biodiversity Action Plan were unsuccessful. But, since 2000 there have also been records from Bedfordshire (site confidential and therefore not mapped), Essex, Norfolk and Suffolk that show this species to be more widely distributed than was formerly believed. These records suggest that *C. spinolae*, whilst genuinely rare, is likely to be more widely distributed than formerly believed, although it is very difficult to detect. For this reason, its former status of Endangered has been revised to Vulnerable. It qualifies under criterion D1 (less than 1,000 mature individuals). The number of sites from which it is known is fewer than 10 in the last 25 years and, in the few cases where it has been investigated, the number of trees providing breeding sites at a particular locality has been less than five. Therefore, the total larval population at a site cannot be more than high tens to low hundreds of larvae and the number of adults emerging each year is probably in the low tens. It may also qualify under criterion D2 (five or fewer locations). Whilst the total number of locations over this period is around 10, the number from which it has been reported in any five year period is less than five.

**Threats** The association with rot holes means that loss of continuity of aged trees is potentially a matter of concern at some locations. This is a species that might be encountered in urban parks and so arboricultural practices such as cavity filling (with cement) could contribute to a reduction in possible breeding opportunities. There are indications that this species went through a period of decline as a result of drought, and therefore climate change that resulted in desiccation of rot holes might threaten this species.

**Management and conservation** Efforts may be needed to address the issue of long-term continuity of age structure amongst trees in old woodlands and parklands. Education of local authority arboricultural officers may help to publicise the importance of rot holes for rot hole hoverflies.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Rotheray (1997a), Stubbs & Falk (2002).

*Chalcosyrphus eunotus* (Loew, 1873)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This species is seemingly confined to the West Midlands/Welsh borders region and to a small number of localities in Dorset and Somerset.

**Habitat** This is a woodland species that is most frequently encountered in the deep-sided dingle woodlands from Gloucestershire to Shropshire where it is associated with fallen timber in log-jams in streams.

**Ecology** *Chalcosyrphus eunotus* is an enigmatic species whose larvae are believed to develop in partially submerged timber. The larvae of its near-relative *C. nemorum* live under bark with decaying sap and similar niche utilisation is to be expected in *C. eunotus*.

**Status** Recent work in the Welsh borders has shown that *C. eunotus* is more widely distributed than was formerly believed. It is currently known from 33 post-1980 hectads on the Hoverfly Recording Scheme database and we believe that there are further records that have not yet been reported to us. As a result of this new information, the status has been revised from Vulnerable to Nationally Scarce.

**Threats** This is a flagship species for log-jams in streams, a habitat that is very vulnerable to removal both from a flood management perspective and to facilitate better navigation. Continued or excessive removal of log jams, especially those in the dingle woodlands of the Welsh borders, remains a threat.

**Management and conservation** Reversal of the trend of clearance of log jams and removal of submerged rotting timber is essential if this and the wider guild of invertebrates that inhabit such situations are to be conserved across their known range.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Chamaesyrrhus caledonicus* Collin, 1940

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Confined to northern Scotland, but there is no obvious pattern to its distribution. The localities are widespread and include Culbin Sands (1903-1991), Rothiemurchus Forest (1988), Achfary Forest (1985) and old records from Boat of Garten (1903) and Rannoch (1917). This species was originally described from Scotland and outside Britain it is known only from single records from the Netherlands and Leningrad.

**Habitat** This little known species was discovered at Culbin Sands on the Moray Firth and this remains the locality from which most records have come, most recently in 1991. The habitat here is pine plantation on sand dunes and the latest specimen was swept from heathy vegetation under the pines. Some other records have come from Caledonian pine woodland where it was also swept from heathy vegetation in the few cases where any details are known.

**Ecology** Nothing is known of the larval stages of this species or any of its near relatives in the tribe Pelecocerini. Adults fly in July and August and have been recorded by sweeping low heathy vegetation.

**Status** Very little is known of this species. It has been recorded from 3 post-1980 hectads and from only six localities in total, but only once in each case except at Culbin Sands where it has been found on at least four occasions. It is therefore considered to be Vulnerable under criterion D2 on account of its highly restricted distribution. It has only ever been recorded from five localities, with post 1985 records from just three of them. Only one site, Culbin Forest, has repeatedly yielded records, the most recent being in 2006. It seems likely that the population is very small (criterion D1) but, considering that the biology remains unknown, we have no way of estimating this or any population trends.

**Threats** Large scale forestry operations resulting in changes to ground-layer structure at Culbin Sands. Elsewhere, loss of ride structure and intensification of forestry may shade out suitable habitat.

**Management and conservation** Existing mosaics of vegetation should be retained wherever possible. Any further occurrences of this species should be reported with details of its capture location so that more detailed information on its habitat preferences may be assembled.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Stubbs & Falk (2002).

*Chamaesyrrhus scaevoides* (Fallén, 1817)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Widely distributed across the Highlands around the Cairngorms, and through Ross & Cromarty.

**Habitat** The majority of records are from Caledonian pine forests, but there are also records from conifer plantations, suggesting that this is not primarily associated with *Pinus*. Current evidence suggests that the favoured habitat is heathy vegetation within open woodland.

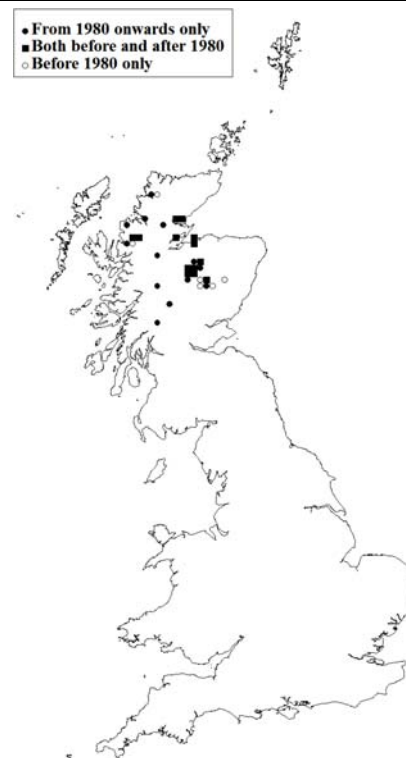
**Ecology** Nothing is known of the larval stages of this species or any of its near relatives in the tribe Pelecocerini. Adults fly from June to August and are usually swept from heathy vegetation along footpaths and ride margins. They can be reasonably abundant within their restricted range and habitat. They have been observed visiting Tormentil *Potentilla erecta* and Ragwort *Senecio jacobaea* flowers along the edges of such paths.

**Status** There are 26 post-1980 hectads for this species. The overall distribution of records and its wider association with rides in conifer plantation means that its status has been revised from Rare to Nationally Scarce.

**Threats** Loss of ride structure and intensification of forestry may shade out suitable habitat.

**Management and conservation** Existing mosaics of vegetation should be retained wherever possible. Any further occurrences of this species should be reported with details of its capture location so that more detailed information on its habitat preferences may be assembled.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Cheilosia ahenea* (von Rosser, 1840)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Known from just a single location on Islay. This species is also known from various localities along the west coast of Ireland and may prove to be more widespread on dunes of the Western Isles.

**Habitat** Current evidence points to this species being confined to Machair grassland in Scotland. In Ireland it has also been found on limestone grassland and adjacent sand dune systems.

**Ecology** Very little is known of the larval ecology of *C. ahenea*, although being a *Cheilosia* it may be assumed that it is a stem or root borer in as yet unknown host plant.

**Status** There are three records between the 25<sup>th</sup> and 29<sup>th</sup> of June 2000 from a locality on Islay. Very little further work in western Scotland has occurred since then, although a visit to the dunes of southern Kintyre failed to reveal this species. Given the lack of knowledge about this species, highly restricted distribution of Machair grassland, and current evidence of a highly localised population it is felt appropriate to list this species as Vulnerable under criterion D1 (small population size) and D2 (five or fewer localities).

**Threats** Intensification of grazing regimes on Machair grassland.

**Management and conservation** Existing grazing and cutting regimes on Machair grassland should be maintained.

**Published sources** Speight (2000), Stubbs & Falk (2002).

*Cheilosia barbata* Loew, 1857



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Confined to southern England, mainly south of the Thames in Kent, Surrey, and Sussex, but extending north and west through Berkshire, Oxfordshire and Warwickshire. There is an outlying record from West Suffolk and another from the Isle of Wight. The map in Ball *et al.* 2011 incorrectly shows the distribution extending into northern England and Scotland. This was due to confusion of synonymy over records of “*Cheilosia honesta*” from old literature sources. These should have been attributes to *C. lasiopa*, not to this species.

**Habitat** The majority of records come from woodlands and grasslands on the Chalk, but there are also records from the Wealden clays and from the London Clay, suggesting that a calcareous influence is possibly more important than drainage.

**Ecology** The larva is unknown, but the larvae of Cheilosini are usually found boring in stems, or roots or are leaf miners. The adults of this species are flower visitors, and have been recorded from Hogweed and Wild Parsnip *Pastinaca sativa* flowers.

**Status** There are 44 post-1980 hectads for *C. barbata*. There are also suggestions that this species may have declined. However, caution is required because the Hoverfly Recording Scheme lacks recent information from key areas for this species. We therefore judge that there should be no change in the status of Nationally Scarce.

**Threats** Loss of woodlands and scrubby environments on calcareous soils in southern England.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open glades. Where the species occurs in grasslands they are likely to be adjacent to woodland, so maintenance of similar transitions along the woodland edge are important, whilst minimisation of scrub invasions within the grassland should remain a priority.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Stubbs & Falk (2002).



*Cheilosia carbonaria* Egger, 1860



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Widely distributed across southern England south of the Thames, with scattered records north as far as Cheshire.

**Habitat** This is mainly a woodland species but is by no means confined to ancient woodlands, having been recorded from a range of woody heathland and grassland sites. Evidence from Surrey suggests that clay woodlands are often favoured.

**Ecology** The larva is unknown, but the larvae of Cheilosini are usually found boring in stems and roots of plants or mining leaves. Adults are usually found visiting flowers, often white or yellow umbellifers, in sheltered spots such as open rides or around the edges of woodland, scrub or hedgerows.

**Status** There are 60 post-1980 hectads, and initial analysis suggests that this species may have declined. However, caution is required because the Hoverfly Recording Scheme lacks recent information from key areas for this species. We therefore judge that there should be no change in the status of Nationally Scarce.

**Threats** Loss of woodlands and scrubby environments on clay soils in southern England.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open glades. Where the species occurs in grasslands they are likely to be adjacent to woodland, so maintenance of similar transitions along the woodland edge are important, whilst minimisation of scrub invasions within the grassland should remain a priority.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Stubbs & Falk (2002).



*Cheilosia chrysocoma* (Meigen, 1822)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** There are scattered records across England, Wales and Scotland, although some clumping is also apparent with concentrations of records in western Scotland, southern Cumbria, North Wales, South Wales and the Welsh borders, Oxfordshire and Northamptonshire.

**Habitat** This seems to be mainly a species of woodland rides and glades,

**Ecology** Even though *C. chrysocoma* is a very distinct species, its ecology is poorly known. Females have been observed ovipositing at the base of *Angelica* *Angelica sylvestris* and it is assumed that this is the larval host plant. Adults are often noted sunning themselves on vegetation but can also be flower visitors.

**Status** There are 54 post-1980 records of *C. chrysocoma*. This, together with the overall distribution of records, indicates that this is a more widespread species than was previously believed. As a result, its status has been revised down from Rare to Nationally Scarce.

**Threats** Drainage of damp mesotrophic grasslands and woodlands with *Angelica*, and intensification of grazing of grasslands or cutting regimes within woodland rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open glades. Where the species occurs in grasslands they are likely to be adjacent to woodland, so maintenance of similar transitions along the woodland edge are important, whilst minimisation of scrub invasions within the grassland should remain a priority.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Stubbs & Falk (2002).



*Cheilosia cynocephala* Loew, 1840



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Widely distributed as far north as southern Scotland. The heaviest concentration of records seems to be from Dorset, Somerset and East Anglia.

**Habitat** The majority of records are from calcareous localities; either from Chalk or limestone grasslands.

**Ecology** The larvae are known to mine Musk Thistle *Carduus nutans*, but an association with Welled Thistle *C. crispus* has also been noted in Warwickshire. This species is double-brooded with the summer brood much more abundant than the spring brood.

**Status** There are 68 post-1980 records. This is not a straightforward species to identify and it is possible that some records are erroneous. There is evidence from initial analysis of the dataset that this species is declining but *Cheilosia* are not as comprehensively reported by recorders as they used to be. We therefore conclude that the status of Nationally Scarce should remain unchanged.

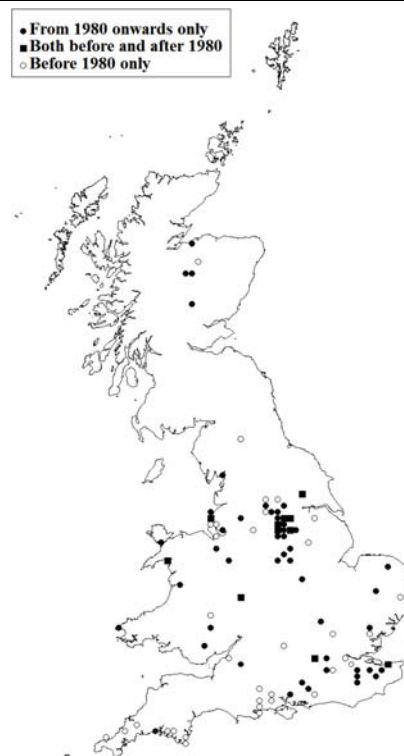
**Threats** Herbicide use to destroy stands of Musk Thistle; intensification of grassland management; and scrub encroachment on limestone grassland.

**Management and conservation** Grassland management on calcareous soils where Musk Thistle occurs should aim to ensure that the thistle populations are maintained. Use of weed-wipes for thistle control should be applied sparingly, avoiding concentrations of Musk Thistles where they occur in combination with Creeping Thistle *Cirsium arvense*.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Cheilosia mutabilis* (Fallén, 1817)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Widely distributed as far as northern Scotland but with very noticeable concentrations of records in South Yorkshire and Derbyshire. Elsewhere, records are mainly scattered and offer no obvious pattern.

**Habitat** There are records from woodland, grassland and heathland localities.

**Ecology** Larvae have been found in the roots of Welled Thistle *Carduus crispus*, but as this is not a heathland species and *C. mutabilis* is also known from heathland, it must be assumed that a variety of host thistles are utilised. Adults rarely occur in numbers, most frequently being found as single individuals.

**Status** There are 58 post-1980 records. In 1991 there were suggestions of decline in abundance: also apparent in the current data set. This decline may in part reflect an overall decline in recording of *Cheilosia* and as a consequence we do not believe that a change in status from Nationally Scarce is required.

**Threats** Intensification of grazing pressure, intensified woodland ride management and deliberate random destruction of thistle populations.

**Management and conservation** Maintain existing mosaics of habitats, ensuring that where thistles other than creeping thistle are not targeted for destruction.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Cheilosia nebulosa* Verrall, 1871

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Widely distributed at low density across England, with a single Scottish record.

**Habitat** This is a species of woodland rides, but does not appear to be confined to particular soil types, having been recorded from heavy clays to light sands.

**Ecology** Very little is known of the larval host plant of *C. nebulosa*, although there are suggestions that this species is associated with Hardhead *Centaurea nigra*. Adults are often noted at Sallow *Salix* catkins in spring, and males often hover at head height in woodland rides.

**Status** There are 63 post-1980 records, and although initial analysis of the dataset suggests a decline, overall numbers of localities far exceed the number of records known in 1991. For this reason the status has been revised from Rare to Nationally Scarce.

**Threats** Intensification of management of woodland rides, reduced ride management and scrubbing of rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Cheilosia nigripes* (Meigen, 1822)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is a southern English species that is most commonly encountered in Surrey, Sussex, Kent, Dorset, Somerset and Gloucestershire.

**Habitat** This is a woodland species that occurs on Chalk and limestone.

**Ecology** This is a very poorly known species whose larval host plant is unknown. Males are often noted sunning themselves on sunlit leaves.

**Status** There are 25 post-1980 hectads. There is no evidence of a decline and consequently the status has been revised down from Rare to Nationally Scarce.

**Threats** Intensification of management of woodland rides, reduced ride management and scrubbing of rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Cheilosia psilophthalma* Becker, 1874

● From 1980 onwards only  
 ■ Both before and after 1980  
 ○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** There are records in the Hoverfly Recording Scheme dataset from North Yorkshire, South Yorkshire, Derbyshire and Somerset. Other known locations include Warwickshire, Suffolk and Berkshire.

**Habitat** This is a species of unimproved grassland.

**Ecology** The larvae are reported to feed within the rosette of Mouse-ear Hawkweed *Pilosella officinarum*. Females have been found sitting upon rosettes of this plant. Adults are typically found visiting Sallow *Salix* and other spring flowering shrubs.

**Status** This is a recent addition to the British list and is difficult to distinguish from *C. urbana* with which it shares the same host plant (although *C. urbana* larvae attack the roots rather than the above ground parts). There are 16 post-1980 hectads on the Hoverfly Recording Scheme database, but it is difficult to be certain that these are all correctly identified. As a consequence it is difficult to make any judgement of its true distribution, and therefore it is considered Data Deficient.



**Threats** Intensification of nutrient-poor flower-rich grasslands. Mouse-ear hawkweed occurs in relatively short swards and is likely to be affected by reduced grazing pressure or elevated nutrient levels that promote the development of rank mesotrophic grassland.

**Management and conservation** Grassland management should aim to maintain grazing regimes that favour the retention of short swards favoured by Mouse-ear Hawkweed.

**Published sources** Stubbs & Falk (2002).

*Cheilosia pubera* (Zetterstedt, 1838)



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is mainly a northern species, but there are populations in Lincolnshire and Norfolk and outliers from Hampshire and Wiltshire.

**Habitat** Analysis of its distribution suggests that its main strongholds are upland localities where it can be exceptionally abundant. Typical examples of suitable habitat are wet roadside verges with Water Avens *Geum rivale* and Marsh Marigold *Caltha palustris*, streamsides with Butterbur *Petasites hybridus* beds and Buttercups *Ranunculus*. In Norfolk this is a fenland species and such habitats are likely to be typical of many localities elsewhere in England and Scotland. At the moment there are no records from Wales.

**Ecology** The larvae are reportedly associated with Water Avens on the continent, and recent observations of this species in southern Scotland suggest that this will prove to be the case in the UK. Adults are regular flower visitors and can occur in numbers at Marsh Marigold and Buttercups.

**Status** There are 62 post-1980 hectads on the Hoverfly Recording Scheme database and further records that require investigation before confirmation. This level of records is consistent with a status of Nationally Scarce. However, further recording in Scotland may prove that the species is more widespread and require downgrading of this status in the future.

**Threats** Drainage of wetlands for forestry in upland locations. In lowlands such as in southern England, desiccation of wetlands through drainage or drought is a potential danger to remaining populations. These southern outliers are potentially vulnerable to climate change scenarios modelled in recent studies.

**Management and conservation** Water levels within suitable wetlands should be maintained, together with mosaics of water edge vegetation. Scrub control may be required if Water Avens populations are to be retained.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (2005d), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Cheilosia sahlbergi* Becker, 1894

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Restricted to mountainous areas of Scotland especially parts of the Cairngorms and the Breadalbane mountains in Perthshire.

**Habitat** This is a montane species that is restricted to altitudes above 750 metres. Some localities indicate an association with base-rich environments, but this is not borne out by all localities.

**Ecology** Larvae have been found as external grazers of the roots of Alpine Bistort *Persicaria vivipara*. The adults do not appear to fly readily, and can be observed crawling out of vegetation given patience to sit and watch.

**Status** There are 11 post-1980 hectads. Upland habitats are generally less well recorded than lowlands, simply on grounds of logistics, so there is the possibility that further populations will be located. The larval foodplant is widely distributed in the uplands of Scotland and northern England. However, this is one of a suite of species that are confined to a very narrow altitudinal range that may become compressed further by climate change. This species is therefore considered to be Vulnerable under criteria B2 (area of occupancy less than 2,000 km<sup>2</sup>) and (a) severely fragmented because it is restricted to mountain tops (biii) and a decline in the extent of its habitat due to climatic warming has been inferred from modelling studies.

**Threats** Overgrazing is the most likely management threat, but in the longer-term climate change is a very real threat, with the possibility that this species will be lost under certain projected climate change scenarios. Other potential threats come from habitat degradation arising from development of leisure activities such as mountain biking or possibly winter sports.

**Management and conservation** Upland grazing regimes should be maintained at a level commensurate with retention of its foodplant Alpine Bistort. Leisure activities on mountains within its known range should be carefully regulated to avoid habitat degradation. This is an element of the high mountain insect fauna which receives very little survey effort because few entomologists are active at these altitudes. Most of the records come from work carried out by conservation agencies in the late 1980s. There is ongoing effort to repeat these surveys, therefore a better understanding of changes may emerge over the next few years.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Stubbs & Falk (2002).



*Cheilosia semifasciata* Becker, 1874

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larva and mines illustrated by Rotheray (1993).

**Distribution** This species is largely confined to North Wales with outlier in the Welsh borders and Shropshire, but there are discrete populations in southern England such as at Pamber Forest (Hampshire), Hurtwood (Surrey) Piddles Wood (Dorset) and Nare Head (Cornwall). The old records from Woodditton Wood in Cambridgeshire are genuine (based on specimens in the Hope Department Collection, Oxford).

**Habitat** This is a woodland species, and tends towards shaded woodland situations.

**Ecology** The larvae mine the leaves of Orpine *Sedum telephium* in southern England and Navelwort *Umbilicus rupestris* in North Wales. Although the foodplants, especially Navelwort in North Wales, are widespread, *C. semifasciata* appears to have a genuinely localised and confined distribution. Searches of the foodplant, even in areas where the species is known to occur, reveal that most apparently suitable patches are unoccupied. It seems likely that there are some very specific requirements that need to be met concerning the location and situation of the plant. These may relate to the moisture regime and the length of time over which the leaves remain green and fleshy. The blotches produced by the larvae are quite obvious and the larva is adapted to minimise the risk of detection because upon vacation of a mined leaf it chews through the stem, thereby depriving predators of the multiple visual clues that might draw attention to occupied mines. Over its development period in spring, the larva may occupy and vacate five of six leaves before it reaches maturity. Adults fly in April and May although the overall flight period is from March to July.

**Status** There are 24 post-1980 hectads. The highly restricted distribution and discrete habitat preferences lead to the conclusion that this species should be graded Near Threatened.

**Threats** In southern England, changing woodland management and loss of coppicing may lead to a decline in Orpine populations. In North Wales, increased woodland management leading to greater exposure of Navelwort populations to sunlight may reduce the viability of some populations. This is a species that should be flagged as possibly vulnerable to the effects of climate change, at least in southern England.

**Management and conservation** In southern England, existing management practices should be maintained or reintroduced to ensure the survival of Orpine populations. In North Wales, exposed colonies of Navelwort may be made more attractive by allowing greater shading. However, localised thinning may be needed to ensure light levels are maintained sufficient to support Navelwort.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Cheilosia* species B sensu Stubbs & Falk, 1983

● From 1980 onwards only  
 ■ Both before and after 1980  
 ○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** There is only one record of a single male found at Ballater in the central Highlands of Scotland on 30/05/1981.

**Habitat** The single record was from a riverbank.

**Ecology** The identity of *Cheilosia* species B is uncertain, but is thought to be either *C. gigantea* or the recently separated and very little known *C. ingerae*. The larval foodplant of *C. gigantea* is Northern Dock *Rumex longifolius* and Scottish Dock *Rumex aquaticus*, both of which have highly restricted distributions in Scotland and northern England.

**Status** Despite further searches, no more individuals have been found since the original in 1981. Whilst it is clear that the specimen is different from other species known in Britain, it has not proved possible to name it with certainty based on the single individual available. For the same reasons no status can be ascribed because of data limitations; it has therefore been listed as Data Deficient.

**Threats** Unknown, but any activities that restrict the distribution of Scottish dock and northern dock must be viewed as deleterious to possible populations of *Cheilosia* species B. The known locality is close to an urban centre and therefore increased access to this section of riverbank may lead to deterioration of bankside habitats. River improvement schemes such as straightening and widening also have the potential to adversely affect suitable bankside vegetation.

**Management and conservation** Waterways that support Scottish Dock and Northern Dock should not be intensively managed or 'improved'.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Cheilosia uviformis* Becker, 1894

● From 1980 onwards only  
 ■ Both before and after 1980  
 ○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** England as far as Scotland, but too few records to be sure about genuine distribution.

**Habitat** Uncertain, possibly a denizen of seasonally flooded woodlands, but evidence is highly circumstantial at the moment. In Ireland it has been recorded from lakeside Willow *Salix* and Alder *Alnus* carr.

**Ecology** This is a member of a genus of phytophagous species, many of which are associated with thistles. There is as yet nothing upon which to base any suggestions for host plant associations. Females have been taken at Hawthorn *Crataegus* and *Salix* in Ireland, but as yet there are limited data upon which to make any judgements of ecology in Great Britain.

**Status** There are 4 post-1980 records on the Hoverfly Recording Scheme database. This is an insufficient basis upon which to make any judgement of the species' status and it has therefore been listed as Data Deficient.

**Threats** If indications are correct that seasonally flooded woodlands are its habitat, then changes to drainage regimes are a possible threat, as is intensification of woodland management. This remains conjecture, however, and for the time-being it must be concluded that further information is needed before a rational judgement can be made.

**Management and conservation** Unknown.

**Published sources** Speight (1986), Stubbs & Falk (2002).



*Cheilosia velutina* Loew, 1840

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** England as far north as southern Scotland, with the majority of records in eastern England.

**Habitat** Widely recorded from woodlands, grassland and heathlands.

**Ecology** There are no British breeding records but there is an old continental record of larvae in the roots of Common Figwort *Scrophularia nodosa*. Adults are most frequently encountered on umbellifer flowers.

**Status** There are 67 post-1980 records of this difficult species, suggesting that it may be more abundant than current records suggest. However, given that relatively few records do come to light each year, it remains likely that it has highly restricted distribution and for this reason we have concluded that its status should stay as Nationally Scarce.

**Threats** Intensification of grassland and woodland management to the detriment of possible host plants is the most likely threat. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open glades. Where the species occurs in grasslands they are likely to be adjacent to woodland, so maintenance of similar transitions along the woodland edge are important, whilst minimisation of scrub invasions within the grassland should remain a priority.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Chrysotoxum elegans* Loew, 1841

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is mainly a southern and western species with the majority of records confined to the area south of a line between the Severn and the Wash. Most recent records emanate from South-west England, especially Cornwall, Devon and Dorset, but also from Norfolk, Suffolk and Cambridgeshire. There are a few records from the South Wales coast and from the Welsh borders.

**Habitat** This is a grassland and woodland species that is most frequently associated with thermophilic conditions such as short turf on the Chalk in East Anglia or coastal grasslands in the south west, but there are also occasional records from sites on clay.

**Ecology** This is one of a suite of species that is believed to be associated with ant nests. The precise nature of this relationship is unknown, however. Adults are bivoltine, peaking in May/June and August/September, suggesting that larval development is relatively fast. Adults visit a range of flowers, especially umbellifers; they have been noted in number on occasions at Wild Parsnip *Pastinaca sativa*.

**Status** There are 70 post-1980 hectads; its status has therefore been revised from Rare to Nationally Scarce.

**Threats** Loss of unimproved grasslands to agricultural intensification, together with increased levels of coastal urbanisation are the most likely threats.

**Management and conservation** This is mainly a grassland species so the establishment of grazing regimes that maintain a mosaic of short and long swards on coastal and Chalk grasslands should be considered if not already in place. Where it occurs in woodland localities, the secret is likely to lie in the maintenance of open warm rides with shorter swards along the central track and ride edges, grading into more traditional woodland edge vegetation.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Chrysotoxum octomaculatum* Curtis, 1837

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Historic distribution extends across Dorset, Hampshire (New Forest and Woolmer Forest) and west Surrey. Today, there appear to be two discrete populations, one in Dorset (Hartland Moor, Gore Heath and Newton Bay), the other in Surrey (Thursley Common & Hankley Common). There are records from Cornwall and Essex that may refer to this species, but they are old and may in fact prove to have been *Chrysotoxum verralli*, which was not separated from *C. octomaculatum* until 1940. This is a widely distributed species across southern and central Europe which is Red Data Listed by some of the more northerly states (e.g. Denmark, Germany).

**Habitat** This is a heathland species. There is one locality (Hankley Common) where it has been observed in a little more detail: this is a damp hollow with sedges *Carex* and a scattering of Birch *Betula* scrub, suggesting that it is a heathland edge species. However, *C. octomaculatum* has also been found some distance from this site, possibly indicating more widespread occurrence on heathland edge.

**Ecology** *Chrysotoxum* is a genus that is thought to be associated with ants, or ant-tended root aphids and this species is likely to occupy similar niches. Nothing is known of its actual ant associate and to date no breeding site has been confirmed with certainty. Adults are noted as flower visitors, having been taken at Buttercups *Ranunculus* sp. and *Rhododendron*.

**Status** This species was a Biodiversity Action Plan Priority Species and was the subject of detailed survey. It is currently recorded from 5 post-1980 hectads, but there is considerable evidence of decline and apparent extinctions from some former strongholds such as The New Forest and Studland Heath (where there is a long history of occurrence until 1964, but it was not relocated by an English Nature funded survey in 1995). It is accorded the status of Endangered under criterion B1 (extent of occurrence 5000 km<sup>2</sup> or less) since it has been recorded from just five hectads since 1980. Populations are fragmented (B1a) because the two known centres of population are very distant. There is evidence of ongoing decline (B1bii) with records from only two hectads since 2000.

**Threats** Assuming there is a link between this species and damp habitat within heathland, declining water levels, scrub invasion of restricted breeding sites, and fire pose the most serious threats. The Hankley locality appears to be very small, occupying an area of perhaps 800 m<sup>2</sup>, whilst little is known of its likely breeding site in Dorset. During periods of drought, fire must be a major concern because it can lead to deep burns back to the mineral soil that may be expected to sterilise tracts of heathland as has been experienced at Thursley Common in 2006.

**Management and conservation** Efforts should be made to prevent known localities from changing significantly in character, including removal of invasive scrub whilst retention of sufficient scrub to maintain the overall micro-climate. The possible importance of heathland edge vegetation also needs to be given due consideration as this is an important contributor to heathland invertebrate biodiversity across a range of taxa. Fire is a particular risk and creation of firebreaks in vulnerable locations may be necessary to minimise this risk.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Levy, *et al.* (1992), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Chrysotoxum vernale* Loew, 1841

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** All modern records are confined to Dorset and Hampshire where it appears to be restricted to a narrow coastal belt. There are also 19<sup>th</sup> Century records from Cornwall (G.H. Verrall) and Devon (J.W. Yerbury). There are numerous records from the Channel Islands, suggesting that *C. vernale* is close to the edge of its European range.

**Habitat** Available records suggest that this species occurs across a range of habitats, from heathland to woodland clearings and perhaps even reedbeds.

**Ecology** *Chrysotoxum* is a genus that is thought to be associated with ants, or ant-tended root aphids and this species is likely to occupy similar niches. Nothing is known of its actual ant associate and to date no breeding site has been confirmed with certainty. Adults have been reported visiting Wood Spurge *Euphorbia amygdaloides*.

**Status** There are 7 post-1980 hectads and with indications of a decline, at least in its historic range in Devon and Cornwall. The majority of records are from one hectad in Dorset, which is one of the best recorded English counties. Available records suggest that Studland was a particular stronghold until the 1980s but the last record for this area was in 1990. Since 1990 there have been a scatter of Dorset records with one small area (in the vicinity of Tonerspuddle Heath & Bog SSSI) yielding eight records over a number of years to 2010. There are just two recent records from Hampshire, the last of which was in 1993. Given the comprehensive nature of recording in Dorset and the small number of records and sites, we believe that the status of Endangered is appropriate for this striking and readily identified insect. It qualifies under criterion B1 with the extent of occurrence being down to 2 hectads since 2000 and this represents a significant decline compared to 1980 (B12bii). Its localities are severely fragmented (B1a) being restricted to surviving remnants of heathland.

**Threats** Loss of heathland to housing or agriculture, intensified recreational activity that increases the risk of fire, scrub invasion and declining woodland management.

**Management and conservation** Efforts should concentrate on maintaining existing mosaics of habitat on known sites, ensuring that open heathland and ride structures are maintained. Scrub control may be necessary on some heathlands, where measures to counter extensive fire damage by firebreaks may also be needed.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Levy, *et al.* (1992), Rotheray (1993), Stubbs & Falk (2002).

*Didea intermedia* Loew, 1854

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Widely distributed, but with concentrations of records in the Scottish Highlands, North-west England and Cumbria, East Anglia, west Surrey, Dorset and Hampshire. It can be abundant where it occurs.

**Habitat** This species is normally associated with conifer plantations and Caledonian pine forest, but may also occur on partially coniferised heathland.

**Ecology** The larvae of this genus are predaceous upon arboreal aphids and given the concentration of records from conifer plantations it must be assumed that conifer aphids are the principal prey items. There is a single report of larvae associated with aphids on Scots Pine *Pinus*. Adults have been taken at yellow composite flowers along plantation rides.

**Status** There are 70 post-1980 hectads. Although there are indications of decline, these are believed to reflect changing recorder effort and consequently a status of Nationally Scarce is considered appropriate.

**Threats** Changing priorities within woodland management may lead to reductions in conifer cover in some southern and eastern English forestry compartments. On heathland extensive removal of Scots Pine may also have an impact on local populations. At the moment, however, there is no reason to believe that threats are particularly severe.

**Management and conservation** Provided forestry blocks are replaced with the same species mix the continued occurrence of *D. intermedia* may be expected within its existing range.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Evenhuis (1978), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).





*Doros profuges* (Harris, 1780) (as *Doros conopseus* (Fabricius, 1775) in Falk, 1991)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Widely scattered records mainly from sites on chalk and limestone. There appear to be several well established colonies on the western chalk rim of the Weald, on the North Downs of Surrey, the South Downs of Sussex, the Hampshire fringe, and on limestone around Morecambe Bay. It has also been recorded at a coastal site on Mull in Scotland and The Burren in Ireland. Historic records include Dorset, Essex, Somerset, Worcestershire, Cambridgeshire and Caernarvonshire. The species occurs widely across Europe but is generally scarce in the more northerly parts of its range.

**Habitat** Most records are associated with well drained, basic soils and most frequently, but not exclusively, from unimproved chalk or limestone grassland. It appears to be associated with the interface between grassland and woodland.

**Ecology** A large, spectacular, wasp-mimic. Despite extensive survey as part of the Biodiversity Action Plan, we are little closer to understanding the ecology of this elusive hoverfly. A female has been observed low down on an Ash *Fraxinus* trunk, possibly ovipositing. The larva has not been found, but Speight has examined the mouthparts from a last larval instar skin, retained in a puparium. They are very similar in structure to those of *Xanthogramma* (predators on ant-attended root aphids) and indicate that it is predatory. An association with the black ant *Lasius fuliginosus* has been suggested, but this is based on scanty and circumstantial evidence and it does not occur in at least two of the areas where the fly has been found (Mull and The Burren). Adults may visit flowers for nectar and many reports mention bramble *Rubus*, with flies either sunning themselves on the leaves or visiting the flowers. Most records, in Britain as elsewhere in Europe, are of females. This has led to speculation that adult activity is mainly arboreal, apart from females coming down to ground level to lay their eggs. This, coupled with the very brief, mid-June flight period may explain why it is so elusive and difficult to study.

**Status** This was a Biodiversity Action Plan Priority Species. There are 21 post-1980 hectads, suggesting that overall, the population is reasonably stable. However, there is strong evidence of localised declines and possible extinctions. It seemingly became extinct in the 1970s from a site in Essex where it was found over a period of 100 years, and it has not been found recently at several other historic sites. Rotheray & Gilbert (2011) describe this species as a migrant that has become established. However, the Hoverfly Recording Scheme has records dating back to 1780 and numerous 19<sup>th</sup> Century records, so this seems unlikely. A status of Near Threatened is justified.

**Threats** Scrub invasion and loss of woodland/grassland interfaces. Most, but not all sites are SSSI or wildlife trust reserves and therefore the risks relate more to changing land management that does not favour *D. conopseus* rather than further loss of habitat. However, it is conceivable that populations occur in the wider countryside and further agricultural intensification may remain an issue.

**Management and conservation** Efforts should concentrate on maintaining existing mosaics of habitat on known sites, ensuring that open downland and scrub edges are maintained in juxtaposition. Scrub control may be necessary on some sites.



**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Levy, Levy (1998), Levy, *et al.* (1992), Morris (1998), Plant (2000), Rotheray (1993), Rotheray & Gilbert (2011), Speight (1988), Speight *et al.* (2001), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Epistrophe melanostoma* (Zetterstedt, 1843)

● From 1980 onwards only  
 ■ Both before and after 1980  
 ○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002).

**Distribution** The majority of records are from Surrey where *E. melanostoma* has become well established. Other records include Dorset, South Hampshire & Middlesex.

**Habitat** This is a woodland and scrub-edge species that is most often noted in broad-leaved woodland rides and on flowery roadside verges in woodlands, especially where Hedge Mustard *Alliaria petiolata* is present.

**Ecology** The larvae of this genus are predaceous upon arboreal and scrub-dwelling aphids, and perhaps also on tall herbs. The precise predator prey relationship has yet to be established, however. Adults fly in May and June and can often be found sunning on leaves. They are also regular flower visitors and are reported from, *inter-alia*, Buttercup *Ranunculus*, Dog Rose *Rosa canina* and Cow Parsley *Anthriscus sylvestris*.

**Status** This is a relatively recent addition to the British list, but is clearly well-established in southern England. Although the number of records is comparatively low, its range seems to be expanding and we do not believe there to be a significant conservation threat. None-the-less, it is recorded from just 26 post-1980 hectads and has therefore been accorded the status of Nationally Scarce.

**Threats** This is a woodland edge species that is most likely to be affected by over-intensive ride management and loss of scrub structure at the interface with high woodland. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Epistrophe ochrostoma* (Zetterstedt, 1849)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** There is a single record from the Menai Straits in North Wales where it was found on 04/05/1988.

**Habitat** This is a woodland and scrub-edge species that is most often noted in broad-leaved woodland rides and on flowery roadside verges in woodlands.

**Ecology** The larvae of this genus are predaceous upon arboreal and scrub-dwelling aphids, and perhaps also on tall herbs. However, the precise predator prey relationship has yet to be established.

**Status** There are insufficient records to determine the status of *E. ochrostoma* in Great Britain. It has therefore been listed as Data Deficient.

**Threats** This is a woodland edge species that is most likely to be affected by over-intensive ride management and loss of scrub structure at the interface with high woodland. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Rotheray (1993), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Eristalis cryptarum* (Fabricius, 1794)**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Formerly known from the heathland bogs of the New Forest as well as from a scatter of sites in Dorset (especially Studland Heath), Devon, South Somerset and Cornwall. There are numerous records for the period between 1900 and the 1930s, after which an obvious decline occurred. The last record from the New Forest was in 1951. There were two records from south Dartmoor in the 1960s and one in 1978, after which there were no records until we re-located the species in August 1993. Today, it is confined to just 4 contiguous hectads within a restricted area of Dartmoor.

**Habitat** This is a denizen of Rhos pasture, valley mires where there is moderate to heavy grazing by cattle or ponies. Typical habitat includes a mixture of open water and emergent vegetation comprising Bog-bean *Menyanthes trifoliata*, sedges *Carex* and rushes *Juncus*, as well as mosaics of seepages with scattered Sallow *Salix* scrub.

**Ecology** The larvae of this genus are 'long-tailed', a modification that allows the animal to breathe whilst living entirely submerged. Females have been observed ovipositing into crevices in a fresh cowpat and into saturated peaty mud in a well-trampled seepage. But, despite detailed searches, the larva has yet to be found. Observations of flower visits indicate that *Eristalis cryptarum* visits flowers that are not habitually visited by others of the genus *Eristalis* and has also been noted actively avoiding two plant species: *Ranunculus flammula* and *Cardamine pratensis*. Favoured flowers are closely associated with Rhos pasture: Marsh Marigold *Caltha palustris* and Bog-bean *Menyanthes trifoliata* are particularly favoured, together with less frequent visits to Bog Asphodel *Narthecium ossifragum*, Devil's-bit Scabious *Succisa pratensis*, Common Tormenitl *Potentilla erecta* and Bog Pimpernel *Anagallis tenella*. Populations at individual sites seem to be small, mark-recapture studies having estimated the population at one 1ha site as around 40 adults. At another 2ha site the population estimate was between 100 and 160 adults. It is suggested that the Dartmoor population operates as a meta-population that is dependent upon a network of suitable sites in close proximity to each other.

**Status** This was a Biodiversity Action Plan (BAP) Priority Species that was chosen on account of the very serious decline it exhibited in the past 50 years. As a result of BAP funding, it was the subject of detailed study over six years. Those studies showed that the population is perilously close to extinction. A status of Critically Endangered is justified under criterion B2 because extensive surveys have identified only 16 small locations at which it is potentially breeding regularly (total area under 1km<sup>2</sup>), although this appears to fluctuate considerably from year to year (B2cii) and the quality of the habitat (B2biii) is under threat due to problems with maintaining continuity of grazing management. Mark-recapture exercises suggest the adult population is very small (low hundreds), at low density and fluctuates greatly from year to year although movements of marked individuals of over over 1km were observed – suggesting it is quite mobile. The most recent survey in 2012 focussed on the 6 locations where previous surveys had shown it to be most abundant, found only 3 of these occupied and located only 9 individuals.

**Threats** The sites for this species are outside current statutory protection mechanisms, although many of the sites lie within Dartmoor National Park. Threats include drainage and lack of drainage leading in either case to desiccation and scrub invasion. As a meta-population, the loss of individual sites may have wider implications for the survival of the population as a whole.

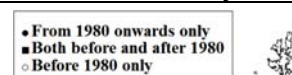


**Management and conservation** Open, natural seepages and mires are essential. Current evidence points to the need for continued grazing both on account of the need to maintain open scrub-free habitat, but also because hoof prints and inputs of dung may be crucial to larval development. Some scrub control is recommended for the majority of sites to prevent encroachment. However, the shelter afforded by a fringe of scrub may also be important so these fringes should be retained. It is essential that the network of suitable sites is maintained if the population is to survive. Consideration may also need to be given to the provision of statutory protection for these sites.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Castle & Falk (2012), Drake (2005), Drake & Baldock (2004, 2005, 2013), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Eumerus sabulonum* (Fallén, 1817)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is a coastal species, with scattered records on the south coast from Studland westwards and then more extensively along the north coast of Cornwall and Devon and the west coast of Wales. There is also a locality in Ayrshire, some considerable distance from its main centres of population.

**Habitat** *E. sabulonum* occurs on earthy coastal cliffs and upon sand dunes.

**Ecology** Larvae of the genus *Eumerus* tunnel within stems and roots of a variety of plants. *E. sabulonum* is believed to mine the stem bases of Sheeps-bit *Jasione montana* which is reported as the larval host plant on the continent and, in Britain, adults have been noted laying eggs at the base of this plant and also visiting the flowers.

**Status** There are 36 post-1980 hectads, placing this species firmly in the status Nationally Scarce.

**Threats** Stabilisation of coastal cliffs and sand dunes, possibly including eutrophication of grasslands leading to the loss of conditions suitable for *E. sabulonum*. Heavy access pressures caused by recreational visitors may also be affect Grey dunes with Sheeps-bit but scrub invasion as a result of under-grazed dunes and cliffs may be a problem elsewhere.

**Management and conservation** The principle threats are currently linked to recreational pressures which should be restricted where they are likely to impact upon fragile habitats. Provision of boardwalks may be necessary on some dunes. Where grazing pressure is insufficient to counter scrub invasion, measures should be taken to limit or reverse these effects.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Eupeodes nielsenii* (Dušek & Láška, 1976) (as *Metasyrphus nielsenii* (Dušek & Láška, 1976) in Falk, 1991)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larvae keyed and illustrated by Rotheray (1993).

**Distribution** There are two very distinct populations, one in the Scottish Highlands; the other in Dorset. There are also scattered records across England, Wales and Southern Scotland that suggest that this species is more widely distributed than current data suggest.

**Habitat** The main centre of population in Scotland seems to have been Caledonian pinewoods, but today that link is much weaker as *E. nielsenii* now occurs in a wide range of conifer woodlands.

**Ecology** The larvae are predaceous upon aphids and adelgids on Larch *Larix* and Scots Pine *Pinus sylvestris*. Adults are flower visitors.

**Status** *E. nielsenii* is currently known from 54 hectads, placing it out of danger but meeting the criteria for Nationally Scarce.

**Threats** Changing forestry practice may occasionally be an issue where coniferous woodland is replanted with hardwoods, but the range of possible prey items and the extent of coniferous woodland makes it unlikely that this species will be threatened.

**Management and conservation** Provided forestry blocks are replaced with the same species mix the continued occurrence of *Eupeodes nielsenii* may be expected within its existing range.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rojo *et al.* (2003), Stubbs & Falk (2002).





Order DIPTERA

Family SYRPHIDAE

*Eupeodes nitens* (Zetterstedt, 1843) (as *Metasyrphus nitens* (Zetterstedt, 1843) in Falk, 1991)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). This species is depicted in the popular guide to the “Insects of Britain and Western Europe” (against an illustration of *Xanthogramma pedissequum*) and consequently all records should be treated with considerable caution.

**Distribution** The majority of records are southern or western and are largely confined to England. Obvious centres of population lie in Dorset, Hampshire and Surrey with a further concentration of records Along the Severn valley and the Welsh Marches. The most northerly records are from southern Cumbria and County Durham.

**Habitat** This is mainly a species of broad leaved woodland.

**Ecology** The larvae are predaceous upon aphids on shrubs, with reports of associations with aphids on Black Currant *Ribes nigrum*, Elderberry *Sambucus nigra* and Spindle *Euonymus europaeus*.

**Status** There are 54 post 1980 hectads for *Eupeodes nitens*, suggesting that it could be accorded the status of Nationally Scarce. There are, however, indications that this species has undergone a significant decline over the past 25 years pushing it towards the status of Vulnerable. *Eupeodes* is a genus that comprises some very abundant species and others that are far less abundant but which are difficult to identify and whose numbers may be masked by the common species. This may be the case for *E. nitens* and given the trends in recorder bias towards more readily identified species, this masking effect cannot be discounted but we conclude that it should be accorded the status of Nationally Scarce.

**Threats** This seems to be a woodland edge species that is most likely to be affected by over-intensive ride management and loss of scrub structure at the interface with high woodland. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Chinery (2007), Falk (1991), Rojo *et al.* (2003), Stubbs & Falk (2002).



*Ferdinandea ruficornis* (Fabricius, 1775)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is largely an English species with just a single record from Wales. It is mainly southern, almost entirely confined to a line between the Humber and the Ribble, but with a single outlier in North Yorkshire.

**Habitat** This is a woodland and parkland species that is associated with sap runs.

**Ecology** The larvae are filter feeders on yeasts and bacteria, and live in sap runs on a variety of trees. *F. ruficornis* is thought to be one of a suite of species that are to some degree associated with the workings of the Goat Moth *Cossus cossus*, but it is unlikely that this is an obligate association as the fly does occur at localities where the moth has not been found. Adults are very difficult to locate, but are occasional flower visitors.

**Status** There are 53 post 1980 hectads, suggesting that it could be accorded the status of Nationally Scarce. There are, however, indications that this species has undergone a significant decline over the past 25 years pushing it towards the status of Vulnerable. If an association with goat moth were to prove to be correct, then the indications of decline would be borne out by a similar decline in the fortunes of the goat moth. At this stage, however, it would be unwise to attach too much significance to the lower frequency of records in recent years. This is because it is a notoriously scarce animal that rarely, if ever, occurs in numbers and changing frequency is as likely to represent changes in recorder effort and the profile of skills within the recording community.

**Threats** If the perceived association with *Cossus* infested trees is correct, then the decline in such trees is a matter of concern. In the New Forest, such trees have declined and have been heavily affected by woodpecker activity. In parkland, trees with sap runs are sometimes felled because they are believed to be dangerous. Similar timber hygiene programmes in woodland offer the same threat to this species and the wider guild of invertebrates associated with sap runs.

**Management and conservation** Long-term continuity of habitat is essential if this and other sap-run species are to flourish. Where discontinuity of woodland age classes is apparent, efforts to resolve this are needed (this is especially true in some parklands). Loss of old woodland habitat within the wider countryside, and loss of connectivity between suitable habitats remain matters of concern, especially as the degree to which isolated hedgerow trees may contribute suitable habitat is unclear.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Hammerschmidtia ferruginea* (Fallén, 1817)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larva keyed and illustrated by Rotheray (1993).

**Distribution** This is a boreal species that is confined to the Highlands of Scotland. The main stronghold is Strathspey between Newtonmore in the south and Grantown in the north. Other sites are along the River Findhorn, Easter Ross, south-east Sutherland and Deeside.

**Habitat** Restricted to larger aspen woodlands in the Highlands of Scotland.

**Ecology** The larvae are found in wet decaying cambium that builds up under the bark of recently fallen or dead standing trunks and branches of Aspen *Populus tremula* with a diameter of at least 25 cm. Wet decaying cambium builds up for about four years before the bark cracks and it dries out. Only Aspen stands with more than 100 live trees over 25cm diameter are large enough to maintain the continuity of suitably sized fallen timber needed to support a population of *H. ferruginea*. Most aspen stands in Scotland are small, less than 1.5 ha., and only 14 Aspen stands extend over 4.5 ha. The species is virtually absent from the numerous smaller stands, especially those over 1km from core areas. Adults have been noted at the flowers of Hawthorn *Craetagus monogyna*, Bird cherry *Prunus padosa* and Rowan *Sorbus aucuparia*.

**Status** This was a Biodiversity Action Plan Priority Species. There are 10 post-1980 hectads. In 2000 a survey, jointly funded by RSPB and SNH, was undertaken by the Malloch Society of all the larger Aspen stands to determine the size of the population (Rotheray, 2000). This was estimated at 300 larvae, living in just 12 pieces of suitable dead wood. Population levels do however vary on an annual basis according to the amount of dead wood available. More recent work by a PhD student has shown that the number of adults than can be produced from a single fallen tree can be considerably higher (several hundred) and that they are capable of dispersing over at least 4km. The status is judged to be Endangered under criterion B2 since the area of Aspen stands amounts to less than a few hundred hectares and recent records are known from less than 10 one-kilometre squares. Its range is severely fragmented (B2a) and the number of individuals shows extreme fluctuations from year to year (B2c).

**Threats** Loss of larval habitat is the main threat to this species. Aspen stands in the Scottish Highlands have been lost or fragmented to the point where there are very few large enough to provide the necessary continuity of larval habitat. In years when the amount of dead wood available is low there is the distinct threat of local extinction. In years when the population of *H. ferruginea* is so small, collecting by dipterists may also present a threat.

**Management and conservation** Trials by the Malloch society and RSPB have shown that, if no fresh dead wood has arrived by natural means, continuity of fallen timber can be achieved by felling one or two suitably sized Aspen each year. However, regular felling of trees depends upon the capacity of stands to replenish themselves. Fallen trees should be severed from their root-plates to prevent fungal competition and standing dead trees should be dropped to the ground to reduce desiccation. It may also be necessary to exclude grazing animals both to encourage natural regeneration and to protect fallen timber from bark stripping. In the longer term, planting of Aspen to extend and link existing stands may also be necessary.



**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993, 2000), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Helophilus groenlandicus* (Fabricius, 1780)

● From 1980 onwards only  
 ■ Both before and after 1980  
 ○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** All of the known records are from the North-west coast of Scotland and the inner Hebrides. The most recent records were in 1990 (Beinn Eighe) and 1998 (Handa).

**Habitat** This would appear to be a boreal species that is confined to low-lying wetlands on or near the coast (in Scotland). Elsewhere it is a widely distributed Holarctic species.

**Ecology** The larvae of this genus are 'long-tailed', a modification that allows the animal to breathe whilst living entirely submerged. As yet, the larvae have not been found or described so very little is known of their ecology, but an association with boggy pools on or near the coast appears to be consistent with the known distribution of *H. groenlandicus*.

The adults are flower visitors and are reported pollinators of *Primula laurentiana* in North America.

**Status** There are just five records of *H. groenlandicus*, three of which were made in the 1930s. The most recent record was in 1998. Rotheray & Gilbert (2011) suggest that this species is a vagrant. However, all the records are from the north west of Scotland, not an area where one would expect vagrants to consistently turn up. We therefore conclude that these data give very few indications of the true status of *H. groenlandicus* and have judged it to be Data Deficient.

**Threats** Peat cutting and drainage of coastal wetlands.

**Management and conservation** There is little to indicate what, if any, management is necessary.

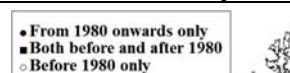
**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Larson & Barrett (1998), Rotheray (1993), Rotheray & Gilbert (2011), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Heringia brevidens* (Egger, 1865) (as *Neocnemodon brevidens* (Egger, 1865) in Falk, 1991)



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** There are scattered records across England and Wales as far north as the dunes at Ainsdale. The first record was from a site on the River Wandle in south London in 1949, since when there have been records from a wide scatter of sites including recent records from Glamorganshire, Worcestershire, Middlesex, South Lancashire, and Cambridgeshire. There are a number of records for Woodwalton Fen NNR, but other reports tend to be of single occurrences.

**Habitat** This would appear to be associated with wetlands, with the evidence pointing at riversides and fenlands that support Black Poplar *Populus nigra* hybrids and Willows *Salix* spp.

**Ecology** The larvae of *Heringia* appear to be predaceous upon aphids, and those of *H. heringi* and *H. senilis* are known to occur in galls on poplar leaves and stems caused by the aphid *Pemphigus spirothecae*. Therefore, although the larva of *H. brevidens* is unknown, it seems likely that it will exhibit similar associations when found. The adults are likely to occur sunning on leaves and are known to visit flowers such as Marsh Marigold *Caltha palustris*.

**Status** There are 16 post-1980 hectads and insufficient data to detect any obvious decline. This is a difficult species to detect and lies within that group of hoverflies that is tackled by relatively few recorders. It is therefore suspected that *H. brevidens* is likely to be more widely distributed than current data suggest, placing it amongst those considered to be at low risk: Nationally Scarce.

**Threats** Drainage of wetlands and clearance of poplar and willow stands from wetland and riparian locations are likely to be the most significant threats.

**Management and conservation** Where this species is known to occur, efforts should be made to retain stands of poplars and Willow. Elsewhere, recognition of this species as a possible element of the assemblage associated with wetlands needs to be applied in managing for the overall wetland fauna, including that of scrub and canopy species.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Jones (2002), Morris (1998), Rotheray (1993), Stubbs (1980), Stubbs & Falk (2002).

*Heringia latitarsis* (Egger, 1865) (as *Neocnemodon latitarsis* (Egger, 1865) in Falk, 1991)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Widely distributed across southern England and Wales as far north as South Yorkshire and South Lancashire. There is a record from Midlothian but the data accompanying it are poor, with no locality name, recorder or date. There are post-1990 records from Dorset, Surrey, East Kent, Nottinghamshire and South-west Yorkshire.

**Habitat** The records suggest that this is a woodland species, and some records indicate that forestry plantations are favoured. In Surrey, the data point to dry sandy habitats with warm micro-climates, but this may actually reflect afforestation of sandy sites with conifers.

**Ecology** The larvae of *Heringia* appear to be predaceous upon aphids, and some appear to be more closely associated with conifers. At this stage it is not possible to be more precise, but an association with ground-layer of arboreal aphids seems likely. Adults have been noted to visit a range of woodland edge flowers such as Cow Parsley *Anthriscus sylvestris* but are more commonly found flying low down amongst vegetation or sun-basking on leaves.

**Status** There are 37 post-1980 hectads, and although there are indications of a decline this is likely to be attributable to changing levels of recording of more challenging taxa. We therefore believe that the status of Nationally Scarce should be applied.

**Threats** This is a woodland edge species that is most likely to be affected by over-intensive ride management and loss of scrub structure at the interface with high woodland. If as suspected, it is associated with conifer plantations then changes to planting regimes may be a factor in its localised occurrence. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Rojo *et al.* (2003), Rotheray (1993), Stubbs & Falk (2002).





Order DIPTERA

Family SYRPHIDAE

*Heringia pubescens* (Delucchi & Pschorn-Walcher, 1955) (as *Neocnemodon pubescens* (Delucchi & Pschorn-Walcher, 1955) in Falk, 1991)



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is a widely distributed species that occurs widely in southern England as far north as Yorkshire and then appears again in the Highlands of Scotland. This seeming disjunct distribution may be indicative of two separate populations or simply reflects recorder effort.

**Habitat** A significant proportion of records are from conifer woodlands and the suspicion must rest upon this being the favoured habitat.

**Ecology** The larvae of *Heringia* appear to be predaceous upon aphids. *H. pubescens* is one that seems most likely to be associated with conifer aphids and has been known to occur in considerable numbers in some coniferous woodlands. Adults have been noted to visit a range of woodland edge flowers, including Dogs Mercury *Mercurialis perennis* and Snowberry *Symphoricarpos albus* but are more commonly found flying low down amongst vegetation or sun-basking on leaves.

**Status** There are 57 post-1980 hectads, and the analysis indicates decline in the past 25 years, but this is likely to be attributable to changing levels of recording of more challenging taxa. We therefore believe that the status of Nationally Scarce should be applied.

**Threats** This is a woodland edge species that is most likely to be affected by over-intensive ride management and loss of scrub structure at the interface with high woodland. If as suspected, it is associated with conifer plantations then changes to planting regimes may be a factor in its localised occurrence. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rojo *et al.* (2003), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Heringia verrucula* (Collin, 1931) (as *Neocnemodon verrucula* (Collin, 1931) in Falk, 1991)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** There are scattered records as far north as the Cairngorms. Recent records are confined to West Norfolk, South-west Yorkshire, South-east Yorkshire and North-east Yorkshire.

**Habitat** This is a woodland species with records from both mixed and coniferous woodlands.

**Ecology** The larvae of *Heringia* are predaceous upon aphids. *H. verrucula* is one that seems most likely to be associated with conifers.

**Status** There are 16 post-1980 hectads but this species remains highly enigmatic, making it difficult to draw any conclusions about its status. We therefore conclude that it should be defined as Data Deficient.

**Threats** This is likely to be a woodland edge species that could be affected by over-intensive ride management and loss of scrub structure at the interface with high woodland. If as suspected, it is associated with conifer plantations then changes to planting regimes may be a factor in its localised occurrence. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rojo *et al.* (2003), Rotheray (1993), Stubbs & Falk (2002).

*Lejops vittatus* (Meigen, 1822)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is a coastal species that occurs along the south and east coast from Norfolk to Sussex. It also occurs on the grazing marshes of the Gwent Levels and Somerset. There are post-1990 records from Norfolk (Horsey Mere), South Essex (Fobbing Marshes), East Kent (Iwade Marshes, Neatscourt and Seasalter Marshes), East Sussex (East Guldeford Levels) and Somerset Levels (Stear, Ham Wall), with the bulk of records from East Kent.

**Habitat** This is a wetland species with aquatic larvae and is associated with stands of Sea Club Rush *Bulboschoenus maritimus*. The majority of sites are coastal grazing marshes.

**Ecology** There is a continental account of larval development; eggs are laid on the stems and leaves of emergent vegetation and larvae remain amongst surface vegetation until the last instar, at which point they migrate to submerged organic deposits. In the UK the overwhelming majority of localities are grazing marsh ditches with stands of Sea Club Rush where the ditches are permanently wet but with a fluctuating level of brackish water. There are, however, very old records from inland localities that suggest more widespread distribution in the past. Adults are known to feed on pollen from the flower heads of Sea Club Rush and can occasionally be found in numbers by sweeping.



**Status** There are 18 post-1980 10k squares and analysis of the data suggest that there has been a significant decline over the past 25 years. However this may be due to recording artefacts reflecting the fact that there was a period of intensive survey of levels and coastal grazing marsh habitats in the late 1980s, but there has been little recent recording in these habitats. The database currently lacks recent records from the stronghold of the species in the Essex marshes and therefore the true situation for this species is difficult to determine. We therefore believe the status of Near Threatened is appropriate.

**Threats** This is a wetland species that is potentially at risk from drainage and abstraction projects that affect freshwater flows onto grazing marshes. In East Kent, there are grazing marshes that suffer from lack of water and, if climate change projections for eastern England prove to be correct, this may become a more widespread problem. As many localities are coastal, there is the possibility that some of these sites may be lost as coastlines are realigned to accommodate the effects of sea level rise and the need to deliver more sustainable flood management schemes. Coastal grazing marsh sites can be adversely affected by intensification of grazing regimes that reduce the extent ditch margin vegetation, and by ditch management that removes excessive lengths of ditch vegetation at one time, especially those floating rafts of vegetation that are important for larval development.

**Management and conservation** Maintenance of water levels within existing grazing marsh regimes is a priority. Maintenance of saline transitions within grazing marsh ditches also appears to be required. Ditches should be managed on a long-enough rotation to allow the maintenance of all seral stages including sections heavily invaded by tall emergent plants, especially Sea Club Rush and the retention of mats of floating vegetation.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Speight (1998), Stubbs & Falk (2002), Waitzbauer (1976).

Order DIPTERA

Family SYRPHIDAE

*Mallota cimbiciformis* (Fallén, 1817)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larva keyed and illustrated by Rotheray (1993).

**Distribution** This is mainly a southern English species that occurs sporadically as far north as Lanarkshire. There are post-1990 records from Cornwall, Dorset, North Somerset, South Hampshire, North Wiltshire, South Essex, Leicestershire, Northamptonshire, South-east Yorkshire, South Lancashire and Durham.

**Habitat** This is a woodland and parkland species that is associated with over-mature trees with water-filled rot holes. It does occasionally stray some distance from its breeding site and has been found at Hogweed *Heracleum sphondylium* some distance from suitable trees.

**Ecology** The larvae are filter-feeders that inhabit water-filled rot holes and have been found in rot holes in Beech *Fagus* and Horse Chestnut *Aesculus*.

**Status** Recorded from 45 post-1980 hectads. Searches for larvae in rot holes suggests that this species may be more widely distributed than records of adults suggest. Even so, this species is sufficiently scarce to merit the status of Nationally Scarce.

**Threats** The association with rot holes in older trees means that loss of continuity of aged trees is potential a matter of concern at some locations. This is a species that might be encountered in urban parks and so arboricultural practices such as cavity filling (with cement) could contribute to a reduction in possible breeding opportunities.

**Management and conservation** Efforts may be needed to address the issue of long-term continuity of age structure amongst trees in old woodlands and parklands. Education of local authority arboricultural officers may help to publicise the importance of rot holes for rot hole hoverflies.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



*Melangyna barbifrons* (Fallén, 1817)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Apparently disjunct: widely scattered across southern England to southern Cumbria and North Yorkshire, reappearing in the Highlands of Scotland. Records since 1990 include: Derbyshire, South-west Yorkshire, North-east Yorkshire and East Inverness & Nairn.

**Habitat** This is a woodland species, possibly occurring in both coniferous and deciduous woodland.

**Ecology** The larvae of *Melangyna* are aphidophagous, but those of *M. barbifrons* are as yet unknown. What little evidence there is to date suggests that *M. barbifrons* is associated with shrub layers and canopy trees. Adults fly very early in the season and have been noted visiting Sallow *Salix* flowers.

**Status** There are 17 post-1980 hectads for this species. Both *M. barbifrons* and *M. quadrimaculata* fly extremely early in the spring, often when opportunities for fieldwork are very limited. Even so, it seems that *M. barbifrons* is genuinely uncommon and possibly declining; we have therefore concluded that the status of Near Threatened is justified.

**Threats** This is likely to be a woodland edge species that could be affected by over-intensive ride management and loss of scrub structure at the interface with high woodland. If it is associated with conifer plantations then changes to planting regimes may be a factor in its localised occurrence. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the rides.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades. Rideside shrub clearance should endeavour to avoid removal or cutting of all flowering willows on any one ride management cycle.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Melangyna ericarum* (Collin, 1946)**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).**Distribution** This species seems to be mainly confined to Strathspey where it was discovered in the 1940s and from where the only recent records come (Loch an Eilein, 1981 and Loch Tulloch, 1991). An old specimen from “Glen Shin” (Sutherland) in 1936 has been located in collections.**Habitat** The evidence points to this being a specialist of Caledonian pine forests.**Ecology** The larvae of *Melangyna* are aphidophagous, but those of *M. ericarum* are as yet unknown. What little evidence there is to date suggests that *M. ericarum* is associated with Scots Pine *Pinus sylvestris*.**Status** There are 4 post-1980 hectads for this speciality of Scotland. We believe that its distribution is restricted to a very small part of the Scottish Highlands and given the absence of records since 1991, we conclude that it should be given the status Vulnerable under criterion D2 (five or fewer locations) with recent records from only two sites.**Threats** The association with Caledonian pine forest means that this species is vulnerable to changes in the age classes of pine trees within the forests. At present, some of these forests suffer from lack of recruitment amongst younger age classes.**Management and conservation** Re-establishment of continuity of age classes within some stands of Scots Pine is essential. In some Caledonian pine forests further efforts may be needed to reduce the impact of Red Deer *Cervus elaphus* grazing on pine forest regeneration.**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Collin (1946), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).

*Melanostoma dubium* (Zetterstedt, 1837)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Note, there is evidence of taxonomic confusion as MacGowan *et al.* (1997) have shown this species to be the end of an altitudinal cline within *Melanostoma mellinum*.

**Distribution** This is a mainly upland species that is known from the highlands of Scotland, Cumbria and the North Pennines, the North York Moors, central Wales and North Devon.

**Habitat** This is a species of uplands at altitudes of 500 to 1000 metres, occurring along boggy streamsides and similar boggy locations.

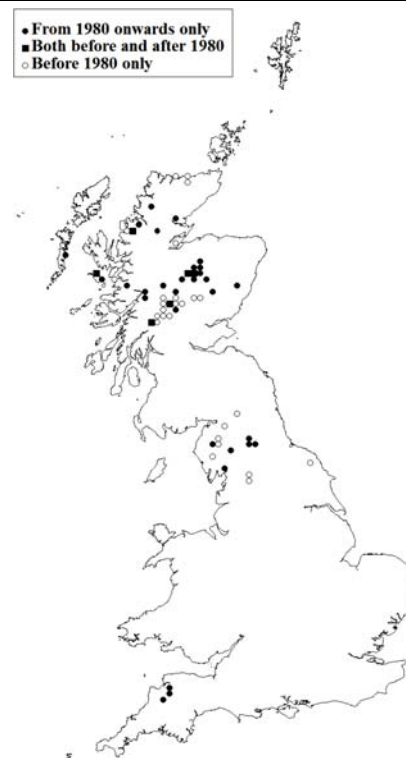
**Ecology** The larvae are not known but the genus as a whole is believed to comprise a group of aphid predators that occur within leaf litter and ground layers.

**Status** There are 36 post-1980 hectads and just six post 1990 hectads, with initial analysis suggesting that a highly significant decline has occurred. As a result, a status of Near Threatened or even Vulnerable might be considered appropriate. However, there is some taxonomic uncertainty about this species and suggestions that it is part of a cline within *M. mellinum* make it likely that it has not been as well reported as might have been expected had there been certainty about its identity. In addition, recording from uplands generally appears not to have filtered through as records to the Recording Scheme and consequently these species may be under-represented in recent years, thus affecting the statistics. It is therefore concluded that the status Nationally Scarce should apply.

**Threats** Increasing or declining grazing pressure along upland stream valleys, leading to changing sward structure or scrub invasion. If a genuine upland species, *M. dubium* might be affected by climate change and loss of populations at lower altitudes.

**Management and conservation** Maintain existing habitat mosaics along streamsides and on upland boggy areas.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), MacGowan *et al.* (1997), Rotheray (1993), Stubbs & Falk (2002).





Order DIPTERA

Family SYRPHIDAE

*Meligramma euchromum* (Kowarz, 1885) (as *Epistrophe euchroma* (Kowarz, 1885) in Falk, 1991)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is a largely southern species that occurs as far north to South Cumbria, South Yorkshire, Derbyshire and Anglesey. There are post-1990 records from Dorset, North and South Hampshire, South Wiltshire, West Gloucestershire, Surrey, East Kent, Middlesex, Derbyshire and West Lancashire.

**Habitat** This is a woodland and scrub-edge species that is most often noted in broad-leaved woodland rides and on flowery roadside verges in woodlands.

**Ecology** The larvae of this genus are predaceous upon arboreal and scrub-dwelling aphids, and perhaps also on tall herbs. The precise predator prey relationship has yet to be established, however. Adults fly in May and June and can often be found sunning on leaves of Sycamore *Acer* and Horse Chestnut *Aesculus*. The adults have been recorded visiting the flowers of Blackthorn *Prunus spinosa*, Hawthorn *Crataegus* and Wood Spurge *Euphorbia amygdaloides*. There is a record of a specimen bred out from a larva found in a suburban garden in south London.



**Status** There are 47 post-1980 hectads. This is a scarce species that seems to be genuinely of restricted distribution, making the application of the status of Nationally Scarce quite appropriate.

**Threats** This is a woodland edge species that is most likely to be affected by over-intensive ride management and loss of scrub structure at the interface with high woodland. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the ride, to the detriment of low-growing ride side vegetation.

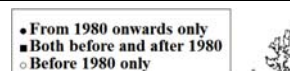
**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Meligramma guttatum* (Fallén, 1817) (as *Melangyna guttata* (Fallén, 1817) in Falk, 1991)



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larva keyed by Rotheray (1993).

**Distribution** This is a widely distributed species across England, Scotland and Wales, but one that appears to be somewhat more frequent in northern England. Post-1990 records include East Cornwall, North and South Somerset, Carmarthenshire, Glamorganshire, Meirionydd, Derbyshire, South Yorkshire, Westmorland, Ayrshire, North Ebeudes and East Invernesshire.

**Habitat** This is a woodland species that occurs on wooded riverbanks, wet woodland and carr and in northern Sycamore *Acer* woods. In Surrey it appears to be associated with carr woodland with Willows *Salix*.

**Ecology** The larvae are predaceous upon aphids and have been recorded feeding upon the aphid *Drepanosiphum platanoides* on Sycamore. The adults are flower visitors and have been recorded at Hogweed *Heracleum sphondylium*.

**Status** There are 67 post-1980 hectads. This is a scarce species that, though rarely encountered, is appropriate for the status of Nationally Scarce.

**Threats** This is a woodland edge species that is most likely to be affected by over-intensive ride management and loss of scrub structure at the interface with high woodland. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the ride.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Morris (1998), Rojo *et al.* (2003), Rotheray (1993), Stubbs & Falk (2002).



## Order DIPTERA

## Family SYRPHIDAE

*Microdon analis* (Macquart, 1842) (as *Microdon eggeri* Mik, 1897 in Falk, 1991)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larva keyed and illustrated by Rotheray (1993) (as *M. eggeri*).

**Distribution** The distribution is disjunct with populations in southern England on the heaths of Berkshire, Surrey, Sussex, Hampshire and Dorset, and again in the Highlands of Scotland where it occurs in Caledonian pine forest at localities such as Rothiemurchus Forest, Glen Affric, the Black Wood of Rannoch and Loch Garten.

**Habitat** This is a woodland and heathland species that occurs widely across Heather *Calluna* heath with Scots Pine *Pinus sylvestris* in southern England and in similar locations in Caledonian pine forest. It is also reported from areas of windblow within former conifer plantations that were felled by the Great Storm of 1987 in southern England.

**Ecology** The larvae are predators within the nests of the black ant *Lasius niger* (agg.). They are armoured and of a shape that allows them to clamp themselves firmly onto hard substrates such as bark, making them immune to the attention of the ant colony. Larvae are usually found in ant colonies within Pine *Pinus* and Birch *Betula* stumps and can often be found in some numbers. Adults are rarely encountered and are most frequently found by sweeping as they are not regular flower visitors.

**Status** There are 58 post-1980 hectads. The range of this species is well defined and although further colonies may be found, its overall distribution is well known. There are indications of a decline over the past 25 years, but this probably reflects changing recorder effort, with much less intensive recording from, for example, the heathlands of Surrey. The status of Nationally Scarce is therefore quite appropriate.

**Threats** There is a possible risk arising from over-emphasis on removal of timber from heathland in southern England, as regular provision of new Pine and Birch stumps is possibly essential. Similarly, loss of new stumps within Caledonian pine forests may be an issue where the woodland age classes are not continuous. Deep burns as a result of major heathland fires may be responsible for localised loss of populations.

**Management and conservation** Maintenance of continuity within heathland pine and birch cover is a necessity, at least enough to allow the creation of new stumps on a regular basis. When pines are felled, the stumps should be allowed to stand to a height of perhaps as much as a foot above ground, thereby creating suitable conditions for the black ant. It is possible that this species will be located in more conifer blocks, and in such circumstances rotational cutting should help to maintain the supply of suitable ant habitat.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).



## Order DIPTERA

*Microdon devius* (Linnaeus, 1761)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larva keyed and illustrated by Rotheray (1993).

**Distribution** This is mainly a species of southern England (Surrey, North Hampshire and West Sussex) but there are outlying populations in West Norfolk and East Suffolk, and from Merionethshire and old records from Oxfordshire (Cothill Fen) and from the Wyre Forest. There are post-1990 records from Buckinghamshire, North Hampshire, West Sussex, and Merionethshire but the majority of modern localities lie on the North Downs of Surrey.

**Habitat** In southern England, *M. devius* is closely associated with short turfed Chalk downland, but in East Anglia the records are from fens (Middle Harling Fen and Redgrave and Lopham Fens), as they are from Oxfordshire, at which they are likely to be associated with grassland elements of the site, rather than with the wetland.

**Ecology** The larvae are predators within the nests of the yellow ant *Lasius flavus*. They are heavily armoured, which allows them to live within the ant colony where they feed upon the eggs and larvae of the host. Adults rarely stray far from their parental ant nests and may be found sitting on vegetation close to ant hills. They are not usually known as flower visitors, but have been reported from flowers of Ox-eye Daisy *Leucanthemum vulgare*.

**Status** *M. devius* is reported from 21 post-1980 hectads and was listed as a species on the long list of the UK Biodiversity Action Plan. Our knowledge of the distribution of *M. devius* is reasonably complete and many of its known locations have yielded a history of records for many decades. The localised distribution of *M. devius* therefore means that we can be reasonably assured that the status of Near Threatened is appropriate.

**Threats** Under grazing and scrub invasion have been shown to be a problem on many downlands, especially those in Surrey that are currently being renovated by extensive scrub control. There is also evidence of a population at Farthing Downs in Surrey having been eliminated by gang-mowing that destroyed the hummocky grassland populated by yellow ants.

**Management and conservation** This species relies on open grasslands where there are active nests of the yellow ant *Lasius flavus* and therefore measures to prevent or reverse scrub invasion are essential. Scrub cutting should concentrate on joining up remaining patches of grassland and should be followed by treatment to prevent regrowth and subsequently by grazing. Downland with ant mounds should not be mowed and herbicides treatment of cut stumps should only be applied to restricted areas.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), DoE (1995), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Microdon mutabilis* (Linnaeus, 1758)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** The “*Microdon mutabilis*” of earlier works (e.g. Stubbs & Falk, 1983) was split by Schönrogge *et al.* (2002), into two species *M. mutabilis* and *M. myrmicae* and most of the records formerly ascribed to *M. mutabilis* are believed to relate to *M. myrmicae*. As yet the true *M. mutabilis* has been confirmed from only two areas in Scotland (Mull and near Inverness), and six sites in south-west Ireland (mainly the famous limestone district in The Burren).

**Habitat** The true *M. mutabilis* appears to be associated with dry, well-drained sites, including limestone pavement.

**Ecology** The larvae are associated with ant nests, and at the moment the principal host appears to be *Formica lemani* which is widespread in northern and western Britain. There is some evidence that adult *Microdon* from particular ant nests may stand the greatest prospect of breeding successfully if they lay their eggs in association with the original host colony, thereby suggesting a degree of sub-speciation linked to the characteristics of individual ant colonies.

**Status** *Microdon mutabilis* and *M. myrmicae* can only be reliably separated by examination of the larva or puparium. For this reason it has not been possible to revise existing data with any confidence. In the absence of sufficient data, this species must be listed as Data Deficient, although *M. mutabilis sensu lato* would qualify for Nationally Scarce.

**Threats** At the moment it is not possible to identify specific threats, but the association with *Formica* ants suggests that declines in grazing regimes may lead to rank vegetation that is less suitable for the ant colonies and hence *M. mutabilis*.

**Management and conservation** Maintain current grazing regimes where populations of *M. mutabilis s.l.* has been previously recorded.

**Published sources** Ball *et al.* (2011), Schönrogge *et al.* (2002), Stubbs & Falk (2002).

Order DIPTERA

Family SYRPHIDAE

*Myolepta dubia* (Fabricius, 1805) (as *Myolepta luteola* (Gmelin, 1788) in Falk, 1991)

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larvae keyed to genus and illustrated by Rotheray (1993) (as *M. luteola*).

**Distribution** *M. dubia* is currently restricted to the east of a line between The Wash and The Severn. There are post-1990 records from Dorset, North Somerset, North Wiltshire, South Hampshire, North Hampshire, East Sussex, Surrey, Middlesex, Buckinghamshire, Berkshire, Bedfordshire Cambridgeshire and west Suffolk.

**Habitat** This is a woodland and parkland species that favours locations with over-mature trees with water-filled rot holes.

**Ecology** The larvae are filter-feeders that inhabit water-filled rot holes and have been found in rot holes in Beech *Fagus* and Horse Chestnut *Aesculus*. Adults are rarely encountered, but have been recorded from a variety of flowers, including Hogweed *Heracleum sphondylium*, Upright Hedge Parsley *Torilis japonica*, Wild Parsnip *Pastinaca sativa* and Dogwood *Cornus sanguinea*.

**Status** *M. dubia* is recorded from 76 post-1980 hectads. Although there is some evidence of a decline in frequency, this is a tricky species to find as an adult and may have a very limited flight period. Furthermore, it is easily overlooked as a *Cheilosia* by the inexperienced recorder and so it may be overlooked. It therefore seems likely that it has not declined and that the status Nationally Scarce is appropriate.

**Threats** The association with rot holes in older trees means that loss of continuity of aged trees is potential a matter of concern at some locations. This is a species that might be encountered in urban parks and so arboricultural practices such as cavity filling (with cement) could contribute to a reduction in possible breeding opportunities.

**Management and conservation** Efforts may be needed to address the issue of long-term continuity of age structure amongst trees in old woodlands and parklands. Education of local authority arboricultural officers may help to publicise the importance of rot holes for rot hole hoverflies.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Morris & Ball (2004), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Myolepta potens* (Harris, 1780)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Discovered by John Cowley, a Somerset naturalist, in 1945 at Loxley Wood near the edge of the Somerset Levels. Between 1946 and 1949, Cowley and d'Assis-Fonseca found more specimens, and also found it 25 miles further north at Combe Dingle near Bristol. It was not seen again until 1961 when six larvae were found by J.C. Hartley in a rot-hole at Ashton Court not far from Combe Dingle. Despite many searches, it has not been found again in either area and Ball & Morris (2000) believed it to be extinct in Britain. However, larvae were found at Moccas Park NNR, Herefordshire in rot holes in Horse Chestnut *Aesculus hippocastanum* in 2002 and it has subsequently been found utilising rot-holes in a variety of tree species on this site. In 2009 an adult was found in the Forest of Dean, Gloucestershire. It was apparently found in Somerset in 2013 (although not at one of the historic locations), but we have not yet received details of this record. Elsewhere in Europe it ranges from France and Germany through central Europe to the Black Sea. It is rare throughout its range and is listed in the Red Data Books of a number of countries. It is listed by the Council of Europe as a Saproxylic Indicator Species.

**Habitat** This species is associated with woodland and parkland with old trees. It may also occur in the wider countryside where hedgerows support old and senescent trees.

**Ecology** The larvae are filter-feeders that inhabit water-filled rot holes and have been found in rot holes in Horse Chestnut, although it has been found in rot-holes in other deciduous tree species in the past.

**Status** This species was formerly classed as Endangered and was listed on the UK BAP as a Priority Species. Recent evidence suggests that *M. potens* is actually very poorly known and its recent discovery in Herefordshire suggests that it may be found more widely if rot holes are sampled in detail. However, there are growing concerns about the multiple impacts of a suite of pathogens that are thought to threaten the health of Horse Chestnuts with the risk that those in public places may be felled for safety reasons. Therefore, even if further populations are detected, the population does appear to be seriously at risk. The status of Critically Endangered is justified under criterion D – population size estimated to number 50 or fewer mature individuals. At Moccas Park, larvae probably number several hundreds, but development is believed to take several years so the number of adults emerging each year is likely to be small (few tens). The record from the Forest of Dean in 2009 suggests that another population is present which remains to be located, but could potentially be of a similar size.

**Threats** The association with rot holes in older trees means that loss of continuity of aged trees is potential a matter of concern at some locations. This is a species that might be encountered in urban parks and so arboricultural practices such as cavity filling (with cement) could contribute to a reduction in possible breeding opportunities. In current circumstances where various diseases of Horse Chestnut are giving cause for concern and leading to the felling of mature trees, this species may be made that much more vulnerable. Loss of hedgerow trees may also be an issue in the vicinity of existing or previously known populations.

**Management and conservation** Efforts may be needed to address the issue of long-term continuity of age structure amongst trees in old woodlands and parklands. Education of local authority arboricultural officers may help to publicise the importance of rot holes for rot hole hoverflies.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Levy & Levy (1998), Phillips (2009), Rotheray (1993), Speight (1989), Stubbs & Falk (2002).



*Neoascia interrupta* (Meigen, 1822)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This species is almost entirely confined to eastern England as far north as South Yorkshire and west to Warwickshire and Oxfordshire. There are, however, records from North Wales and southern Scotland that are curious anomalies.

**Habitat** This is a wetland species that is associated with tall emergents such as Bulrush *Typha*. It would appear to be tolerant of brackish conditions and occurs extensively across the grazing marshes of the Thames estuary.

**Ecology** The larvae of this genus are associated with rotting vegetation and many are wholly aquatic. Field observations suggest that an association with Bulrush is possible, but the evidence is circumstantial.

**Status** There are 86 post-1980 hectads. At the moment, this suggests that the status of Nationally Scarce should apply. As recording coverage of eastern England is generally good, we believe that the current distribution and frequency is representative of *N. interrupta*. But, it is possible that this species will prove to be more widespread with further recording and there may be a need to de-list this species in any subsequent review.

**Threats** The most likely threat arises from water abstraction and possible loss of wetlands. Prolonged drought is a further possibility. Apart from these, the most likely threats will be to localised populations associated with small water-bodies that may be totally cleared of emergent vegetation in a single episode.

**Management and conservation** Maintenance of water levels within existing grazing marsh regimes is a priority. Ditches and ponds should be managed on a long-enough rotation to allow the maintenance of all seral stages including sections heavily invaded by tall emergents, especially Bulrushes and the retention of mats of floating vegetation.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Orthonevra intermedia* Lundbeck, 1916

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Veen (2004).**Distribution** Confined to two localities within the Delamere Forest, Cheshire.**Habitat** A wetland species that is reported to occur in bogs, poor fen and rich fen. In Scandinavia floating mats of bog vegetation are the preferred habitat. It is this habitat that appears to most closely resemble the locations where this species was found in Cheshire.**Ecology** The larvae are reported to occur within organic matter. Adults have been noted visiting the flowers of Hawthorn *Crataegus*, Dog Rose *Rosa canina*, Buckthorn *Frangula alnus*, Black Cherry *Prunus serotina* and Water Parsnip *Berula erecta*.**Status** Martin Drake swept two males and a female form recently cleared birch woodland at Norley Moss on 2 July 2003. A further two males were swept from Barnsbridge Basin on 6 July 2003. Both sites lie within the Delamere Forest. There have been no further records in the intervening ten years but it is possible that nobody has looked for this species in suitable habitat. The paucity of data suggests that the true distribution of this species is not well-established and, consequently, it is considered Data Deficient.**Threats** The current known localities lie within an area of wooded bogs and peatlands that have been undergoing restoration. Provided sympathetic wetland management continues this species will probably continue to occur in the Delamere Forest. Major threats elsewhere are likely to involve drainage and forestry on peatlands.**Management and conservation** Floating mats of vegetation and bog vegetation should be conserved by maintaining water supply and water chemistry. Measures to restore wetlands by reversing drainage and forestry will help to ensure that suitable bog and fen habitats are retained and improved.**Published sources** Bartsch *et al.* (2009); Drake (2006)



Order DIPTERA

Family SYRPHIDAE

*Paragus albifrons* (Fallén, 1817)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Historically, this species has been recorded from southern England from East Suffolk to Dorset. *P. albifrons* appears to have undergone a dramatic contraction in range. Since 1980 it has been recorded in South Hampshire and at sites in the inner Thames Estuary with only two known records in the last 10 years. Historically, it was known from a number of localities in Dorset, but must be assumed to have gone from that county because it has been intensively surveyed for the past 25 years.

**Habitat** It has been recorded from coastal localities and generally thermophilic conditions such as coastal shingle and limestone grassland.

**Ecology** There are continental reports of larvae as predaceous upon *Aphis craccivora* (not British?) on Restharrow *Ononis repens*, on *Aphis fabae* on Sea Beet *Beta vulgaris*, Creeping Thistle *Cirsium arvense* and Goat's-beard *Tragopogon pratensis*, and *Aphis fabae-solanella* on Black Nightshade *Solanum nigrum*. Adults are very difficult to locate, flying low amongst vegetation.

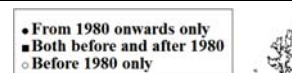
**Status** There is no doubt that this species has undergone a profound decline. For example, it was recorded on a number of occasions on the Isle of Portland between 1890 and 1950 but has not been located since, despite many searches by two of our most capable hoverfly recorders. There are 5 post-1980 hectads, but we have only received two records since 2000. We are aware of another record from a site in the same area with planning permission for redevelopment. It is therefore accorded the status of Critically Endangered under criterion B1 because it is only known from a very few, small localities in the Thames Estuary which are tiny fragments (B2a). It has undergone a very significant decline in range (B2b(i)(ii)) and if one of only three recent localities is lost, this will continue.

**Threats** In the absence of known populations, this section must be treated as conjecture. The most recent records emanate from the Thames Estuary and therefore should there be extant populations they may be vulnerable to measures to respond to sea level rise such as managed realignment. This may also be true of localities on coastal shingle that could be vulnerable to the impact of coastal squeeze.

**Management and conservation** This appears to be a species of warm environments, possibly those that are grazed or sustained as ruderal or xerophytic conditions. Efforts to retain such habitats should take account of the possible occurrence of *P. albifrons* and its association with aphids on plants such as black nightshade and thistles that might otherwise be regarded as "weed" species.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Levy, *et al.* (1992), Rojo *et al.* (2003), Stubbs & Falk (2002).

*Paragus tibialis* (Fallén, 1817)



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Mainly confined to West Surrey, Hampshire and Dorset, from which it has been recorded since 1990. There are older records from Devon, South Wiltshire, West Gloucestershire, Merionethshire and Glamorgan.

**Habitat** The majority of modern records are from *Calluna* heathland. Older records include coastal localities that comprise sand dunes with dune heath, but these records must be treated with caution as *P. tibialis* and *P. haemorrhous* were inseparable before 1978.

**Ecology** The larvae are predaceous upon aphids with continental records of associations with fruit trees and a wide array of other aphid-plant associates. The majority of records relate to the aphids *Aphis craccivora*, *Aphis fabae*, *Aphis gossypii* and *Brachycaudus helichrysi*. The adults fly low and may visit a variety of low-growing heathland flowers along trackways and other examples of heath-edge.

**Status** There are 20 post-1980 hectads, the majority of which are confined to highly restricted parts of Surrey, South Hampshire and Dorset. Although it is difficult to separate from *P. haemorrhous*, it is a species that the more capable recorders can be expected to spot, and occurs in some of the best recorded parts of the country. We can therefore be reasonably certain that its distribution is relatively well known, and therefore a status of Near Threatened seems justifiable.

**Threats** Scrub invasion and fire pose the most serious threats. During periods of drought, fire is a major concern because it can lead to deep burns back to the mineral soil that may be expected to sterilise tracts of heathland.

**Management and conservation** Efforts should be made to prevent known localities from changing significantly in character, including removal of invasive scrub. The possible importance of heathland edge vegetation also needs to be given due consideration, as this is an important contributor to heathland invertebrate biodiversity across a range of taxa. Fire is a particular risk and creation of firebreaks in vulnerable locations may be necessary to minimise this risk.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Levy, *et al.* (1992), Morris (1998), Rojo *et al.* (2003), Stubbs & Falk (2002).

*Parasyrphus nigratarsis* (Zetterstedt, 1843)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larva keyed and illustrated by Rotheray (1993).

**Distribution** This is mainly a northern and western species that is widely distributed across Scotland, Cumbria and Wales, but is also reported from East Anglia, South Hampshire and Cornwall.

**Habitat** The majority of records emanate from wet woodlands and conifer plantations where there are fringes of deciduous scrub such as Sallow *Salix* and Alder *Alnus*.

**Ecology** The larvae are predaceous upon the larvae of Chrysomelid beetles on Alder (*Chrysomela aenea*) Sallow (*Lochmaea capraea*) and Dock *Rumex* (*Gastrophysa viridula*). Adults visit umbellifer flowers and may also be found sun-basking on leaves.

**Status** In the period since 1991, our knowledge of *P. nigratarsis* has improved considerably. At that time it was believed to merit the status Endangered. It is now clear that this was a particularly pessimistic judgement, especially as *P. nigratarsis* is now known from 49 post-1980 hectads. These changes in our knowledge have resulted in its status having been revised to Nationally Scarce.

**Threats** This species is likely to be found along woodland edges and in association with trees of little economic value. As a consequence over-intensification of ride management and woodland edges may be detrimental to the survival of this species. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the ride, to the detriment of low-growing ride side vegetation, Sallow and Alder.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades. Rideside shrub clearance should endeavour to avoid removal of all Sallow and Alder on any single ride management cycle.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray & Hewitt (1999), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Parhelophilus consimilis* (Malm, 1863)



**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** There are scattered records from central Scotland south to South Somerset (Westhay Moor), Dorset (Studland), Cornwall, East Kent and East Anglia (including Thompson Common and Sutton Broad Fen).

**Habitat** This is a wetland species that occurs in habitats that reflect a transition between fen and bog, erring on the side of nutrient-poor acid waters and poor fen.

**Ecology** The larvae of this genus are 'long-tailed', a modification that allows the animal to breathe whilst living entirely submerged. To date this species' larvae appears not to have been found.

**Status** There are 43 post-1980 hectads for this species, but it is mainly found in the less well recorded areas of northern and western Britain, so it will probably prove to be more widespread. However there are indications that *P. consimilis* has undergone a possible decline over the past 25 years. The earlier assessment that this species was Vulnerable now appears overly pessimistic and the status of Nationally Scarce applies more appropriate.

**Threats** Drainage of nutrient-poor peatlands; declining rainfall in lowland England as a result of climate change, leading to scrub encroachment; intensification of grazing around wetland margins. In lowland situations, nutrient enrichment of poor fens through diffuse pollution from excessive agricultural application of nitrates may be an issue. Elsewhere, deposition of atmospheric nitrogen may also be an issue to be aware of.

**Management and conservation** Maintenance of traditional water levels within active wetlands is essential. Where water levels decline, scrub encroachment and development of damp woodland is likely, so in such situations scrub clearance is an essential component of measures to restore wetland biotopes. Measures to limit on reverse nitrification of watercourses may be necessary.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).

*Pelecocera tricincta* Meigen, 1822

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is a southern species that is restricted to Devon, Dorset, Isle of Wight, South Hampshire, North Hampshire, West Gloucestershire, Surrey and East Sussex.

**Habitat** This is a heathland species that favours wetter heaths with cross-leaved heath *Erica tetralix*.

**Ecology** The larva is unknown. Adults are flower visitors and can be found at yellow, low-growing flowers such as Tormentil *Potentilla*, Cats-ear *Hypochoeris radicata*, Hawkbit *Leontodon* sp. and Buttercup *Ranunculus* sp. along heathland rides and heath verge. On occasions, it can occur in numbers, but records more frequently refer to single individuals.

**Status** There are 31 post-1980 hectads. As a consequence the status of this species has been revised down from Rare to Nationally Scarce.

**Threats** Scrub invasion and fire pose the most serious threats. During periods of drought, fire must be a major concern because it can lead to deep burns back to the mineral soil that may be expected to sterilise tracts of heathland.

**Management and conservation** Efforts should be made to prevent known localities from changing significantly in character, including removal of invasive scrub. The possible importance of heathland edge vegetation also needs to be given due consideration, as this is an important contributor to heathland invertebrate biodiversity across a range of taxa. Fire is a particular risk and creation of firebreaks in vulnerable locations may be necessary to minimise this risk.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Levy, *et al.* (1992), Morris (1998), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Pipiza lugubris* (Fabricius, 1755)

● From 1980 onwards only  
 ■ Both before and after 1980  
 ○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This species is widely distributed across England and Wales but is largely absent from extensive areas east of the Pennines and the East Midlands. The major concentrations of records are centred upon South Lancashire/Cheshire, Dorset, Hampshire, Surrey and Sussex.

**Habitat** This appears to be a woodland species that occurs along damp rides. There are suspicions that it may be associated with locations supporting Meadowsweet *Filipendula ulmaria*.

**Ecology** The larvae of this genus are predaceous upon aphids but the precise prey of *P. lugubris* are unknown. Adults have been caught from beds of Meadowsweet and Wild Parsnip *Pastinaca sativa* on a grassy verge.

**Status** There are 89 post-1980 hectads for this species. There are indications that this species has declined over the past 25 years, but this is one of the cohort of species that are difficult to identify and therefore attract declining levels of recorder effort. We therefore feel that this decline is may be caused, at least in partly changes in recorder behaviour. Even though *P. lugubris* is not straightforward to identify, it is in our experience a genuinely scarce species and continues to merit the status of Nationally Scarce.

**Threats** This species is likely to be found along woodland edges. As a consequence intensification of ride management and woodland edges may be detrimental to its survival. In some locations, declining ride management may also be an issue as it may lead to closing of the canopy over the ride, to the detriment of low-growing ride side vegetation.

**Management and conservation** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades, especially where damp rides with meadowsweet occur.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Stubbs & Falk (2002).





Order DIPTERA

Family SYRPHIDAE

*Pipizella maculipennis* (Meigen, 1822)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Although there are records from southern and western Scotland, the majority of records occur south of Warwickshire. There are post-1990 records from West Gloucestershire, North Wiltshire, North Hampshire, South Hampshire, Isle of Wight, West Sussex and West Suffolk.

**Habitat** Unclear: the localities of the records suggest that this ranges from grasslands, through grass heaths, to woodlands, but a common thread seems to be low-growing vegetation in warm situations.

**Ecology** There are continental reports of larval associations as a predator upon root-dwelling aphids. There are no British rearing records. The adult is rarely recorded and there are no clear pointers as to its particular behaviour, but others within the genus are sun-baskers and flower visitors, especially at low-growing umbellifers.

**Status** There are 29 post-1980 hectads for this species, which is one of a cohort of species that are difficult to identify that have received a declining amount of attention from recorders. There are no indications that its status has changed in recent years, and this together with the difficulty of detection, suggests that its status should be revised down from Rare to Nationally Scarce.

**Threats** Changes to grassland structure away from finer grasses typical of warmer, drier environments towards ranker grasslands and scrub. In woodland locations, intensification or reductions of ride management activity both pose a threat.

**Management and conservation** Uncertain. Where it occurs, the wisest course is to maintain existing mosaics of habitats.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rojo *et al.* (2003), Stubbs & Falk (2002).

*Platycheirus amplus* Curran, 1927

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Current data suggest that this is a northern species. The majority of records are from the uplands of Scotland, but there are also records from the North York Moors and the south Pennines.

**Habitat** Current data suggest that this is an inhabitant of poor fen, wet meadows and upland flushes. However, very little is known about the ecology of this species and its precise habitat associations.

**Ecology** The genus *Platycheirus* comprises a range of aphid-feeding predators, many of which are associated with aphids on sedges *Carex* sp. The precise ecology of *P. amplus* is not known.

**Status** There are records from 11 post-1980 hectads. This is a poorly known species, but its northern distribution suggests that it is likely to be under-recorded, suggesting that a status of Near Threatened is appropriate.

**Threats** Drainage, over-grazing and coniferisation are possible threats.

**Management** Maintain existing mosaics of wetland habitats in upland locations.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Stubbs & Falk (2002).





*Platycheirus discimanus* Loew, 1871

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Although there are records from Scotland, this seems to be a largely English species that occurs widely south of a line between south Cumbria and North East Yorkshire.

**Habitat** This is a woodland species that occurs in both coniferous and deciduous woodlands.

**Ecology** The larvae are predaceous upon aphids, with continental records of associations with *Brevicoryne brassicae* and aphids on Larch *Larix*. Adults fly early in the spring and are most readily found visiting the catkins of Sallow *Salix* where they can sometimes occur in considerable numbers.

**Status** There are 61 post-1980 hectads and indications of a decline over the past 25 years. In particular, there are no records from southern England south of a line between the Thames and the Severn since 1990. This is not an easy species to find as it is active very early in the season and often flies higher than recorders can reach; a very long net handle being necessary at many localities. It is therefore unclear whether the apparent decline in the south is genuine or related to recorder behaviour, especially as recent work in Northamptonshire has revealed a number of new localities. We therefore conclude that the status Nationally Scarce should apply.

**Threats** Changes to woodland management practices that affect the stand types or ride-side vegetation are the most likely changes that will affect this species. In conifer plantations, removal of stands of larch may be a possible factor in the long-term survival of particular populations.

**Management** Existing ride structures should be retained or enhanced to provide transitional structure between grasslands and high forest, with provision of sunny open flower-rich glades. Rideside shrub clearance should endeavour to avoid removal or cutting of all flowering Sallows on any one ride management cycle. Where stands of Larch are felled, consideration might be given to replanting with the same species and retention of a small number of mature trees.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (2005a), Rojo *et al.* (2003), Stubbs & Falk (2002).



*Platycheirus immarginatus* (Zetterstedt, 1849)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). This is a difficult species to identify, especially in the female, and there are many incorrect identifications in older collections.

**Distribution** This is mainly a coastal species around England and Wales, but there are inland records from Strathspey in the Scottish Highlands from reliable and experienced recorders.

**Habitat** This is a wetland species that occurs in coastal grazing marshes, tidal rivers and other brackish marshes. Northern inland locations have a rich fringe of sedges *Carex* on the banks of rivers and lakes.

**Ecology** The larvae are predaceous upon the larvae of the aphid *Trichocallis cyperi*, although there are a variety of non British records relating to a range of other aphids that may actually relate to laboratory breeding projects. The adults occur within rank low vegetation and may be found visiting the flower heads of sedges and grasses in keeping with other related species.

**Status** Records have been received from 104 post-1980 hectads, putting this species at the point where it should not qualify as Nationally Scarce. However, a substantial proportion (22%) of these records are for inland localities and include many based on females, or where the sex is unknown, and must be questioned. Records based on males (where identification is more reliable) come from only 22 hectads (and are all coastal) whilst coastal records (shown on the map) from 1980 onwards come from 71 hectads. There are indications that this species has undergone a decline in the past 25 years, but the relative paucity of recent records may reflect the tendency of recorders to avoid more challenging groups! Therefore, we believe that this species should still be accorded the status of Nationally Scarce and that the identification of specimens claimed to belong to this species need to be re-checked.

**Threats** Intensification of management of coastal wetlands, eutrophication of coastal wetlands and further canalisation of tidal river fringes. Some populations may be vulnerable to realignment of flood defences in response to sea level rise, but it must be anticipated that in the long run this is a species that may benefit from those realignments that create greater areas of brackish fringes.

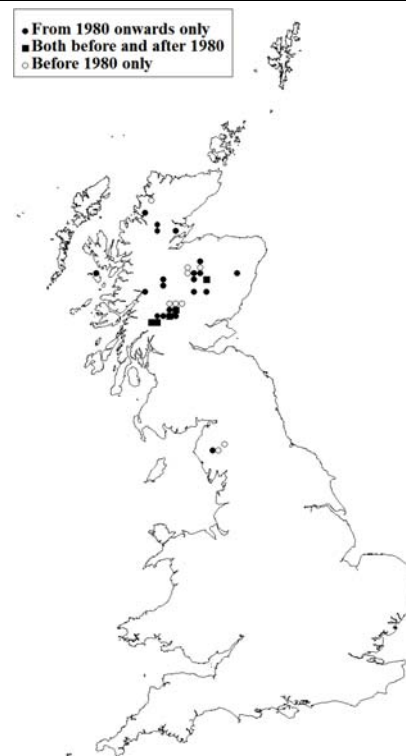
**Management and conservation** Maintenance of water levels within existing grazing marsh regimes is a priority together with maintenance of saline transitions within grazing marsh ditches. Fringes of *Carex* along tidal rivers should be recognised as important and efforts should be made to avoid their loss to upgrading tidal defences.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Platycheirus melanopsis* Loew, 1856**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).**Distribution** Records are confined to the Highlands of Scotland and to Cumbria.**Habitat** This is a montane species that occurs at altitudes in excess of 250 to 300 metres.**Ecology** The larvae are predaceous and it has been suggested that their association is with the scale insect *Arctorthezia cataphracta*. Adult males are found hovering close to the ground, especially over bare ground of tracks and rocky outcrops.**Status** There are 25 post-1980 hectads. Because it is restricted to high altitude areas of the north and west of Britain, which is a poorly recorded area, it is possible that this species is more widely distributed than current records suggest. Although this species must be considered to be a candidate for the status of Vulnerable, we conclude that at the moment the status of Near Threatened is appropriate.**Threats** The greatest threat to this montane species is the possible effects of climate change that would squeeze populations into ever decreasing areas of the uplands. Afforestation and drainage are further threats that have generally abated, although reductions in grazing pressure might lead to increased scrub development that might not favour *P. melanopsis*. In some popular parts of the Cairngorms, increased visitor pressure may be an issue if vegetation cover is lost and soil erosion increases.**Management and conservation** Maintain existing grazing management and ensure that visitor pressure to popular mountains within the Cairngorms is limited to ensure that soil erosion is avoided.**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1997b), Stubbs & Falk (2002).

*Platycheirus perpallidus* Verrall, 1901

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is mainly a northern and upland species that is widely distributed across Scotland and northern England, extending into Wales down to the Severn Estuary. There are no recent records south of the West Midlands and just a single record from South Wiltshire in 1949 that needs to be treated with caution.

**Habitat** This is a wetland species that occurs along the margins of ditches, ponds and mires, especially where sedges *Carex* occur in poor fen.

**Ecology** The larvae are predaceous upon the sedge aphid *Trichocallis cyperi*; there are also records of associations with the aphids *Hyalopterus pruni* on Bulrush *Typha angustifolia* and *Subsaltusaphis rosseri* on the sedge *Carex rostrata*. Adults seem to prefer the water-side edge of wetland vegetation.

**Status** There are 76 post-1980 hectads. The data suggest that this species has declined over the past 25 years, but recording from suitable locations seems also to have declined in recent years so this needs to be treated with some caution. We consequently believe that the status Nationally Scarce should still apply.

**Threats** Drainage, river channel improvements and over-grazing are the most likely threats to suitable riparian vegetation. However, diffuse pollution from nitrate application may also be a consideration.

**Management and conservation** Efforts should concentrate on maintaining fringes of sedge-rich marginal vegetation around and along water bodies, ensuring sufficient grazing and cutting to deter scrub invasion.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rojo *et al.* (2003), Rotheray (1993), Stubbs & Falk (2002).



*Platycheirus sticticus* (Meigen, 1822)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** There are scattered records across England and Wales with outlying records from Scotland (Mid-Perthshire and South Aberdeenshire) in the 1980s.

**Habitat** We know very little of this species, which rarely (if ever) occurs in numbers. It has been found in a variety of habitats including woodland edges, hedgerows and grasslands. In part this uncertainty may arise because *P. sticticus* is very similar to the abundant *P. albimanus* and may be overlooked as a result.

**Ecology** The larvae are predaceous upon aphids or psyllids (there is a doubtful continental record of larvae associated with *Psilla pyri* on *Pyrus malus*) but to date we have no clear picture of its ecology.

**Status** Although very difficult to locate, this species is known from 59 post-1980 hectads and as such qualifies for inclusion as Nationally Scarce.

**Threats** Given the wide range of habitats from which this species has been recorded and its widely scattered distribution, one can only provide broad indications that over-intensive woodland ride management, hedgerow removal, scrub invasion and intensification of grassland management may pose threats.

**Management and conservation** Where this species is known to occur, the existing mosaic of habitats should be retained. Rotational ride management should aim to maintain open swards grading into scrub. Similarly, field margins and woodland edges would benefit from maintenance of such gradations.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rojo *et al.* (2003), Stubbs & Falk (2002).



*Pocota personata* (Harris, 1780)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is mainly an English species with records north and west to Cheshire and the Welsh borders. There are outlying records from Duncombe Park (North-east Yorkshire).

**Habitat** This is a woodland and parkland species that favours locations with over-mature trees with water-filled rot holes.

**Ecology** The larvae are filter-feeders that inhabit water-filled rot holes and have been found in rot holes in Beech *Fagus* and Horse Chestnut *Aesculus*. Adults are rarely encountered, but are sometimes reported flying around suitable rot-holes and occasionally at flowers such as Hawthorn *Crataegus*.

**Status** There are 36 post-1980 hectads. On current evidence there would appear to have been a decline in eastern England but the Recording Scheme is lacking the most recent data for some of these counties and therefore we suspect that the decline may in part reflect uneven recorder effort. However, this is one of a number of rot-hole breeding species which are difficult to find as adults and can be surveyed more reliably by searching for larvae. If looked for in this way, it will probably prove to be more widespread.

**Threats** The association with rot holes in older trees means that loss of continuity of aged trees is potential a matter of concern at some locations. This is a species that might be encountered in urban parks and so arboricultural practices such as cavity filling (with cement) could contribute to a reduction in possible breeding opportunities.

**Management and conservation** Efforts may be needed to address the issue of long-term continuity of age structure amongst trees in old woodlands and parklands. Education of local authority arboricultural officers may help to publicise the importance of rot holes for rot hole hoverflies.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).





*Psilota anthracina* Meigen, 1822

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** The stronghold of this species appears to be Hampshire, West Surrey, Berkshire together with a string of localities through the West Midlands through to Nottinghamshire and Derbyshire. However there are a wider spread of records including Dorset, South Essex and Hertfordshire.

**Habitat** This is a woodland and parkland species that is associated with sap runs.

**Ecology** The larvae are filter feeders on yeasts and bacteria in decaying sap in trees damaged by wind or perhaps by beetle or Goat Moth *Cossus cossus*. Continental reports of larvae in sappy rot holes in conifers are now believed to relate to two other species of *Psilota* that have not been found in Britain (yet!). Recent evidence suggests that *P. anthracina* is confined to broadleaved trees. Adults are very difficult to locate, but are occasional visitors to flowers such as Hawthorn *Crataegus*.

**Status** There are 33 post 1980 hectads, suggesting that it should be accorded the status of Nationally Scarce. There are, however, indications that this species has undergone a significant decline over the past 25 years pushing it towards the status of Vulnerable. If an association with Goat Moth were to prove to be correct, then the indications of decline would be borne out by a similar decline in the fortunes of the moth. At this stage, however, it would be unwise to attach too much significance to the lower frequency of records in recent years. This is because it is a notoriously difficult animal to find and it is easily dismissed as a shiny black muscid or *Cheilosia impressa*. It is therefore likely that the decline may be explained in part by the degree to which recorders pay attention to black hoverflies and the current evidence suggests that such genera are less readily tackled than they were in the past.

**Threats** If the perceived association with *Cossus* infested trees is correct, then the decline in such trees is a matter of concern. In the New Forest, such trees have declined and have been heavily affected by woodpecker activity. In parkland, trees with sap runs are sometimes felled because they are believed to be dangerous. Similar timber hygiene programmes in woodland offer the same threat to this species and the wider guild of invertebrates associated with sap runs.

**Management and conservation** Long-term continuity of habitat is essential if this and other sap-run species are to flourish. Where discontinuity of woodland age classes is apparent, efforts to resolve this are needed (this is especially true in some parklands). Loss of old woodland habitat within the wider countryside, and loss of connectivity between suitable habitats remain matters of concern, especially as the degree to which isolated hedgerow trees may contribute suitable habitat is unclear.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Sphaerophoria bankowskae* (Goeldlin de Tiefenau, 1989)**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).**Distribution** The species was originally discovered in a wood in N. Essex in 1986 and subsequently found in rides in a wood in Northamptonshire in 1990. There is a recent Scottish record from Glen Affric in 2010. It is poorly known in Europe despite its widespread distribution.**Habitat** Rides and open areas in woodland.**Ecology** Larvae of the genus *Sphaerophoria* are predaceous upon aphids. We have no further information.**Status** As there are just three known records we must conclude that there are insufficient data upon which to base any judgement on status. This species is therefore regarded as Data Deficient.**Threats** Intensification of woodland ride management, and declining ride management that leads to closing of the canopy over the ride.**Management and conservation** Where this species is known to occur, the existing mosaic of habitats should be retained. Rotational ride management should aim to maintain open swards grading into scrub. Similarly, field margins and woodland edges would benefit from maintenance of such gradations.**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Plant(1990), Stubbs (1996), Stubbs & Falk (2002).



*Sphaerophoria loewi* Zetterstedt, 1843

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Almost entirely restricted to coastal locations around England, Wales and Scotland, but with confirmed inland records from the Strathspey and recently in a clay pit in Bedfordshire. There are post-1980 records from East Sutherland, Glamorganshire, Lanarkshire, North Lancashire, North Lincolnshire and West Sussex. Most records are of single individuals, but it has been found in some numbers at Leighton Moss and in the Tay Reedbeds.

**Habitat** Beds of Common Reed *Phragmites* and Sea Club Rush *Bulboschoenus maritimus* in brackish situations, such as borrow-dykes behind sea walls, are favoured.

**Ecology** The larvae are unknown, but larvae of *Sphaerophoria* are predaceous upon aphids and other soft bodied hemiptera and it seems likely that *S. loewi* will exhibit similar associations. Adults have been recorded flying around stands of tall emergent vegetation and are known flower visitors, although precise flower visits are not reported.

**Status** There are 13 post-1980 10km localities of this little known species. Based on the wide distribution and difficulty of finding adults, we conclude that its status should be revised from Vulnerable to Near Threatened.

**Threats** Loss of coastal reedbeds. This may arise from new flood defences and possibly the loss of brackish borrow-dykes behind sea walls that have to be realigned to counter sea level rise.

**Management and conservation** In coastal locations, creation of new brackish reedbeds in the vicinity of existing populations may be needed to ensure continuity of habitat. Within grazing marshes and other locations behind sea walls, reedbed management should seek to maintain brackish inundated areas where reeds grow at lower densities than occur in strictly freshwater locations.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



Order DIPTERA

Family SYRPHIDAE

*Sphaerophoria potentillae* Claussen, 1984

● From 1980 onwards only  
 ■ Both before and after 1980  
 ○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This species is known solely from a very limited area of North Devon.

**Habitat** Occurs in wet unimproved Culm grassland.

**Ecology** The larvae are unknown, but larvae of *Sphaerophoria* are predaceous upon aphids and other soft bodied hemiptera and it seems likely that *S. potentillae* will exhibit similar associations. Adults are reported flower visitors and have been noted at yarrow *Achillea millefolium*, Tormentil *Potentilla erecta* and buttercup *Ranunculus* sp.

**Status** There are 3 post-1980 hectads. This is a poorly known species that was added to the British fauna in 1989, since when there has been no indication that its distribution is very much wider than the area in which it was initially found. Culm grassland is a highly restricted habitat and therefore we judge that this species should be given the status of Vulnerable on the basis of criterion D2 (five or fewer localities).

**Threats** Continuing management of these sites is almost entirely dependent on agri-environment programmes because of ongoing pressure on livestock farmers. Where grazing is discontinued, scrub invasion and changes in the sward structure is rapid. Unless support is available, the only alternative economic course for many landowners is sward improvement to increase productivity. This and possibly atmospheric nitrification constitute the main additional threats.

**Management and conservation** Maintain existing grazing regimes on Culm grassland to retain the range of mosaics that currently exist.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).



*Sphaerophoria virgata* (Linnaeus, 1758)

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is a widely distributed species that has its main populations centred in Dorset/South Hampshire, North Hampshire/Surrey and the Highlands of Scotland. There are scattered records across Wales and the West Midlands, as well as in the South Pennines and the Scottish borders.

**Habitat** This is a heathland species that is most frequently found along heathland rides. Evidence suggests that it is most closely associated with Heather *Calluna vulgaris* heaths and moors.

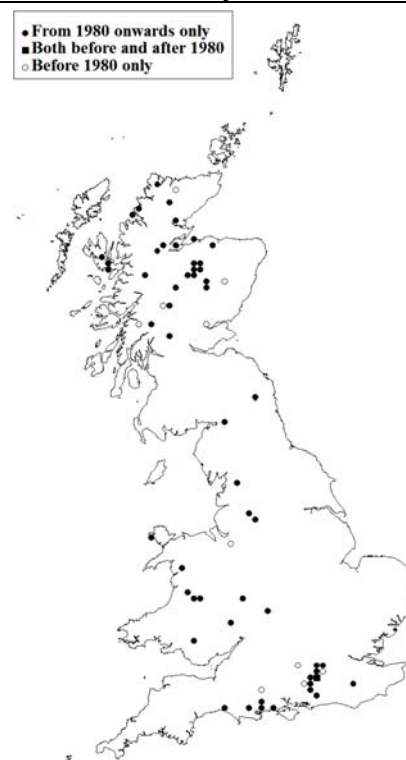
**Ecology** The larvae are unknown, but larvae of *Sphaerophoria* are predaceous upon aphids and other soft bodied hemiptera and it seems likely that *S. virgata* will exhibit similar associations, possibly those associated with ericaceous shrubs. Adults are known flower visitors and have been reported from Heather flowers and Tormentil *Potentilla erecta* flowers.

**Status** There are 54 post-1980 hectads and no evidence of a decline in frequency or distribution. Its northern and western distribution, centred in areas that tend to be poorly recorded, suggests that it may prove to be more widespread. This species qualifies as Nationally Scarce based on currently available data.

**Threats** Scrub invasion and fire pose the most serious threats. During periods of drought, fire must be a major concern because it can lead to deep burns back to the mineral soil that may be expected to sterilise tracts of heathland.

**Management and conservation** Efforts should be made to prevent known localities from changing significantly in character, including removal of invasive scrub. The possible importance of heathland edge vegetation also needs to be given due consideration as this is an important contributor to heathland invertebrate biodiversity across a range of taxa but clearly *S. virgata* is attracted to edge vegetation as nectar resources. Fire is a particular risk and creation of firebreaks in vulnerable locations may be necessary to minimise this risk.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).



*Triglyphus primus* Loew, 1840

● From 1980 onwards only  
■ Both before and after 1980  
○ Before 1980 only

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is an English species that is mainly confined to eastern England extending north to South Lancashire and southern Yorkshire with the most northerly record from Mid-West Yorkshire.

**Habitat** The range of habitats is broad, but generally points to an association with thermophilic environments including heathland, brownfield sites and dry grasslands.

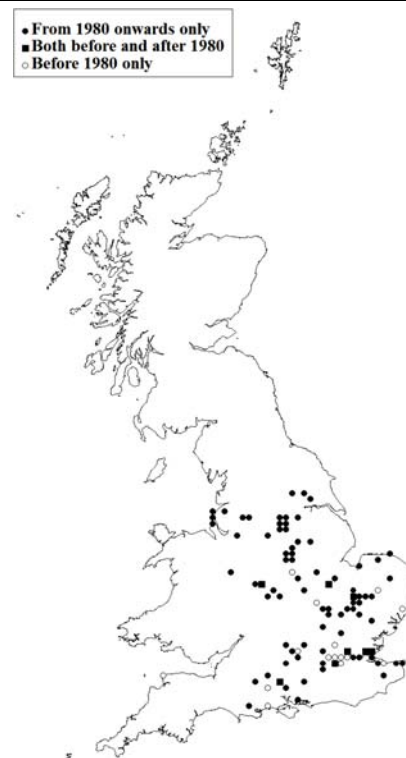
**Ecology** The larvae are believed to be specific to the galls of the aphid *Cytosiphum artemisiae* on Mugwort *Artemisia vulgaris*. Adults can occasionally be found in considerable numbers, visiting umbellifers such as Wild Carrot *Daucus carota* and Wild Parsnip *Pastinaca sativa*.

**Status** There are 83 post-1980 hectads. Analysis suggests that *T. primus* has undergone a significant decline in the past 25 years but it is one of a cohort of species that appear to attract less attention amongst the modern generation of recorders. However, this is not a difficult species to identify. Given that it is not regularly encountered and certainly occupies a restricted range of habitats, some of which are threatened, we conclude that the status Nationally Scarce should apply.

**Threats** Loss of thermophilic habitats and ruderal communities through development of brownfield sites is the most likely threat to *T. primus*.

**Management and conservation** Seek to maintain existing mosaics of vegetation on brownfield sites and dry grassland locations, possibly scarifying to encourage localised development of ruderal communities such as Mugwort.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Rotheray (1993), Stubbs & Falk (2002).



*Xylota abiens* Meigen, 1822

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** Current evidence suggests that this is an English species with the greatest concentration of records south of a line between the Wash and the Severn. There are scattered post 1980 records from Cumberland, Cheshire, Shropshire and Staffordshire.

**Habitat** This is a woodland species that occurs in both broad-leaved and coniferous woodland.

**Ecology** The larvae are saproxylic, occurring in rotting tree roots and have been found in decaying sap under the bark at the base of dead standing Pine *Pinus*. Adults are flower visitors and have been reported from Buttercups *Ranunculus* and Hawthorn *Crataegus*. They can occasionally occur in numbers.

**Status** There are 73 post-1980 hectads and some evidence of a decline over the past 25 years. Given the numbers of localities from which this species has been recorded the status of Nationally Scarce seems to be appropriate at the moment.

**Threats** Emphasis on woodland hygiene, including the removal of root plates might be a localised problem, perhaps especially in localities such as parkland where stump grinding is a favoured management approach.

**Management and conservation** Maintain a continuous supply of subterranean rotting timber as a result of ongoing woodland management.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Morris (1998), Rotheray (1993, 2004), Stubbs & Falk (2002).



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**XYLOTA TARDA**

Nationally Scarce

Order DIPTERA

Family SYRPHIDAE

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*Xylota tarda* Meigen, 1822

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004). Larva keyed to genus and illustrated in Rotheray (1993).

**Distribution** This is a widely distributed species with widespread records in England from the Midlands south. There are scattered northern English records and a greater concentration of records from the Scottish Highlands.

**Habitat** This is a woodland species that is most frequently found in close association with aspen.

**Ecology** The larvae are saproxylic and have been found in association with sap runs on Poplar *Populus* species and in decaying sap under the bark of fallen Aspen *P. tremula*. The evidence points to a particular association with Aspen *Populus tremula*. Adults are rarely noted and there do not appear to be flower visit records.

**Status** There are 90 post-1980 hectads for *X. tarda* – i.e. approaching the borderline for inclusion in this review. However, Aspen is a very localised species and is still vulnerable because it is not an economic species and therefore prone to grubbing out. This species is therefore believed to merit continued inclusion as Nationally Scarce.

**Threats** Intensification of woodland management and the removal of Aspen stands from localities that support *X. tarda*.

**Management and conservation** Maintain existing stands of Aspen where they occur within woodlands.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993, 2004), Stubbs & Falk (2002).



*Xylota xanthocnema* Collin, 1939

**Identification** Keyed by Stubbs & Falk (2002) and Veen (2004).

**Distribution** This is a widely distributed species that occurs most frequently in southern England, especially Dorset and Somerset. There are records as far north as Duncombe Park in North East Yorkshire. Records extend east through to East Norfolk and west to a variety of locations in Wales, especially South Wales.

**Habitat** This is a woodland species that is most frequently found in old broad-leaved woodland.

**Ecology** The larvae are saproxylic and have been found in association with rot holes in Yew *Taxus baccata* and Oak *Quercus*. Adults are rarely noted but can be found browsing on aphid honeydew and pollen on sunlit leaves.

**Status** There are 87 post-1980 hectads, placing this species close to the point at which its status might be questioned. Analysis suggests that this species has declined significantly over the past 25 years. However, it requires careful examination to separate it from the common *X. sylvarum* and the tendency of recorders to pay less attention to more difficult species in recent times may be a factor. We conclude that this species should remain listed as Nationally Scarce.

**Threats** The association with rot holes in older trees means that loss of continuity of aged trees is potential a matter of concern at some locations. This is a species that might be encountered in urban parks and so arboricultural practices such as cavity filling (with cement) could contribute to a reduction in possible breeding opportunities.

**Management and conservation** Efforts may be needed to address the issue of long-term continuity of age structure amongst trees in old woodlands and parklands. Education of local authority arboricultural officers may help to publicise the importance of rot holes for rot hole hoverflies.

**Published sources** Ball & Morris (2000), Ball *et al.* (2011), Falk (1991), Rotheray (1993), Stubbs & Falk (2002).





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## 11. Index

This index includes all generic and specific names of animals and plants and all locality names mentioned in the main text. References to the page numbers of data sheets following the name of a species are shown in **bold** type. References to the page numbers of Sections 5, 6, 8, 9 and Appendix A are shown in *italic* type. Insect names are given as species followed by genus (*abiens*, *Xylota*) while plant names are given as genus followed by species (*Acer campestre*).

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## **APPENDIX 1. The IUCN Red List Categories and Criteria as set out in Version 3.1 of the guidance (IUCN 2001).**

### **CRITICALLY ENDANGERED (CR)**

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

#### **A. Reduction in population size based on any of the following:**

1. An observed, estimated, inferred or suspected population size reduction of  $\geq 90\%$  over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

- a direct observation
- b an index of abundance appropriate to the taxon
- c a decline in area of occupancy, extent of occurrence and/or quality of habitat
- d actual or potential levels of exploitation
- e the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of  $\geq 80\%$  over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of a to e under A1.

3. A population size reduction of  $\geq 80\%$ , projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of  $\geq 80\%$  over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

#### **B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:**

1. Extent of occurrence estimated to be less than  $100 \text{ km}^2$ , and estimates indicating at least two of a–c:

a. Severely fragmented or known to exist at only a single location.

b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

c. Extreme fluctuations in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) number of locations or subpopulations
- (iv) number of mature individuals.

2. Area of occupancy estimated to be less than  $10 \text{ km}^2$ , and estimates indicating at least two of a–c:

a. Severely fragmented or known to exist at only a single location.

b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

- c. Extreme fluctuations in any of the following:
  - (i) extent of occurrence
  - (ii) area of occupancy
  - (iii) number of locations or subpopulations
  - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 250 mature individuals and either:
  - 1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR
  - 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a–b):
    - a. Population structure in the form of one of the following:
      - (i) no subpopulation estimated to contain more than 50 mature individuals, OR
      - (ii) at least 90% of mature individuals in one subpopulation.
    - b. Extreme fluctuations in number of mature individuals.
- D. Population size estimated to number fewer than 50 mature individuals.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

#### **ENDANGERED (EN)**

A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

- A. Reduction in population size based on any of the following:
  - 1. An observed, estimated, inferred or suspected population size reduction of  $\geq 70\%$  over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
    - (a) direct observation
    - (b) an index of abundance appropriate to the taxon
    - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
    - (d) actual or potential levels of exploitation
    - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
  - 2. An observed, estimated, inferred or suspected population size reduction of  $\geq 50\%$  over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
  - 3. A population size reduction of  $\geq 50\%$ , projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
  - 4. An observed, estimated, inferred, projected or suspected population size reduction of  $\geq 50\%$  over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
  - 1. Extent of occurrence estimated to be less than 5000 km<sup>2</sup>, and estimates indicating at least two of a–c:
    - a. Severely fragmented or known to exist at no more than five locations.
    - b. Continuing decline, observed, inferred or projected, in any of the following:
      - (i) extent of occurrence
      - (ii) area of occupancy
      - (iii) area, extent and/or quality of habitat
      - (iv) number of locations or subpopulations

- (v) number of mature individuals.
- c. Extreme fluctuations in any of the following:
  - (i) extent of occurrence
  - (ii) area of occupancy
  - (iii) number of locations or subpopulations
  - (iv) number of mature individuals.
- 2. Area of occupancy estimated to be less than 500 km<sup>2</sup>, and estimates indicating at least two of a–c:
  - a. Severely fragmented or known to exist at no more than five locations.
  - b. Continuing decline, observed, inferred or projected, in any of the following:
    - (i) extent of occurrence
    - (ii) area of occupancy
    - (iii) area, extent and/or quality of habitat
    - (iv) number of locations or subpopulations
    - (v) number of mature individuals.
  - c. Extreme fluctuations in any of the following:
    - (i) extent of occurrence
    - (ii) area of occupancy
    - (iii) number of locations or subpopulations
    - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 2500 mature individuals and either:
  - 1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR
  - 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a–b):
    - a. Population structure in the form of one of the following:
      - (i) no subpopulation estimated to contain more than 250 mature individuals, OR
      - (ii) at least 95% of mature individuals in one subpopulation.
    - b. Extreme fluctuations in number of mature individuals.
- D. Population size estimated to number fewer than 250 mature individuals.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).

#### **VULNERABLE (VU)**

A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:

- A. Reduction in population size based on any of the following:
  - 1. An observed, estimated, inferred or suspected population size reduction of  $\geq 50\%$  over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
    - (a) direct observation
    - (b) an index of abundance appropriate to the taxon
    - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
    - (d) actual or potential levels of exploitation
    - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
  - 2. An observed, estimated, inferred or suspected population size reduction of  $\geq 30\%$  over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of  $\geq 30\%$ , projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
  4. An observed, estimated, inferred, projected or suspected population size reduction of  $\geq 30\%$  over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 20,000 km<sup>2</sup>, and estimates indicating at least two of a–c:
    - a. Severely fragmented or known to exist at no more than 10 locations.
    - b. Continuing decline, observed, inferred or projected, in any of the following:
      - (i) extent of occurrence
      - (ii) area of occupancy
      - (iii) area, extent and/or quality of habitat
      - (iv) number of locations or subpopulations
      - (v) number of mature individuals.
    - c. Extreme fluctuations in any of the following:
      - (i) extent of occurrence
      - (ii) area of occupancy
      - (iii) number of locations or subpopulations
      - (iv) number of mature individuals.
  2. Area of occupancy estimated to be less than 2000 km<sup>2</sup>, and estimates indicating at least two of a–c:
    - a. Severely fragmented or known to exist at no more than 10 locations.
    - b. Continuing decline, observed, inferred or projected, in any of the following:
      - (i) extent of occurrence
      - (ii) area of occupancy
      - (iii) area, extent and/or quality of habitat
      - (iv) number of locations or subpopulations
      - (v) number of mature individuals.
    - c. Extreme fluctuations in any of the following:
      - (i) extent of occurrence
      - (ii) area of occupancy
      - (iii) number of locations or subpopulations
      - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 10,000 mature individuals and either:
1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR
  2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a–b):
    - a. Population structure in the form of one of the following:
      - (i) no subpopulation estimated to contain more than 1000 mature individuals, OR
      - (ii) all mature individuals are in one subpopulation.
    - b. Extreme fluctuations in number of mature individuals.
- D. Population very small or restricted in the form of either of the following:
1. Population size estimated to number fewer than 1000 mature individuals.



2. Population with a very restricted area of occupancy (typically less than 20 km<sup>2</sup>) or number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.

E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

## **DEFINITIONS**

### *Extent of occurrence* (Criteria A and B)

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (*e.g.* large areas of obviously unsuitable habitat) (but see 'area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

### *Area of occupancy* (Criteria A, B and D)

Area of occupancy is defined as the area within its 'extent of occurrence' which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. In some cases the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon, the nature of threats and the available data.

### *Location* (Criteria B and D)

The term 'location' defines a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat.

### *Quantitative analysis* (Criterion E)

A quantitative analysis is defined here as any form of analysis which estimates the extinction probability of a taxon based on known life history, habitat requirements, threats and any specified management options. Population viability analysis (PVA) is one such technique. Quantitative analysis should make full use of all relevant available data. In a situation in which there is limited information, such data as are available can be used to provide an estimate (for instance, estimating the impact of stochastic events on habitat). In presenting the result of quantitative analysis. The assumptions (which must be appropriate and defensible), the data used and the uncertainty in the data or quantitative model must be documented.

## APPENDIX 2. List of Red Data Book and Nationally Scarce species

Species listed in Shirt (1987), Falk (1991) and the present review are tabulated in alphabetical order, together with the conservation status assigned in each of these works.

Scientific name	Shirt, 1987	Falk, 1991	This review
<i>Anasimyia interpuncta</i> (Harris, 1776)	Vulnerable	Rare	Nationally Scarce
<i>Anasimyia lunulata</i> (Meigen, 1822)	–	Notable	Nationally Scarce
<i>Blera fallax</i> (Linnaeus, 1758)	Endangered	Endangered	CRITICALLY ENDANGERED
<i>Brachyopa insensilis</i> Collin, 1939	–	Notable	–
<i>Brachyopa bicolor</i> (Fallén, 1817)	Vulnerable	Rare	Nationally Scarce
<i>Brachyopa pilosa</i> Collin, 1939	Rare	Notable	Nationally Scarce
			Family
<i>Brachypalpus laphriformis</i> (Fallén, 1816)	Rare	Notable	–
<i>Caliprobola speciosa</i> (Rossi, 1790)	Endangered	Endangered	Near Threatened
<i>Callicera aurata</i> (Rossi, 1790) (as <i>C. aenea</i> (F.) in Shirt, 1987 and Falk, 1991)	Vulnerable	Rare	Nationally Scarce
<i>Callicera rufa</i> Schummel, 1842	Endangered	Rare	Nationally Scarce
<i>Callicera spinolae</i> Rondani, 1944	Endangered	Endangered	VULNERABLE
<i>Chalcosyrphus eunotus</i> (Loew, 1873)	Vulnerable	Vulnerable	Nationally Scarce
<i>Chamaesyrphus caledonicus</i> Collin, 1940	Endangered	Endangered	VULNERABLE
<i>Chamaesyrphus scaevoides</i> (Fallén, 1817)	Rare	Rare	Nationally Scarce
<i>Cheilosia ahenea</i> (von Rosser, 1840)	–	–	VULNERABLE
<i>Cheilosia barbata</i> Loew, 1857	–	Notable	Nationally Scarce
<i>Cheilosia carbonaria</i> Egger, 1860	Rare	Notable	Nationally Scarce
<i>Cheilosia chrysocoma</i> (Meigen, 1822)	–	Rare	Nationally Scarce
<i>Cheilosia cynocephala</i> Loew, 1840	Rare	Notable	Nationally Scarce
<i>Cheilosia mutabilis</i> (Fallén, 1817)	Rare	Notable	Nationally Scarce
<i>Cheilosia nebulosa</i> Verrall, 1871	Rare	Rare	Nationally Scarce
<i>Cheilosia nigripes</i> (Meigen, 1822)	Rare	Rare	Nationally Scarce
<i>Cheilosia psilophthalma</i> Becker, 1874	–	–	DATA DEFICIENT
<i>Cheilosia pubera</i> (Zetterstedt, 1838)	Rare	Notable	Nationally Scarce
<i>Cheilosia sahlbergi</i> Becker, 1894	Rare	Vulnerable	VULNERABLE

<i>Cheilosia semifasciata</i> Becker, 1894	–	Rare	Near Threatened
<i>Cheilosia soror</i> (Zetterstedt, 1843)	–	Notable	–
<i>Cheilosia</i> species B sensu Stubbs, 1983 (? <i>gigantea</i> (Zetterstedt, 1938))	Rare	Endangered	DATA DEFICIENT
<i>Cheilosia uviformis</i> Becker, 1894	–	–	DATA DEFICIENT
<i>Cheilosia velutina</i> Loew, 1840	Rare	Notable	Nationally Scarce
<i>Chrysotoxum elegans</i> Loew, 1841	Rare	Rare	Nationally Scarce
<i>Chrysotoxum octomaculatum</i> Curtis, 1837	Vulnerable	Vulnerable	ENDANGERED
<i>Chrysotoxum vernale</i> Loew, 1841	Endangered	Endangered	ENDANGERED
<i>Criorhina asilica</i> (Fallén, 1816)	–	Notable	–
<i>Criorhina ranunculi</i> (Panzer, 1804)	–	Notable	–
<i>Didea alneti</i> (Fallén, 1817)	Endangered	Endangered	–
<i>Didea fasciata</i> Macquart, 1834	–	Notable	–
<i>Didea intermedia</i> Loew, 1854	–	Notable	Nationally Scarce
<i>Doros profuges</i> Harris, 1780 (as <i>D. conopseus</i> (F.) in Shirt, 1987 and Falk, 1991)	Vulnerable	Vulnerable	Near Threatened
<i>Epistrophe diaphana</i> (Zetterstedt, 1843)	–	Notable	–
<i>Epistrophe melanostoma</i> (Zetterstedt, 1843)	–	–	Nationally Scarce
<i>Epistrophe ochrostoma</i> (Zetterstedt, 1849)	–	–	DATA DEFICIENT
<i>Eristalis cryptarum</i> (Fabricius, 1794)	Vulnerable	Vulnerable	CRITICALLY ENDANGERED
<i>Eristalis rupium</i> Fabricius, 1805	–	Notable	–
<i>Eumerus ornatus</i> Meigen, 1822	–	Notable	–
<i>Eumerus sabulonum</i> (Fallén, 1817)	Rare	Notable	Nationally Scarce
<i>Eupeodes bucculatus</i> (Rondani, 1857) (as <i>Metasyrphus latilunulatus</i> (Collin) in Falk, 1991)	–	Notable	–
<i>Eupeodes lapponicus</i> (Zetterstedt, 1838) (as <i>Metasyrphus lapponicus</i> (Zetterstedt) in Falk, 1991)	–	Notable	–
<i>Eupeodes nielseni</i> Dušek & Láška, 1976 (as <i>Metasyrphus nielseni</i> Dušek & Láška in Falk, 1991)	–	Notable	Nationally Scarce
<i>Eupeodes nitens</i> (Zetterstedt, 1843) (as <i>Metasyrphus nitens</i> (Zetterstedt) in Falk, 1991)	–	Notable	Nationally Scarce
<i>Ferdinandea ruficornis</i> (Fabricius, 1775)	Vulnerable	Notable	Nationally Scarce
<i>Hammerschmidtia ferruginea</i> (Fallén, 1817)	Endangered	Endangered	ENDANGERED
<i>Helophilus groenlandicus</i> (Fabricius, 1780)	Rare	Vulnerable	DATA DEFICIENT

<i>Heringia brevidens</i> (Egger, 1865) (as <i>Neocnemodon brevidens</i> (Egger) in Falk, 1991)	–	Notable	Nationally Scarce
<i>Heringia latitarsis</i> (Egger, 1865) (as <i>Neocnemodon latitarsis</i> (Egger) in Falk, 1991)	–	Notable	Nationally Scarce
<i>Heringia pubescens</i> Delucchi & Pschorn-Walcher, 1955 (as <i>Neocnemodon pubescens</i> Delucchi & Pschorn-Walcher in Falk, 1991)	–	Notable	Nationally Scarce
<i>Heringia verrucula</i> (Collin, 1931) (as <i>Neocnemodon verrucula</i> (Collin) in Falk, 1991)	–	Notable	DATA DEFICIENT
<i>Lejogaster tarsata</i> (Megerle in Meigen, 1822) (as <i>L. splendida</i> (Meigen) in Falk, 1991)	–	Notable	–
<i>Lejops vittatus</i> (Meigen, 1822)	Vulnerable	Vulnerable	Near Threatened
<i>Mallota cimbiciformis</i> (Fallén, 1817)	Vulnerable	Notable	Nationally Scarce
<i>Megasyrphus erraticus</i> (Linnaeus, 1758)	–	Notable	–
<i>Melangyna barbifrons</i> (Fallén, 1817)	–	Notable	Near Threatened
<i>Melangyna ericarum</i> (Collin, 1946)	–	Rare	VULNERABLE
<i>Melanogaster aerea</i> (Loew, 1843) (as <i>Chrysogaster macquarti</i> Loew in Shirt, 1987 and Falk, 1991)	Rare	Notable	
<i>Melanostoma dubium</i> (Zetterstedt, 1838)	–	Notable	Nationally Scarce
<i>Melanostoma</i> form A sensu Stubbs, 1983	–	Notable	–
<i>Meligramma euchromum</i> (Kowarz, 1885) (as <i>Epistrophella euchroma</i> (Kowarz) in Shirt, 1987 and Falk, 1991)	Rare	Rare	Nationally Scarce
<i>Meligramma guttatum</i> (Fallén, 1817) (as <i>Melangyna guttata</i> (Fallén) in Shirt, 1987 and Falk, 1991)	Rare	Notable	Nationally Scarce
<i>Meligramma trianguliferum</i> (Zetterstedt, 1843) (as <i>Melangyna triangulifera</i> (Zetterstedt) in Falk, 1991)	–	Notable	–
<i>Microdon analis</i> (Macquart, 1842) (as <i>M. eggeri</i> Mik in Shirt 1987 in Falk, 1991)	Rare	Notable	Nationally Scarce
<i>Microdon devius</i> (Linnaeus, 1761)	Vulnerable	Vulnerable	Near Threatened
<i>Microdon mutabilis</i> (Linnaeus, 1758)	–	–	DATA DEFICIENT
<i>Microdon myrmicae</i> Schönrogge <i>et al.</i> 2002 (as <i>M. mutabilis</i> (L.) in Shirt, 1987 and Falk, 1991)	Rare	Notable	–
<i>Myolepta dubia</i> (Fabricius, 1805) (as <i>M. luteola</i> (Gmelin) in Shirt, 1987 and Falk, 1991)	Rare	Notable	Nationally Scarce

<i>Myolepta potens</i> (Harris, 1780)	Endangered	Endangered	CRITICALLY ENDANGERED
<i>Neoascia obliqua</i> Coe, 1940	–	Notable	–
<i>Neoascia interrupta</i> (Meigen, 1822)	–	Notable	Nationally Scarce
<i>Neoascia obliqua</i> Coe, 1940	–	Notable	–
<i>Orthonevra brevicornis</i> Loew, 1843	Rare	Notable	–
<i>Orthonevra geniculata</i> Meigen, 1830	Rare	Notable	–
<i>Orthonevra intermedia</i> Lundbeck, 1916	–	–	DATA DEFICIENT
<i>Paragus albifrons</i> (Fallén, 1817)	Rare	Vulnerable	CRITICALLY ENDANGERED
<i>Paragus tibialis</i> (Fallén, 1817)	–	Notable	Near Threatened
<i>Parasyrphus nigrirarsis</i> (Zetterstedt, 1843)	Endangered	Endangered	Nationally Scarce
<i>Parhelophilus consimilis</i> (Malm, 1863)	Vulnerable	Vulnerable	Nationally Scarce
<i>Pelecocera tricineta</i> Meigen, 1822	Rare	Rare	Nationally Scarce
<i>Pipiza lugubris</i> (Fabricius, 1775)	–	Notable	Nationally Scarce
<i>Pipizella maculipennis</i> (Meigen, 1822)	Rare	Rare	Nationally Scarce
<i>Pipizella virens</i> (Fabricius, 1805)	–	Notable	–
<i>Platycheirus amplius</i> Curran, 1927	–	–	Near Threatened
<i>Platycheirus discimanus</i> Loew, 1871	–	Notable	Nationally Scarce
<i>Platycheirus immarginatus</i> (Zetterstedt, 1849)	–	Notable	Nationally Scarce
<i>Platycheirus melanopsis</i> Loew, 1856	Rare	Rare	Near Threatened
<i>Platycheirus perpallidus</i> Verrall, 1901	Rare	Notable	Nationally Scarce
<i>Platycheirus podagratus</i> (Zetterstedt, 1838)	–	Notable	–
<i>Platycheirus sticticus</i> (Meigen, 1822)	–	Notable	Nationally Scarce
<i>Pocota personata</i> (Harris, 1780)	Vulnerable	Vulnerable	Nationally Scarce
<i>Psilota anthracina</i> Meigen, 1822	Vulnerable	Vulnerable	Nationally Scarce
<i>Rhingia rostrata</i> (Linnaeus, 1758)	Vulnerable	Rare	–
<i>Sphaerophoria bankowskiae</i> (Goeldlin de Tiefenau, 1989)	–	–	DATA DEFICIENT
<i>Sphaerophoria loewi</i> Zetterstedt, 1843	Vulnerable	Vulnerable	Near Threatened
<i>Sphaerophoria potentillae</i> Claussen, 1984	–	–	VULNERABLE
<i>Sphaerophoria virgata</i> Goeldlin de Tiefenau, 1974	–	Notable	Nationally Scarce
<i>Sphegina verecunda</i> Collin, 1937	–	Notable	–
<i>Triglyphus primus</i> Loew, 1840	–	Notable	Nationally Scarce
<i>Volucella inanis</i> (Linnaeus, 1758)	–	Notable	–

<i>Volucella inflata</i> (Fabricius, 1794)	–	Notable	–
<i>Volucella zonaria</i> (Poda, 1761)	–	Notable	–
<i>Xanthandrus comtus</i> (Harris, 1780)	Vulnerable	Notable	–
<i>Xylota abiens</i> Meigen, 1822	–	Notable	Nationally Scarce
<i>Xylota florum</i> (Fabricius, 1805)	–	Notable	–
<i>Xylota jakutorum</i> Bagachanova, 1980 (as <i>X. coeruleiventris</i> Zetterstedt in Shirt 1991)	–	Notable	–
<i>Xylota tarda</i> Meigen, 1822	–	Notable	Nationally Scarce
<i>Xylota xanthocnema</i> Collin, 1939	–	Notable	Nationally Scarce