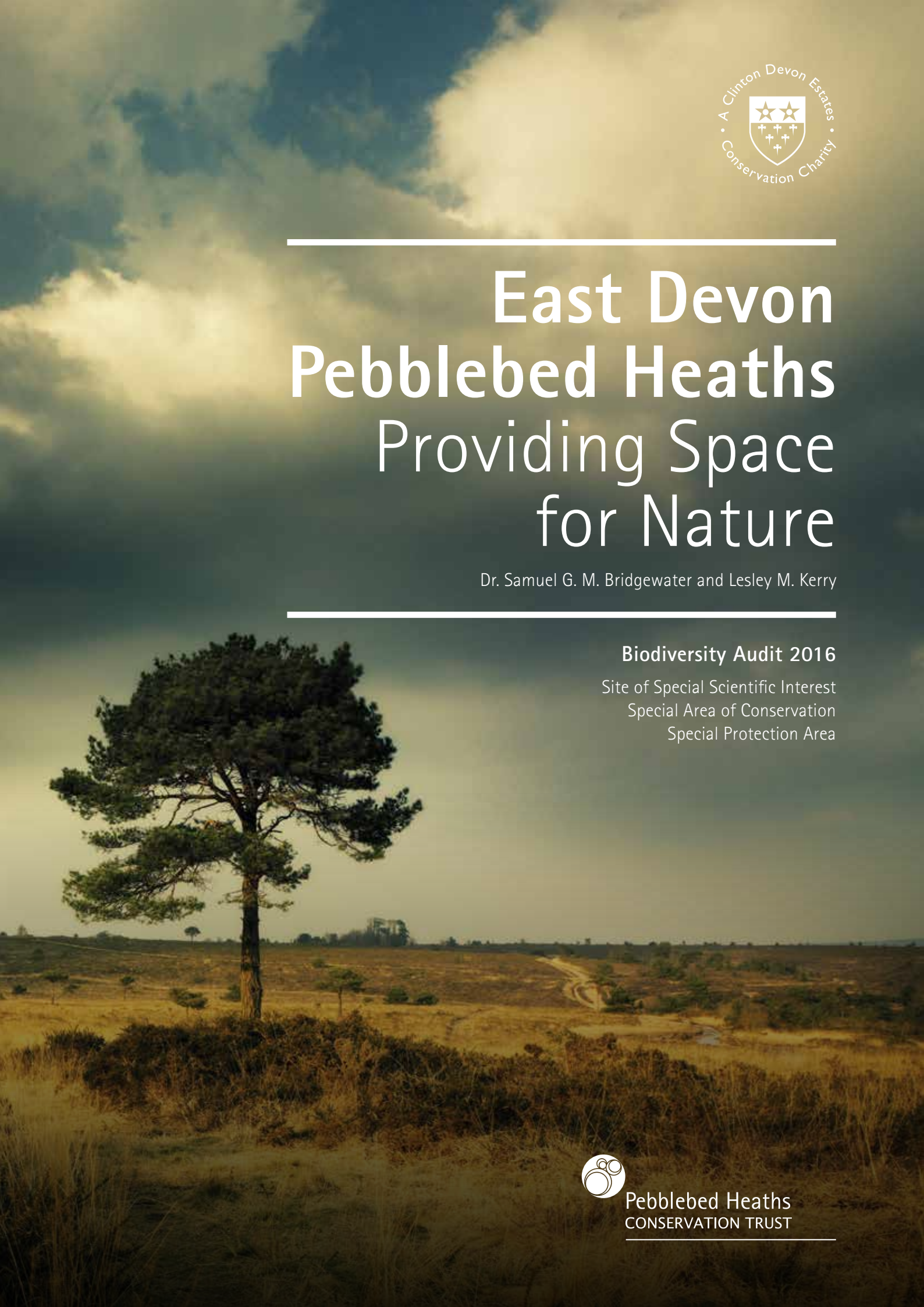

East Devon Pebblebed Heaths
Providing Space for Nature

Dr. Samuel G. M. Bridgewater and Lesley M. Kerry

Biodiversity Audit 2016

Site of Special Scientific Interest
Special Area of Conservation
Special Protection Area

Pebblebed Heaths
CONSERVATION TRUST

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Cover photo: Bicton Common

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Pebblebed Heaths
CONSERVATION TRUST

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Introduction by 22nd Baron Clinton

22nd Baron Clinton

It gives me great pleasure to write the foreword for this remarkable report, which provides unique insights into the rich biodiversity of an iconic part of the Clinton Devon Estates. Once considered a wasteland of little social and biological value, the East Devon Pebblebed Heaths are now cherished by society as a beautiful landscape of international conservation and scientific importance with a geology stretching back 240 million years to the Triassic period.

This report is notable for quantifying and presenting the amazing diversity of the Heaths for the first time. With over 3,000 species documented from a broad mosaic of habitats across 1,100 hectares, this work illustrates how our heathlands truly provide 'space for nature'. Not only is the wildlife diverse, but much of it is rare or threatened. Over 10% of the species known to occur within the boundaries of this Site of Special Scientific Interest have been shown to have high conservation value. But this report not only presents what we do know; it also highlights how much we have still to learn. In terms of our knowledge of the existing biodiversity, for many groups of animals it appears that we have only just scratched the surface.

The cultural history of the site is as fascinating as its ecology and geology. Designated as Open Access land, the site is also highly valued locally for recreation. The report provides a benchmark study that we hope will raise the profile of the site, stimulate further scientific enquiry and inform its future management. It also illustrates how it is possible to embed conservation objectives within the ever increasing and complex demands of society. Ensuring that the right balance is maintained is a key future challenge for our management team.

Heathlands represent a habitat that exists in checked succession. Whatever our best endeavours, this site will always try to revert back to woodland. Our work on the heaths could therefore quite reasonably be judged as being ecologically and economically flawed. However, I hope that this report helps clarify why we believe that the effort and expense related to the perhaps 'uncomfortable truth' of heathland management is worthwhile.

I am grateful to Dr Sam Bridgewater, who leads the Estates' conservation team, and ecologist Lesley Kerry for this report and its comprehensive biodiversity audit. The data used has been collated from a broad range of groups and individuals dedicated to understanding heathland ecology. We value partnership working highly across our land holdings and are extremely appreciative of the support we have received in helping us to understand and manage what I consider to be the conservation jewel in the Estates' crown.

Private estates manage a significant proportion of the British countryside and I sincerely believe that by working in partnership we have an important role to play in developing the large-scale, robust, inter-linked and well-managed reserves that our nation requires to support its natural capital.

I hope you enjoy reading this report, and that the East Devon Pebblebed Heaths remain a place for wildlife to thrive and society to enjoy far into the future.

Clinton

Common Cottongrass
(*Eriophorum angustifolium*)

Acknowledgements

This work is based on collated records from numerous sources. The following people and organisations have kindly supplied significant amounts of data which has been used in the preparation of this report:

Toby Taylor and the RSPB (particularly for Aylesbeare and Harpford Commons); Edric Hopkinson and the Devon Wildlife Trust (Bystock and Venn Ottery Reserves); Roger Smith and the Botanical Society for the British Isles; Barry Henwood, Roger Bristow, Kim Leaver and the Devon Moth Group; the Devon Biodiversity Records Centre; Jean Turner and volunteers from Butterfly Conservation (for their annual recording); Dave Smallshire from the British Dragonfly Society; John Walters (invertebrates); the Devon Reptile and Amphibian Group; Sarah Butcher and the Devon Bat Group; the Devon Mammal Group; the Dipterists Forum; the Devon Bryophyte Group; David Farley and the Devon Fungus Group; Steven Falk, Rory Diamond and Buglife; and Nigel Pinhorn.

In addition, thanks are due to the many professional and amateur wildlife enthusiasts who have chosen the Pebblebed Heaths as an area of study and contributed to our understanding of the biodiversity of the reserve. Special thanks are also due to Paul Swain and Ed Lagdon and volunteers of the Pebblebed Heaths Conservation Trust, Toby Taylor and RSPB staff and volunteers, and the Devon Wildlife Trust staff and volunteers who over the years have managed the site and conserved its wildlife. Finally, we would like to thank Natural England for their on-going advice and support which has been crucial to ensuring the long-term management of the site.

Heath and Western Gorse

Summary

Kestrel
(*Falco tinnunculus*)

Summary

The objective of this study was to collate data on the biodiversity of the East Devon Pebblebed Heaths Site of Special Scientific Interest (SSSI), in order to increase understanding of the species it supports and their conservation status. The wildlife value of the Heaths has long been recognised, but there is a need to be able to quantify and articulate more precisely what this value is. This is essential in securing support for the Heaths in the long term, and provides the necessary baseline evidence to improve conservation management decisions.

Analysis of all available records reveals that 3,108 species have been recorded from the SSSI. The diversity of certain groups is well understood and it is considered that future studies will not greatly augment the lists presented here. These include vascular plants: 605 species; birds: 148 species; butterflies: 50 species recorded historically and 26 regularly; dragonflies and damselflies: 27 species; mammals: 38 species; and reptiles and amphibians: 10 species. However, many broad groups of invertebrates, including Coleoptera and Hymenoptera, remain understudied and the lists of these taxa do not represent their true diversity. Further studies of these lesser recorded groups are a priority. At present, moths (517 species) and true flies (Diptera, 575 species) are the most diverse invertebrate groups represented.

Looking across Colaton Raleigh Common to Peak Hill

The Pebblebed Heaths are a popular recreational destination

The SSSI is generally associated with heathland and mire vegetation, which cover about 70% of the area. However, it is clear from those species groups for which we have a good understanding of their ecology, that a significant proportion of the diversity is not made up of 'heathland specialists', but of species that are ecological generalists or which have a greater affinity to other habitats. This highlights the importance of managing landscape-scale habitat mosaics, including woodland and grassland, in maintaining overall diversity. This supports Natural England's Mosaic Approach to conservation management and confirms that the SSSI should be managed at a landscape scale. Landscape-scale conservation is a key driver in Biodiversity 2020, England's current strategy for wildlife and ecosystem services.

Of those species which either live entirely within the boundaries of the SSSI, or which use the SSSI on an occasional basis, and excluding historical records, 375 (12%) have conservation designations. Many of England's rarest and most threatened species are listed under Section 41 of the 2006 Natural Environment and Rural Communities Act. Of the 943 species in this list, 84 (9%) have been recorded in the SSSI, illustrating its conservation importance. A further 20 species are of European significance (i.e. listed in Annex IV of the Habitats Directive). These include Southern Damselfly, Dartford Warbler, Nightjar, Smooth Snake, Dormouse, Otter (occasionally) and 14 species of bat. Other designations include a broad range of taxa which are Nationally Scarce (59), birds listed in the Birds of Conservation Concern Red List (51), plants which are considered to be Devon Rarities (10) or Devon Notables (35 species), or species listed as priority species under the Devon Biodiversity Action Plan (28).

Although the SSSI has great conservation significance, of no lesser value are the other supporting, regulating, provisional and cultural 'ecosystem services' supplied by them. At present these services are generally poorly quantified and under-valued (certainly in conventional economic terms) in decision making related to the long-term management of the site. The National Ecosystem Assessment (2011)[1] is clear in its findings that, nationally, heathlands are treasured cultural landscapes, as well as being of great importance for biodiversity. Many of the key findings of the UK National Ecosystem Assessment (Follow On) (2014)[2] are particularly pertinent to the future management of the reserve. These include increasing our understanding of the links between the natural capital of heaths and the economy, and improving knowledge of the cultural significance of the heaths and their value to society. This would be a productive area of research and is considered to be a priority.

Summary continued

Although there is a good general understanding of the biodiversity and habitats of the SSSI, significant gaps remain in our knowledge of the presence and ecology of key groups, primarily invertebrates. A key priority is to improve our understanding of the diversity of those groups for which knowledge is currently very incomplete through further focused survey work. These groups include the Coleoptera, Hymenoptera, Lepidoptera (particularly moths), Diptera, Arachnids, fungi, lichens and bryophytes.

With the exception of species of European significance, most of the data available are presence/absence records, and thus internal distribution patterns remain unclear. This hinders the ability to monitor the status of highly significant species. A further priority is to clarify the distribution, habitat requirements and associated positive management interventions for those species highlighted in the report as being of high conservation value.

Distribution knowledge of species of European significance (including Dartford Warbler, Nightjar and Southern Damselfly) is generally good, with annual (or quintennial in the case of Nightjars) monitoring and dedicated habitat management work undertaken. Monitoring, mapping and management of these key species should continue.

One of the greatest threats to the SSSI is recreational pressure; the 1.9 million estimated annual visits will increase over the coming years and this level of visitor pressure has the potential to impact adversely not just on the designated features, but on all wildlife. Improvement of knowledge of internal patterns of movement and impact, and the development of a Visitor Management Plan that avoids and mitigates this impact is another priority.

Climate change will increasingly have a significant impact on the management of the site and the status of all species. An improved understanding of how predicted climate change in East Devon will change the fortunes of species and constrain, or necessitate changes in, management would be highly beneficial. A re-evaluation of the SSSI, SAC and SPA designation features every ten years, compared with species and habitat fortunes at a European level, is also desirable.

Common Frog
(*Rana temporaria*)

Introduction

Bog Asphodel
(*Narthecium ossifragum*)

Introduction

The primary objective of this study was to collate data on the biodiversity of the East Devon Pebblebed Heaths Site of Special Scientific Interest (hereafter referred to simply as the Pebblebed Heaths or the SSSI), in order to increase understanding of the species it supports and their conservation status. Although the wildlife value of heathlands has long been recognised, there is a need to be able to articulate what this value is. This is essential in securing support for this site in the long term, and provides the necessary baseline evidence to improve conservation management decisions.

Lowland heaths are amongst the most important conservation sites in Europe due to the rarity of the habitats and species they support. The UK has 58,000 ha of lowland heath, representing about 20% of the European total. Approximately 25% (14,500 ha) of these are in south-west England, with 4,000 ha in Devon. At 1,111.9 ha, the East Devon Pebblebed Heaths SSSI comprises the single largest expanse of lowland heathland in Devon.

An examination of historical Ordnance Survey maps show that a considerable area (some 640 ha) of the Pebblebed Heaths has been lost since 1906, with post-1947 losses amounting to a further 380ha, mainly to conifer plantations, conversion to grassland and mineral extraction. However, some areas of plantation have been returned to heath recently and a large commercial quarry will be returned to heathland over the next ten years.

View to Woodbury Castle

Geology

The Pebblebed Heaths derive their name from the underlying bed of sandstone pebbles that was deposited during the Triassic era, approximately 240 million years ago. These beds are 30m deep in places and stretch across significant parts of East Devon and as far north as Cheshire. The reddish colouration of the pebbles caused by oxidised iron indicates that the climate of the region prior to their deposition was hot and arid. Towards the end of the Triassic, the climate became wetter and the pebbles were weathered from a mountainous landscape and eroded into their current rounded shape as they were transported down a giant river system before finally being deposited. The pebbles can be found along significant stretches of the south coast as far as Portland, having been transported by longshore drift.

Biodiversity studies

Vegetation

There have been a number of vegetation surveys on the Pebblebed Heaths over the decades of varying degrees of detail. An early seminal work that helped clarify the range of habitats present focused on Aylsebeare Common (Ivimey-Cook et al., 1975)[3]. This identified the presence of a range of vegetation types including wet and dry heath. More recent surveys have tended to describe, classify and map vegetation communities using the methodology of the National Vegetation Classification (NVC). This has included work undertaken by Kerry and Evans (1989) on Aylesbeare and Harpford Commons (Unit 7 of the SSSI)[4], Andrew McCarthy Associates (2005)[5] on Hawkerland (Unit 8), Colaton Raleigh Common (Unit 9) and Bicton Common (Unit 11), and by Prosser and Wallace (2006)[6] on Venn Ottery Common (SSSI Units 1, 5 and 6), Aylesbeare and Harpford Commons (Unit 7), Woodbury Common (Unit 10), East Budleigh Common (Unit 12), Dalditch Common (Unit 13), Lympstone Common (Unit 14), Bystock (Unit 15), Withycombe Raleigh Common (Unit 16), Bicton Common (Unit 17) and Colaton Raleigh Common (Unit 18). Additional NVC survey work has been undertaken by Sheldon (2011)[7] on Colaton Raleigh Common (Unit 9) and by Kerry (2013)[8] on Aylesbeare and Harpford Commons (Unit 7) and part of Bicton Common (Unit 17)[9]. The SSSI units surveyed are summarised in Table 1.

With the exception of Units 2 and 4 (Venn Ottery) and 18 (part of Colaton Raleigh Common), all areas of the heathland have been surveyed following NVC methodology at least once in the last decade. Aylsebeare and Harpford Commons have been the most extensively studied.

Birds

The first formalised monitoring of birds on the Pebblebed Heaths was undertaken in the 1970s and instigated by the RSPB and the Devon Wildlife Trust. National surveys for the Dartford Warbler have been carried out in 1974, 1984, 1994 and 2006, with data collated by the British Trust for Ornithology (BTO). In addition, from 1989 the Pebblebed Heaths Conservation Trust, RSPB staff, ecological contractors and volunteers have monitored this species annually using the Common Bird Census methodology.

National surveys have also been the primary means of monitoring the Nightjar population, with these carried out in 1974, 1981, 1992, 2004 and 2010. RSPB staff and volunteers have monitored Aylesbeare and Harpford Commons annually for this species since 1976, Withycombe Raleigh from 1995 and Venn Ottery (East) from 1996.

Stonechat were monitored by Roger Thornett between 1989 and 2006 (excluding RSPB-managed land), with RSPB staff and volunteers monitoring Aylesbeare and Harpford Commons since 1976, Withycombe Raleigh since 1995 and Venn Ottery (East) since 1996. Surveys of this species have usually been associated with those of Dartford Warblers from the end of March to the end of May, although from 2007 there have been casual records taken only. For all formal surveys, Common Bird Census methodology has been.

Curlew were monitored on Colaton Raleigh and Hawkerland by Roger Thornett between 1989 and 2006, with RSPB staff and volunteers monitoring Aylesbeare since 1977.

Introduction continued

Mammals

There has been little formal monitoring of mammals on the SSSI, with the exception of dormice boxes established by the RSPB and the Devon Wildlife Trust, and bats occurring in remaining military buildings (now acting as hibernacula) by members of the Exeter City Bats/Devon Bat Group. Records on mammals are held by the Devon Wildlife Trust, the RSPB, Clinton Devon Estates, Exeter City Bats/Devon Bat Group and the Devon Biological Records Centre.

Reptiles

Historical recording of reptiles and amphibians on the Pebblebed Heaths has been sporadic and occasional. In recent years reptiles have been monitored annually during the spring and summer season through the use of snake sheets on Venn Ottery, Aylesbeare, Hawkerland, Woodbury, Bicton and Withycombe Raleigh Commons. These are monitored by members of the Devon Reptile and Amphibian Group (DRAG) and RSPB staff and volunteers, with the data used to support the National Amphibian and Reptile Recording Scheme (NARRS). Paper and electronic copies of data are held by Clinton Devon Estates, the RSPB, DRAG and the Devon Biodiversity Records Centre.

Butterflies

Formalised recording of the butterflies on the SSSI has been undertaken since 1977, with regular population counts of key species undertaken since 1988. The focus of monitoring has been primarily on the Silver-studded Blue, a rare heathland specialist, with other species generally recorded as part of annual Silver-studded Blue counts. The Devon Branch of Butterfly Conservation has taken a primary role in coordinating surveys, with Roger Thornett leading monitoring between 1988 and 2000, Jean Turner between 2001 and 2013 and Lesley Kerry from 2014.

Above: Ruby Red cattle grazing on Hawkerland.
Top right: Pioneer heathland with bare ground provides excellent habitat for invertebrates.

Odonata

Dragonflies on the SSSI have been regularly monitored since 1977, with the RSPB conducting surveys of all water bodies on Aylesbeare and Harpford Commons until the late 1990s. In 1995 the British Dragonfly Society undertook an Inventory of Key Dragonfly Sites in Devon, as a baseline statement of the condition of the most important sites remaining in Devon for the group at that time. This included the Pebblebed Heaths. The study was repeated in 2005/2006.

On the Pebblebed Heaths suitable habitats on Aylesbeare Common, Colaton Raleigh Common, Bystock Pools, Bicton Common and Venn Ottery Common were visited with threats described and management suggestions given. Fieldwork comprised detailed surveys during which adults were counted and breeding evidence recorded. Key Sites were defined according to criteria established by the British Dragonfly Society.

Currently the primary focus of annual survey work is the Southern Damselfly (*Coenagrion mercuriale*), with population counts made at the three known existing sites on the heaths, with historical data available from 1977 (Aylesbeare Common) and 1994 (Colaton Raleigh Common). The Southern Damselfly was reintroduced onto Venn Ottery Common in 2007 and has been monitored annually since this date.

One colony of Small Red Damselfly has been the subject of a scientific paper (Kerry, 2013)[10], although three are known from within the SSSI. A survey of the Odonata of Bicton Common was undertaken in 2014.

Other Invertebrates

There have been few formal surveys of the remaining groups of invertebrates within the SSSI. Three of the most significant have focused on Aylesbeare and Withycombe Raleigh Commons. These were undertaken by Colin Plant (2000)[11], Dave Boyce and John Walters (2003)[12] and Joan Childs (2010)[13], with the latter being a hoverfly survey of selected RSPB nature reserves. The most recent survey was of beetles focused predominantly on Bicton Common in 2015[13b] Between them they have generated significant data on a broad range of insect groups. The invertebrates remain understudied.

Over the years local specialists and specialist fora have visited various parts of the SSSI on fieldtrips. Some of this data finds its way eventually into the Devon Biodiversity Records Centre. For example, the Dipterists Forum visited Aylesbeare and Venn Ottery Commons in October 2010, and Aylesbeare Common, Venn Ottery Common and Bystock in July 2011.

The Devon Fly Group visited Bicton Common in 2014 and 2015. Information for the aquatic orders Ephemeroptera, Mecoptera, Plecoptera and Trichoptera are derived principally from surveys undertaken on ponds within Aylesbeare Common, including a hydrophone survey (Carlson, 2012).

Other significant records have been derived from a Devon Wildlife Trust Bioblitz event held at Bystock Pools in 2011, and from incidental records by various recorders.

Conservation Status

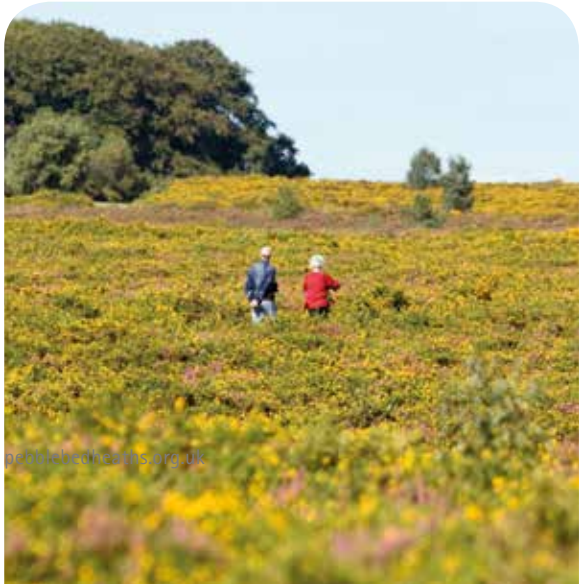
The East Devon Pebblebed Heaths are one of the most important conservation sites in the UK and indeed Europe. The main core of the Heaths was notified as a **Site of Special Scientific Interest** (SSSI) between 1952 and 1986, as a nationally important example of Atlantic-climate lowland heathland supporting a wide diversity of heathland-associated communities and important populations of birds and invertebrates. This area was also designated as a **Special Area of Conservation** (SAC) in June 1996 under the EU Habitats Directive, primarily because of its significant areas of North Atlantic wet and dry heaths and the populations of Southern Damselfly (*Coenagrion mercuriale*), for all of which the area was considered one of the best in the UK. At the same time, and over the same area as the SAC, the heaths were also designated a **Special Protection Area** (SPA) under the EU Birds Directive, qualifying under Article 4.1 by regularly supporting 2.4% of the UK population of breeding Nightjar (*Caprimulgus europaeus*) as at 1992 and 8% of the UK population of breeding Dartford Warbler (*Sylvia undata*) as at 1994. The **East Devon Area of Outstanding Natural Beauty** (AONB) was designated in 1963 and covers all of the Pebblebed Heaths. The AONB Management Strategy recognises the Heaths as a significant landscape feature in East Devon, containing important natural habitats and archaeological features. The adopted strategy states: *"The protection and, where appropriate, enhancement of these important elements in landscape character will contribute to the conservation of the overall beauty of the area and its diversity. The Council will have special regard to the effect of proposed developments on these different landscape elements".*

Introduction continued

Ownership of 'the Commons' and management

The Pebblebed Heaths are registered as Common Land. What typically characterises 'a Common' is the customary rights of use (commons rights) historically associated with the inhabitants (commoners) of certain properties adjacent to common land. These rights of use typically included the right to graze domestic stock and collect wood for fuel. The legacy of common land dates back to before Anglo-Saxon times. By the time of the Tithe Maps (1839-1846), few legitimate commons rights were being exercised on the Pebblebed Heaths. However, grazing did continue at least until the Second World War, possibly on a tenant basis. The Commons Registration Act (1965) recognised only one commoner.

Although associated in public consciousness with public ownership, common land is usually privately owned, with the core area of Pebblebed Heaths being no exception. Although known locally as Woodbury Common, the Heaths comprise a number of adjacent commons including those of Dalditch, Withycombe Raleigh, Lympstone, East Budleigh, Bicton, Woodbury, Colaton Raleigh, Hawkerland, Aylesbeare, Harpford and Venn Ottery. The core area of the heaths are owned by Clinton Devon Estates and managed by the Pebblebed Heaths Conservation Trust. Withycombe Raleigh, Lympstone and Venn Ottery Commons are under separate ownership. Withcombe Raleigh, Aylesbeare and Harpford and Venn Ottery Commons are managed by the RSPB, with Bystock owned and managed by the Devon Wildlife Trust.



Enjoying a walk on Woodbury Common
There are an estimated 1.9 million visits to the Pebblebed Heaths annually.

Cultural Significance

Recreation

East Devon's Pebblebed Heaths have been 'Open Access' since 1930 when Lord Clinton granted allowance for the general public to 'air and exercise' on the heaths under then newly introduced Law of Property Act 1925. Under the Countryside and Rights of Way Act (CRoW Act) 2000, the Heaths were mapped as 'open country' for public access and the Trustees of Clinton Devon Estates revoked the inclusion of the area under the 1925 Act. This moved the management of the heaths for recreation into step with modern legislation and provides consistency with other open access areas in England. Under the CRoW Act the public have full and free access to all areas of the Pebblebed Heaths by foot. The Act excludes horse-riding, cycling, vehicles, organised games or any activity for commercial gain. However, Clinton Devon Estates applied to the Access Authority, Devon County Council, and were granted general permission for horse riders and cyclists to use the heaths, so long as users act in accordance with the CRoW Act. Full details of what is and is not permitted on the Heaths and the legislation that protects them can be found at www.pebblebedheaths.org.uk.

Today the Pebblebed Heaths represent a superb wilderness area suitable for a range of recreational activities, including walking, mountain biking and horse riding. There are 13 formal and 55 informal car parks, with an estimated 1.9 million visits to the Heaths every year.[14] They are of huge local significance as a place for supporting mental and physical health and wellbeing through providing contact with nature and a place to exercise, socialise and enjoy. Of those who visit, 20% do so every day and 45% at least once a week.

Left: The Royal Marines train on the Pebblebed Heaths and are an important conservation partner.

Below: Prehistoric tumulus: Over 160 historic features are recorded for the Heaths.

Military Training

The Pebblebed Heaths have a long history of military training dating back to Napoleonic times, with Woodbury Common used in the early 1900s as a First World War training camp for the Royal Devon Yeomanry. During the Second World War, a large Royal Marine training camp was established on the heaths at Dalditch. At its height Dalditch Camp contained over 5,000 personnel and comprised over 500 buildings, including a cinema and 378 Nissan huts that could each sleep 12 men. Now deserted and largely reclaimed by nature, the concrete and brick footprints of the buildings can still be seen within the heath, with some structures now acting as bat hibernacula. American forces also used an area on Hawkerland Common and there was a decoy airfield on Bicton Common, with further decoy lights on Aylesbeare Common.

The Royal Marine Commandos still train on the Pebblebed Heaths, although their camp is now based at Lympstone. About 750 trainees go through Lympstone Camp each year with training taking 32 weeks. A significant proportion of their training time (approximately 50%) is spent on the heaths, with their famous endurance course based on Bicton Common. This is also the site of the annual Commando Challenge charity event.

Prior to training beginning on the heaths, all recruits are given a briefing on the conservation significance of the site by staff of the Pebblebed Heaths Conservation Trust. The Royal Marines are important conservation partners for the Trust. Their presence acts as a useful deterrent to illegal activities, and they assist with some conservation work.

Archaeology

Because of their long history of occupation and use, the Pebblebed Heaths have a rich archaeological history, with 168 historic features noted in the County Council's Historic Environment Record. From the prehistoric peoples who built the large number of barrows and cairns (burial mounds) and ceremonial pebble platforms on the heaths to military uses, traces of the footprints of human occupation are evident across the site.

The most important site is the designated Scheduled Monument of Woodbury Castle Iron Age Hillfort. Additional features of great note include Scheduled Monument burial barrows and cairns, of which 21 have been identified. Roads of Roman origin run through the area as do many parish boundaries, hollow ways and field systems dating from the late Saxon period. Other features enriching this cultural landscape date from various historical periods and include quarries, boundary banks, ridge and furrow and artificial landscape features including planted mounds, and military earthworks.

Introduction continued

Threats

Military and recreational pressure

The intensity of use of the Pebblebed Heaths is a cause of significant disturbance to the wildlife, with adverse impacts of people and pets including predation (particularly of ground nesting breeding birds), trampling and erosion of paths and tracks, nutrient enrichment through dog mess (especially close to car parks), and occasionally the introduction of invasive alien plants (e.g. Himalayan Balsam and Japanese Knotweed)[15]. Additional impacts are wild fires and arson. Although controlled burning (swailing) is a useful management technique to maintain a diversity of habitat ages, uncontrolled and unplanned fires can be detrimental to the heathland ecosystem. For example, an accidental fire on Colaton Raleigh Common in 2010 burnt a single block of heathland of over 100 ha, destroying significant areas of mature gorse and breeding habitat for Dartford Warblers and creating a large area of uniform age.

Climate Change

One key characteristic of the UK's weather is its variability, which masks longer term trends. However the climate and weather is changing. On current projections, the central estimate of the impacts of global warming on Devon is an increase in average temperatures by two to three degrees by 2050, with the climate becoming 20 to 30% drier[16]. Although predications are uncertain, it is highly likely that the Pebblebed Heaths will experience milder, wetter winters and hotter, drier summers. This will impact on species' distributions and ranges and may have both positive and negative implications for wildlife and for heathland management. For example, accidental fires are likely to become more common in the future, and there may be loss of wet heaths and mire habitat which could impact adversely on species such as the Southern Damselfly. Warmer winters might benefit resident birds such as the Dartford Warbler, which experiences periodic population crashes during harsh winters (2011, for example), and the ranges of such southerly restricted species are likely to expand northwards. The Dartford Warbler is one of the UK's species which has enjoyed the greatest breeding range expansions (352%) between 1968-72[17] and 2008-11. In part this is due to our rapidly warming climate. Other impacts include longer gowing seasons, which might benefit grasses more than shrub species and change the composition of the heathland vegetation[18]. Looking ahead, management must respond to the inevitability of climate change.

Acid and nitrogen deposition

The combustion of fossil fuels, animal food production and the use of agricultural fertilizers results in the emission of pollution, including nitrogen oxide (NO_x), sulphur dioxide (SO_2), ammonia (NH_3) and nitrous oxide (N_2O). These can acidify rainfall and also contribute nitrogen to soils. Research indicates that the deposition of additional nitrogen onto heathlands increases the sensitivity of Heather to drought (which may be compounded by climate change), can favour the growth of nutrient-demanding species such as grasses over shrubs like Heather, and is detrimental to the diversity and health of moss and lichen communities.

The Air Pollution Information System's figures for the critical load for nitrogen inputs to dry heathland are 10-20 kg/ha/year and in wet heathland 10-25 kg/ha/year, with the lower end of this range applied to sites with low intensity management. Above these levels the vegetation is likely to be impacted. On the Pebblebed Heaths, the level of nitrogen deposition has been estimated at 20 kg/ha/yr in 2005, dropping to 15.68kg/ha/yr by 2020. The first figure is above the maximum critical loads and the second above the minimum.

Funding and Management Change

Like most conservation across Europe, management of the Pebblebed Heaths is currently supported through agri-environment schemes (currently through Higher Level Stewardship), although Clinton Devon Estates historically has funded management, and continues to do so. Although the drivers of heathland management are clear, economically and ecologically it is important to understand that the management of the Pebblebed Heaths is far from sustainable. Management involves maintaining the heathland in a state of checked natural succession and, as such, fights against natural processes: it is work that is required forever. There is currently a legal obligation to maintain the SSSI in a favourable condition and although funds are currently available to suport this, for management to be sustainable, there is a need to diversify funding streams that can support habitat works. Reliance on single sources of funding related to the Common Agricultural Policy is a risky long-term policy to pursue. There is an urgent need to look at the full range of ecosystem services provided by the SSSI - supporting, provisioning, regulating and cultural - to understand better the links with the local economy and wellbeing, and to investigate how Payments for Ecosystem Services[19] might support its long term management.

In the absence of funding support, the likely outcome is that management will become less intensive and the site will in parts revert to scrub and ultimately woodland. Although such habitats are also of high wildlife value, such a succession will ultimately result in loss of a unique cultural landscape and rare key heathland species associated with it, although of course, other generalist or woodland specialist species will likely benefit.

Management

The Pebblebed Heaths have been occupied and exploited by people since at least the Bronze Age, with activities such as turf cutting, burning and grazing turning the once wooded area into the open landscape so valued today.

Without continued management, heathland habitat can quickly revert to scrub and ultimately to woodland. Because lowland heathlands are now so rare in Europe, there is a need to protect those few areas that remain to ensure the survival of a distinctive landscape element and the specialised species that depend on this habitat.

Conserving biodiversity is not just about protecting the variety of species. It is also about protecting the variety of habitats. A number of techniques are used for managing lowland heathland for wildlife in southern England. These include grazing and removal of encroaching trees and scrub, burning (swailing), scraping and turf digging and mowing. The techniques deployed depend on the site and the conservation objectives. In essence they seek to ensure that the habitats of highest wildlife value are maintained.

Top left: Fly-tipping is one of the problems faced by the conservation team.

Right: Preparing electric fencing for grazing livestock.

Introduction continued

Scrub Clearance

Birch is one species that can quickly recolonize heathland. Although grazing can help reduce the speed of scrub incursion, there is usually the need for additional active clearance using chainsaws or tractor-powered mulching machines. The benefits of such management are the maintenance of open heath communities and open views. However, sensitivity and planning is required when undertaking such operations. Woodland copses within the heathland and those following watercourses also provide important wildlife habitats, and it is important to manage heathland for landscape scale habitat mosaics.

Western Gorse (*Ulex gallii*) and European Gorse (*U. europaeus*) are important components of heathland, providing valuable habitat for a range of species including the Dartford Warbler. Gorse stands are important for general foraging and breeding cover in summer and for foraging of many bird species in winter. Thick gorse is particularly important as shelter in hard weather. Western Gorse is generally of lower stature than European Gorse and is typically more abundant across the drier heaths, occurring as a mixed stand with other sub-shrubs such as Heather. European Gorse tends to be found in disturbed areas of greater fertility, often along roadsides. Across the Pebblebed Heaths, management aims to keep this species at about 10% cover. European Gorse has a natural lifecycle of several decades, after which it tends to become 'leggy' (known as 'mophead gorse') and less suitable for providing shelter. To ensure that there is always younger, thick gorse to provide shelter and food for species such as the Dartford Warbler, a 15 year coppice cycle is followed with the gorse flailed by machinery, after which it regenerates.

Grazing

Grazing can be a useful heathland management practice in the right circumstances, and replicates one of the practices of the commoners of old. Potential benefits include the inhibition of tree seedling growth; a reduction in the cover of grasses; maintenance of structural diversity of vegetation; and an increase in herbaceous plant diversity. There is also currently substantial deposition of atmospheric nitrogen onto the heaths, which favours the formation of non-heathland habitat. Cattle grazing can assist with removing this fertility.

Grazing does not, however, remove the requirement to undertake additional interventions. Grazing intensity must also be carefully controlled. Nevertheless, grazing is widely regarded by heathland conservation managers as an important additional tool to maintain this rare habitat in an ideal condition. Grazing has been re-introduced to a large number of UK lowland heathland sites in recent years. Rare breed cattle such as Devon Reds are used within temporary seasonal enclosures on the Pebblebed Heaths (e.g. Hawkerland and Colaton Raleigh Commons) to manage the wet heath and mires. Their presence helps to improve the habitat for some rare species, such as Southern Damselfly. Grazing is undertaken on the Pebblebed Heaths in the summer months (May to September) when there is sufficient grass growth to support them.

After a full public consultation in 2011 an application was made to the Planning Inspectorate to erect permanent fencing to enclose 469 ha of the core area of the Pebblebed Heaths. This included Aylesbeare, Harpford, Hawkerland, Woodbury, Bicton, Lympstone, East Budleigh and Withycombe Raleigh Commons. The proposal was approved in perpetuity by the Planning Inspectorate in 2012. Support for extensive grazing of the Pebblebed Heaths comes from Natural England, the RSPB, the East Devon AONB, the Devon Wildlife Trust, the Amphibian and Reptile Conservation Trust and the British Dragonfly Society.

Although Planning Permission has been granted for the permanent enclosure of the Commons areas listed above, it was decided in 2013 by the Pebblebed Heaths Conservation Trust, and with approval from Natural England, that a staged approach would be taken of fencing the Commons areas that it manages, with only Bicton Common fenced. It was felt that such an approach would ensure that legal obligations to return the heaths to a favourable status would be met, helping England to meet its Biodiversity 2020 targets, whilst thoroughly trialling a new management system and enabling public reaction to be gauged.

Although temporary grazing with cattle during the summer using electric fences has occurred in Hawkerland, Colaton Raleigh and Aylesbeare Commons for many years, it is recognised that permanent fencing comprises a significant development. Bicton Common is now the location of a grazing research project in partnership with the Duchy College and Plymouth University. This will provide science-based evidence on the impacts of grazing animals on heathland. Aylesbeare and Harpford Commons have also been permanently fenced with the RSPB overseeing the introduction of more extensive grazing at these sites.

Mowing and Flailing

Mowing of dry heath can be used as an alternative to burning (swailing) to return maturing areas of Heather to pioneer stage, and can break up areas of even-aged and homogeneous heath to increase wildlife value. However, unlike an effective burn, mowing only removes the standing vegetation and leaves the lower layers and the litter layer intact. Thus, the effect on the accumulated nutrient stores is modest. To ensure that the fertility of the heathland is not increased, mown material must be removed off site. This can cause problems of disposal, although if cut in autumn when the Heather seed is ripe, the cut litter can be stored for later use in heathland restoration projects elsewhere. Like too frequent burning, regular mowing can encourage the growth of grasses at the expense of Heather, and is thus avoided. Where mowing can be highly useful is in the creation and maintenance of firebreaks, and to circumscribe swail sites prior to burning to assist with fire control.

The core area of the Heaths is managed by the Pebblebed Heaths Conservation Trust.

Introduction continued

Swailing

Heathlands are dominated by dwarf shrubs, with Heather (*Calluna vulgaris*) being one of the defining species. Upon germination Heather goes through a series of distinct growth phases (pioneer, building and mature) that can last in excess of 30 years before it degenerates. The controlled burning of heathland (also called *swailing* or *swaling*, or *muirburn* in Scotland) essentially resets the heathland clock back to zero, and is a useful tool in conservation as it can help create a mosaic of habitats of different ages to support a wide range of wildlife. Swailing helps ensure that the needs of all species are catered for. It can also help to remove some of the nutrients held in the leaf litter layer, ensuring that heathland does not become too fertile, which would encourage the development of woodland. Once an area is burnt, regeneration is either from remaining rootstocks or from the seedbank.

Heather burning is legally restricted between 1st April and the 31st October. This avoids the period of active plant growth and the breeding seasons of reptiles and birds, and limits any adverse impacts on wildlife. Typically, burning is undertaken in late winter, after frosts have drawn water from the soil. The weather is closely monitored before and during a burn. Too wet and the vegetation can be hard to ignite; too dry and the risk of a fire getting out of control increases. Ideally there should be a light breeze of predictable speed and direction.

Controlled burns are only undertaken by experienced conservation managers; unmanaged fires can have catastrophic consequences for wildlife. Typically an area of mature heathland of about 0.2 ha is targeted, with firebreaks created prior to burning to ensure the fire doesn't spread outside of the designated area. Firebeaters and foggers (water sprayers) are also always on hand to assist in fire management. Burning on the Pebblebed Heaths is usually done against the wind (backburning) to produce a hot, slow-moving fire. Controlled burning is only done occasionally on a site every few decades. If the frequency of burning is too great it can promote the growth of grasses at the expense of Heather, which reduces the wildlife value of the habitat.

Raking, scraping and turf stripping

The surface scraping of heathland vegetation using a machine is a management technique used to remove all above ground vegetation. It can create pioneer heathland habitat and bare ground, and when undertaken at deeper profiles (turf stripping) can be effective in controlling bracken through the removal of rhizomes. Scraping and removal of vegetation from the site can be more effective than burning or mowing in removing nutrients.

Scraping requires an experienced machine operator who can remove the vegetation mat and leave soil profiles intact. Surface scraping creates a bare ground environment which can be of benefit to ephemeral (seasonal and short-lived) heathland plants and some invertebrate groups. It is an ideal management technique to create new habitat for Silver-studded Blue butterflies to colonise.

There are a number of problematic issues relates with this technique, including the disposal of material from the scrape. However, this can provide suitable conditions for breeding Grass Snakes, is often used by Slow Worms, small mammals and invertebrates, and can supply a source of seed material for heathland restoration. An additional potential problem is the disturbance of underground archaeology.

At present only surface raking is generally undertaken on the Pebblebed Heaths to ensure that the underlying archaeology is not damaged. When turf stripping is required for habitat management, it is only considered after consultation with Natural England and the County archaeologist, and under close archaeological supervision.

Methodology

Conservation Trust staff overseeing a controlled burn

Methodology

Species lists have been compiled using information from various sources, including datasets held by the Devon Biodiversity Records Centre (7,672 records), the RSPB (4,116 records), the Botanical Society for the British Isles (4,376 records) and the County Recorder for the Devon Moth Group (1,976 records). In total 18,140 records were analysed. This information was supplemented with additional data provided by local specialists and specialist groups, and from unpublished studies/reports commissioned by Clinton Devon Estates, the RSPB and the Devon Wildlife Trust. The individual sources of information are highlighted in the text. Some of these have provided very significant insights into the biodiversity of the heaths. For example, a single invertebrate survey undertaken by Colin Plant in 2000 on Aylesbeare Common recorded 776 species. There is a degree of overlap between some of the existing databases, although no single source analysed contains all the records collected. Records are available for all Commons areas within the SSSI, but data was generally biased to Aylesbeare and Harpford, Venn Ottery and Bystock.

Taxonomy has been checked against the National Biodiversity Network Gateway website, with group specialists advising on recent taxonomic changes. There have been recent modifications, for example, in the taxonomy of higher plants, Lepidoptera (moths) and fungi. Where specialists have doubted the validity of a record, these have been removed, or the contested nature highlighted.

Designations

The designations used in this report follow those cited in the on-line JNCC Taxon Designations database 2014 (http://jncc.defra.gov.uk/page-3418). References to the sources of the information can be found on the database. Information was also cross-referenced with the National Biodiversity Network Gateway.

Where local publications have been available which are not included on the Taxon Designation Database (for example, The Nature of Devon: A Biodiversity and Geodiversity Action Plan), or where local specialist groups have been able to provide additional information on the conservation statuses of species, such data has been included with references provided in the text for the group considered.

A view across Bicton Common to Blackhill Quarry

For example, the terms **Devon Rarities** (recorded from three or fewer localities), **Notable 1** (recorded in one to 25 tetrads, or 2 km × 2 km squares, within Devon), **Notable 2** (recorded between 26 and 50 tetrads) and **Notable 3** (recorded between 51 and 100 tetrads) have been derived from the Atlas of Devon Flora (1984).

European Legislation and European Protected Species and Habitats

One of the aims of the Convention on the Conservation of European Wildlife and Natural Habitats (the **Bern Convention, 1982**) was to ensure the conservation and protection of wild plant and animal species and their natural habitats listed in Appendices I and II of the Convention. Obligations under the Convention are met through Council Directive 79/409/EEC on the Conservation of Wild Birds (the **Birds Directive**) and the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the **Habitats Directive**).

In England the obligations are transposed into national law by means of the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended).

The Habitats Directive requires Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes of the Directive at a favourable conservation status. This includes the designation of **Special Areas of Conservation** (SACs) for habitats and species listed on Annex I and Annex II respectively. Annex IV lists species in need of strict protection (**European Protected Species**) and Annex V species whose taking from the wild can be restricted by European law.

The Birds Directive requires the identification and classification of **Special Protection Areas** (SPAs) for rare or vulnerable species listed in Annex I of the Directive. Together with Special Areas of Conservation designated under the Habitats Directive, SPAs form a network of European protected areas known as **Natura 2000**. In England the provisions of the Birds Directive are implemented through the Wildlife & Countryside Act 1981 (as amended).

Species of Principal Importance and Biodiversity Action Plan Priority Species

Section 41 (S41) of The Natural Environment and Rural Communities (NERC) Act 2006 required the government to publish a list of habitats and species of **Principal Importance** for the conservation of biodiversity in England, with 941 species listed. These all required action under the UK Biodiversity Action Plan (UKBAP) and under the UK BAP system were considered as **Priority Species**. The UK BAP list of Priority Species was first created in 1995 and updated for the final time in 2007. Although the UK BAP has now been replaced by the UK Post-2010 Biodiversity Framework, S41 species of Principle Importance are still regarded as conservation priorities.

Roe Deer
(*Capreolus capreolus*)

Methodology continued

Birds of Conservation Concern

The most widely cited source of information informing the conservation status of UK birds is **The Birds of Conservation Concern** (BoCC) list[20]. This uses criteria that attempts to combine and reflect UK bird species' global, European and UK conservation statuses, as well as measuring the importance of the UK population in international terms. Species are rated Red, Amber or Green, depending on the level of threat. Those on the Red List are considered to be the most under threat, and are either considered to be globally threatened based on IUCN criteria, or show notable declines within the UK.

Endangered, Nationally Notable and Nationally Scarce Species

The conservation status of some species used in this report are derived from the Red List system initiated by IUCN in 1966 to evaluate the extinction risk to species globally, based on existing knowledge of their distribution extent, population size and known threats. A variety of Red Lists and more detailed Red Data Books have since been published dealing with various plant and animal groups at global, regional and country levels. The aim has been to identify those species at greatest risk from extinction and to identify the critical factors responsible. In Britain, the first Red Data Book was published in 1977 and dealt with vascular plants. Since that time a number of key species groups have been treated. Categories used are **Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient** or **Not Evaluated**. Those species listed as Critically Endangered, Endangered or Vulnerable are highlighted in this report.

The terms **Nationally Scarce, National Notable** and **Nationally Rare** are also used within this document. These terms have been applied to various taxa groups for species with restricted distributions. Early assessments of invertebrate taxa, for example, used the term Nationally Notable. For some taxa this category was further split into Notable A (Na) for species occurring in 16 to 30 hectads (10 km x 10 km square) and Notable B (Nb) for those occurring in 31 to 100 hectads. Nationally Rare species occur in 15 or fewer hectads.

However, the restricted distribution categories have now been standardised to Nationally Rare and Nationally Scarce without further subdivision. The UK system of assessing rarity based solely on distribution is often used alongside the IUCN criteria. Publications that include information about both Red Listed and Nationally Rare and Scarce species are known as National Reviews. At present, designations are in a state of flux, with some covered by old reviews dating back to the 1990s and others having received more modern treatments. A number of groups are in the process of having their status updated.

Full explanations of all categories can be found on the National Biodiversity Network Gateway website (https://data.nbn.org.uk/).

The Nature of Devon: A Biodiversity and Geodiversity Action Plan

This document was first published in July 1998, and last revised in 2009 by the Devon Biodiversity Partnership. It was Devon's response to the national biodiversity planning process and took the objectives and targets of the UK Biodiversity Action Plan and translated and amplified these within a local context.

The State of Devon's Nature, published by the Devon Local Nature Partnership in 2013, provides a succinct overview of the Key Habitats and Species to be found in the County.

pebblebedheaths.org.uk

Common Cottongrass
(*Eriophorum angustifolium*)

Results and Discussion

Yellowhammer
(*Emberiza citrinella*)

Results and Discussion

Species diversity

An analysis of all available records reveals that 3,108 species have been recorded from the East Devon Pebblebed Heaths. Of those species which either live entirely within the boundaries of the SSSI, or which use the SSSI on an occasional basis, and excluding historical records, 375 (12%) have conservation designations. Summary details of taxa groups, their diversity, and their associated conservation designations can be found in Table 1, with detailed explanations presented in the corresponding taxa sections.

Based on current knowledge, the most diverse group represented in the SSSI are vascular plants, with 605 species recorded. Due to the depth of studies undertaken, including comprehensive National Vegetation Classification (NVC) surveys, this is likely to be broadly accurate, although further focused studies on groups such as sedges, for example, would no doubt add further to the list. Fungi (378 species recorded), lichens (76 species) and bryophytes (mosses and liverworts, 139 species), are certainly under-recorded, and the list presented here is unlikely to represent an accurate account of the true diversity of these groups within the SSSI. Further survey and identification effort is required.

The true flies (Diptera) and moths (Lepidoptera) are also highly diverse in the SSSI, with 575 and 517 species recorded to date, respectively. These figures represent 8% and 22% of the total known diversity of these two groups in the UK, at 7,000 Diptera species and 2,400 moth species. It is highly likely that further studies will augment these lists.

As they are relatively well known and easily identified groups, the lists presented for the Odonata (dragonflies and damselflies: 27 species) and butterflies (50 species recorded historically, 26 regularly) are likely to be an accurate representation of the diversity in the SSSI. In common with most studies on 'total biodiversity', other invertebrate groups are almost certainly under-recorded. The 243 species of Coleoptera (beetles: 6% of the ca. 4,000 known in the UK[21]), 94 species of Hymenoptera (ants, bees and wasps: 1% of the ca. 7,800 UK species) and 121 species of Arachnids (spiders and allies: (19% of the 645 UK species) are not a true reflection of their diversity in the reserve. The status of each of these groups is also in need of clarification and further studies are a research priority.

Collecting by members of the Devon Fly Group, Bicton Common

Table 1. Summary of diversity and species with conservation designations

NB. Some taxa have multiple designations. For full details of the criteria used, please refer to the relevant taxa section. Higher plant diversity listed below does not include microspecies, although these are provided in the full species list. Nationally Scarce includes those historically described as Nationally Notable (A+B).

Species group	Species recorded	Species with designations	European Protected	NERC S41/UKBAP	Devon BAP	Nationally Scarce	Local	Rare	Devon Rarity	Devon Notable 1	Devon Notable 2	Devon Notable 3	Birds of Conservation Concern Red	Birds of Conservation Concern Amber	Near Threatened	Vulnerable	Endangered
Plants	605	94		6	6				10	17	12	7			29	14	4
Fungi	377																
Bryophytes	139																
Lichens	76																
Birds	148	51	2	8	9								17	34			
Mammals	38	19	16	11	6												
Reptiles	6	5	1	5													
Amphibians	4	1		1													
Butterflies	50(26)	12		11	4												
Moths	517	138		34		15	94										
Odonata	27	2	1	1	1	1											1
Orthoptera	18				1												
Diptera	575	19		1		19		1									
Ephemeroptera	5																
Mecoptera	2																
Plecoptera	7																
Trichoptera	19																
Hymenoptera	94	9		3	1	5		1							1	1	
Coleoptera	243	22		1		19										1	1
Hemiptera	25																
Arachnids	121	1						1									
Other groups	34	2		2													
TOTAL	3,108	375	20	84	28	59	94	3	10	17	12	7	17	34	30	16	6

Results and Discussion continued

Heathland versus non-heathland specialists

The East Devon Pebblebed Heaths SSSI is generally associated with heathland and mire vegetation, which cover 70% of the total area. However, it is clear upon an examination of those species groups for which we have a good understanding of species ecology, that a significant proportion of the diversity is not made up of 'heathland specialists'. This serves to highlight the importance of landscape scale mosaics of a variety of habitats, including woodland and grassland, in supporting total diversity. For example, of the 583 species of higher plant recorded, only 100 (i.e. ca. 17% of the total) can be considered true specialist heathland species.

Likewise for birds, where only two (1% of the total) – Dartford Warbler and the Nightjar – are true heathland specialists. For butterflies, of the 26 species recorded annually, only four (15%) have particularly strong associations with heathland: Silver-studded Blue, Grayling, Small Heath and Green Hairstreak.

Common Lizard
(*Zootoca vivipara*)

Of the 20 species of breeding Odonata recorded, four (20%) are heathland specialists: Small Red Damselfly, Southern Damselfly, Golden-ringed Dragonfly and Keeled Skimmer. Of the 517 moths recorded, 51 species (10%) are strongly associated with heathland.

In addition, even those species that are heathland specialists have markedly different requirements, with some preferring mature habitat and others pioneer stage, open ground or edge (ecotonal) areas. This does not undermine the biodiversity value of heathland, but rather emphasises the importance of managing habitat mosaics across the wider landscape in supporting wildlife, and the need to manage the full range of habitats within the SSSI to ensure all species have the places they need to thrive. This view is supported by Natural England's Mosaic Approach to nature conservation[22], which helps ensure that resilient ecological networks are maintained. A national study of heathland considering the Moasic Approach identified that of 133 Priority Species for Conservation known from heathland landscapes, 38% were associated with intermixed grassland, and 30% with scrub and scattered trees, for example[23]. A broad focus on landscape-scale conservation is also a key part of Biodiversity 2020, England's current strategy for wildlife and ecosystem services[24]. Lowland heathland across the UK is generally highly fragmented. As the biggest block of lowland heathland in Devon, the East Devon Pebblebed Heaths SSSI is one of the few remaining areas where it is possible to carry out landscape-scale conservation focussed on heathland, but encompassing a broad range of additional habitats.

It is hard to compare the diversity found within the East Devon Pebblebed Heaths SSSI either with other mosaic heathland sites or other conservation areas, because few comparative lists are available, and the extent of sites varies greatly. Suffice to say that the data provided here, as expected, further demonstrates that heathland in general, and the Pebblebed Heaths in particular, support a broad range of species groups, with invertebrates particularly well represented. The importance of heathland for supporting rare birds, reptiles and invertebrates is well known. This, together with the rarity of the habitat at a European scale, is why in part the Pebblebed Heaths enjoy various European and national conservation designations.

Conservation Designations

Heathlands are known to be of high conservation importance for invertebrates, with over 400 species of invertebrate associated with heathland known to be of conservation significance nationally[25]. Many of England's rarest and most threatened species are listed in S41 of the NERC Act (2006). Of the 943 species in this list, 84 (9%) have been found in the SSSI. In addition, 20 species are of European significance (i.e. listed in Annex IV of the Habitats Directive). These include Southern Damselfly, Dartford Warbler, Nightjar, Smooth Snake, Dormouse, Otter and 14 species of bats, although the Otter only occasionally passes through. Other designations include a broad range of species which are Nationally Scarce (59), birds listed in the Birds of Conservation Concern Red List (17), plants which are considered to be Devon Rarities (10) or Devon Notable 1, 2 or 3 (35 species), or listed as priorty species under the Devon Biodiversity Action Plan (29). Table 1 should be consulted for the full range of designations.

Ecosystem Services

Although the primary focus of this study has been to further clarify the habitats, species and conservation significance of the East Devon Pebblebed Heaths, of no lesser value are the other supporting, regulating, provisional and cultural 'ecosystem services' supplied by them. At present these services are generally poorly quantified and under-valued (in conventional economic terms) in decision making related to the long-term management of the reserve. The National Ecosystem Assessment (2011) is clear in its findings that heathlands are treasured nationally as cultural landscapes, as well as being of great importance for biodiversity[26]. Many of the key findings of the UK National Ecosystem Assessment (Follow On, 2014) are particularly pertinent to the future management of the reserve[27]. These include increasing our understanding of the links between the natural capita of the heaths and the economy, and improving knowledge of the cultural significance of the heaths and their value to society. This would be a productive area of research and is also considered to be a priority.

The recreational, archaeological and landscape value of the Pebblebed Heaths, and its contribution to the mental and physical wellbeing of East Devon residents was highlighted in the Introduction.

The Pebblebeds underlying the heaths are of Triassic age and are 30m deep

One of the key aims of the recently established Local Nature Partnership (Natural Devon) is to promote a naturally active population. With an estimated 1.9 million visits annually, the SSSI contributes much to the physical and mental wellbeing of the local population. There is a need to better understand and quantify this social value. Reconciling the demands of nature with those of the public in an Open Access landscape will be a challenge over the coming years. The development of a Visitor Management Plan will be key to ensuring that the inherent qualities of the heaths are preserved whilst their recreational value remains respected and enhanced.

In addition to their cultural value, the Pebblebed Heaths also provide provisioning and regulating services. For example, the National Ecosystem Assessment indicates that about 70% of the UK's drinking water is sourced from mountains, moorland and heaths, and the Pebblebed Heaths SSSI certainly plays an important role locally in freshwater provision. The heaths are underlain by the extensive Budleigh Salterton Pebblebeds, one of the region's most important and stable aquifers; the drinking water for over 8,000 inhabitants of the Otter Valley is abstracted directly from the Pebblebeds, with the SSSI providing much of the local catchment area. Four tributaries of the River Otter, itself a County Wildlife Site with its estuary an SSSI, originate on the Pebblebed Heaths, with this ecosystem helping to sustain the River Otter as a healthy aquatic ecosystem by regulating water flow in times of drought.

Results and Discussion continued

An example of a regulating service provided by the Pebblebed Heaths is the sequestration of carbon. Heathland soils vary greatly depending on the parent material, but rough estimates are that they contain an average of 88 tonnes of carbon per hectare, with the vegetation holding two tonnes per hectare[28]. Areas of wet heath and mire over peat will have significantly greater carbon storage than dry heath. Based on these figures, a very conservative estimate of the carbon stored within the heathland vegetation (70% of total area) of the East Devon Pebblebed Heaths SSSI would be 70,000 tonnes. This is, of course, small in comparison to woodland landscapes of a comparative size, where above-ground biomass can contain in the region of 200 tonnes of carbon per hectare, i.e. 100 times more than heathland vegetation. Neglect of heathland areas and a reversion to scrub and woodland results in a net gain in carbon sequestration; heathland restoration results in a net loss whilst heathland management is generally considered to be carbon neutral.

Future Priorities

Although there is a good general understanding of the biodiversity and habitats of the SSSI, significant gaps remain in our knowledge about the presence and ecology of key groups, especially invertebrates. A key priority is to improve our understanding of the diversity of those groups for which knowledge is most incomplete through further focused survey work. These include Coleoptera, Hymenoptera, Lepidoptera (particularly moths), Diptera and Arachnids, fungi, lichens and bryophytes.

With the exception of species of European significance, most of the data available are presence/absence records, and thus distribution patterns remain unclear. This hinders the ability to monitor the status of important species and to manage optimally their habitats. A further priority is to undertake a study to clarify the distribution, habitat requirements and associated positive management interventions for those species highlighted in the report as being of high conservation value. At present, with the exception of the Southern Damselfly, management of invertebrates generally focuses on maintaining areas of bare ground (particularly on south-facing slopes). This is a broad-brush approach and could no doubt be significantly improved.

Knowledge of the distributions of species of European significance (including Dartford Warbler, Nightjar and Southern Damselfly) is generally good, with annual (or quinquennial in the case of Nightjars) monitoring and dedicated habitat mangement work undertaken. Monitoring, mapping and management of these key species should continue.

One of the greatest threats to the SSSI going forward is recreational pressure; the 1.9 million estimated annual visits will increase over the coming years. Visitor pressure has the potential to impact adversely not just on the designated features, but on all wildlife. Another priority is to improve knowledge of internal patterns of movement and impact, and the development of a Visitor Management Plan that avoids and mitigates this impact.

Climate change will increasingly have a significant impact on the management of the site and the status of all species. It would be highly beneficial to improve understanding of how predicted climate change in East Devon will change the fortunes of existing species and necessitate changes in or constrain management, as would a re-evaluation of the SSSI, SAC and SPA designation features on a ten-yearly basis, framed against species and habitat fortunes at a European level.

Vegetation and Plant Life

The insectivorous Sundew (*Drosera rotundifolia*)

Vegetation and Plant Life

- 605 recorded species of vascular plant.
- Six species of higher plant only known from historical records.
- 378 species of fungi.
- 139 recorded species of moss and liverworts (a likely underestimate).
- 76 recorded species of lichen (a likely underestimate).
- 94 higher plant species of County, National or International conservation significance.
- One key species identified for conservation in Devon, and five species characteristic of Devon or of popular appeal (Devon BAP, 1998).
- Higher plants include 33 garden escapees and 13 invasive or potentially invasive species.
- Over 50 NVC vegetation types or subtypes.
- Seven vegetation types covering 70% of area are notified under SSSI designation.
- In 2012, 17% of the area of the SSSI was in 'Favourable' condition, 82% 'Unfavourable Recovering' and 1% 'Unfavourable No Change'.

The East Devon Pebblebed Heaths SSSI is dominated by two broad vegetation types: dry heath and wet heath. The former typically occurs on plateaus, slopes and better-drained areas and covers an area of 635 ha (56% of the SSSI: Andrew McCarthy Associates, 2006). The latter covers 127 ha (11% of the SSSI) and is found on valley sides, in valley bottoms, associated with streams and flushes, or where the land is poorly drained. Therefore together these two vegetation categories account for two-thirds of the SSSI. Each can be subdivided into further plant communities based on the National Vegetation Classification (NVC) system (Rodwell et al., 1991)[29]. Of these, the most characteristic dry heath community conforms broadly to NVC category H4 (Western Gorse *Ulex europeaus*/Bristle Bent *Agrostis curtisii* heath), with wet heath typified by M16 (Cross-leaved Heath *Erica tetralix-Sphagnum compactum* wet heath).

Although these two vegetation types can be considered to 'define' the Pebblebed Heaths, 57 different heathland, woodland, mire, bracken and grassland plant communities (many are NVC sub-communities) have been recorded across the site by various researchers. Seven NVC vegetation types, including those classified as wet or dry heath (H4, M14, M16), swamp/mire (M21, M24, M25) and acid grassland (U4), are notified as specific 'features of interest' of the SSSI. The three communities which make up the dry and wet heath (H4, M14, M16) are also qualifying features of the Special Area of Conservation (SAC). As such they are considered to be of National and European importance.

Bell Heather
(*Erica cinerea*)

Existing Condition of the SSSI

The condition of the SSSI was assessed by Natural England in 2012 following the criteria laid out in the *Definitions of Favourable Condition for Designated Features of Interest*[30]. The definitions comprise a number of measurable attributes for the special interest features of the site, including vegetation structure. At the time of the last survey, 17% of the area of the SSSI was assessed as being 'Favourable', 82% as 'Unfavourable Recovering' and 1% as 'Unfavourable No Change' (Table 2).

The primary reasons cited for the unfavourable condition of certain SSSI units related primarily to a higher than ideal proportion of scrub cover and an inbalance in age structure of the heath vegetation (i.e. proportion in pioneer, building, mature or degenerate state). Current management seeks to address these issues, including through an expansion of conservation grazing.

Table 2. Known dates of NVC surveys, by SSSI unit

SSSI Unit	Common Name	1989[i]	2006[ii]	2010[iii]	2013[iv]	Status (2013)
1	Scot's Pollard		✓			17.4 ha
2	Venn Ottery Common					25.86 ha
3	No longer considered a discrete unit					
4	Venn Ottery					0.32 ha
5	Venn Ottery Common					21.71 ha
6	Common Farm		✓			13.25 ha
7	Aylesbeare and Harpford Common	✓	✓		✓	190.85 ha
8	Hawkerland Valley		✓			78.22 ha
9	Colaton Raleigh Common		✓	✓		333.56 ha
10	Woodbury Common		✓			102.27 ha
11	Bicton Common		✓			100.79 ha
12	East Budleigh Common		✓			116.13 ha
13	Dalditch Common		✓			8.45 ha
14	Lympstone Common		✓			36.37 ha
15	Bystock Pools		✓			12.88 ha
16	Withycombe Raleigh Common		✓			16.18 ha
17	Bicton Common		✓		✓	31.89 ha
18	The Hill			✓	✓	28.06 ha

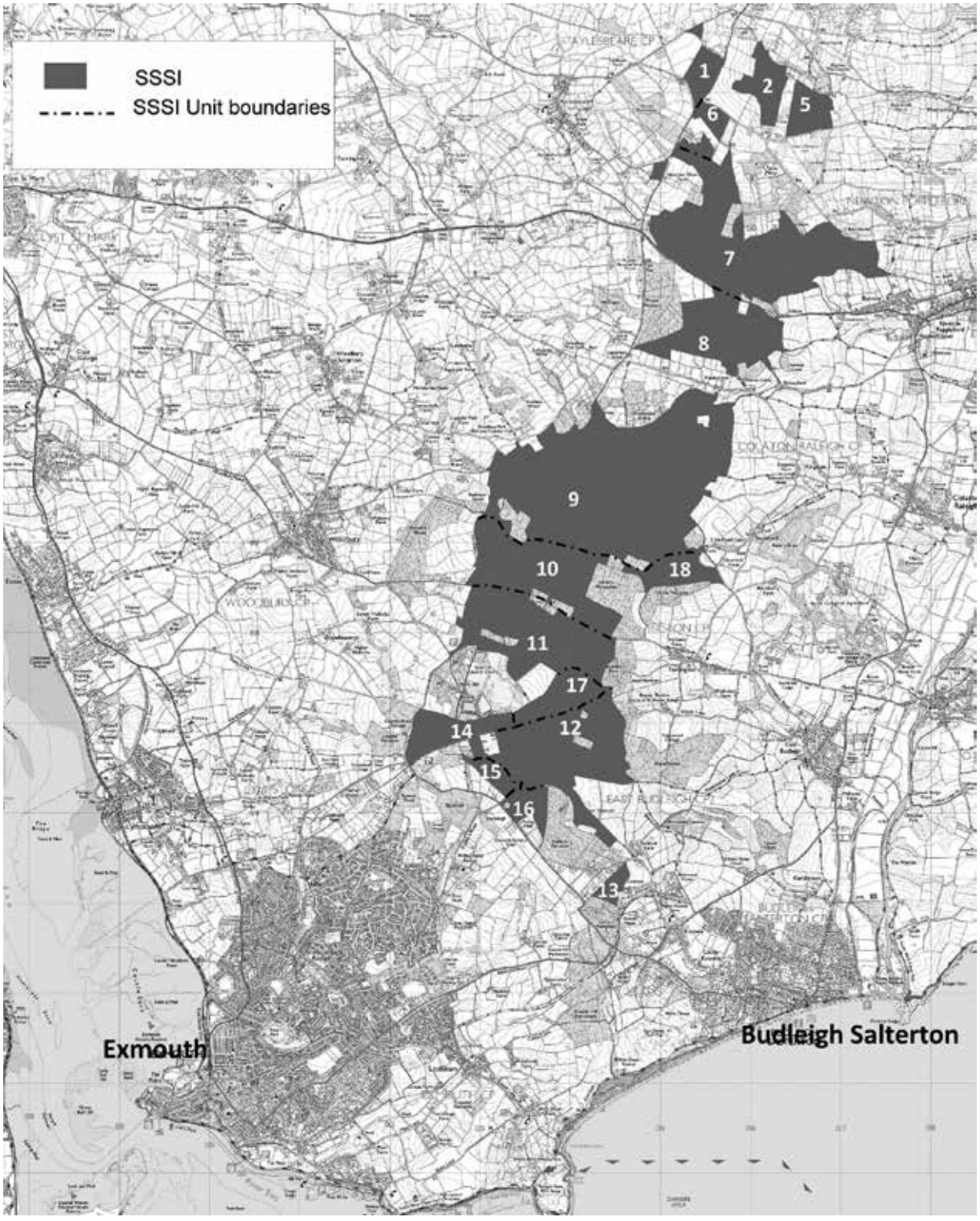
Key to SSSI condition status

Favourable | Unfavourable Recovering | Unfavourable No Change

i) Kerry & Evans (1989)
ii) Prosser and Wallace (2006) & Andrew McCarthy Associates (2006)
iii) Sheldon (2010)
iv) Kerry (2013a & b)

Vegetation and Plant Life continued

Map showing SSSI area and unit boundaries and numbers



Brief characterisation of the vegetation communities

Dry heath (NVC H4) is characterised by the constant presence of Heather (*Calluna vulgaris*), Western Gorse (*Ulex gallii*) and Bristle Bent grass (*Agrostis curtisii*). Bell Heather (*Erica cinerea*), Cross-leaved Heath (*Erica tetralix*) and Deer-grass (*Trichophorum cespitosum*) can also be present, with the abundance of these and other species determining the sub-communities. Typically the abundance of Cross-leaved Heath and Purple Moor-grass increases and the abundance of Western Gorse decreases as one moves from dry to wetter conditions.

Wet heath, as typified by the widespread NVC community M16, has the constant presence of Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), Purple Moor-grass (*Molinia caerulea*) and Compact Bog-moss (*Sphagnum compactum*), with the latter three species favouring wet conditions. Of the other forms of wet heath associated with M16, the Black Bog-rush (*Schoenus nigricans*)/Bog Asphodel (*Narthecium ossifragum*) community (M14) is of perhaps the greatest conservation significance and is found only very locally in the UK, in Cornwall, east Devon, south-east Dorset and the New Forest. As such it can be considered to be Nationally Scarce. It is a conspicuous component of the vegetation of Colaton Raleigh, Bicton and Aylesbeare Commons. Typical plant associates of this include Round-leaved Sundew (*Dosera rotundifolia*), Pale Butterwort (*Pinguicula lusitanica*), Bog Pimpernel (*Anagallis tenella*) and White-beak Sedge (*Rhynchospora alba*). This formation typically appears where calcium-rich waters flush onto the valley sides.

Although only covering an area of 32 ha (3% of total area), three fen/mire communities are also of significance, being qualifying features of the SSSI. These comprise M21 *Narthecium ossifragum-Sphagnum papillosum* valley mire, M24 *Molinia caerulea-Cirsium dissectum* fen-meadow and M25 *Molinia caerulea-Potentilla erecta* mire. Purple Moor-grass (*Molinia caerulea*) is a dominant component of all of these formations.

Table 3. National (SSSI) and European (SAC) designated vegetation features of interest

BAP Broad Habitat type	Specific designated features (by NVC community)	Explanatory description of the feature	SSSI notified interest features	SAC qualifying interest features
Dwarf shrub heath	H4 *Agrostis curtisii-Erica curtisii* heath	European dry heath	✓	✓
	M14 *Schoenus nigricans-Narthecium ossifragum* mire	North Atlantic wet heaths with *Erica tetralix*	✓	✓
	M16 *Erica tetralix-Sphagnum compactum* wet heath		✓	✓
Fen marsh swamp	M21 *Narthecium ossifragum-Sphagnum papillosum* valley mire	Valley mire/fen	✓	
	M24 *Molinia caerulea-Cirsium dissectum* fen-meadow	Fen meadow	✓	
	M25 *Molinia caerulea-Potentilla erecta* mire	Fen meadow	✓	
Acid grassland – lowland	U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland	Acid grassland with abundant Bristle Bent, Sheep's Fescue and Common Bent	✓	

SSSI = Site of Special Scientific Interest;
SAC = Special Area of Conservation;
NVC = National Vegetation Community

Vegetation and Plant Life continued

Data from commissioned NVC surveys has been extensively augmented by a miscellany of individual records collected by a range of professional and amateur botanists. Much of this additional information has been collated and verified by Roger Smith, the Devon Vice County Recorder for the Botanical Society of the British Isles (BSBI), with these species records being used to update the tetrad (2 km x 2 km) information on plant distribution in the county through the Devon Vice County Plant Atlas (in press).

A number of vegetation monitoring programmes have been established on the Pebblebed Heaths over the years, although much of the data arising from these has yet to be analysed or published. These include 122 permanent quadrats established in 1988 and 1990 by the RSPB on Aylesbeare and Harpford to monitor the effects of management by burning and grazing, and to investigate different bracken control methods; these quadrats were surveyed again in 1995 and 2009 (Kerry, pers. comm.). In addition, a controlled experiment using 24 quadrats to monitor the response of heathland vegetation to turf stripping, burning and cutting (without any grazing, with rabbit grazing only and with both rabbit and cattle grazing) was set up on Harpford Common in 2008, and surveyed again in 2010 and 2013 (Kerry, pers. comm.).

In 2007, 450 geo-referenced 2m x 2m fixed-point survey points were established across the SSSI, including Hawkerland, East Budleigh Common, Bicton Common, Woodbury Common and Colaton Raleigh Common, with photographs and survey data using the DOMIN scale, with additional descriptive notes collected at each point. These plots have yet to be comprehensively revisited. In 2014, 60 permanent sample plots were established on Bicton Common to monitor the impacts of grazing. Additional studies include: investigating the age of Heather (*Calluna vulgaris*), with on-going monitoring of quadrats being undertaken by the RSPB at Venn Ottery, Aylesbeare, Harpford, St Mary-in-the-Willows and Withycombe Raleigh; and 100 geo-referenced fixed-point photographs taken by the Pebblebed Heaths Conservation Trust on Colaton Raleigh Common in 2010 after a large accidental burn, with follow up photographs taken annually to document the site's recovery.

Scots pine (*Pinus sylvestris*)

The Flora of the Pebblebed Heaths

From the data available, 605 species of vascular plant have been found within the SSSI (Appendix 1). In addition a number of microspecies have been recorded: *Euphrasia* (3), *Rubus* (23) and *Taraxacum* (5). Of the 'true' species found, 540 can be considered to be native, 31 exotic garden escapees and 12 invasives. In some cases it is hard to ascribe some records accurately to within the boundaries of the SSSI and thus the overall figure may be a slight overestimate. This species list covers all of the NVC communities found within the SSSI, not just the heathland. The heathland vascular flora can reasonably be considered to comprise 92 species i.e. 17% of the total.

In addition to vascular plants, 378 fungi, 76 lichens and 139 native bryophyte taxa have been reliably identified in the SSSI. However, in contrast to the vascular plant flora, fungi, bryophytes and lichens are likely to be much under-recorded, and the figures cited are therefore likely to be a considerable underestimate. A preliminary species list for all plants and fungi can be found in Appendix 1. Those commonly found in heathland and or mire are highlighted in bold.

Plants of conservation significance

A significant number of plant species within the SSSI are of high conservation significance, with 59 taxa recognised as having county or national designations (with some species appearing in multiple lists). Six of these have only been recorded historically and their continued presence is in doubt. Historical and current higher plant species of particular conservation concern found on the heaths are summarised in Table 4 opposite.

Table 4. Plants of conservation significance known currently or historically from the heaths

Vascular Plant Red List for England (2014)[i]	**Endangered**	Annual Knawel* (last seen in 1963; A), Lesser Butterfly-orchid, Pale Dog-violet
	Near Threatened	Bell Heather, Bitter Vetch, Carline Thistle, Chaffweed, Common Cudweed, Common Valerian, Corn Mint, Creeping Willow, Cross-leaved Heath, Devil's-bit Scabious, Elecampane, Flea Sedge, Goldenrod, Heather, Heath Pearlwort, Heath Milkwort, Heath Speedwell, Marsh Arrowgrass, Marsh Ragwort, Marsh St. John's-wort, Round-leaved Sundew, Sanicle, Small Cudweed, Star Sedge, Tormentil, Quaking-grass, White Beak-sedge, Wild Strawberry, Wood-sorrel
	Vulnerable	Allseed, Chamomile, Common Cottongrass, Common Cudweed, Corn Marigold, Corn Spurrey, Dodder, Lesser Spearwort, Lesser Water-Plantain, Lousewort, Marsh Lousewort, Oblong-leaved Sundew, Petty Whin, Tubular Water-Dropwort* (last seen in 1974; VO)
Vascular Plant Red List for Great Britain (2006)[ii]	**Endangered**	Marsh Clubmoss* (last seen in 1977; A)
Scarce Plants in Britain (1994)[iii]	**Nationally Scarce**	Brown Beak-sedge* (last seen in 1983; A, B), Marsh Clubmoss* (last seen in 1977; A), Pale Dog-violet, Scots Pine, Stinking Hellebore* (last seen in 1992; H), Welsh Poppy
Section 41 of NERC Act (2006)	**Species of Principle Importance**	Annual Knawel, Chamomile, Marsh Clubmoss*, Lesser Butterfly-orchid, Pale Dog-violet, Tubular Water-Dropwort*
Derived from Atlas of Devon Flora (1984)[iv]	**Devon Rarities (Recorded from three or fewer localities in Devon)**	Allseed, Black Poplar, Broad-leaved Cottongrass, Brown Beak-sedge* (last seen in 1983; A, B), Chaffweed, Common Meadow-rue, Few-flowered Spike-rush, Lesser Water-plantain (last seen in 1995, A), Marsh Clubmoss* (last seen in 1977; A), Tubular Water-Dropwort* (last seen in 1974; VO)
	Notable 1 (Recorded in 1 to 25 tetrads in Devon)	Annual Knawel* (last seen in 1963; A), Bee Orchid, Cotton Thistle, Fine-Leaved Sheep's-Fescue, Fir Clubmoss, Fragrant Orchid complex, Grass Vetchling, Hairy Buttercup, Lesser Centaury, Pepper-saxifrage, Round-leaved Crowfoot, Small Cudweed, Solomon's-seal, White Water-lily, Wild Mignonette, Lesser Bulrush, Yellow Water-lily
	Notable 2 (Recorded in 26 to 50 tetrads)	Pale Dog-violet, Early Marsh-orchid, Pyramidal Orchid, Smooth Brome, Rough Hawk's-beard, Oblong-leaved Sundew, Wood Horsetail, Blue Fleabane, Common Gromwell, White Beak-sedge, Black Bog-rush, Rat's-tail Fescue
	Notable 3 (Selected species recorded in over 50 tetrads)	Chamomile, Lesser Butterfly-orchid, Petty Whin, Narrow Buckler-fern, Water Chickweed, Royal Fern, Cowslip
Devon BAP (1998)	**Key Species**	Marsh Clubmoss
	Characteristic	Heather, Oblong-leaved Sundew, Royal fern, Primrose, Western Gorse

*= only known from historical records; A = Aylesbeare; B = Bicton; H = Hawkerland; VO = Venn Ottery

i) Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., Fay, M.F., Martin, J.P., Parkhurst, T., Preston, C.D. & Taylor, I.A. Vascular Plant Red List for England. 2014. Botanical Society of Britain and Ireland, Bristol.

ii) Cheffings, C. & Farrell, L. (Edc.). 2006. The Vascular Plant Red Data List for Great Britain.

iii) Stewart, A., Pearman, D.A. & Preston, C.D. 1994. Scarce Plants in Britain. 515pp.

iv) Ivimey-Cook, R.B. 1984. Atlas of the Devon Flora. Devonshire Association. 258pp.

Vegetation and Plant Life continued

For in an in-depth description of the inclusion criteria for the various conservation lists, the original publications should be consulted; suffice to say that some take a national and some a more local perspective. The list includes a number of perhaps surprising species (e.g. Heather) which are locally abundant. However, their inclusion makes more sense when one considers that they are particularly associated with heathland habitat which has has suffered a significant decline in England during the last century. Nationally, the decline is of concern, although in the Pebblebed Heaths it is clearly abundant. Forty-five species are highlighted in the Vascular Plant Red List for England (2014), with seven considered to be Nationally Scarce, occurring in between 16 and 100 hectads (10 km x 10 km grid square) across Great Britain (Stewart et al., 1994). The former Devon Biodiversity Action Plan (2005) listed eight taxa as Key Species, with two of these (Marsh Clubmoss and Chamomile) also listed in the UK Biodiversity Action Plan (1994), which was replaced in 2010 by the UK Biodiversity Framework. Six species are Species of Principle Importance in England under S41 of the NERC Act (2006). Based on an analysis of the Atlas of Devon Flora (1984), ten species are considered to be Devon rarities (native species recorded from three or fewer localities in Devon, 17 as Notable 1 (recorded from 4-25 tetrads), 12 as Notable 2 (recorded from 26-50 tetrads) and seven as Notable 3 (selected species recorded from over 50 tetrads).

The Endangered (GB), Nationally Scarce and Devon Rarity Marsh Clubmoss (*Lycopodiella inundata*) is one of the species of great conservation worth. First recorded on the Commons in 1784, it was last recorded on Aylesbeare Common in 1977; additional survey effort is needed to clarify whether any populations remain within the SSSI. The same is true of the Nationally Scarce and Devon Rarity Brown Beak-sedge (*Rhynchospora fusca*). Although plants were recorded on Aylesbeare in 1955 and on Bicton Common in 1968 and 1983, this species has not been noted since.

There are only historical records in the SSSI for the Near Threatened and Devon Rarities Chaffweed (*Centunculus minimus*) and Lesser Water-plantain (*Baldellia ranunculoides*). There is a need to clarify the status of existing populations. Two additional species of conservation significance surveyed for the recent BSBI Threatened Plants Project are also known from the Pebblebed Heaths. These comprise Pale Dog-violet (*Viola lactea*), a species which flourishes under a degree of disturbance and occurs on open heath and roadsides, and the Vulnerable parasite Dodder (*Cuscuta epithymum*), the latter locally common on its host Western Gorse (*Ulex gallii*). In addition, the Nationally Scarce Stinking Hellebore (*Helleborus foetidus*) was recorded in 1992 from Hawkerland, but its current status remains uncertain. Amongst the less common orchids, Heath Fragrant Orchid (*Gymnadenia borealis*) is currently only known from Colaton Raleigh Common, with the Lesser Butterfly-orchid (*Platanthera bifolia*) more widespread but rare, with an uncertain distribution. The Early Marsh-orchid (*Dactylorhiza incarnata* subsp. *pulchella*) remains locally frequent on Bicton and Colaton Raleigh Commons, although was once more widespread. Amongst insectivorous species, Pale Butterwort (*Pinguicula lusitanica*), Round-leaved Sundew (*Drosera rotundifolia*) and Oblong-leaved Sundew (*Drosera intermedia*) are all widespread and can be locally abundant. The non-native pitcher-plant *Sarracenia flava* has a small well-established population on Colaton Raleigh Common, first reported in 1999 and still present in 2013.

Yellow Pitcher Plant
(*Sarracenia flava*)

Lousewort
(*Pedicularis sylvatica*)

Invasive Plants

Thirty-four taxa (comprising 33 species) are garden escapees, with 12 species (Table 5) considered to be invasive or potentially invasive; their occurrence needs careful monitoring, control and eradication where possible. Those taxa which are garden escapees are highlighted in Appendix 1. Five of the invasive species are non-native pines associated with surrounding plantations. The regeneration of Lodgepole pine from the soil seedbank is particularly problematic in areas of heathland restored from plantations. The Butterfly-bush (*Buddleia davidii*) is abundant in a number of localities, particularly where there has been historical disturbance and an increase in the soil fertility, with East Budleigh Common being one site where its occurrence is problematic. This Common was previously the site of a military training camp and the soil is much enriched with lime. There has been one recorded occurrence of Parrot's-feather (*Myriophyllum aquaticum*) in recent years in a pond on Colaton Raleigh Common, where work has been on-going to eradicate this since 2013. Himalayan Balsam (*Impatiens glandulifera*) is another species of concern which threatens to invade the Pebblebed Heaths from adjacent plantations and tributaries. Small populations have been recorded on the edge of Colaton Raleigh and Bicton Commons, with these now being treated annually to eradicate them.

Table 5. Invasive or potentially invasive plants

Common Name	Scientific Name
Water Fern	*Azolla filiculoides*
Butterfly-bush	*Buddleja davidii*
Japanese Knotweed	*Fallopia japonica*
Giant Knotweed	*F. sachalinensis*
Spanish Bluebell	*Hyacinthoides hispanica*
Himalayan Balsam	*Impatiens glandulifera*
Parrot's-feather	*Myriophyllum aquaticum*
Himalayan Knotweed	*Persicaria wallichii*
Lodgepole Pine	*Pinus contorta*
Corsican/Austrian Pine	*P. nigra*
Maritime Pine	*P. pinaster*
Monterey Pine	*P. radiata*

Vegetation and Plant Life continued

Appendix 1. List of Vascular Plant Species

Species in bold are those particularly associated with heathland/mire habitat

GE = Garden escapees; I = Invasive

Family	Scientific name	Common name
Adoxaceae	*Adoxa moschatellina*	Moschatel
Alismataceae	*Alisma plantago-aquatica*	Water Plantain
	Baldellia ranunculoides	Lesser Water-plantain
Amaranthaceae	*Amaranthus caudatus*	Love-lies-bleeding (GE)
Amaryllidaceae	*Allium vineale*	Wild Onion
Apiaceae	*Aegopodium podagraria*	Ground Elder
	Aethusa cynapium	Fool's Parsley
	Angelica sylvestris	**Wild Angelica**
	Anthriscus sylvestris	Cow Parsley
	Apium nodiflorum	Fool's Water-cress
	Chaerophyllum temulum	Rough Chervil
	Chamaecyparis lawsoniana	Lawson's Cypress
	Conium maculatum	Hemlock
	Conopodium majus	Pignut
	Heracleum sphondylium	Hogweed
	Hydrocotyle vulgaris	**Marsh Pennywort**
	Oenanthe crocata	Hemlock Water-dropwort
	O. fistulosa	Tubular Water-Dropwort
	Sanicula europaea	Sanicle
	Torilis japonica	Upright Hedge-parsley
Apocynaceae	*Vinca major*	Greater Periwinkle
	V. minor	Lesser Periwinkle
Aquifoliaceae	*Ilex aquifolium*	Holly
Araceae	*Arum maculatum*	Lords-and-Ladies
Araliaceae	*Hedera helix*	Common Ivy
Asteraceae	*Achillea millefolium*	Yarrow
	A. ptarmica	**Sneezewort**
	Arctium minus	Lesser Burdock
	Artemisia vulgaris	Mugwort
	Bellis perennis	Daisy
	Carduus crispus	Welted Thistle
	Carlina vulgaris	Carline Thistle
	Centaurea nigra	**Common Knapweed**
	C. scabiosa	Greater Knapweed
	Chamaemelum nobile	Chamomile

Family	Scientific name	Common name
	Cicerbita macrophylla	Common Blue-sow-thistle
	Cirsium arvense	**Creeping Thistle**
	C. dissectum	**Meadow Thistle**
	C. palustre	**Marsh Thistle**
	C. vulgare	Spear Thistle
	Crepis biennis	Rough Hawk's-beard
	C. capillaris	Smooth Hawk's-beard
	C. vesicaria	Beaked Hawk's-beard
	Erigeron acris	Blue Fleabane
	Eupatorium cannabinum	**Hemp-agrimony**
	Filago minima	Small Cudweed
	F. vulgaris	Common Cudweed
	Galinsoga parviflora	Gallant Soldier
	Glebionis segetum	Corn Marigold
	Gnaphalium uliginosum	Marsh Cudweed
	Helminthotheca echioides	Bristly Oxtongue
	Hypochaeris radicata	Cat's-ear
	Inula conyzae	Ploughman's Spikenard
	I. helenium	Elecampne
	Lactuca serriola	Prickly Lettuce
	Lapsana communis	Nipplewort
	Leontodon saxatilis	Lesser Hawkbit
	Leucanthemum vulgare	Oxeye Daisy
	Matricaria discoidea	Pineappleweed
	M. recutita	Scented Mayweed
	Onopordum acanthium	Cotton Thistle
	Petasites fragrans	Winter Heliotrope
	P. hybridus	Butterbur
	Pilosella aurantiaca	Fox-and-cubs
	P. officinarum	Mouse-ear-hawkweed
	Pulicaria dysenterica	**Common Fleabane**
	Scorzoneroides autumnalis	Autumn Hawkbit
	Senecio aquaticus	**Marsh Ragwort**
	S. erucifolius	Hoary Ragwort
	S. jacobaea	Common Ragwort
	S. squalidus	Oxford Ragwort
	S. sylvaticus	Heath Groundsel
	S. vulgaris	Groundsel
	Serratula tinctoria	**Saw-wort**

Vegetation and Plant Life continued

Family	Scientific name	Common name
	Solidago virgaurea	Goldenrod
	Sonchus arvensis	Perennial Sow-thistle
	S. asper	Prickly Sow-thistle
	S. oleraceus	Smooth Sow-thistle
	Tagetes sp.	A Marigold
	Tanacetum parthenium	Feverfew
	T. vulgare	Tansy
	Taraxacum aequisectum	A Dandelion species
	T. expallidiforme	A Dandelion species
	T. lingulatum	A Dandelion species
	T. necessarium	A Dandelion species
	T. nordstedtii	A Dandelion species
	T. officinale agg.	Dandelion
	T. quadrans	A Dandelion species
	Tragopogon pratensis	Goat's-beard
	Tripleurospermum inodorum	Scentless Mayweed
	Tussilago farfara	Colt's-foot
	Cirsium x forsteri	A hybrid thistle
Azollaceae	*Azolla filiculoides*	Water Fern (I)
Balsaminaceae	*Impatiens glandulifera*	Indian Balsam (I)
Berberidaceae	*Berberis wilsoniae*	Mrs Wilson's Barberry (GE)
Betulaceae	*Betula pendula*	Silver Birch
	B. pubescens	Downy Birch
	B. x aurata	Hybrid Birch
	Alnus glutinosa	Alder
	Corylus avellana	Hazel
Boraginaceae	*Anchusa arvensis*	Bugloss
	Echium vulgare	Viper's Bugloss
	Lithospermum officinale	Common Gromwell
	Myosotis arvensis	Field Forget-me-not
	M. discolor	Changing Forget-me-not
	M. laxa	Tufted Forget-me-not
	M. scorpioides	Water Forget-me-not
	M. secunda	Creeping Forget-me-not
	M. sylvatica	Wood Forget-me-not
	Pentaglottis sempervirens	Green Alkanet
	Symphytum officinale	Common Comfrey
	S. tuberosum	Tuberous Comfrey
	S. x uplandicum	A hybrid Comfrey

Family	Scientific name	Common name
Brassicaceae	*Alliaria petiolata*	Garlic Mustard
	Arabidopsis thaliana	Thale Cress
	Barbarea vulgaris	Common Winter Cress
	Brassica nigra	Black Mustard
	Capsella bursa-pastoris	Shepherd's Purse
	Cardamine flexuosa	Wavy Bittercress
	C. hirsute	Hairy Bittercress
	C. pratensis	**Cuckooflower**
	C. pratensis flore pleno	Double Lady's Smock
	Cochlearia danica	Danish Scurvygrass
	Descurainia sophia	Flixweed
	Erophila verna	Common Whitlow-grass
	Hesperis matronalis	Dame's Violet
	Lepidium didymum	Lesser Swine-cress
	L. heterophyllum	Smith's Pepperwort
	Lobularia maritima	Sweet Alison
	Raphanus raphanistrum	Radish
	Rorippa palustris	Marsh Yellow-cress
	Sinapis alba	White Mustard
	S. arvensis	Charlock
	Sisymbrium officinale	Hedge Mustard
	Thlaspi arvense	Common Penny-cress
Buddlejaceae	*Buddleja davidii*	Butterfly-bush (I)
Callitrichaceae	*Callitriche stagnalis*	Common Water-starwort
Campanulaceae	*Jasione montana*	Sheep's-bit
Cannabaceae	*Humulus lupulus*	Hop
Caprifoliaceae	*Leycesteria formosa*	Himalayan Honeysuckle (GE)
	Lonicera nitida	Wilson's Honeysuckle (GE)
	L. periclymenum	Honeysuckle
	Sambucus nigra	Elder
	Viburnum opulus	Guelder-rose
Caryophyllaceae	*Arenaria serpyllifolia*	Thyme-leaved Sandwort
	Cerastium fontanum	Common Mouse-ear
	C. glomeratum	Sticky Mouse-ear
	Moehringia trinervia	Three-nerved Sandwort
	Myosoton aquaticum	Water Chickweed
	Sagina apetala	Annual Pearlwort
	S. procumbens	Procumbent Pearlwort
	S. subulata	Heath Pearlwort

Vegetation and Plant Life continued

Family	Scientific name	Common name
	Scleranthus annuus	Annual Knawel
	Silene coironaria	Rose campion
	S. dioica	Red Campion
	S. flos-cuculi	Ragged Robin
	S. latifolia	White Campion
	S. vulgaris	Bladder Campion
	Spergula arvensis	Corn Spurrey
	S. rubra	Sand Spurrey
	Stellaria alsine	Bog Stitchwort
	S. graminea	Lesser Stitchwort
	S. holostea	Greater Stitchwort
	S. media	Common Chickweed
Celastraceae	*Euonymus europaeus*	Spindle
Ceratophyllaceae	*Ceratophyllum sp.*	A Hornwort
Chenopodiaceae	*Atriplex patula*	Common Orache
	A. prostrata	Spear-leaved Orache
Chenopodiaceae	*Chenopodium album*	Fat Hen
	C. polyspermum	Many-seeded Goosefoot
Clusiaceae	*Hypericum androsaemum*	Tutsan
	H. calycinum	Rose-of-Sharon
	H. elodes	Marsh St. John's-wort
	H. humifusum	Trailing St. John's-wort
	H. perforatum	Perforate St. John's-wort
	H. pulchrum	**Slender St. John's-wort**
	H. tetrapterum	**Square-stalked St. John's-wort**
Convolvulaceae	*Calystegia sepium*	Hedge Bindweed
	C. silvatica	Greater Bindweed
	Convolvulus arvensis	Field Bindweed
Crassulaceae	*Sedum album*	White Stonecrop
	Umbilicus rupestris	Navelwort
Cuscutaceae	***Cuscuta epithymum***	**Dodder**
Cyperaceae	***Carex binervis***	**Green-ribbed Sedge**
	C. demissa	Yellow Sedge
	C. divulsa subsp. divulsa	Grey Sedge
	C. echinata	**Star Sedge**
	C. flacca	**Glaucous Sedge**
	C. hostiana	Tawny Sedge
	C. hostiana x viridula	Hybrid Sedge
	C. laevigata	Smooth-stalked Sedge

Family	Scientific name	Common name
	C. lepidocarpa	Yellow-Sedge
	C. leporina	Oval Sedge
	C. nigra	**Common Sedge**
	C. otrubae	False Fox-sedge
	C. pallescens	Pale Sedge
	C. panicea	**Carnation Sedge**
	C. paniculata	Greater Tussock-Sedge
	C. pendula	Pendulous Sedge
	C. pilulifera	**Pill Sedge**
	C. pseudocyperus	Cyperus Sedge
	C. pulicaris	**Flea Sedge**
	C. riparia	Greater Pond Sedge
	C. spicata	Spiked Sedge
	C. sylvatica	Wood Sedge
	C. remota	Remote Sedge
	Eleocharis multicaulis	**Many-stalked Spike-rush**
	E. quinqueflora	Few-flowered Spike-rush
	Eleogiton fluitans	Floating Club-rush
	Eriophorum angustifolium	**Common Cottongrass**
	E. latifolium	Broad-leaved Cottongrass
	Isolepis setacea	Bristle Club-rush
	Rhynchospora alba	**White Beak-sedge**
	R. fusca	Brown Beak-sedge
	Schoenus nigricans	**Black Bog-rush**
	Trichophorum cespitosum	**Deer-grass**
Dioscoreaceae	*Tamus communis*	Black Bryony
Dipsacaceae	*Dipsacus fullonum*	Teasle
	Succisa pratensis	**Devil's-bit Scabious**
Droseraceae	***Drosera intermedia***	**Oblong-leaved Sundew**
	D. rotundifolia	**Round-leaved Sundew**
Elaeagnaceae	*Hippophae rhamnoides*	Sea-Buckthorn
Ericaceae	***Calluna vulgaris***	**Heather**
	Erica cinerea	**Bell Heather**
	E. tetralix	**Cross-leaved Heath**
	Rhododendron ponticum	Rhododendron (GE)
	Vaccinium myrtillus	**Bilberry**
Euphorbiaceae	*Euphorbia amygdaloides*	Wood Spurge
	E. helioscopia	Sun Spurge
	E. peplus	Petty Spurge

Vegetation and Plant Life continued

Family	Scientific name	Common name
	Mercurialis perennis	Dog's Mercury
Fabaceae	*Cytisus scoparius*	Broom
	Genista anglica	**Petty Whin**
	Laburnum anagyroides	Laburnum (GE)
	Lathyrus linifolius	Bitter Vetch
	L. nissolia	Grass Vetchling
	L. pratensis	Meadow Vetchling
	Lotus corniculatus	**Common Bird's-foot-trefoil**
	L. pedunculatus	Greater Bird's-foot-trefoil
	Medicago arabica	Spotted Medick
	M. lupulina	Black Medick
	Melilotus altissimus	Tall Melilot
	Ononis repens	Common Restharrow
	Ornithopus perpusillus	Bird's-foot
	Trifolium campestre	Hop Trefoil
	T. hybridum	Alsike Clover
	T. medium	Zigzag Clover
	T. pratense	**Red Clover**
	T. repens	White Clover
	T. dubium	Lesser Trefoil
	Ulex europaeus	**Gorse**
	U. europaeus x gallii	**A hybrid Gorse**
	U. gallii	**Western Gorse**
	Vicia cracca	**Tufted Vetch**
	V. hirsuta	Hairy Tare
	V. sativa	Common Vetch
	V. sepium	Bush Vetch
	V. tetrasperma	Smooth Tare
Fagaceae	*Castanea sativa*	Sweet Chestnut
	Fagus sylvatica	Beech
	Quercus cerris	Turkey Oak
	Q. petraea	Sessile Oak
	Q. robur	Pedunculate Oak
Fumariaceae	*Ceratocapnos claviculata*	Climbing Corydalis
	Fumaria muralis subsp. boraei	Common Ramping-fumitory
	F. officinalis	Common Fumitory
	Pseudofumaria lutea	Yellow Corydalis
Gentianaceae	*Centaurium erythraea*	Common Centaury
	C. pulchellum	Lesser Centaury

Family	Scientific name	Common name
Geraniaceae	*Geranium columbinum*	Long-stalked Crane's-bill
	G. dissectum	Cut-leaved Crane's-bill
	G. lucidum	Shining Crane's-bill
	G. molle	Dove's-foot Crane's-bill
	G. robertianum	Herb-Robert
Germaniaceae	*Erodium cicutarium*	Common Stork's-bill
Grossulariaceae	*Ribes nigrum*	Black Currant (GE)
	R. rubrum	Red Currant (GE)
	R. uva-crispa	Gooseberry (GE)
Haloragaceae	*Myriophyllum aquaticum*	Parrot's-feather (I)
Hydrocharitaceae	*Elodea canadensis*	Canadian Waterweed
Iridaceae	*Crocosmia x crocosmiiflora*	A Montbretia (GE)
	Iris foetidissima	Stinking Iris
	I. pseudacorus	Yellow iris
	Sisyrinchium bermudiana	Blue-eyed-grass (GE)
Juncaceae	***Juncus acutiflorus***	**Sharp-flowered Rush**
	J. articulatus	**Jointed Rush**
	J. bufonius sens. lat.	Toad Rush
	J. bulbosus	**Bulbous Rush**
	J. conglomeratus	Compact Rush
	J. effusus	**Soft Rush**
	J. foliosus	Leafy Rush
	J. inflexus	Hard Rush
	J. squarrosus	**Heath Rush**
	J. tenuis	Slender Rush
	Luzula campestris	Field Woodrush
	L. forsteri	Southern Woodrush
	L. multiflora	**Heath Woodrush**
	L. sylvatica	Great Wood-rush
Juncaginaceae	*Triglochin palustre*	Marsh Arrowgrass
Lamiaceae	*Ajuga reptans*	Bugle
	Clinopodium ascendens	Common Calamint
	C. vulgare	Wild Basil
	Galeopsis tetrahit	Common Hemp-nettle
	Glechoma hederacea	Skullcap
	Lamiastrum galeobdolon ssp. argentatum	Yellow Archangel
	L. galeobdon ssp. montanum	
	Lamium album	White Dead-nettle
	L. amplexicaule	Henbit Dead-nettle

Vegetation and Plant Life continued

Family	Scientific name	Common name
	L. maculatum	Spotted Dead-nettle
	L. purpureum	Red Dead-nettle
	Lycopus europaeus	Gypsywort
	Mentha aquatica	**Water Mint**
	M. arvensis	Corn Mint
	M. x verticillata	Whorled Mint
	Origanum vulgare	Wild Marjoram
	Prunella vulgaris	Selfheal
	Scutellaria galericulata	Skullcap
	S. minor	**Lesser Skullcap**
	Stachys officinalis	Betony
	S. palustris	Marsh Woundwort
	S. sylvatica	Hedge Woundwort
	S. x ambigua	A Hybrid Woundwort
	Teucrium scorodonia	Wood Sage
	Thymus polytrichus	**Wild Thyme**
Lemnaceae	*Lemna minor*	Common Duckweed
Lentibulariaceae	*Pinguicula grandiflora*	Common Butterwort
	P. lusitanica	**Pale Butterwort**
Liliaceae	*Galanthus nivalis*	Snowdrop
	Hemerocallis fulva	Orange Daylily (GE)
	Hyacinthoides hispanica	Spanish Bluebell (I)
	H. non-scripta	Bluebell
	H. x massartiana	A Hybrid Bluebell
	Narcissus agg.	Daffodil (GE)
	Narthecium ossifragum	**Bog Asphodel**
	Polygonatum multiflorum	Solomon's-seal
Linaceae	*Linum bienne*	Pale Flax
	L. catharticum	**Fairy Flax**
	Radiola linoides	Allseed
Lythraceae	*Lythrum portula*	Water-purslane
	L. salicaria	**Purple Loosestrife**
Malvaceae	*Malva moschata*	Musk Mallow
Menyanthaceae	***Menyanthes trifoliata***	**Bog-bean**
Nymphaeaceae	*Nuphar lutea*	Yellow Waterlily
	Nymphaea alba	White Waterlily
Oleaceae	*Fraxinus excelsior*	Ash
	Ligustrum vulgare	Wild Privet
Onagraceae	*Chamerion angustifolium*	Rosebay Willowherb

Family	Scientific name	Common name
	Circaea lutetiana	Common Enchanter's-nightshade
	Epilobium ciliatum	American Willowherb
	E. hirsutum	Greater Willowherb
	E. montanum	Broad-leaved Willowherb
	E. obscurum	Short-fruited Willowherb
	E. palustre	**Marsh Willowherb**
	E. parviflorum	Hoary willowherb
	E. roseum	Pale Willowherb
Orchidaceae	*Anacamptis pyramidalis*	Pyramidal Orchid
	Dactylorhiza fuchsii	**Common Spotted-orchid**
	D. incarnata	**Early Marsh-orchid**
	D. maculata	Heath Spotted-orchid
	D. praetermissa	Southern Marsh-orchid
	Epipactis helleborine	Broad-leaved Helleborine
	Gymnadenia borealis	**Fragrant Orchid**
	Neottia ovata	Common Twayblade
	Ophrus apifera	Bee Orchid
	Orchis mascula	Early Purple Orchid
	Platanthera bifolia	Lesser Butterfly-orchid
Oxalidaceae	*Oxalis acetosella*	Wood Sorrel
	O. articulata	Pink Sorrel
Papaveraceae	*Meconopsis cambrica*	Welsh Poppy (*GE)
	Papaver dubium	Long-headed Poppy
	P. rhoeas	Common Poppy
	P. somniferum	Opium Poppy (GE)
Pinaceae	*Larix kaempferi*	Japanese Larch
	L. x marschlinsii	Dunkeld Hybrid Larch
	Pinus contorta	Lodgepole Pine (I)
	P. nigra	Corsican/Austrian Pine (I)
	P. pinaster	Maritime Pine (I)
	P. radiata	Monterey Pine (I)
	P. sylvestris	Scots Pine
	Pseudotsuga menziesii	Douglas Fir
	Tsuga heterophylla	Western Hemlock-spruce
Plantaginaceae	*Antirrhinum majus*	Snapdragon
	Plantago coronopus	Buck's-horn Plantain
	P. lanceolata	Ribwort Plantain
	P. major	Greater Plantain
Poaceae	***Agrostis canina***	**Velvet Bent**

Vegetation and Plant Life continued

Family	Scientific name	Common name
	A. capillaris	**Common Bent**
	A. curtisii	**Bristle Bent**
	A. stolonifera	**Creeping Bent**
	A. vinealis	Brown Bent
	Aira caryophyllea	Silver Hair-grass
	A. praecox	Early Hair-grass
	Alopecurus geniculatus	Marsh Foxtail
	A. myosuroides	Black Grass
	A. pratensis	Meadow Foxtail
	Anisantha sterilis	Sterile Brome
	Anthoxanthum odoratum	**Sweet Vernal-grass**
	Arrhenatherum elatius	False Oat-grass
	Avena fatua	Wild Oat
	A. sativa	Oat
	Brachypodium sylvaticum	False Brome
	Briza media	**Quaking-grass**
	Bromopsis ramosa	Hairy Brome
	Bromus hordeaceus	Soft Brome
	B. racemosus	Smooth Brome
	Calamagrostis epigejos	Wood Small Reed
	Catapodium rigidum	Fern Grass
	Ceratochloa cathartica	Rescue Brome
	Cortaderia selloana	Pampas-grass (GE)
	Cynosurus cristatus	Crested Dog's-tail
	Dactylis glomerata	Cock's-foot
	Danthonia decumbens	**Heath-grass**
	Deschampsia cespitosa	**Tufted Hair-grass**
	D. flexuosa	**Wavy hair-grass**
	Elytrigia repens	Common Couch
	Festuca arundinacea	Tall Fescue
	F. filiformis	Fine-Leaved Sheep's-fescue
	F. ovina	**Sheep's-fescue**
	F. rubra	**Red Fescue**
	Glyceria declinata	Small Sweet-grass
	G. fluitans	Floating Sweet-grass
	Holcus lanatus	**Yorkshire-fog**
	Holcus mollis	Creeping Soft-grass
	Hordeum vulgare	Six-rowed Barley
	Lolium multiflorum	Italian Rye-grass

Family	Scientific name	Common name
	L. perenne	Perennial Rye-grass
	Molinia caerulea	**Purple Moor-grass**
	Panicum miliaceum	Common Millet
	Phalaris arundinacea	Reed Canary-grass
	P. paradoxa	Awned Canary Grass
	Phleum bertolonii	Smaller Cat's-tail
	P. pratense	Timothy
	Phragmites australis	**Common Reed**
	Poa annua	Annual Meadow-grass
	P. pratensis	Smooth Meadow-grass
	P. trivialis	Rough Meadow-grass
	Schedonorus giganteus	Giant Fescue
	S. pratensis	Meadow Fescue
	Vulpia bromoides	Squirreltail Fescue
	V. myuros	Rat's-tail Fescue
Polygalaceae	***Polygala serpyllifolia***	**Heath Milkwort**
	P. vulgaris	**Common Milkwort**
Polygonaceae	*Fallopia convolvulus*	Black Bindweed
	F. japonica	Japanese Knotweed (I)
	F. sachalinensis	Giant Knotweed (I)
	Persicaria hydropiper	Water-pepper
	P. lapathifolia	Pale Persicaria
	P. maculosa	Redshank
	P. wallichii	Himalayan Knotweed (I)
	Polygonum arenastrum	Equal-leaved Knotgrass
	P. aviculare	Knotgrass
	Rumex acetosa	**Common Sorrel**
	R. acetosella	Sheep's Sorrel
	R. conglomeratus	Clustered Dock
	R. crispus	Curled Dock
	R. obtusifolius	Broad-leaved Dock
	R. sanguineus	Wood Dock
Portulacaceae	*Claytonia sibirica*	Pink Purslane (GE)
Potamogetonaceae	*Potamogeton natans*	Broad-leaved Pondweed
	P. polygonifolius	**Bog Pondweed**
Primulaceae	*Anagallis arvensis subsp.arvensis*	Scarlet pimpernel
	A. tenella	**Bog Pimpernel**
	Centunculus minimus	Chaffweed
	Cyclamen hederifolium	Sowbread

Vegetation and Plant Life continued

Family	Scientific name	Common name
	Lysimachia nemorum	Yellow Pimpernel
	Primula veris	Cowslip
	P. vulgaris	Primrose
Ranunculaceae	*Anemone nemorosa*	Wood Anemone
	Aquilegia vulgaris	Columbine
	Clematis vitalba	Traveller's Joy
	Ficaria verna	Lesser Celandine
	Helleborus foetidus	Stinking Hellebore
	Ranunculus acris	Meadow Buttercup
	R. bulbosus	Bulbous Buttercup
	R. flammula	Lesser Spearwort
	R. omiophyllus	Round-leaved Crowfoot
	R. repens	Creeping Buttercup
	R. sardous	Hairy Buttercup
	Thalictrum flavum	Common Meadow-rue
Resedaceae	*Reseda lutea*	Wild Mignonette
Rhamnaceae	*Frangula alnus*	Alder Buckthorn
Rosaceae	*Agrimonia eupatoria*	Common Agrimony
	A. procera	Fragrant Agrimony
	Aphanes arvensis	Parsley-piert
	A. australis	Slender Parsley-piert
	Chaenomeles speciosa	Chinese Quince (GE)
	Cotoneaster affinis	Purpleberry Cotoneaster (GE)
	C. bullatus	Hollyberry Cotoneaster (GE)
	C. conspicuus	Tibetan Cotoneaster (GE)
	C. cooperi	Cooper's Cotoneaster (GE)
	C. dielsianus	Diel's Cotoneaster (GE)
	C. horizontalis	Wall Cotoneaster (GE)
	C. ignotus	A Cotoneaster (GE)
	C. simonsii	Himalayan Cotoneaster (GE)
	Crataegus monogyna	Hawthorn
	Filipendula ulmaria	**Meadowsweet**
	Fragaria vesca	Wild Strawberry
	Geum urbanum	Wood Avens
	Malus pumila	Apple
	M. sylvestris	Crab Apple sens. str.
	Potentilla anglica	Trailing Tormentil
	P. anserine	Silverweed
	P. erecta	**Tormentil**

Family	Scientific name	Common name
	P. reptans	**Creeping Cinquefoil**
	P. sterilis	Barren Strawberry
	Prunus avium	Wild Cherry
	P. laurocerasus	Cherry Laurel
	P. spinosa	Blackthorn
	Pyrus communis	Pear
	Rosa arvensis	Field Rose
	Rosa canina agg.	Dog Rose species
	R. micrantha	Small-flowered Sweet-briar
	R. stylosa	Short-styled Field Rose
	R. x andegavensis	A Hybrid Rose
	Rubus albionis	A bramble species
	R. botryeros	A bramble species
	R. boulayi	A bramble species
	R. briggsianus	A bramble species
	R. cardiophyllus	A bramble species
	R. dumnoniensis	A bramble species
	R. echinatus	A bramble species
	R. errabundus	A bramble species
	R. fruticosus agg.	**Bramble**
	R. heterobelus	A bramble species
	R. idaeus	Raspberry (GE)
	R. imbricatus	A bramble species
	R. malvernicus	A bramble species
	R. nemoralis	A bramble species
	R. platyacanthus	A bramble species
	R. polyanthemus	A bramble species
	R. prolongatus	A bramble species
	R. pruinosus	A bramble species
	R. pyramidalis	A bramble species
	R. questieri	A bramble species
	R. ramosus	A bramble species
	R. rilstonei	A bramble species
	R. scissus	A bramble species
	R. sempernitens	A bramble species
	R. ulmifolius	A bramble species
	R. vestitus	A bramble species
	Sorbus aria	Whitebeam
	S. aucuparia	Rowan

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Family	Scientific name	Common name
	S. intermedia	Swedish Whitebeam
	Spiraea douglasii	Steeple-bush (GE)
Rubiaceae	*Cruciata laevipes*	Crosswort
	Galium album	Hedge Bedstraw
	G. aparine	Cleavers
	G. odoratum	Sweet Woodruff
	G. palustre	**Common Marsh-bedstraw**
	G. saxatile	**Heath Bedstraw**
	G. uliginosum	Fen Bedstraw
	G. verum	Lady's Bedstraw
	Rubia peregrina	Wild Madder
	Sherardia arvensis	Field Madder
Salicaceae	*Populus nigra subsp. betulifolia*	Black Poplar
	P. tremula	Aspen
	Salix aurita	Eared Willow
	S. caprea	Goat Willow
	S. cinerea	Grey Willow
	S. repens	**Creeping Willow**
	S. x multinervis	A Hybrid Willow
Sapindaceae	*Acer campestre*	Field Maple
	A. platanoides	Norway Maple
	A. pseudoplatanus	Sycamore
	Aesculus hippocastanum	Horse-chestnut
Sarraceniaceae	*Sarracenia flava*	Yellow Pitcher Plant (GE)
Saxifragaceae	*Chrysosplenium oppositifolium*	Opposite-leaved Golden-saxifrage
	Saxifraga tridactylites	Rue-leaved Saxifrage
Scophulariaceae	*Cymbalaria muralis*	Ivy-leaved Toadflax
	Digitalis purpurea	Foxglove
	Euphrasia anglica x micrantha	A hybrid Eyebright
	E. confusa	An Eyebright
	E. nemorosa	An Eyebright
	E. officinalis agg.	An Eyebright
	Kickxia elatine	Sharp-leaved fluellen
	Linaria purpurea	Purple Toadflax
	L. vulgaris	Common Toadflax
	Odontites vernus	Red Bartsia
	Pedicularis palustris	**Marsh Lousewort**
	P. sylvatica	**Lousewort**
	Rhinanthus minor	Yellow Rattle

Family	Scientific name	Common name
	Scrophularia auriculata	Water Figwort
	S. nodosa	Common Figwort
	Verbascum thapsus	Great Mullein
	Veronica agrestis	Green Field-speedwell
	V. arvensis	Wall Speedwell
	V. beccabunga	Brooklime
	V. chamaedrys	Germander Speedwell
	V. hederifolia	Ivy-leaved Speedwell
	V. montana	Wood Speedwell
	V. officinalis	Heath Speedwell
	V. persica	Common Field-speedwell
	V. serpyllifolia	Thyme-leaved Speedwell
Solanaceae	*Nicandra physalodes*	Apple-of-Peru (GE)
	Solanum dulcamara	Bittersweet
	S. lycopersicum	Tomato (GE)
	S. nigrum	Black Nightshade
Sparganiaceae	*Sparganium erectum*	Branched Bur-reed
Taxaceae	*Taxus baccata*	Yew
Tiliaceae	*Tilia sp.*	A lime
Typhaceae	*Typha angustifolia*	Lesser Bulrush
	T. latifolia	Bulrush
Ulmaceae	*Ulmus procera*	English Elm
Urticaceae	*Urtica dioica*	Common Nettle
	U. urens	Small Nettle
Valerianaceae	***Valeriana officinalis***	**Common Valerian**
	Valerianella carinata	Keeled-fruited Cornsalad
	V. locusta	Cornsalad
Violaceae	*Viola arvensis*	Field Pansy
	V. lactea	**Pale Dog-violet**
	V. odorata	Sweet Violet
	V. palustris	**Marsh Violet**
	V. riviniana	Common Dog-violet
Vitaceae	*Parthenocissus quinquefolia*	Virginia-creeper (GE)
	V. riviniana	Common Dog-violet
	Vulpia bromoides	Squirreltail Fescue
	V. myuros	Rat's-tail Fescue

Vegetation and Plant Life continued

Appendix 2. List of Ferns, Horsetails and Clubmosses

Species in bold are those associated with heathland/mire habitat.

Scientific Name	Common Name
Asplenium adiantum-nigrum	Black Spleenwort
Athyrium filix-femina	Lady Fern
Blechnum spicant	Hard Fern
Dryopteris affinis agg.	Scaly Male-fern
D. carthusiana	***Narrow Buckler-fern***
D. dilatata	Broad Buckler-fern
D. filix-mas	Male Fern
Equisetum arvense	Field Horsetail
E. fluviatile	Water Horsetail
E. palustre	***Marsh Horsetail***
Equisetum sylvaticum	Wood Horsetail
E. telmateia	Great Horsetail
Huperzia selago	Fir Clubmoss
Lycopiella inundata	Marsh Clubmoss
Osmunda regalis	***Royal Fern***
Phyllitis scolopendrium	Hart's-tongue
Polypodium interjectum	Intermediate Polypody
P. vulgare	Polypody
Polystichum aculeatum	Hard Shield-fern
P. setiferum	Soft Shield-fern
Pteridium aquilinum	***Bracken***

Appendix 3. List of Bryophytes

Species in bold are those associated with heathland/mire habitat.

Scientific Name	Common Name
Amblystergium serpens	Creeping Feather-moss
Aneura pinguis	**Greasewort**
Atrichum undulatum	Common Smoothcap
Aulacomnium palustre	**Bog Groove-moss**
Barbula convoluta var. *sardoa*	
B. unguiculata	
Brachythecium rivulare	River Feather-moss
B. rutabulum	Rough-stalked Feather-moss
B. velutinum	Velvet Feather-moss
Breutelia chrysocoma	Golden-head moss
Bryoerythrophyllum recurvirostrum	
Bryum bicolor	Bicolured Bryum
B. bornholmense	
B. capillare	
B. pseudotriquetrum	Marsh Bryum
Calliergonella cuspidata	**Pointed Spear-moss**
Calypogeia arguta	
C. azurea	Blue Pouchwort
C. fissa	**Common Pouchwort**
C. muelleriana	**Mueller's Pouchwort**
Campylium stellatum	**Yellow Starry Feather-moss**
Campylopus brevipilus	**Compact Swan-neck Moss**
C. flexuosus	Rusty Swan-neck Moss
C. fragilis	Brittle Swan-neck Moss
C. introflexus	**Heath Star Moss**
C. pyriformis	Dwarf Swan-neck Moss
Cephalozia bicuspidata	**Two-horned Pincerwort**
C. connivens	**Forcipated Pincerwort**
C.* cf *lunulifolia	**Moon-leaved Pincerwort**
C.* cf *macrostachya	**Bog Pincerwort**
Ceratodon purpureus	Redshank
Conocephalum conicum	Giant Scented Liverwort
Cratoneuron filicinum	Fern-leaved Hook-moss
Cryphaea heteromalla	
Ctenidium molluscum	**Comb-moss**
Dicranella heteromalla	Silky Forklet-moss

Scientific Name	Common Name
Dicranum scoparium	**Broom Fork-moss**
Didymodon tophaceus	
Diplophyllum albicans	**White Earwort**
Drepanocladus revolvens	Rusty Hook-moss
Eurhynchium hians	Swart's Feather-moss
Eurhynchium praelongum	**Common Feather-moss**
E. striatum	Common Striated Feather-moss
Fissidens adianthoides	
F. bryoides	
F. dubius	
F. exilis	Slender Pocket-moss
F. taxifolius	
Fossombronia	A liverwort
Frullania dilatata	Dilated Scalewort
F. tamarisci	Tamarisk Scalewort
Funaria hygrometrica	
Grimmia pulvinata	
Gymnocolea inflata	Inflated Notchwort
Gyroweisia tenuis	
Homalothecium sericeum	
Hookeria lucens	Shining Hookeria
Hylocomium splendens	Glittering Wood-moss
Hypnum andoi	
H. cupressiforme	**Cypress-leaved Plait-moss**
H. jutlandicum	**Heath Plait-moss**
H. resupinatum	
Isothecium myosuroides	Slender Mouse-tail Moss
Kindbergia praelonga	
Kurzia paucifolia	**Bristly Fingerwort**
K. sylvatica	
Lejeunea lamacerina	
Lepidozia reptans	
Leptodictyum riparium	
Leucobryum juniperoideum	
L. glaucum	**Large White-moss**
Lophocolea bidentata	**Bifid Crestwort**
L. heterophylla	
Lophozia ventricosa	**Tumid notchwort**
Metzgeria fruticulosa	Blueish veilwort
M. furcata	Forked Veilwort
M. temperata	
Microlejeunea ulicina	
M. ulicina	

Scientific Name	Common Name
Mnium hornum	Swan's-neck Thyme-moss
Nardia scalaris	Ladder Flepwort
Neckera complanata	
N. pumila	Dwarf Neckera
Odontoschisma sphagnii	**Bog-moss Flapwort**
Orthodontium lineare	
Orthotrichum affine	
O. lyellii	
O. pulchellum	Elegant Bristle-moss
Oxyrrhynchium hians	
Palustriella cf *commutata*	Curled Hook-moss
Pellia cf *epiphylla*	Overleaf Pellia
Plagiomnium undulatum	Hart's-tongue Thyme-moss
Plagiothecium curvifolium	
P. nemorale	Woody Silk-moss
P. succulentum	
Platyhypnidium riparioides	
Pleurozium schreberi	
Pogonatum aloides	
Polytrichastrum formosum	
Polytrichum commune	**Common Haircap**
P. formosum	Bank Haircap
Pseudoscleropodium purum	**Neat Feather-moss**
Pseudotaxiphyllum elegans	
Radula complanata	Even Scalewort
Rhizomnium punctatum	Dotted Thyme-moss
Rhynchostegiella tenella sens. strict.	
Rhynchostegium confertum	
R.riparioides	Long-beaked Water Feather-moss
Rhytidiadelphus squarrosus	**Springy Turf-moss**
Riccardia latifrons	Bog Germanderwort
R.multifida	**Delicate Germanderwort**
Sanionia cf *uncinata*	Sickle-leaved Hook-moss
Scleropodium purum	**Neat Feather-moss**
Scorpidium scorpioides	**Hooked Scorpion-moss**
Sphagnum capillifolium	**Acute-leaved Bog-moss**
S. capillifolium* subsp *rubellum	**Red Bog-moss**
S. compactum	**Compact Bog-moss**
S. cuspidatum	**Feathery Bog-moss**
S. denticulatum	**Cow-horn Bog-moss**

Vegetation and Plant Life continued

Scientific Name	Common Name
S. fallax	**Flat-topped Bog-moss**
S. fimbriatum	**Fringed Bog-moss**
S. inundatum	**Lesser Cow-horn Bog-moss**
S. magellanicum	**Magellanic Bog-moss**
S. molle	**Blushing Bog-moss**
S. palustre	**Blunt-leaved Bog-moss**
S. papillosum	**Papillose Bog-moss**
S. squarrosum	**Spiky Bog-moss**
S. subnitens subnitens	**Lustrous Bog-moss**
S. tenellum	**Soft Bog-moss**
S. teres	**Rigid Bog-moss**
Tetraphis pellucida	
Thamnobryum alopecurum	
Thuidium tamariscinum	**Common Tamarisk-moss**
Tortula muralis var. *muralis*	
Ulota bruchii	
Ulota crispa sens. lat.	Crisped pincushion
Ulota phyllantha	Frizzled Pincushion
Zygodon conoideus	
Z. viridissimus var. *viridissimus*	

Appendix 4. List of Lichens

Species in bold are those associated with heathland/mire habitat.

Scientific Name	Scientific Name
Absconditella lignicola	*Lecanora chlarotera*
Arthonia punctiformis	*L. expallens*
Arthonia radiata	*L. jamesii*
Buellia griseovirens	*Lecidella elaeochroma*
Calicium viride	*Lepraria incana*
Candelaria concolor	*L. lobificans*
Candelariella reflexa	*Melanelia subaurifera*
Cladonia* cf. *chlorophaea	***Micarea peliocarpa***
C. coniocraea	*Opegrapha atra*
C. crispata var cetrariformis	***O. vulgata***
C. digitata	*Parmelia caperata*
C. diversa	*P. subaurifera*
C. fimbriata	*P. subrudecta*
C. floerkeana	***P. sulcata***
C. furcata	***Parmotrema chinense***
C. macilenta	*P. perlatum*
C. polydactyla var. *polydactyla*	*Pertusaria albescens*
C. portentosa	*P. amara*
C. pyxidata	*P. hymenea*
C. ramulosa	*P. pertusa*
C. squamosa	*Phaeographis dendritica*
C. squamosa var. *squamosa*	*Phlyctis argena*
C. uncialis* subsp. *uncialis	***Physcia tenella***
Dibaeis baeomyces	*Placynthiella uliginosa*
Dimerella pineti	*Platismatia glauca*
Enterographa crassa	*Porina chlorotica*
Evernia prunastri	*Punctelia subrudecta*
Flavoparmelia caperata	*Pyrrhospora quernea*
F. soredians	*Ramalina farinacea*
Fuscidea lightfootii	*R. fastigiata*
Graphis elegans	*Schismatomma decolorans*
G. scripta	*Scoliciosporium pruinosum*
Hypocenomyce scalaris	*Thelotrema lepadinum*
Hypogymnia physodes	*Trapeliopsis pseudogranulosa*
H. tubulosa	*Usnea cornuta*
Hypotrachyna revoluta	*U. florida*
Lecanactis abietina	*U. subfloridana*
	Xanthoria parietina

Appendix 5. List of Fungi

Family	Scientific Name	Common Name
Agaricaceae	*Agaricus augustus*	The Prince
	A. campestris	Field Mushroom
	A. langei	Scaly Wood Mushroom
	A. moelleri	Inky Mushroom
	A. silvicola	Wood Mushroom
	A. urinascens	Macro Mushroom
	A. xanthodermus	Yellow Stainer
	Chlorophyllum olivieri	
	Coprinopsis atramentaria	Common Inkcap
	C. comatus	Shaggy Inkcap
	C. plicatilis	Pleated Inkcap
	Handkea excipuliformis	Pestle Puffball
	Lepiota clypeolaria	Shield Dapperling
	L. magnispora	
	Leucoagaricus leucothites	White Dapperling
	Lycoperdon echinatum	Spiny Puffball
	L. perlatum	Common Puffball
	L. pyriforme	Stump Puffball
	Macrolepiota procera	Parasol
	M. excoriata	
Albatrellaceae	*Albatrellus ovinus*	
Amanitaceae	*Amanita citrina*	False Deathcap
	A. excelsa	Grey spoted Amanita
	A. fulva	Tawny Grisette
	A. gemmata	Jewelled Amanita
	A. muscaria	Fly Agaric
	A. phalloides	Deathcap
	A. pophyria	Grey Veiled Amanita
	A. rubescens	Blusher (The)
Ascobolaceae	*Ascobolus albidus*	
	Saccobolus versicolor	
Ascocorticiaceae	*Ascocorticium anomalum*	
Auriculariaceae	*Auricularia mesenterica*	Tripe Fungus
	Exidia glandulosa	Witches' Butter
	E. nucleata	Crystal Brain
	Hirneola auricula-judae	Jelly ear
Bertiaceae	*Bertia moriformis*	
Bolbitiaceae	*Bolbitius titubans*	Yellow Fieldcap

Vegetation and Plant Life continued

Family	Scientific Name	Common Name
	Conocybe rickenii	
	C. tenera	
	Panaeolina foenisecii	Brown Mottlegill
	P. semiovatus	Egghead Mottlegill
Boletaceae	*Boletus badius*	Bay Bolete
	B. chrysenteron	Red Cracking Bolete
	B. edulis	Cep or Penny Bun
	B. erythropus	
	B. luridiformis	
	B. porosporus	Sepia Bolete
	B. radicans	Rooting Bolete
	B. subtomentosus	Suede Bolete
	Leccinum aerugineum	
	L. duriusculum	Slate Bolete
	L. scabrum	Birch Bolete
	L. variicolor	Mottled Bolete
Bondarzewiaceae	*Heterobasidion annosum*	Root Rot
Botryosphaeriaceae	*Guignardia philoprina*	
Bulgariaceae	*Bulgaria inquinans*	Black Bulgar
Cantharellaceae	*Cantharellus cibarius*	Chanterelle
	C. tubaeformis	Trumpet Chanetrelle
Clavariaceae	*Clavulinopsis helvola*	Yellow Club
Clavicipitaceae	*Claviceps purpurea*	Ergot
Clavulinaceae	*Clavulina cinerea*	Grey Coral
	C. coralloides	Crested Coral
	C. rugosa	Wrinkled Club
Cortinariaceae	*Cortinarius anomalous*	Variable Webcap
	C. camphoratus	Goatcheese Webcap
	C. decipiens	Sepia Webcap
	C. delibutus	Yellow Webcap
	C. purpurascens	Bruising Webcap
	C. sanguineus	Bloodred Webcap
	C. semisanguineus	Surprise Webcap
	C. torvus	Stocking Webcap
	C. triumphans	Birch Webcap
	C. uliginosus	Marsh Webcap
	C. violaceus	Violet Webcap
Cyphellaceae	*Chondrostereum purpureum*	Silverleaf Fungus
Dacrymycetaceae	*Calocera cornea*	Small Stagshorn

Family	Scientific Name	Common Name
	C. viscosa	Yellow Stagshorn
	Dacrymyces stillatus	Common Jellyspot
Diaporthaceae	*Diaporthe eres*	
Diatrypaceae	*Diatrype disciformis*	Beech Barkspot
	D. stigma	Common Tarspot
	D. favacea	
	Diatrypella favacea	
	D. quercina	
	Quaternaria quaternata	
Entolomataceae	*Entoloba chalybeum*	
	E. conferendum	Star Pinkgill
	E. porphyrophaeum	Lilac Pinkgill
	E. sericellum	Cream Pinkgill
	E. sericeum	Silky Pinkgill
	Clitopilus prunulus	The Miller
Erysiphaceae	*Erisyphe alphitoides*	Oak Mildew
	E. lonicerae	
	E. sordida	
	Sphaerotheca epilobii	
Fistulinaceae	*Fistulina hepatica*	Beefsteak Fungus
Fomitopsidaceae	*Piptoporus betulinus*	Birch Polypore
	Daedalea quercina	Oak Mazegill
	Daedaleopsis confragosa	Blushing Bracket
	Phaeolus schweinitzii	Dyer's Mazegill
	Postia caesia	Conifer Blueing Bracket
	P. stiptica	Bitter Bracket
	P. subcaesia	Blueing Bracket
Ganodermataceae	*Ganoderma applanatum*	Artist's Bracket
	G. australe	Southern Bracket
	Gomphifius roseus	Rosy Spike
Gomphidiaceae	*Chroogomphus rutilus*	Copper Spike
Helotiaceae	*Ascocoryne sarcoides*	Purple Jellydisc
	Bisporella citrina	Lemon Disco
	Chlorociboria aeruginascens	Green Elfcup
	Neobulgaria pura	Beech Jellydisc
	Mitrula paludosa	Bog Beacon
	Mollisia ligni	
	Trochilia ilicina	Holly Speckle
Helvellaceae	*Helvella lacunosa*	Elfin Saddle
Hericiaceae	*Hericium cirrhatum*	Tiered Tooth

Vegetation and Plant Life continued

Family	Scientific Name	Common Name
Hyaloscyphaceae	*Dematioscypha dematiicola*	
	Hyalopeziza millepunctata	
	Hyaloscypha hyalina	
	Lachnum niveum	
	L. virgineum	Snowy Disco
Hydnaceae	*Hydnum repandum*	Wood Hedgehog
Hydnangiaceae	*Laccaria amethystina*	Amethyst Deceiver
	L. bicolor	Bicoloured Deceiver
	L. laccata	Deceiver
	L. purpureobadia	
Hydnodontaceae	*Subulicystidium longisporum*	
Hygrophoraceae	*Ampulloclitocybe clavipes*	Club Foot
	Hygrocybe flavipes	Yellow Foot Waxcap
	H. conica	Blackening Waxcap
	H. nigrescens	
	H. pratensis	Meadow Waxcap
	H. psittacina	Parrot Waxcap
	H. punicea	Crimson Waxcap
	H. virginea	Snowy Waxcap
Hygrophoropsidaceae	*Hygrophoropsis aurantiaca*	False Chanterelle
Hymenochaetaceae	*Coltrichia perennis*	Tiger's Eye
	Hymenochaete rubiginosa	Oak Curtain Crust
	Phellinus ferreus	Cinnamon Porecrust
	P. ferruginosus	Rusty Porecrust
Hypocreaceae	*Hypocrea pulvinata*	Ochre Cushion
Hysteriaceae	*Gloniopsis praelonga*	
Inocybaceae	*Crepidotus mollis*	Peeling Oysterling
	C. variabilis	Variable Oysterling
	Inocybe eutheles	
	I. geophylla	White Fibrecap
	I. griseolilacina	Lilac Leg Fibrecap
	I. napipes	Bulbous Fibrecap
	I. sindonia	
	Tubaria furfuracea	
Insertae sedis	*Phoma hedericola*	
Lasiosphaeriaceae	*Lasiosphaeria spermoides*	
	Podospora fimiseda	
	P. pleiospora	
	P. setosa	
	Schizothecium tetrasporum	

Family	Scientific Name	Common Name
Leptosphaeriaceae	*Leptosphaeria acuta*	Nettle Rash
Lophiostermataceae	*Herpotrichia macrotricha*	
Lyophyllaceae	*Asterophora parasitica*	Silky Piggyback
	Lyophyllum connatum	White Domecap
Marasmiaceae	*Baeospora myosura*	Conifercone cap
	Macrocystidia cucumis	Cucumber cap
	Marasmiellus ramealis	Twig Parachute
	Marasmius oreades	Fairy Ring Champignon
	M. rotula	Collared Parachute
	Megacollybia platyphylla	Whitelaced Shank
	Oudemansiella mucida	Porcelain Fungus
Melanconidaceae	*Melanconis stilbostoma*	
Meruliaceae	*Bjerkandera adusta*	Smoky Bracket
	Chondrostereum purpureum	Silverleaf Fungus
	Phlebia radiata	Wrinkled Crust
	P. tremellosa	Jelly Rot
Microascaceae	*Cephalotrichum nanum*	
	C. stemonitis	
Mucoraceae	*Pilaira anomala*	
Mycenaceae	*Mycena adscendens*	Frosty Bonnet
	M. archangeliana	Angel's Bonnet
	M. capillaripes	Pinkedge Bonnet
	M. cinerella	Mealy Bonnet
	M. epipterygia	Yellowleg Bonnet
	M. filopes	Iodine Bonnet
	M. galericulata	Common Bonnet
	M. galopus	Milking Bonnet
	M. haematopus	Burgundydrop Bonnet
	M. inclinata	Clustered Bonnet
	M. leptocephala	Nitrous Bonnet
	M. pelianthina	Blackedge Bonnet
	M. polygramma	Grooved Bonnet
	M. pura	Lilac Bonnet
	M. rorida	Dripping Bonnet
	M. stipata	
	M. vitilis	Snapping Bonnet
	Panellus serotinus	Olive Oysterling
	P. stipticus	Bitter Oysterling
Nectriaceae	*Nectria cinnabarina*	Coral Spot
	N. coccinea	

Vegetation and Plant Life continued

Family	Scientific Name	Common Name
	N. punicea	
	Volutella ciliata	
Orbiliaceae	*Orbilia curvatispora*	
	O. xanthostigma	Common Glasscup
Paxillaceae	*Paxillus involutus*	Brown Rollrim
Peniophoraceae	*Peniophora lycii*	
	P. incarnata	Rosy Crust
	P. quercina	
Pezizaceae	*Peziza badia*	Bay Cup
Phacidiaceae	*Phacidium multivalve*	
Phallaceae	*Mutinus caninus*	Dog Stinkhorn
	Phallus impudicus	Stinkhorn
Phanerochaetaceae	*Byssomerlius corium*	Netted Crust
Phragmidiaceae	*Phragmidium mucronatum*	
	P. violaceum	Violet Bramble Rust
Phycomycetaceae	*Spinellus fusiger*	Bonnet Mould
Physalacriaceae	*Armillaria gallica*	Bulbous Honey Fungus
	A. mellea	Honey Fungus
	Flammulina velutipes	Velvet Shank
	Oudemansiella mucida	Porcelain Fungus
	Xerula radicata	Rooting Shank
Pilobalaceae	*Pilobolus crystallinus*	
Pleurotaceae	*Pleurotus cornucopiae*	Branching Oyster
	P. ostreatus	Oyster Mushroom
Pluteaceae	*Pluteus aurantiorugosus*	
	P. cervinus	Deer Shield
	P. leoninus	Lion Shield
Polyporaceae	*Daedaleopsis confragosa*	Blushing Bracket
	Datronia mollis	Common Mazegill
	Faeberia carbonaria	Firesite Funnel
	Laetiporus sulphureus	Chicken of the Woods
	Lenzites betulina	
	Polyporus brumalis	Winter Polypore
	P. durus	Bay Polypore
	P. leptocephalus	Blackfoot Polypore
	P. squamosus	Dryad's Saddle
	Skeletocutis nivea	Hazel Bracket
	Trametes gibbosa	Lumpy Bracket
	T. versicolor	Turkeytail

Family	Scientific Name	Common Name
	T. versicolor	Turkeytail
	Trichaptum abietinum	Purplepore Bracket
Psathyrellaceae	*Lacrymaria lacrymabunda*	Weeping Widow
	Psathyrella candolleana	Pale Brittlestem
	P. piluliformis	
	Psathyrella laevissima	
	P. piluliformis	Common Stump Brittlestem
	Coprinellus disseminatus	Fairy Inkcap
	C. domesticus	Firerug Inkcap
	C. heptemerus	
	C. micaceus	Glistening Inkcap
	C. truncorum	
	C. xanthothrix	
	Coprinopsis lagopus	Hare's-foot Inkcap
Pucciniaceae	*Puccinia coronata*	
	Pucciniastrum epilobii	
Pyronemataceae	*Aleuria aurantia*	Orange Peel Fungus
	Cheilymenia granulata	
	Fimaria theioleuca	
	Scutellinia scutellata	Common Eyelash
Russulaceae	*Lactarius aurantiacus*	Orange Milkcap
	L. blennius	Beech Milkcap
	L. camphoratus	Curry Milkcap
	L. chrysorrheus	Yellowdrop Milkcap
	L. controversus	
	L. deliciosus	Saffron Milkcap
	L. deterrimus	False Saffron Milkcap
	L. hepaticus	Liver Milkcap
	L. pubescens	Bearded Milkcap
	L. quietus	Oakbug Milkcap
	L. rufus	Rufous Milkcap
	L.. subdulcis	Mild Milkcap
	L. subumbonatus	
	L. tabidus	Birch Milkcap
	L. torminosus	Woolly Milkcap
	L. turpis	Ugly Milkcap
	Russula aeruginea	Green Brittlegill
	R. atropurpurea	Purple Brittlegill
	R. betularum	Birch Brittlegill

Vegetation and Plant Life continued

Family	Scientific Name	Common Name
	R. caerulea	Humpback Brittlegill
	R. cyanoxantha	Charcoal Burner
	R. emetica	Sickener
	R. fellea	Geranium Brittlegill
	R. fragilis	Fragile Brittlegill
	R. gracillima	Slender Brittlegill
	R. heterophylla	Greasy Green Brittlegill
	R. ionochlora	
	R. luteotacta	
	R. mairei	Beechwood Sickener
	R. nigricans	Blackening Brittlegill
	R. nobilis	Beechwood Sickener
	R. ochroleuca	Ochre Brittlegill
	R. sanguinaria	Bloody Brittlegill
	R. sardonia	Primrose Brittlegill
	R. solaris	
	R. velenovskyi	Coral Brittlergill
	R. vesca	The Flirt
Rutstroemiaceae	*Rutstroemia firma*	Brown Cup
Schizoporaceae	*Hyphodontia sambuci*	Elder Whitewash
	Schizopora paradoxa	
Sclerodermataceae	*Scleroderma areolatum*	Leopard Earthball
	S. bovista	Potato Earthball
	S. citrinum	Common Earthball
	Scleroderma verrucosum	Scaly Earthball
Sordariaceae	*Sordaria macrospora*	
Sparassidaceae	*Sparassis crispa*	Wood Cauliflower
Sporomiaceae	*Sporormiella australis*	
	S. bipartis	
Stereaceae	*Stereum gausapatum*	Bleeding oak Crust
	S. hirsutum	Hairy Curtain Crust
	S. rameale	
	S. rugosum	Bleeding Broadleaf Crust
	S. sanguinolentum	Bleeding Conifer Crust
Strophariaceae	*Agrocybe pediades*	
	A. rivulosa	Common Fieldcap
	Galerina hypnorum	
	G. laevis	
	Gymnopilus penetrans	Common Rustgill

Family	Scientific Name	Common Name
	Hebeloma crustuliniforme	Poisonpie
	H. leucosarx	
	H. mesophaeum	
	Hypholoma fasciculare	Sulphur Tuft
	H. lateritium	Brick Tuft
	Kuehneromyces mutabilis	Sheathed Woodtuft
	Pholiota squarrosa	Shaggy Scalycap
	Psilocybe semilanceata	
	Stropharia caerulea	Blue Roundhead
	S. semiglobata	Dung Roundhead
Suillaceae	*Suillus bovinus*	Bovine Bolete
	S. granulatus	Weeping Bolete
	S. luteus	Slippery Jack
	S. variegatus	Velvet Bolete
Thelebolaceae	*Ascozonus woolhopensis*	
	Thelebolus stercoreus	
Thelephoraceae	*Thelephora penicillata*	
Tremellaceae	*Tremella aurantia*	
	T. mesenterica	Yellow Brain
Tricholomataceae	*Ampulloclitocybe clavipes*	Club Foot
	Clitocybe dealbata	Ivory Funnel
	C. ericetorum	
	C. fragrans	Fragrant Funnel
	C. geotropa	Trooping Funnel
	C. gibba	Common Funnel
	C. metachroa	
	C. nebularis	Clouded Funel
	Collybia butyracea	Butter cap
	C. confluens	Clustered Toughshank
	C. distorta	
	C. dryophila	Russet Toughshank
	C. peronata	Wood Woolyfoot
	Lepista flaccida	Tawny Funnel
	L. nuda	Wood Blewit
	L. sordida	
	Melanoleuca arcuata	
	Tricholoma album	White Knight
	T. columbetta	Blue Spot Knight
	T. equestre	Yellow Knight

Vegetation and Plant Life continued

Family	Scientific Name	Common Name
	T. fulvum	Birch Knight
	T. imbricatum	
	T. sejunctum	Deceiving Knight
	T. terreum	Grey Knight
	T. ustaloides	
	Tricholomopsis rutilans	Plums and Custard
Tubiferaceae	*Lycogala epidendrum*	
	Reticularia lycoperdon	
Xylariaceae	*Annulohypoxylon multiforme*	
	Biscogniauxia nummularia	Beech Tarcrust
	Daldinia concentrica	King Alfred's Cakes
	Hypoxylon fragiforme	Beech Woodwart
	H. multiforme	Birch Woodwart
	Kretzschmaria deusta	Brittle Cinder
	Xylaria hypoxylon	Candlesnuff Fungus
	X. longipes	Dead Moll's Fingers
	X. polymorpha	Dead Man's Fingers
Unknown	*Entoloba sericellum*	Cream Pinkgill
	Postia stiptica	Bitter Bracket
	Rhopographus filicinus	Bracken Map
	Sphaeronaemella fimicola	
	Stilbella fimetaria	
	Trichobolus zukalii	
	Trochila ilicina	Holly Speckle

Birds

Stonechat
(*Saxicola rubicola*)

Birds

- 148 bird species recorded from the East Devon Pebblebed Heaths SSSI.
- 66 bird species known to breed regularly.
- Of those species which breed regularly or are winter visitors, passage migrants or 'feeders', 51 have high conservation significance (i.e. Birds of Conservation Concern or NERC S41 listed).
- Three species have Action Plans under the Devon Biodiversity and Geodiversity Action Plan (2005).
- Two breeding species (Dartford Warbler and Nightjar) are heathland specialists and species of European conservation significance, their presence underpinning the establishment of the Special Protection Area in 1996.
- Nightjar populations are stable at 78 occupied territories in 2010 (date of last National Survey).
- Dartford Warbler population crashed after the severe winter of 2010/11, subsequently recovering to 73 occupied territories in 2015.

Brief characterisation of the avian fauna

From casual and formal sightings, 148 bird species have been recorded in association with the Pebblebed Heaths SSSI. This represents 35% of the 422 accepted species recorded from Devon (Tyler, 2010)[31]. Of those species recorded, 66 (45%) are known to regularly breed in the SSSI, either on heathland or associated vegetation types, including grassland, mire and woodland. Twelve species, including Brambling, Fieldfare, Jack Snipe, Merlin, Redwing, Woodcock, Great Grey Shrike, Long-eared Owl, Merlin and Hen Harrier, are regular winter visitors (Table 7). The last four can be considered heathland specialists. Indeed, one of the local names for the Hen Harrier is the Furze (gorse) Kite, and the Pebblebed Heaths are known to be one of few favoured areas for over-wintering Great Grey Shrikes in Britain.

Notwithstanding the importance of occasional and historical sightings, if breeders, regular feeders, winter visitors and regularly observed passage migrants are counted together, the 'true' avifauna of the Pebblebed Heaths SSSI can reasonably be assumed to be approximately 90 species. This includes classic dry heathland specialists such as Dartford Warbler and Nightjar, and breeders of wet heathland such as Curlew. This latter species has suffered a severe decline in its breeding range in southern England in recent decades and although still present in summer on the Pebblebed Heaths there has been little evidence of breeding success here since the 1990s. All three of these species are of great conservation significance (see Table 8). A full species list of all birds together with their resident and breeding status is shown in Appendix 6.

The extended species list includes single historical or occasional sightings and 'fly-overs'. Nightingale and Cirl Bunting, for example, have not been recorded since the 1980s. The European Roller is an accidental species in the UK, yet one was present at East Budleigh Common in 1989. Further single or occasional historical sightings include Ring-necked Parakeet, Tree Sparrow, Red-backed Shrike, Corncrake, Quail, Shoveler, Common Sandpiper and Marsh Warbler. Likewise, although in some cases commonly observed in flight, a number of species on the list have very little, if any, real association with the Pebblebed Heaths. Species such as the Red-throated Diver, Mute Swan and Great Black-backed Gull, for example, only generally fly over the heaths and rarely, if ever, alight.

Table 6. Birds recorded during spring or autumn passage

Common Name	Species Name	Status
Dunlin	*Calidris alpina*	OSP
Firecrest	*Regulus ignicapillus*	AP
Golden Oriole	*Oriolus oriolus*	OP
Golden Plover	*Pluvialis apricaria*	OP
Green Sandpiper	*Tringa ochropus*	OP
Greenshank	*Tringa nebularia*	OP
Honey Buzzard	*Pernis apivorus*	SP
Kingfisher	*Alcedo atthis*	PV
Lapwing	*Vanellus vanellus*	PV
Osprey	*Pandion haliaetus*	SP
Pied Flycatcher	*Ficedula hypoleuca*	SP
Red Kite	*Milvus milvus*	SP
Redstart	*Phoenicurus phoenicurus*	SP
Ring Ouzel	*Turdus torquatus*	SP
Wheatear	*Oenanthe oenanthe*	SP
Whimbrel	*Numenius phaeopus*	SP
Whinchat	*Saxicola rubetra*	SP
Wryneck	*Jynx torquilla*	OAP

OAP =Occasional Autumn Passage; OP = Occasional Passage; SP = Spring Passage; OSP = Occasional Spring Passage; AP = Autumn Passage; PV = Passage Visitor

Table 7. Winter visitors

Common Name	Species Name
Brambling	*Fringilla montifringilla*
Fieldfare	*Turdus pilaris*
Great Grey Shrike	*Lanius excubitor*
Hen Harrier	*Circus cyaneus*
Jack Snipe	*Lymnocryptes minimus*
Long-eared Owl	*Asio otus*
Mealy Redpoll	*Carduelis flammea*
Merlin	*Falco columbarius*
Redwing	*Turdus iliacus*
Short-eared Owl (sporadic)	*Asio flammeus*
Water Rail	*Rallus aquaticus*
Woodcock	*Scolopax rusticola*

Birds of conservation significance

Of the 147 bird species recorded from the East Devon Pebblebed Heaths SSSI, 17 (12%) are on the Red List, with 34 (23%) on the Amber List. Of the 66 known breeders on the SSSI 13 (20%) are on the Red List with 15 (23%) on the Amber List. Table 8 shows 51 species of particular conservation significance which regularly frequent the Heaths, including those that breed, feed and are passage migrants or winter visitors.

Yellowhammer
(*Emberiza citrinella*)

Birds continued

Table 8. Birds of conservation significance on the Pebblebed Heaths

Common name	Scientific Name	Status on EDPH SSSI	Birds Dir. Annex 1	BoCC 2009	NERC S.41	UK BAP	Devon BAP
Barn Owl	*Tyto alba*	F					●
Bullfinch	*Pyrrhula pyrrhula*	B			●	●	●
Common Whitethroat	*Sylvia communis*	B					
Curlew	*Numenius arquata*	B			●	●	●
Dartford Warbler	*Sylvia undata*	B	●				●
Dunnock	*Prunella modularis*	B			●		
Fieldfare	*Turdus pilaris*	WV					
Firecrest	*Regulus ignicapillus*	PB					
Grasshopper Warbler	*Locustella naevia*	B			●	●	
Green Woodpecker	*Picus viridis*	B					
Grey Wagtail	*Motacilla cinerea*	PB					
Hen Harrier	*Circus cyaneus*	WV			●		●
Honey Buzzard	*Pernis apivorus*	SP					
House Martin	*Delichon urbicum*	F					
Jack Snipe	*Lymnocryptes minimus*	WV					●
Kestrel	*Falco tinnunculus*	B					
Lesser Redpoll	*Carduelis cabaret*	B			●	●	
Linnet	*Carduelis cannabina*	B			●	●	●
Mallard	*Anas platyrhynchos*	B					
Marsh Tit	*Poecile palustris*	B					
Meadow Pipit	*Anthus pratensis*	B					
Mealy Redpoll	*Carduelis flammea*	WV					
Merlin	*Falco columbarius*	WV					●
Mistle Thrush	*Turdus viscivorus*	B					
Nightjar	*Caprimulgus europaeus*	B	●		●	●	●
Osprey	*Pandion haliaetus*	SP					
Pied Flycatcher	*Ficedula hypoleuca*	SP					
Red Kite	*Milvus milvus*	SP					
Redstart	*Phoenicurus phoenicurus*	SP					
Redwing	*Turdus iliacus*	WV					
Reed Bunting	*Emberiza schoeniclus*	B			●	●	●
Ring Ouzel	*Turdus torquatus*	SP			●	●	●
Sand Martin	*Riparia riparia*	F					
Short-Eared Owl	*Asio flammeus*	WV					

Common name	Scientific Name	Status on EDPH SSSI	Birds Dir. Annex 1	BoCC 2009	NERC S.41	UK BAP	Devon BAP
Skylark	*Alauda arvensis*	B			●	●	
Snipe	*Gallinago gallinago*	B					
Song Thrush	*Turdus philomelos*	B			●	●	●
Spotted Flycatcher	*Muscicapa striata*	B			●	●	
Starling	*Sturnus vulgaris*	B			●		
Stock Dove	*Columba oenas*	B					
Swallow	*Hirundo rustica*	B					
Swift	*Apus apus*	F					
Tree Pipit	*Anthus trivialis*	B			●	●	
Turtle Dove	*Streptopelia turtur*	B			●	●	
Water Rail	*Rallus aquaticus*	WV					
Wheatear	*Oenanthe oenanthe*	SP					●
Whimbrel	*Numenius phaeopus*	SP					
Whinchat	*Saxicola rubetra*	SP					
Willow Warbler	*Phylloscopus trochilus*	B					
Woodcock	*Scolopax rusticola*	WV					
Yellowhammer	*Emberiza citrinella*	B			●	●	

WV = Winter Visitor; Feeding; B = Breeding; SP = Spring Passage; AP = Autumn Passage;

= Amber = Red

Of the 66 breeding bird species recorded from the East Devon Pebblebed Heaths, three are specifically mentioned as notifiable features of the SSSI: Dartford Warbler, Hobby and Nightjar. The Dartford Warbler and Nightjar are also Annex I species under European law, and represent the primary features of the Special Protection Area (SPA) under the EC Birds Directive.

Table 9. Birds cited in the SSSI and SPA designations

Common Name	Scientific name	Key SSSI feature	Key SPA feature
Dartford Warbler	*Sylvia undata*	●	●
Nightjar	*Accipiter nisus*	●	●
Hobby	*Caprimulgus europaeus*	●	

Birds continued

Key Species Profiles

Dartford Warbler

The Dartford Warbler is one of the iconic species of the Pebblebed Heaths. Its global distribution is centred on the Iberian peninsula, with southern England representing is northernmost breeding limit. The most recent national survey in 2006 produced a population estimate of 3,214 territories, up 70% on the previous 1994 figure (Wotton et al., 2009)[32]. Its northward spread is limited by climate, as this resident species barely survives temperatures below freezing, and documented crashes in its population are usually linked to severe winters (e.g. 1962-63 and 2010-11). In England, its breeding habitat is almost entirely undisturbed lowland heathland dominated by either gorse or Heather. Its distribution is closely linked to the Stonechat (*Saxicola torquata*), a species which requires a greater need for perches affording good views, but much less for concealment.

The Dartford Warbler remains on the Pebblebed Heaths all year round, with populations being largely sedentary. It feeds almost exclusively on arthropods found in gorse, with beetles and spiders being particularly favoured. During the spring and summer, caterpillars are also consumed, with these preferentially fed to the young. The species is highly territorial, with territories ranging considerably in size depending on the quality of the habitat and availability of food. A typically good habitat with a high abundance of gorse of the right age and with abundant food might be about one hectare. Once an area is chosen, individuals or pairs show strong site fidelity. The main song period is from March to late September, the singing birds often turning from side to side with crown and throat feathers ruffled. Their nests are positioned close to the ground and are small and compact, made from leaves and bits of Heather. Typically, about four eggs are laid from the end of March, hatching after about 14 days and the young fledgling after a further two weeks. Independence is gained another two weeks after leaving the nest.

Dartford Warbler
(*Sylvia undata*)

The population of Dartford Warblers on the heaths is monitored annually. Apart form the impact of harsh winters, accidental fires, especially during the breeding season, can destroy territories and displace birds. The large accidental fire on Colaton Raleigh Common in 2010 significantly reduced the area of available preferred feeding and breeding habitat on this Common.

At the time of designation in 1996, the Special Protection Area supported 8% (an estimated 128 active breeding territories, based on 1994 data) of the British population of this species, which is the target level set in the Definitions of Favourable Condition for the designated features of interest for the SSSI (Natural England, 2013). The most recent count (2015) recorded 73 pairs across the SSSI. Management can only focus on ensuring sufficient habitat to enable this species to thrive, climate allowing.

Nightjar

Nightjars are summer breeding visitors to the Pebblebed Heaths, arriving between late April and mid-May and departing to over-winter in Africa in August and September. The breeding range of this species is broad, encompassing Southern and Western Europe, the Middle East and Asia. Historically the species was widely distributed throughout Britain, although the breeding range contracted by 51% during the 1970s and 1980s. However, there has been a subsequent 18% expansion in its range in Britain over the last 30 years, with recorded numbers of singing ('churring') males doubling from 2,100 in 1981 to 4,600 in 2004[33].

Their breeding distribution is closely associated with lowland heathland and felled or recently planted conifer plantations. They are ground nesters, the nest comprising an unlined scrape. This leaves them vulnerable to disturbance from predators and from dogs, although they have excellent cryptic, grey-brown plumage providing ideal camouflage during the daytime, when they are at their most vulnerable while incubating or resting on their nest.

They are primarily active at dusk and dawn (crepuscular), feeding largely on moths and flying beetles, which they hawk using a tree as a base from which to forage. They tend to take their food at lower-level elevations with hunting assisted by their wide gape and rectal bristles which function as a trap. Their presence is most readily detected from the male's churring song.

At the time of designation in 1996 the Special Protection Area was believed to support 83 pairs (an estimated 2.4%) of the British breeding population, based on 1992 data. The target level set in the Definitions of Favourable Condition for the designated features of interest for the SPA (Natural England, 2013) comprises 75% of that recorded in 1992 (i.e. 62 pairs). The most recent National census in 2010 recorded 78 territories (based on churring males) across the SSSI.

Nightjar
(*Caprimulgus europaeus*)

Birds continued

Appendix 6. List of birds of the Pebblebed Heaths with Status

NB. Some are historical records (shown as HR)

A = Accidental; AP = Autumn Passage; B = Breeding; F = Feeding; FO = Fly over; HB = Historical Breeder; HR = Historical Record; OP = Occasional Passage; OR = Occasional Record; PB = Possible Breeder; PV = Passage Visitor; SR =Single Record; WV = Winter Visitor;

Family	Scientific Name	Common name	Status
Accipitridae (Hawks and Eagles)	*Accipiter gentilis*	Goshawk	PB
	A. nisus	Sparrowhawk	B
	Buteo buteo	Buzzard	B
	B. lagopus	Rough-legged Buzzard	OR
	Circus cyaneus	Hen Harrier	WV
	C. pygargus	Montagu's Harrier	HR/OP 1976, OP
	Milvus milvus	Red Kite	SP
	Pandion haliaetus	Osprey	SP
	Pernis apivorus	Honey Buzzard	SP
Aegithalidae	*Aegithalos caudatus*	Long-tailed Tit	B
Alaudidae (Larks)	*Alauda arvensis*	Skylark	B
	Lullula arborea	Woodlark	OR
Alcedinidae (Kingfishers)	*Alcedo atthis*	Kingfisher	AP
Anatidae (Ducks, Geese & Swans)	*Anas clypeata*	Shoveler	SR
	A. crecca	Teal	OR
	A. penelope	Wigeon	OR
	A. platyrhynchos	Mallard	B
	A. anser	Greylag Goose	FO
	Aythya fuligula	Tufted Duck	OR
	Branta canadensis	Canada Goose	B
	Cygnus olor	Mute Swan	FO
Apodidae (Swifts)	*Apus apus*	Swift	F
Ardeidae (Herons)	*Ardea cinerea*	Grey Heron	F
	Egretta garzetta	Little Egret	FO
Caprimulgidae (Nightjars)	*Caprimulgus europaeus*	Nightjar	B
Certhiidae (Treecreepers)	*Certhia familiaris*	Treecreeper	B
Charadriidae (Plovers)	*Charadrius hiaticula*	Ringed Plover	OR
	Pluvialis apricaria	Golden Plover	OP
	Vanellus vanellus	Lapwing	PV
Cinclidae (Dippers)	*Cinclus cinclus*	Dipper	OR
Columbidae (Pigeons)	*Columba oenas*	Stock Dove	B
	C. palumbus	Wood Pigeon	B
	Streptopelia decaocto	Collared Dove	OP
	S. turtur	Turtle Dove	B
Coraciidae (Rollers)	*Coracias garrulus*	European Roller	A

Family	Scientific Name	Common name	Status
Corvidae (Crows)	*Corvus corax*	Raven	B
	C. corone	Carrion Crow	B
	C. frugilegus	Rook	B
	C. monedula	Jackdaw	B
	Garrulus glandarius	Jay	B
	Pica pica	Magpie	B
Cuculidae (Cuckoos)	*Cuculus canorus*	Common Cuckoo	B
Emberizidae (Buntings)	*Emberiza cirlus*	Cirl Bunting	HR
	E. citrinella	Yellowhammer	B
	E. schoeniclus	Reed Bunting	B
Falconidae (Falcons)	*Falco columbarius*	Merlin	WV
	F. peregrinus	Peregrine	FO
	F. subbuteo	Hobby	B
	F. tinnunculus	Kestrel	B
Fringillidae (Finches)	*Carduelis cabaret*	Lesser Redpoll	B
	C. cannabina	Linnet	B
	C. carduelis	Goldfinch	B
	C. chloris	Greenfinch	B
	C. flammea	Mealy Redpoll	WV
	C. spinus	Siskin	B
	Coccothraustes coccothraustes	Hawfinch	OR
	Fringilla coelebs	Chaffinch	B
	F. montifringilla	Brambling	WV
	Loxia curvirostra	Crossbill	B
	Pyrrhula pyrrhula	Bullfinch	B
Gaviidae (Divers)	*Gavia stellata*	Red-throated Diver	FO
Hirundinidae (Swallows & Martins)	*Delichon urbicum*	House Martin	F
	Hirundo rustica	Swallow	B
	Riparia riparia	Sand Martin	F
Laniidae (Shrikes)	*Lanius collurio*	Red-backed Shrike	HR/SR
	L. excubitor	Great Grey Shrike	WV
Laridae (Gulls)	*Chroicocephalus ridibundus*	Black-headed Gull	FO
	Larus argentatus	Herring Gull	FO
	L. canus	Common Gull	FO
	L. fuscus	Lesser Black-backed Gull	FO
	L. marinus	Great Black-backed Gull	FO
	L. minutus	Little Gull	FO
Locustellidae (Grasshopper Warblers)	*Locustella naevia*	Grasshopper Warbler	B

Birds continued

Family	Scientific Name	Common name	Status
Motacillidae (Wagtails)	*Anthus pratensis*	Meadow Pipit	B
	A. trivialis	Tree Pipit	B
	Motacilla alba	White / Pied Wagtail	B
	M. alba yarrellii	Pied Wagtail	B
	M. cinerea	Grey Wagtail	PB
Muscicapidae (Flycatchers)	*Ficedula hypoleuca*	Pied Flycatcher	SP
	Luscinia megarhynchos	Nightingale	HR
	Muscicapa striata	Spotted Flycatcher	B
Oriolidae (Orioles)	*Oriolus oriolus*	Golden Oriole	OP
Paridae (Tits) (see also Aegithalidae)	*Cyanistes caeruleus*	Blue Tit	B
	Parus major	Great Tit	B
	Periparus ater	Coal Tit	B
	Poecile montanus	Willow Tit	HR/HB breeder
	P. palustris	Marsh Tit	B
Passeridae (Sparrows)	*Passer domesticus*	House Sparrow	OR
	P. montanus	Tree Sparrow	SR
Phalacrocoracidae (Cormorants)	*Phalacrocorax carbo*	Cormorant	FO
Phasianidae (Pheasants)	*Alectoris rufa*	Red-legged Partridge	B
	Coturnix coturnix	Quail	SR
	Perdix perdix	Grey Partridge	OR
	Phasianus colchicus	Pheasant	B
Phylloscopidae (Warblers)	*Phylloscopus collybita*	Chiffchaff	B
	P. inornatus	Yellow-browed Warbler	OR
	P. sibilatrix	Wood Warbler	OR
	P. trochilus	Willow Warbler	B
Picidae	*Dendrocopos major*	Great Spotted Woodpecker	B
	D. minor	Lesser Spotted Woodpecker	OR
	Jynx torquilla	Wryneck	OP
	Picus viridis	Green Woodpecker	B
Podicipedidae (Grebes)	*Tachybaptus ruficollis*	Little Grebe	OR
Prunellidae (Accentors)	*Prunella modularis*	Dunnock	B
Psittacidae (Parrots)	*Psittacula krameri*	Ring-necked Parakeet	HR/SR
Rallidae (Rails)	*Crex crex*	Corncrake	HR/SR
	Fulica atra	Coot	OR
	Gallinula chloropus	Moorhen	B
	Rallus aquaticus	Water Rail	WV
Regulidae (Goldcrests)	*Regulus ignicapillus*	Firecrest	AP possible B
	R. regulus	Goldcrest	B

Family	Scientific Name	Common name	Status
Scolopacidae (Sandpipers and Allies)	*Actitis hypoleucos*	Common Sandpiper	HR/SR
	Calidris alpina	Dunlin	OSP
	Gallinago gallinago	Snipe	B
	Lymnocryptes minimus	Jack Snipe	WV
	Numenius arquata	Curlew	B
	N. phaeopus	Whimbrel	SP
	Scolopax rusticola	Woodcock	WV
	Tringa nebularia	Greenshank	OPR
	T. ochropus	Green Sandpiper	OPR
Sittidae (Nuthatches)	*Sitta europaea*	Nuthatch	B
Sternidae (Terns)	*Sterna hirundo*	Common Tern	OR
Strigidae (Owls)	*Asio flammeus*	Short-eared Owl	WV
	A. otus	Long-eared Owl	WV
	Athene noctua	Little Owl	OR
	Strix aluco	Tawny Owl	B
	Tyto alba	Barn Owl	F
Sturnidae (Starlings)	*Sturnus vulgaris*	Starling	B
Sylviidae (Warblers) (see also Phylloscopidae and Regulidae)	*Acrocephalus palustris*	Marsh Warbler	HR/SR
	A. schoenobaenus	Sedge Warbler	OR
	A. scirpaceus	Reed Warbler	OR
	Sylvia atricapilla	Blackcap	B
	S. borin	Garden Warbler	B
	S. communis	Common Whitethroat	B
	S. curruca	Lesser Whitethroat	B
	S. undata	Dartford Warbler	B
Troglodytidae (Wrens)	*Troglodytes troglodytes*	Wren	B
Turdidae (Chats)	*Erithacus rubecula*	Robin	B
	Oenanthe oenanthe	Wheatear	SP
	Phoenicurus phoenicurus	Redstart	SP
	Saxicola rubetra	Whinchat	SP
	S. torquatus	Stonechat	B
	Turdus iliacus	Redwing	WV
	T. merula	Blackbird	B
	T. philomelos	Song Thrush	B
	T. pilaris	Fieldfare	WV
	T. torquatus	Ring Ouzel	SP
	T. viscivorus	Mistle Thrush	B

Birds continued

Mammals

Badger
(*Meles meles*)

Mammals

- 38 species recorded, including 14 species of bat, representing 64% of the species recorded from Great Britain (native and introduced).
- Of terrestrial mammals, the presence of four are readily evident (Roe Deer, Rabbit, Badger, Hazel Dormouse), but none can be considered as 'heathland specialists'.
- 11 species are species of Principal Importance for conservation in the UK (S41 list) and listed as Priority Species in the UK BAP (2007), six of which are key species identified for conservation in Devon (Devon BAP, 1998).
- 16 species, including European Otter, Hazel Dormouse and 14 species of bat, are European Protected Species.
- The SSSI supports important hibernacula for Greater and Lesser Horseshoe Bats.

Rabbit
(*Oryctolagus cuniculus*)

Brief characterisation of the mammalian fauna

In general, terrestrial mammals are rarely seen on the open heath, and are more associated with wooded fringes. Otter sightings have been either road kill, or individuals moving through the SSSI to more appropriate stream and riverine habitat. Species (or their signs) most frequently observed within and associated with the SSSI are Rabbit, Roe Deer, Badger and Hazel Dormouse. There are occasional sightings of Red and Fallow Deer but populations of both are transient. Sika and Muntjac have not yet been recorded, although it is anticipated that they are likely to be seen in the future as their ranges expand. Dormice are present within the SSSI and are common in woodlands and woodland edges. They are also often associated with hazel hedgerows, although some gorse stands and coniferous plantations can provide suitable habitat. Hazel, honeysuckle, bramble and oak are all important food sources. Foxes and Badgers, although occasionally seen, tend to quickly move through the heathland areas. There are numerous setts and dens in woodland within and adjacent to the SSSI. These areas are also usually where the Roe Deer are observed. Of great conservation significance are a number of military buildings in the SSSI which have been converted to bat hibernacula. These support populations of Greater and Lesser Horseshoe Bats and a maternity roost of Brown Long-eared Bats. Brown Hare was introduced to farmland adjacent to the SSSI in about 2000 and are occasionally seen on the heath.

Mammals of conservation significance

Sixteen species of mammal found on the heaths are classed as European Protected Species (EPS) in Annex IV of the Habitats Directive (1992) and listed in Schedule 2 of the Habitats and Species Regulations (2010). Two of these (Hazel Dormouse and European Otter) are terrestrial, though only Hazel Dormouse is reasonably associated with the SSSI. The remaining 14 EPS are bats, with Greater and Lesser Horseshoe Bats being of the greatest conservation significance. The Greater Horseshoe Bat is rare in Britain, with less than 5,000[34] distributed in about 24 colonies in south-west England and Wales. The Lesser Horseshoe Bat is also rare in Great Britain and Ireland, with a population estimate of 15,000 in Wales, western England and western Ireland. Both species are associated with woodland and hedgerows. Although they roost and hibernate in the SSSI, heathland is not their primary feeding habitat. The presence of conservation grazing herds of cattle on the heaths may contribute to the availability of important food items through dung-associated insects.

Eleven species are considered to be Species of Principal Importance for the conservation of biodiversity in England and are listed in the NERC S41 list and UK BAP species list. In addition to the EPS listed above, these include Brown Hare, Harvest Mouse and Hedgehog.

Greater Horseshoe Bat
(*Rhinolophus ferrumequinum*)

Mammals continued

Appendix 7. Provisional list of mammals recorded in the SSSI and their conservation status

Family	Scientific name	Common name	Annex IV	NERC S41	UKBAP	Devon BAP
Canidae	*Vulpes vulpes*	Red Fox				
Cervidae	*Capreolus capreolus*	Roe Deer				
	Cervus elaphus	Red Deer				
	Dama dama	Fallow Deer				
Erinaceidae	*Erinaceus europaeus*	Hedgehog		●	●	
Leporidae	*Lepus europaeus*	Brown Hare		●	●	●
	Oryctolagus cuniculus	Rabbit				
Muridae	*Apodemus sylvaticus*	Wood Mouse				
	Micromys minutus	Harvest Mouse		●	●	
	Microtus agrestis	Field Vole				
	Mus domesticus	House Mouse				
	Myodes glareolus	Bank Vole				
	Rattus norvegicus	Common Rat				
Mustelidae	*Lutra lutra*	European Otter	●	●	●	●
	Meles meles	Badger				
	Mustela ermine	Stoat				
	M. nivalis	Weasel				
	M. vison	Mink				
Myoxidae	*Muscardinus avellanarius*	Hazel Dormouse	●	●	●	●
Rhinolophidae	*Rhinolophus ferrumequinum*	Greater Horseshoe Bat	●	●	●	●
	R. hipposideros	Lesser Horseshoe Bat	●	●	●	●
Sciuridae	*Sciurus carolinensis*	Grey Squirrel				
Sorcidae	*Neomys fodiens*	Water Shrew				
	Sorex minutus	Pygmy Shrew				
	S. araneus	Common Shrew				
Talpidae	*Talpa europaea*	Common Mole				
Verspertilionidae	*Barbastella babastellus*	Barbastelle Bat	●	●	●	●
	Eptesicus serotinus	Serotine Bat	●			
	Myotis daubentonii	Daubenton's Bat	●			
	M. mystacinus	Whiskered Bat	●			
	M. natterei	Natterer's Bat	●			
	Nyctalus leisleri	Leisler's Bat	●			
	N. noctula	Noctule Bat	●	●	●	
	Pipistrellus nathusii	Nathusius' Pipistrelle	●			
	P. pipistrellus	Common Pipistrelle	●			
	P. pygmaeus	Soprano Pipistrelle	●	●	●	
	Plecotus auritus	Brown Long-eared Bat	●	●	●	
	P. austriacus	Grey Long-eared Bat	●			

Reptiles and Amphibians

Adder
(*Vipera berus*)

Reptiles and Amphibians

- Nine native species recorded (out of 12 known in the UK).
- One formerly extinct but reintroduced species (Smooth Snake) is a European Protected Species listed in Annex 4 of the Habitats Directive.
- Six species are Species of Principal Importance for Conservation in England and listed in S41 of the NERC Act (2006) and under the UK BAP (2007).
- One alien species (Red-eared Terrapin) is present.

Brief characterisation of the reptile and amphibian fauna

Lowland heathland is one of the best-known habitats for reptiles, as it provides the warm, open, structurally diverse habitats they require, and an abundant food source. In particular they prefer well-developed older vegetation which forms part of the mosaic of age groups.

With the exception of the re-established Smooth Snake, the native amphibians and reptiles listed below are relatively abundant across the Commons in appropriate habitat, though no population estimates are available. The non-native Red-eared Terrapin is known only from Bystock Pool. This species is a native to the United States. The Common Lizard, Slow Worm and Adder are the most abundant of the reptiles.

One issue that has been flagged up across all lowland heathland sites is the potential conflict that can exist between certain management interventions designed to deliver the broad range of age classes required for a heathland to be considered as being in 'favourable status', and reptile and amphibian welfare[35]. Management that can be detrimental to reptiles includes controlled burning (swailing) and grazing, the recommendation from specialist interest groups being that a cautious approach to the use of such techniques is adopted and that reptiles and amphibians are explicitly recognised in management objectives to avoid unintended consequences[36].

Slow Worm
(*Anguis fragilis*)

Palmate Newt
(*Lissotriton helveticus*)

Appendix 8. Reptiles recorded in the SSSI

Family	Scientific name	Common name	Annex IV	NERC S41	UKBAP (2007)
Anguidae	*Anguis fragilis*	Slow Worm		●	●
Colubridae	*Coronella austriaca*	Smooth Snake	●	●	●
	Natrix natrix	Grass Snake		●	●
Emydidae	*Trachemys scripta**	Red-eared Terrapin			
Lacertidae	*Zootoca vivipara*	Common Lizard		●	●
Viperidae	*Vipera berus*	Adder		●	●

*Non-native

Appendix 9. Amphibians recorded in the SSSI

Family	Scientific name	Common name	NERC S41	UKBAP (2007)
Bufonidae	*Bufo bufo*	Common Toad	●	●
Ranidae	*Rana temporaria*	Common Frog		
Salamandridae	*Lissotriton helveticus*	Palmate Newt		
Salamandridae	*L. vulgaris*	Smooth Newt		

Reptiles and amphibians of conservation significance

The Smooth Snake, a European Protected Species (EPS), has been recorded from the SSSI and has been the subject of a re-establishment programme. Slow Worm, Smooth Snake, Grass Snake, Adder, Common Lizard and Common Toad are all species of Principal Importance for conservation in England, appear on the NERC S41 (2006) list and are Priority Species for Conservation under the UK Biodiversity Action Plan (2007).

Reptiles and Amphibians continued

Butterflies

Clouded Yellow
(*Colias croceus*)

Butterflies

- 50 species of butterfly have been recorded from the SSSI.
- 26 species are recorded annually, 14 occasionally or rarely.
- 10 species have not been recorded since 2000.
- 12 commonly recorded species are of national conservation significance, including two which are considered Endangered.
- 20 (84%) regularly recorded species are in national decline.
- Key species: Silver-studded Blue.

Grayling
(*Hipparchia semele*)

Brief characterisation of the butterflies of the SSSI

Analysis of all records for butterflies on the Pebblebed Heaths reveals that 50 species have been recorded, i.e. 92% of the 62 species known to be historically resident or regular breeding migrants in Britain and Ireland. In Devon, 75 species have been recorded, or are reputed to have occurred historically[37], 43 of which are believed to have bred. Of the 50 species recorded from the SSSI, 10 are known only from historical records (Table 11), with a further 14 seen rarely or very infrequently, or which can be considered as 'unusual or unlikely records'. Such records include Small Blue (present in Devon but not associated with the Pebblebed Heaths), Large Tortoiseshell (generally considered to be extinct in the UK, although there are occasional sightings of immigrants) and Grizzled Skipper and Chalkhill Blue (both typical of southern chalk downland). Painted Lady and Clouded Yellow are regular immigrants with Pale Clouded Yellow a rare immigrant. The presence of Essex Skipper both on the Pebblebed Heaths and in Devon is contested, and sightings of this species may be misidentifications of Small Skipper.

Typically, 26 species are recorded from the SSSI annually (Table 10). Those particularly associated with heathland include the Silver-studded Blue (see species profile), Grayling, Small Heath and Green Hairstreak. The majority are widely found across the SSSI in a variety of habitats where foodplants and suitable conditions allow, including in grassland and woodland. For example, species commonly associated with woodland edges rather than heathland include Holly Blue, Orange Tip, Ringlet, Silver-washed Fritillary and Speckled Wood.

Small Heath
(*Coenonympha pamphilus*)

Table 10. Butterflies regularly recorded

Common Name	Scientific Name
Brimstone	*Gonepteryx rhamni*
Comma	*Polygonia c-album*
Common Blue	*Polyommatus icarus*
Dark Green Fritillary	*Argynnis aglaja*
Gatekeeper	*Pyronia tithonus*
Grayling	*Hipparchia semele*
Green Hairstreak	*Callophrys rubi*
Green-veined White	*Pieris napi*
Holly Blue	*Celastrina argiolus*
Large Skipper	*Ochlodes sylvanus*
Large White	*Pieris brassicae*
Meadow Brown	*Maniola jurtina*
Orange Tip	*Anthocharis cardamines*
Peacock	*Aglais io*
Purple Hairstreak	*Favonius quercus*
Red Admiral	*Vanessa atalanta*
Ringlet	*Aphantopus hyperantus*
Silver-studded Blue	*Plebejus argus*
Silver-washed Fritillary	*Argynnis paphia*
Small Copper	*Lycaena phlaeas*
Small Heath	*Coenonympha pamphilus*
Small Pearl-bordered Fritillary	*Clossiana selene*
Small Skipper	*Thymelicus sylvestris*
Small Tortoiseshell	*Aglais urticae*
Small White	*Pieris rapae*
Speckled Wood	*Pararge aegeria*

Table 11. Butterflies known from historical records only

Common Name	Scientific Name	Comment
Brown Hairstreak	*Thecla betulae*	None recorded since 1985
Camberwell Beauty	*Nymphalis antiopa*	One recorded 1991
Chalkhill Blue	*Lysandra coridon*	None recorded since 1999
Heath Fritillary	*Melitaea athalia*	One recorded 1919
High Brown Fritillary	*Fabriciana adippe*	None recorded since 1996
Marsh Fritillary	*Euphydryas aurinia*	None recorded since 1986
Purple Emperor	*Apatura iris*	None recorded since 1995
Queen of Spain Fritillary	*Issoria lathonia*	None recorded since 1950
Swallowtail	*Papilio machaon*	1919 or earlier
White-letter Hairstreak	*Satyrium w-album*	None recorded since 1980

Butterflies

Conservation status

Because they are easily detected in the field and their habitat requirements are relatively well known compared to many other invertebrate groups, butterflies are considered good 'proxy' indicators for how invertebrates in general are faring. There has been a well-documented decline in the abundance of many UK butterfly species in recent decades, including on the Pebblebed Heaths. These declines have been driven largely by habitat destruction and degradation, notably the loss of unimproved grassland and inappropriate land management. In addition, the Climatic Risk Atlas of European Butterflies (2008) suggests that the vast majority of European butterflies will be badly affected by climate change[38], although some UK habitat generalists have been able to spread northwards. Most European species will have to shift their distributions considerably northwards and will lose a large amount of their suitable 'climate space'. Furthermore, habitat specialists such as Silver-studded Blue live in discrete colonies in very specific habitats and have limited ability to move, making it difficult to alter their distribution in step with a rapidly changing climate.

The State of UK Butterflies (2011) indicates that 72% of species have declined in abundance at monitored sites (ten-year trend), and that the UK distributions of 54% of butterflies have also declined[39]. For example, population trends for many heathland specialists are negative: the Silver-studded Blue being down 29% across its range; Small Heath down 28%; Grayling down 33%; Green Hairstreak down by 27% (Appendix 10). The cold and wet summer of 2012 was particularly challenging for butterflies, this being the worst year on record with 52 species declining out of the 56 monitored. In the SSSI, Silver-studded Blue counts dropped to under 400 from a 16 year high of 925 in 2009, although the good summer of 2013 has since seen an encouraging recovery to nearly 1,000. Prior to this, from the year 2000 onwards, numbers had been building as management activities on the SSSI have strived to create the pioneer heath habitat required by this species. Regardless of periodic population crashes due to poor summers, some UK butterfly species continue to expand their territories in the face of climate change, with these tending to be the more mobile, adaptable, generalist species.

Brimstone
(*Gonepteryx rhamni*)

These species include Peacock, Comma, Speckled Wood and Ringlet, all of which are recorded from the wider SSSI heathland landscape.

Appendix 10 outlines those 40 species that are recorded annually, or occasionally on the SSSI. Historical records are not included but have been provided in Table 11. Data is provided on their general status on the SSSI (whether common, frequent or rare), along with their conservation status as defined by the GB Butterfly Red List (2010)[40], the State of UK Butterflies 2011, those species listed on the NERC (2006) Section 41 list of species of Principal Importance and Priority Species under the UK BAP (2007), and as a Priority Species under the Devon Biodiversity and Geodiversity Action Plan (2009).

In total 11 species are highlighted as species of Principal Importance for conservation (S41 list). Of the 26 species generally recorded annually on the SSSI, 84% are in decline in the UK (based on 10 year trends). Those species recorded which show positive population trends nationally are Grayling, Pearl-bordered Fritillary, Orange Tip and Ringlet. Based on IUCN criteria, the GB Butterfly Red List (2010) highlights four species as Vulnerable (Dingy Skipper, Grizzled Skipper, Silver-studded Blue, White Admiral), four as Near Threatened (Small Blue, Small Heath, Small Pearl-bordered Fritillary, Wall) and two as Endangered (Pearl-bordered Fritillary, Wood White).

Key Species Profiles

Silver-studded Blue (*Plebejus argus*)

The Silver-studded Blue was once a relatively common and widely distributed species in Britain, but underwent severe declines during the 20th Century caused by loss of its favoured habitats. A sedentary species, lowland heathland is the most widely used habitat in Britain, although it can also be found on calcareous grasslands (e.g. Isle of Portland, Dorset, and Great Orme, N.Wales) and sand dunes (e.g. Cornwall).

On the Pebblebed Heaths the butterfly requires short, pioneer heathland, with the success of colonies deteriorating as heathland matures and undergoes succession. A wide variety of ericaceous and leguminous foodplants are favoured by larvae including Heather (*Calluna vulgaris*), Bell Heather (*Erica cinerea*), Cross-leaved Heath (*E. tetralix*) and gorse (*Ulex* spp.), with adult butterflies feeding on nectar of heather species.

The Silver-studded Blue has a symbiotic association with Black Ants (*Lasius niger*) on heathlands. Female butterflies lay eggs only where they detect ant pheromones, with the butterfly larvae secreting sugars and amino acids as a reward for the ants. In return, ants protect the larvae and subsequently the pupae from predation or parasitism within the nest. The association of the butterfly with open, pioneer heathland vegetation relates in part to this being favoured by the ant.

This species rarely flies any distance, often only a few dozen metres, and thus it is susceptible to habitat fragmentation. Management works on the SSSI seek to ensure the continuity of its favoured habitat, with this species viewed as threatened and representing a priority species to conserve.

Silver-studded Blue
(*Plebejus argus*)

Butterflies continued

Appendix 10. Butterflies recorded from the SSSI (excluding historical records)

Status on SSSI: C = Common (seen annually); O = Occasional (seen annually); R = Rare (seen annually); II = Irregular Immigrant (not seen annually); OR = Occasionally Recorded (not seen annually); RR = Rarely Recorded (not seen annually); **UKBMS 10-yr trend (%)** = UK Butterfly Monitoring Scheme 10 yr trend (%), 2002 – 2012; Red List = The Butterfly Red List for Great Britain 2010 (NT = Near Threatened; VU= Vulnerable; EN = Endangered). Species in **bold** have a strong association with heathland

Family	Scientific name	Common name	Status on SSSI	NERC S41	UK BAP (2007)	Devon BAP 1998	UKBMS 10 -yr trend (%)	GB Red List 2010
Hesperiidae	*Erynnis tages*	Dingy Skipper	O	●	●		-19	VU
	Ochlodes sylvanus	Large Skipper	C				-35	
	Pyrgus malvae	Grizzled Skipper	RR	●	●		-29	VU
	Thymelicus lineola	Essex Skipper	RR				-67	
	T. sylvestris	Small Skipper	C				-62	
Lycaenidae	*Aricia agestis*	Brown Argus	RR				-38	
	Callophrys rubi	**Green Hairstreak**	C				-27	
	Celastrina argiolus	Holly Blue	C				-29	
	Cupido minimus	Small Blue	RR	●	●		31	NT
	Favonius quercus	Purple Hairstreak	O				-9	
	Lycaena phlaeas	Small Copper	O				-24	
	Plebejus argus	**Silver-studded Blue**	O	●	●	●	-29	VU
	Polyommatus icarus	Common Blue	O				-30	
Nymphalidae	*Aglais io*	Peacock	C				-24	
	A. urticae	Small Tortoiseshell	C				-64	
	Aphantopus hyperantus	Ringlet	C				25	
	Argynnis aglaja	Dark Green Fritillary	R				18	
	A. paphia	Silver-washed Fritillary	C				38	
	Boloria euphrosyne	Pearl-bordered Fritillary	RR	●	●	●	-42	EN
	B. selene	Small Pearl-bordered Fritillary	O	●	●	●	-19	NT
	Coenonympha pamphilus	**Small Heath**	C	●	●		-28	NT
	Hipparchia semele	**Grayling**	C	●	●		-33	
	Lasiommata megera	Wall	RR	●	●		-37	NT
	Limenitis camilla	White Admiral	O	●	●		-9	VU
	Maniola jurtina	Meadow Brown	C				-8	
	Melanargia galathea	Marbled White	RR			●	-21	
	Nymphalis polychloros	Large Tortoiseshell	RR					
	Pararge aegeria	Speckled Wood	C				42	
	Polygonia c-album	Comma	O				34	
	Pyronia tithonus	Gatekeeper	C				-23	
	Vanessa atalanta	Red Admiral	C				-21	
	V. cardui	Painted Lady	II				52	
Pieridae	*Anthocharis cardamines*	Orange Tip	C				-8	
	Colias croceus	Clouded Yellow	II				235	
	C. hyale	Pale Clouded Yellow	II					
	Gonepteryx rhamni	Brimstone	C				0	
	Leptidea sinapis	Wood White	OR	●	●		-49	EN
	Pieris brassicae	Large White	C				34	
	P. napi	Green-veined White	C				-9	
	P. rapae	Small White	C				-26	

Moths

Cinnabar caterpillars
(*Tyria jacobaeae*)

Moths

- 517 species of macro- and micro-moths recorded, 22% of the ca. 2,400 species of moth known from Britain and Ireland.
- 138 species (27%) are of conservation significance, being Nationally Notable A (two species), Nationally Notable B (13), Local (94) or species of Principal Importance for Conservation (S41 of the NERC Act 2006 and UK BAP 2007) (35).
- 51 species (10%) have requirements particularly associated with heathland.
- 11 species are known to be immigrants.
- Although better recorded than some other insect groups, moths are still under-recorded from the Pebblebed Heaths, hence the list is not a true representation of diversity.
- On average, moth popuations are believed to have declined by over 40% in southern England over the last 40 years. Due to its size, broad range of habitats and lack of light pollution, the SSSI represents an important site for moth conservation.

Left: Cinnabar (*Tyria jacobaeae*)
Below: Beautiful brocade (*Lacanobia contigua*)

Appendix 11. Provisonal list of moths recorded in the SSSI

Na = Nationally Scarce A (recorded from 16-30 10km squares in Great Britain since 1st January 1980); **Nb** = Nationally Scarce B (recorded from 31-100 10km squares in Great Britain since 1st January 1980); **Local** (recorded from 101-200 10km squares in Great Britain since 1st January 1960.

Species deemed to be of particular conservation significance by the Devon Moth Recorder are denoted by a +. Species particularly associated with heathland are highlighted in **bold**. The family order follows the British Checklist of Lepidoptera.

Family	Status	Scientific Name	Common Name
Micropterigidae		*Micropterix aruncella*	
Eriocraniidae		*Eriocrania subpurpurella*	
Hepialidae	S41/UKBAP	*Hepialus humuli*	Ghost Moth
		Korscheltellus lupulina	Common Swift
	Local	***Phymatopus hecta***	**Gold Swift**
		Triodia sylvina	Orange Swift
Nepticulidae		*Bohemannia pulverosella*	
		Stigmella aurella	
		S. betulicola	
		S. confusella	
Adelidae		*Adela reaumurella*	Green Long-horn
		Nematopogon swammerdamella	
Incurvariidae		*Incurvaria oehlmanniella*	
	Local	*Phylloporia bistrigella*	
Tischeriidae		*Coptotriche marginea*	
Psychidae		*Psyche casta*	
Tineidae		*Monopis weaverella*	
		Nemapogon ruricolella	
		Tinea semifulvella	
Bucculatricidae		*Bucculatrix demaryella*	
Gracillariidae		*Caloptilia robustella*	
		Phyllonorycter maestingella	
	Local	***P. quinqueguttella***	
		P. ulmifoliella	
Yponomeutidae		*Yponomeuta padella*	
		Swammerdamia caesiella	
Ypsolophidae		*Ypsolopha dentella*	
		Y. ustella	
Plutellidae		*Plutella xylostella*	Diamond-back Moth
Glyphipterigidae	Local	***Glyphipterix schoenicolella***	
		G. simpliciella	
		G. thrasonella	
Argyresthiidae		*Argyresthia brockeella*	
		A. goedartella	

Moths continued

Family	Status	Scientific Name	Common Name
		A. retinella	
	Local	*A. semitestacella*	
Oecophoridae		*Batia lambdella*	Greater Twany Tubic
		Crassa unitella	
		Esperia sulphurella	
Chimabachidae		*Diurnea fagella*	
Pelepodidae		*Carcina quercana*	
Depressariidae		*Agonopterix alstromeriana*	
		A. conterminella	
		A. nervosa	
		A. ocellana	
		A. umbellana	
Cosmopterigidae		*Limnaecia phragmitella*	
Gelechiidae	Local	*Aristotelia ericinella*	
		Brachmia blandella	
		Bryotropha domestica	
		B. terrella	
		Carpatolechia decorella	
	Local	*C. proximella*	
		Hypatima rhomboidella	
		Neofaculta ericetella	
Batrachedridae		***Batrachedra pinicolella***	
		B. praeangusta	
Colephoridae		*Coleophora alticolella*	
		C. mayrella	
		C. milvipennis	
		C. pyrrhulipennella	
		C. serratella	
Elachistidae		*Elachista albidella*	
Blastobasidae		*Blastobasis adustella*	
		B. lacticolella	
Scythrididae	Local	***Scythris grandipennis***	
Pterophoridae		*Adaina microdactyla*	
		Buckleria paludum	
	Local	*Capperia britanniodactyla +*	
		Emmelina monodactyla	
		Pterophorus pentadactyla	White Plume Moth
		Stenoptilia zophodactylus	
Epermeniidae		*Epermenia chaerophyllella*	

Family	Status	Scientific Name	Common Name
Choreutidae		*Anthophila fabriciana*	Nettle-tap
Tortricidae		*Acleris hastiana*	
		A. hyemana	
	Local	*A. kochiella*	
	Local	*Aethes beatricella*	
		Agapeta hamana	
		A. zoegana	
		Aleimma loeflingiana	
	Local	*Ancylis diminutana*	
	Local	*A. subarcuana*	
		Apotomis betuletana	
	Local	*A. capreana*	
		A. turbidana	
		Archips podana	Large Fruit-tree Tortrix
		A. xylosteana	Variegated Golden Tortrix
		Argyrotaenia ljungiana	
		Bactra lancealana	
		Cacoecimorpha pronubana	Carnation Tortrix
		Capua vulgana	
		Celypha lacunana	
		Clepsis consimilana	
		Cydia coniferana	
		C. fagiglandana	
		C. splendana	
		C. ulicetana	
		Ditula angustiorana	Red-barred Tortrix
		Epinotia bilunana	
	Local	*E. demarniana*	
		E. immundana	
		E. ramella	
	Local	*E. rubiginosana*	
		Epiphyas postvittana	Light Brown Apple Moth
		Eucosma cana	
		Eulia ministrana	
		Eupoecilia angustana	
		Hedya pruniana	Plum Tortrix
		Lozotaenia forsterana	
		Notocelia rosaecolana	
		N. uddmanniana	Bramble Shoot Moth

Moths continued

Family	Status	Scientific Name	Common Name
	Local	*Pammene albuginana*	
		Pandemis cerasana	Barred Fruit-tree Tortrix
		P. cinnamomeana	White-faced Twist
		P. corylana	Chequered Fruit-tree Tortrix
		P. heparana	Dark Fruit-tree Tortix
		Piniphila bifasciana	
		Pseudargyrotoza conwagana	
	Local	*Pseudococcyx posticana*	
		Ptycholomoides aeriferanus	
		Rhyacionia buoliana	**Pine Shoot Moth**
		R. pinicolana	
		R. pinivorana	**Spotted Shoot Moth**
	Local	*Strophedra weirana*	
		Syndemis musculana	
		Tortrix viridana	Green Oak Tortrix
Cossidae		*Zeuzera pyrina*	Leopard Moth
Sesiidae		*Sesia bembeciformis*	Lunar Hornet Moth
	Nb	*Synanthedon formicaeformis*	Red-tipped Clearwing
	Nb	*S. tipuliformis*	Currant Clearwing
Zygaenidae		*Zygaena filipendulae*	Six-spot Burnet
	Local	*Z. trifolii*	Five-spot Burnet
Pyralidae		*Acrobasis advenella*	
	Local	*Aglossa pinguinalis +*	Large Tabby
		Aphomia sociella	Bee Moth
		Cryptoblabes bistriga	Double-striped Knot-horn
		Dioryctria abietella	
	Local	***D. simplicella***	
	Local	*Endotricha flammealis*	
		Galleria mellonella	Wax Moth
	Local	*Homoeosoma sinuella*	
		Hypsopygia costalis	Gold Triangle
	Local	*Pyla fusca*	
		Myelois circumvoluta	Thistle Ermine
	Local	***Pempelia genistella***	
	Local	***P. palumbella***	
		Phycitodes binaevella	
Crambidae		*Acentria ephemerella*	Water Veneer
		Agriphila geniculea	
		A. inquinatella	

Family	Status	Scientific Name	Common Name
	Local	*A. latistria*	
		Agriphila straminella	
		A. tristella	
		Anania lancealis	
		A. coronata	
		A. crocealis	
		Cataclysta lemnata	Small China-mark
		Catoptria pinella	
		Chrysoteuchia culmella	Garden Grass-veneer
		Crambus lathoniellus	
		C. pascuella	
	Local	***C. uliginosellus***	
		Elophila nymphaeata	Brown China-mark
	Local	*Eudonia delunella*	
		E. lacustrata	
		E. mercurella	
	Local	*E. pallida*	
		E. truncicolella	
		Eurrhypara hortulata	Small Magpie
		Mecyna asinalis	
		Nomophila noctuella	Rush Veneer
		Parapoynx stratiotata	Ringed China-mark
		Pleuroptya ruralis	Mother of Pearl
		Pyrausta purpuralis	
		Scoparia ambigualis	
		S. pyralella	
		Udea ferrugalis	Rusty-dot Pearl
		U. olivalis	
		U. prunalis	
Drepanidae		*Achlya flavicornis*	Yellow Horned
		Cilix glaucata	Chinese Character
		Drepana falcataria	Pebble Hook-tip
		Falcaria lacertinaria	Scalloped Hook-tip
		Habrosyne pyritoides	Buff Arches
		Ochropacha duplaris	Common Lutestring
	Local	*Polyploca ridens*	Frosted Green
		Tethea ocularis	Figure of Eighty
		Thyatira batis	Peach Blossom
	S41/UKBAP	*Watsonalla binaria*	Oak Hook-tip

Moths continued

Family	Status	Scientific Name	Common Name
	Local	*W. cultraria*	Barred Hook-tip
Lasiocampidae		*Euthrix potatoria*	Drinker
		Lasiocampa quercus	Oak Eggar
		Macrothylacia rubi	**Fox Moth**
	S41/UKBAP	*Malacosoma neustria*	Lackey
	S41/UKBAP	*Trichiura crataegi*	Pale Eggar
Saturniidae		***Saturnia pavonia***	**Emperor Moth**
Sphingidae		*Deilephila elpenor*	Elephant Hawk-moth
	Local	***D. porcellus***	**Small Elephant Hawk-moth**
	Nb	*Hemaris fuciformis*	Broad-bordered Bee Hawk-moth
		Laothoe populi	Poplar Hawk-moth
	Immigrant	*Macroglossum stellatarum*	Humming-bird Hawk-moth
		Mimas tiliae	Lime Hawk-moth
		Smerinthus ocellata	Eyed Hawk-moth
		Sphinx ligustri	Privet Hawk-moth
Geometridae		*Abraxas grossulariata*	Magpie Moth
	Local	*Acasis viretata*	Yellow-barred Brindle
		Aethalura punctulata	Grey Birch
		Agriopis marginaria	Dotted Border
		Alcis repandata	Mottled Beauty
		Anticlea badiata	Shoulder Stripe
		Aplocera plagiata	Treble-bar
	Local	***Archiearis parthenias***	**Orange Underwing**
		Asthena albulata	Small White Wave
		Biston betularia	Peppered Moth
		B. strataria	Oak Beauty
		Bupalus piniaria	**Bordered White**
		Cabera exanthemata	Common Wave
		C. pusaria	Common White Wave
		Campaea margaritata	Light Emerald
		Camptogramma bilineata	Yellow Shell
		Catarhoe cuculata	Royal Mantle
	Nb	*C. rubidata*	Ruddy Carpet
	Local	***Charissa obscurata***	**Annulet**
	Na	***Chlorissa viridata***	**Small Grass Emerald**
		Chloroclysta truncata	Common Marbled Carpet
		Chloroclystis v-ata	V-Pug
		Cidaria fulvata	Barred Yellow
	Local	*Cleorodes lichenaria*	Brussels Lace

Family	Status	Scientific Name	Common Name
		Colostygia pectinataria	Green Carpet
		Colotois pennaria	Feathered Thorn
		Cosmorhoe ocellata	Purple Bar
		Crocallis elinguaria	Scalloped Oak
	Local	***Cyclophora albipunctata***	**Birch Mocha**
	Local	*C. linearia*	Clay Triple-lines
	Local	*C. punctaria*	Maiden's Blush
		Deileptenia ribeata	Satin Beauty
	S41/UKBAP	*Ecliptopera silaceata*	Small Phoenix
		Ectropis crepuscularia	Engrailed
	Local	*Ectropis species*	Small Engrailed
		Electrophaes corylata	Broken-barred Carpet
		Ematurga atomaria	**Common Heath**
		Ennomos alniaria	Canary-shouldered Thorn
	S41/UKBAP	*E. erosaria*	September Thorn
	S41/UKBAP	*E. fuscantaria*	Dusky Thorn
		Epione repandaria	Bordered Beauty
		Epirrhoe alternata	Common Carpet
	Local	*E. galiata*	Galium Carpet
	Local	*E. rivata*	Wood Carpet
		Epirrita species	Epirrita species
		Eulithis prunata	Phoenix
		E. pyraliata	Barred Straw
		E. testata	Chevron
	Nb	*Euphyia biangulata*	Cloaked Carpet
	Local	*E. unangulata*	Sharp-angled Carpet
		Eupithecia abbreviata	Brindled Pug
		E. absinthiata	Wormwood Pug/Ling Pug
		E. centaureata	Lime-speck Pug
		E. exiguata	Mottled Pug
		E. icterata	Tawny Speckled Pug
		E. indigata	**Ochreous Pug**
	Local	*E. inturbata*	Maple Pug
		E. nanata	**Narrow-winged Pug**
		E. pulchellata	Foxglove Pug
		E. subfuscata	Grey Pug
	Local	*E. tripunctaria*	White-spotted Pug
	Local	*E. virgaureata*	Golden-rod Pug
		E. vulgata	Common Pug

Moths continued

Family	Status	Scientific Name	Common Name
		Geometra papilionaria	Large Emerald
		Gymnoscelis rufifasciata	Double-striped Pug
	Local; S41/UKBAP	*Hemistola chrysoprasaria*	Small Emerald
		Hemithea aestivaria	Common Emerald
		Hydrelia flammeolaria	Small Yellow Wave
	Nb	*H. sylvata*	Waved Carpet
	Local	*Hydria undulata*	Scallop Shell
		Hydriomena furcata	July Highflyer
		H. impluviata	May Highflyer
		Hylaea fasciaria	Barred Red
		Idaea aversata	Riband Wave
		I. biselata	Small Fan-footed Wave
		I. dimidiata	Single-dotted Wave
	Local	*I. fuscovenosa*	Dwarf Cream Wave
		I. seriata	Small Dusty Wave
	Local	*I. straminata* +	Plain Wave
		I. subsericeata	Satin Wave
	Nb	***I. sylvestraria***	**Dotted Border Wave**
		Jodis lactearia	Little Emerald
		Larentia clavaria +	Mallow
	Local	*Ligdia adustata*	Scorched Carpet
		Lomaspilis marginata	Clouded Border
		Lomographa temerata	Clouded Silver
	Local	*Macaria alternata*	Sharp-angled Peacock
		M. liturata	**Tawny-barred Angle**
		Menophra abruptaria	Waved Amber
		Mesoleuca albicillata	Beautiful Carpet
		Odontopera bidentata	Scalloped Hazel
		Operophtera brumata	Winter Moth
		Opisthograptis luteolata	Brimstone Moth
		Ourapteryx sambucaria	Swallow-tailed Moth
	Nb	***Pachycnemia hippocastanaria***	**Horse Chestnut**
	Local	*Paradarisa consonaria*	Square Spot
		Pasiphila rectangulata	Green Pug
	Local	*Perconia strigillaria*	*Grass Wave*
		Peribatodes rhomboidaria	Willow Beauty
		Perizoma affinitata	Rivulet
		P. alchemillata	Small Rivulet
		P. flavofasciata	Sandy Carpet

Family	Status	Scientific Name	Common Name
		Petrophora chlorosata	**Brown Silver-line**
	Local	*Plagodis dolabraria*	Scorched Wing
		P. pulveraria	Barred Umber
		Plemyria rubiginata	Blue-bordered Carpet
		Pseudopanthera macularia	Speckled Yellow
		Pseudoterpna pruinata	**Grass Emerald**
		Pterapherapteryx sexalata	Small Seraphim
	Immigrant	*Rhodometra sacraria*	Vestal
	Local; S41/UKBAP	*Scopula floslactata*	Cream Wave
		S. imitaria	Small Blood-vein
	Local	*S. marginepunctata*	Mullein Wave
	Nb; S41/UKBAP	*Scotopteryx bipunctaria*	Chalk Carpet
		S. chenopodiata	Shaded Broad-bar
		S. luridata	**July Belle**
		S. mucronata	**Lead Belle**
		Selenia dentaria	Early Thorn
		S. lunularia	Lunar Thorn
		S. tetralunaria	Purple Thorn
	Local	*Semiaspilates ochrearia*	Yellow Belle
		Thera britannica	Spruce Carpet
		T. firmata	Pine Carpet
		T. obeliscata	Grey Pine Carpet
	S41/UKBAP	*Timandra comae*	Blood-vein
		Trichopteryx carpinata	Early Tooth-striped
		Xanthorhoe designata	Flame Carpet
	S41/UKBAP	*X. ferrugata*	Dark-barred Twin-spot Carpet
		X. fluctuata	Garden Carpet
		X. montanata	Silver-ground Carpet
		X. spadicearia	Red Twin-spot Carpet
Notodontidae		*Cerura vinula*	Puss Moth
		Clostera curtula	Chocolate-tip
	Local	*Drymonia dodonaea*	Marbled Brown
		D. ruficornis	Lunar Marbled Brown
		Furcula furcula	Sallow Kitten
		Notodonta dromedarius	Iron Prominent
		N. ziczac	Pebble Prominent
		Phalera bucephala	Buff-tip
		Pheosia gnoma	Lesser Swallow Prominent
		P. tremula	Swallow Prominent

Moths continued

Family	Status	Scientific Name	Common Name
		Pterostoma palpina	Pale Prominent
		Ptilodon capucina	Coxcomb Prominent
		Stauropus fagi	Lobster Moth
Erebidae	S41/UKBAP	*Arctia caja*	Garden Tiger
	Local	*A. villica*	Cream-spot Tiger
	Local	*Atolmis rubricollis*	Red-necked Footman
	Local	*Callimorpha dominula*	Scarlet Tiger
		Calliteara pudibunda	Pale Tussock
	Local	***Cybosia mesomella***	**Four-dotted Footman**
	Local	***Diacrisia sannio***	**Clouded Buff**
	Local	*Eilema complana*	Scarce Footman
	Local	*E. depressa*	Buff Footman
		E. griseola	Dingy Footman
		E. lurideola	Common Footman
	Local	*E. sororcula*	Orange Footman
	Nb	*Euplagia quadripunctaria*	Jersey Tiger
		Euproctis similis	Yellow-tail
		Herminia grisealis	Small Fan-foot
		Hypena proboscidalis	Snout
	Nb	*Hypenodes humidalis +*	Marsh Oblique-barred
	Local	*Laspeyria flexula*	Beautiful Hook-tip
	Local	*Lymantria monacha*	Black Arches
	Local	*Miltochrista miniata*	Rosy Footman
		Orgyia antiqua	Vapourer
	Local	*Nycteola revayana*	Oak Nycteoline
		Phragmatobia fuliginosa	Ruby Tiger
	Local	***Phytometra viridaria***	**Small Purple-barred**
		Rivula sericealis	Straw Dot
	Local	*Schrankia costaestrigalis*	Pinion-streaked Snout
	Nb	*S. taenialis +*	White-line Snout
		Scoliopteryx libatrix	Herald
	S41/UKBAP	*Spilosoma lubricipeda*	White Ermine
		S. luteum	Buff Ermine
	S41/UKBAP	*Tyria jacobaeae*	Cinnabar
		Zanclognatha tarsipennalis	Fan-foot
Noctuidae		*Abrostola tripartita*	Spectacle
		Acronicta leporina	Miller
		A. megacephala	Poplar Grey
	S41/UKBAP	*A. psi*	Grey Dagger

Family	Status	Scientific Name	Common Name
	S41/UKBAP	*A. rumicis*	Knot Grass
		Agrochola circellaris	Brick
	S41/UKBAP	***A. helvola***	**Flounced Chestnut**
		A. lota	Red-line Quaker
		A. macilenta	Yellow-line Quaker
		Agrotis clavis	Heart and Club
		A. exclamationis	Heart and Dart
	Immigrant	*A. ipsilon*	Dark Sword-grass
		A. puta	Shuttle-shaped Dart
		A. segetum	Turnip Moth
		A. vestigialis	Archer's Dart
	S41/UKBAP	*Allophyes oxyacanthae*	Green-brindled Crescent
	S41/UKBAP	*Amphipoea oculea*	Ear Moth
		Amphipyra berbera	Svensson's Copper Underwing
		A. pyramidea	Copper Underwing
	S41/UKBAP	*A. tragopoginis*	Mouse Moth
		Anaplectoides prasina	Green Arches
		Anarta myrtilli	**Beautiful Yellow Underwing**
		Apamea crenata	Clouded-bordered Brindle
		A. monoglypha	Dark Arches
	S41/UKBAP	*A. remissa*	Dusky Brocade
	S41/UKBAP	*Aporophyla lutulenta*	Deep-brown Dart
		A. nigra	Black Rustic
	Immigrant	*Autographa gamma*	Silver Y
		A. pulchrina	Beautiful Golden Y
		Axylia putris	Flame
	S41/UKBAP	*Blepharita adusta*	Dark Brocade
		Callistege mi	Mother Shipton
	S41/UKBAP	*Caradrina morpheus*	Mottled Rustic
		Ceramica pisi	Broom Moth
		Cerapteryx graminis	**Antler Moth**
		Cerastis rubricosa	Red Chestnut
		Charanyca trigrammica	Treble Lines
		Coenobia rufa	Small Rufous
		Colocasia coryli	Nut-tree Tussock
		Conistra vaccinii	Chestnut
		Cosmia trapezina	Dun-bar
	Local	*Craniophora ligustri*	Coronet
	Local; S41/UKBAP	*Dasypolia templi*	Brindled Ochre

Moths continued

Family	Status	Scientific Name	Common Name
		Denticucullus pygmina	Small Wainscot
		Diachrysia chrysitis	Burnished Brass
		Diarsia brunnea	Purple Clay
		D. mendica	Ingrailed Clay
		D. rubi	Small Square-spot
	S41/UKBAP	*Dichonia aprilina*	Merveille du Jour
		Diloba caeruleocephala	Figure of Eight
		Discestra trifolii	Nutmeg
		Dryobotodes eremita	Brindled Green
	S41/UKBAP	*Eugnorisma glareosa*	Autumnal Rustic
		Euplexia lucipara	Small Angle Shades
	S41/UKBAP	*Euxoa tritici*	White-line Dart
		Gortyna flavago	Frosted Orange
		Hadena bicruris	Lychnis
		H. perplexa	Tawny Shears
		Hecatera bicolorata	Broad-barred White
	Immigrant	*Helicoverpa armigera*	Scarce Bordered Straw
		Hoplodrina alsines	Uncertain
		H. ambigua	Vine's Rustic
		H. blanda	Rustic
	Local	***Lacanobia contigua***	**Beautiful Brocade**
		L. oleracea	Bright-line Brown-eye
	Local	*L. suasa*	Dog's Tooth
		L. thalassina	Pale-shouldered Brocade
	Local	*L. w-latinum*	Light Brocade
	S41/UKBAP	*Leucania comma*	Shoulder-striped Wainscot
	Na	*L. putrescens*	Devonshire Wainscot
	Local	*Lithophane hepatica*	Pale Pinion
		L. leautieri	Blair's Shoulder-knot
		L. ornitopus	Grey Shoulder-knot
	S41/UKBAP	*Litoligia literosa*	Rosy Minor
		Luperina testacea	Flounced Rustic
		Lycophotia porphyrea	**True Lover's Knot**
		Mamestra brassicae	Cabbage Moth
		Melanchra persicariae	Dot Moth
		Mesapamea secalis	Common Rustic
		Mesapamea species.	Mesapamea species
		Mesoligia furuncula	Cloaked Minor
	Local	*Mormo maura*	Old Lady

Family	Status	Scientific Name	Common Name
	Immigrant	*Mythimna albipuncta*	White-point
		M. conigera	Brown-line Bright Eye
		M. ferrago	Clay
		M. impura	Smoky Wainscot
	Nb; immigrant	*M. l-album*	L-album Wainscot
		M. pallens	Common Wainscot
	Local	*M. pudorina*	Striped Wainscot
	Immigrant	*M. unipuncta*	White-speck
	Immigrant	*M. vitellina*	Delicate
	Local	*Naenia typica*	Gothic
		Noctua comes	Lesser Yellow Underwing
		N. fimbriata	Broad-bordered Yellow Underwing
		N. interjecta	Least Yellow Underwing
		N. janthe	Lesser Broad-bordered Yellow Underwing
		N. pronuba	Large Yellow Underwing
		Ochropleura plecta	Flame Shoulder
		Oligia fasciuncula	Middle-barred Minor
		O. latruncula	Tawny Marbled Minor
		O. strigilis	Marbled Minor
	Local	*O. versicolor*	Rufous Minor
		Orthosia cerasi	Common Quaker
		O. cruda	Small Quaker
		O. gothica	Hebrew Character
		O. incerta	Clouded Drab
		O. munda	Twin-spotted Quaker
		Panolis flammea	**Pine Beauty**
	Local	*Parastichtis suspecta*	Suspected
	Immigrant	*Peridroma saucia*	Pearly Underwing
		Phlogophora meticulosa	Angle Shades
		Photedes minima	Small Dotted Buff
		Plusia festucae	Gold Spot
		Polia nebulosa	Grey Arches
	Local	*Polymixis lichenea*	Feathered Ranunculus
		Protodeltote pygarga	**Marbled White Spot**
	Local	*Pyrrhia umbra*	Bordered Sallow
		Rusina ferruginea	Brown Rustic
	Immigrant	*Spodoptera exigua*	Small Mottled Willow
	Local/S41/UKBAP	***Stilbia anomala***	**Anomalous**

Moths continued

Family	Status	Scientific Name	Common Name
	S41/UKBAP	*Tholera decimalis*	Feathered Gothic
	S41/UKBAP	*Xanthia icteritia*	
		X. togata	Pink-barred Sallow
	Local; S41/UKBAP	***Xestia agathina***	**Heath Rustic**
	Local	***X. castanea***	**Neglected Rustic**
		X. c-nigrum	Setaceous Hebrew Character
	Local	*X. ditrapezium*	Triple-spotted Clay
		X. sexstrigata	Six-striped Rustic
		X. triangulum	Double Square-spot
		X. xanthographa	Square-spot Rustic
	Local	*Xylena vetusta*	Red Sword-grass
		Xylocampa areola	Early Grey
Nolidae	Local	*Bena bicolorana*	Scarce Silver-lines
		Nola confusalis	Least Black Arches
		Pseudoips prasinana	

Emperor moth male
(*Saturnia pavonia*)

Appendix 12. Moths of conservation significance

Species deemed to be of particular conservation significance by the Devon Moth Recorder are denoted by a +.
Species particularly associated with heathland are highlighted in **bold**

Local species (i.e. recorded from 101–300 10km squares in Great Britain since 1st January 1960)

Family Name	Scientific Name	Common Name
Hepialidae	***Hepialus hecta***	Gold Swift
Incurvariidae	*Phylloporia bistrigella*	
Gracillariidae	***Phyllonorycter quinqueguttella***	
Glyphipterigidae	***Glyphipterix schoenicolella***	
Argyresthiidae	*Argyresthia semitestacella*	
Gelechiidae	*Aristotelia ericinella*	
	Carpatolechia proximella	
Scythrididae	***Scythris grandipennis***	
Pterophoridae	*Capperia britanniodactyla+*	
Tortricidae	*Acleris comariana*	
	A. kochiella	
	Aethes beatricella	
	Ancylis diminutana	
	Ancylis subarcuana	
	Apotomis capreana	
	Epinotia demarniana	
	Epinotia rubiginosana	
	Pammene albuginana	
	Pseudococcyx posticana	
	Strophedra weirana	
Zygaenidae	*Zygaena trifolii*	Five-spot Burnet
Pyralidae	*Aglossa pinguinalis+*	Large Tabby
	Dioryctria simplicella	
	Endotricha flammealis	
	Homoeosoma sinuella	
	Pyla fusca	
	Pempelia genistella	
	Pempelia palumbella	
Crambidae	*Agriphila latistria*	
	Crambus uliginosellus	
	Eudonia delunella	
	E. pallida	
Drepanidae	*Watsonalla cultraria*	Barred Hook-tip
	Polyploca ridens	Frosted Green
Sphingidae	*Deilephila elpenor*	Elephant Hawk Moth

Moths continued

Family Name	Scientific Name	Common Name
	Deilephila porcellus	**Small Elephant Hawk-moth**
Geometridae	*Acasis viretata*	Yellow-barred Brindle
	Archiearis parthenias	**Orange Underwing**
	Charissa obscurata	**Annulet**
	Cleorodes lichenaria	Brussels Lace
	Cyclophora albipunctata	**Birch Mocha**
	C. linearia	Clay Triple-lines
	C. punctaria	Maiden's Blush
	Ectropis species	Small Engrailed
	Epirrhoe galiata	Galium Carpet
	E. rivata	Wood Carpet
	Euphyia unangulata	Sharp-angled Carpet
	Eupithecia inturbata	Maple Pug
	E. pulchellata	Foxglove Pug
	E. tripunctaria	White-spotted Pug
	E. virgaureata	Golden-rod Pug
	Hemistola chrysoprasaria	Small Emerald
	Idaea fuscovenosa	Dwarf Cream Wave
	I. straminata +	Plain Wave
	Ligdia adustata	Scorched Carpet
	Macaria alternata	Sharp-angled Peacock
	M. notata	Peacock Moth
	Paradarisa consonaria	Square Spot
	Perconia strigillaria	**Grass Wave**
	Plagodis dolabraria	Scorched Wing
	Rheumaptera undulata	Scallop Shell
	Scopula floslactata	Cream Wave
	S. marginepunctata	Mullein Wave
	Semiaspilates ochrearia	Yellow Belle
Notodontidae	*Drymonia dodonaea*	Marbled Brown
Erebidae	*Arctia villica britannica*	Cream-spot Tiger
	Atolmis rubricollis	Red-necked Footman
	Callimorpha dominula	Scarlet Tiger
	Cybosia mesomella	**Four-dotted Footman**
	Diacrisia sannio	**Clouded Buff**
	Eilema complana	Scarce Footman
	E. depressa	Buff Footman
	E. sororcula	Orange Footman
	Laspeyria flexula	Beautiful Hook-tip

Family Name	Scientific Name	Common Name
	Lymantria monacha	Black Arches
	Miltochrista miniata	Rosy Footman
	Phytometra viridaria	**Small Purple-barred**
	Schrankia costaestrigalis	Pinion-streaked Snout
Noctuidae	*Bena bicolorana*	Scarce Silver-lines
	Craniophora ligustri	Coronet
	Dasypolia templi	Brindled Ochre
	Lacanobia contigua	**Beautiful Brocade**
	Lacanobia suasa	Dog's Tooth
	Lacanobia w-latinum	Light Brocade
	Lithophane hepatica	Pale Pinion
	Mormo maura	Old Lady
	Mythimna pudorina	Striped Wainscot
	Naenia typica	Gothic
	Nycteola revayana	Oak Nycteoline
	Oligia versicolor	Rufous Minor
	Polymixis lichenea	Feathered Ranunculus
	Pyrrhia umbra	Bordered Sallow
	Stilbia anomala	Anomalous
	Xestia agathina	Heath Rustic
	X. castanea	Neglected Rustic
	X. ditrapezium	Triple-spotted Clay
	Xylena vetusta	Red Sword-grass
Nolidae	*Nola confusalis*	Least Black Arches
Nationally Scarce A (Na) species (i.e. recorded from 16–30 10km squares in Great Britain since 1st January 1980)		
Geometridae	*Chlorissa viridata*	Small Grass Emerald
Noctuidae	*Mythimna putrescens*	Devonshire Wainscot
Nationally Scarce B (Nb) species (i.e. recorded from 31–100 10km squares in Great Britain since 1st January 1980)		
Sesiidae	*Synanthedon formicaeformis*	Red-tipped Clearwing
	Synanthedon tipuliformis	Currant Clearwing
Sphingidae	*Hemaris fuciformis*	Broad-bordered Bee Hawk-moth
Geometridae	*Catarhoe rubidata*	Ruddy Carpet
	Euphyia biangulata	Cloaked Carpet
	Hydrelia sylvata	Waved Carpet
	Idaea sylvestraria	**Dotted Border Wave**
	Pachycnemia hippocastanaria	**Horse Chestnut**
	Scotopteryx bipunctaria	Chalk Carpet
Erebidae	*Euplagia quadripunctaria*	Jersey Tiger
	Hypenodes humidalis+	Marsh Oblique-barred

Moths continued

Family Name	Scientific Name	Common Name
	Schrankia taenialis+	White-line Snout
Noctuidae	*Mythimna l-album*	L-album Wainscot
Species of Principal Importance listed in NERC (2006) Section 41 and as Priority Species for Conservation under the UK BAP (2007)		
Hepialidae	*Hepialus humuli*	Ghost Moth
Drepanidae	*Watsonalla binaria*	Oak Hook-tip
Lasiocampidae	*Malacosoma neustria*	Lackey
	Trichiura crataegi	Pale Eggar
Geometridae	*Ecliptopera silaceata*	Small Phoenix
	Ennomus erosaris	September Thorn
	E. fuscantaria	Dusky Thorn
	Hemistola chrysoprasaria	Small Emerald
	Scopula floslactata	Cream Wave
	Scotopteryx bipunctaria	Chalk Carpet
	Timandra comae	Blood-vein
	Xanthorhoe ferrugata	Dark-barred Twin-spot Carpet
Erebidae	*Arctia caja*	
	Spilosoma lubricipeda	White Ermine
	Tyria jacobaeae	Cinnabar
Noctuidae	*Acronicta psi*	Grey Daggar
	A. rumicis	Knot Grass
	Agrochola helvola	Founced Chestnut
	Allophyes oxyacanthae	Green-bridled Crescent
	Amphipoea oculea	Ear Moth
	Apamea remissa	Dusky Brocade
	Aporophyla lutulenta	Deep-brown Dart
	Blepharita adusta	Dark Brocade
	Caradrina morpheus	Mottled Rustic
	Dasypolia templi	Brindles Ochre
	Diloba caeruleocephala	Figure of Eight
	Eugnorisma glareosa	Autumnal Rustic
	Euxoa tritici	White-line Dart
	Mesoligia literosa	Rosy Minor
	Mythimna comma	Shoulder-striped Wainscot
	Stilbia anomala	Anomalous
	Tholera decimalis	Feathered Gothic
	Xanthia icteritia	
	Xestia agathina	Heath Rustic

NB. Some species are listed multiple times in the tables above.

Buff-tip
(*Phalera bucephala*)

Appendix 13. Immigrant moths

The following species have been recorded in the SSSI, but are likely to have flown in or been transported by wind from sources outside of the UK

Family	Scientific Name	Common Name
Sphingidae	*Macroglossum stellatarum*	Humming-bird Hawk-moth
Noctuidae	*Agrotis ipsilon*	Dark Sword-grass
	Autographa gamma	Silver Y
	Helicoverpa armigera	Scarce Bordered Straw
	Mythimna albipuncta	White-point
	M. l-album	L-album Wainscot
	M. unipuncta	White-speck
	M. vitellina	Delicate
	Peridroma saucia	Pearly Underwing
	Rhodometra sacraria	Vestal
	Spodoptera exigua	Small Mottled Willow

Moths continued

Odonata:
dragonflies and damselflies

Golden-ringed Dragonfly
(*Cordulegaster boltonii*)

Odonata: dragonflies and damselflies

- 27 (66%) of the 41 current breeding and migrant British species have been recorded from the SSSI.
- 20 species breed annually, with one species occasionally recorded (unconfirmed breeder), two as 'wandering singles', two as irregular immigrants and one that occurred twice prior to 1989.
- Of the breeding species, two have national or international significance.
- One species is recognised as a UK BAP Priority Species.
- Aylesbeare, Colaton Raleigh and Venn Ottery Commons are recognised as Internationally Important sites due to the presence of populations of the internationally endangered Southern Damselfly

Small Red Damselfly
(*Ceriagrion tenellum*)

Key dragonfly sites in the SSSI

Internationally Important Sites	Aylesbeare, Colaton Raleigh and Venn Ottery Commons

Currently the primary focus of annual survey work is transect counts of the Southern Damselfly (*Coenagrion mercuriale*) at the three known sites in the SSSI. Historical data for two of the sites goes back to 1977 (Aylesbeare Common) and 1994 (Colaton Raleigh Common). The Southern Damselfly was reintroduced to Venn Ottery Common in 2007 and has been monitored annually since.

A PhD study on Southern Damselfly ecology focussed in part on the Pebblebed Heaths (Purse, 2001)[41]. One of the three known Small Red Damselfly colonies in the SSSI has been the subject of a scientific paper (Kerry, 2013)[42]. A survey of the Odonata of Bicton Common was undertaken in 2014.

Brief characterisation of the dragonflies of the SSSI

The 20 breeding species recorded from the SSSI represent about half of the 41 species that currently have established breeding populations in Britain[43], and two-thirds of the 30 species (13 damselflies and 17 dragonflies) breeding in Devon in 2005/6[44]. Those species most associated with heathland mire systems are Small Red Damselfly, Southern Damselfly, Golden-ringed Dragonfly, Large Red Damselfly and Keeled Skimmer. Together with Bystock Pools, the mires of Venn Ottery, Aylesbeare, Colaton Raleigh and Bicton Commons are the habitats of greatest value for dragonflies[45]. Further details on the distribution, ecology and identification of dragonflies can be found in the Atlas of Dragonflies in Britain and Ireland (2014)[46] and Britain's Dragonflies (2014)[47].

Table 12. Dragonflies breeding regularly in the SSSI

Common Name	Scientific Name	HabDir Annex 4	NERC S41	Red List GB post 2001[i]	Nationally Scarce B[ii]	UK BAP	Devon BAP
Azure Damselfly	*Coenagrion puella*						
Banded Demoiselle	*Calopteryx splendens*						
Beautiful Demoiselle	*C. virgo*						
Black-tailed Skimmer	*Orthetrum cancellatum*						
Blue-tailed Damselfly	*Ischnura elegans*						
Broad-bodied Chaser	*Libellula depressa*						
Common Blue Damselfly	*Enallagma cyathigerum*						
Common Darter	*Sympetrum striolatum*						
Downy Emerald	*Cordulia aenea*						
Emerald Damselfly	*Lestes sponsa*						
Emperor Dragonfly	*Anax imperator*						
Four-spotted Chaser	*Libellula quadrimaculata*						
Golden-ringed Dragonfly	*Cordulegaster boltonii*						
Hairy Dragonfly	*Brachytron pratense*						
Keeled Skimmer	*Orthetrum coerulescens*						
Large Red Damselfly	*Pyrrhosoma nymphula*						
Migrant Hawker	*Aeshna mixta*						
Small Red Damselfly	*Ceriagrion tenellum*				●		
Southern Damselfly	*Coenagrion mercuriale*	●	●	EN		●	●
Southern Hawker	*A. cyanea*						

EN = Endangered

i) Daguet, C.A., French, G.C. and Taylor, P. (2008). The Odonata Red Data List for Great Britain. Species Status 11; 1-34. Joint Nature Conservation Committee, Peterborough.
ii) Cham, S., Nelson, B., Parr, A., Prentice, S, Smallshire, D. and Taylor, P. 2014. Atlas of Dragonflies in Britain and Ireland. Biological Records Centre. 280 pp.

Table 13. Species recorded as 'wanderers' or occasional immigrants

English name	Scientific name
Banded Demoiselle	*Calopteryx splendens*
Black Darter	*Sympetrum danae*
Common Hawker	*Aeshna juncea*
Red-veined Darter	*S. fonscolombii*
Ruddy Darter	*S. sanguineum*
White-legged Damselfly	*Platycnemis pennipes*
Yellow-winged Darter	*S. flaveolum*

Odonata: dragonflies and damselflies continued

Dragonflies of conservation significance

The rarest species found on the site is the Southern Damselfly. This is a European Protected Species, as defined by Annex IV of the Habitats Directive (1992). In part, it was the presence of several populations of this species on the Pebblebed Heaths that led to its Special Area of Conservation designation in 1996. Within the SSSI it occurs on base-rich runnels and streams often within acid heathland areas. This species is also the only dragonfly listed as a Species of Principal Importance for the conservation of biodiversity in England under S41 of NERC Act 2006. It was listed as a Priority Species in the UK BAP (2007) and the Devon BAP and is classified as Endangered in the Odonata Red List of Great Britain (2008)[48].

The Small Red Damselfly is of national significance and is considered to be Nationally Scarce B, being found in between 31 and 100 hectads[49]. Restricted to heathlands in southern England and west Wales, there are small colonies at several sites within the SSSI and its populations appear to be increasing. It prefers shallow, acid pools, seepages and runnels in heathland mires. Species of local significance, being found in less than 10% of the tetrads in Devon, comprise Red-eyed Damselfly, Hairy Dragonfly and Downy Emerald. The first and last occur at Squabmoor Reservoir (just outside the boundary of the SSSI) and the last two species nearby at Bystock Reservoir. Hairy Dragonfly has also been recorded at Squabmoor Reservoir and at a pond on Aylesbeare Common.

Key Species Profile

Southern Damselfly

The Southern Damselfly (*Coenagrion mercuriale*) is one of Europe's rarest and most threatened damselflies and one of five members of the genus *Coenagrion* currently found in Britain[50]. It is the only resident British dragonfly to be listed in the Habitats Directive. It is also listed on Schedule 5 of the UK Wildlife and Countryside Act 1981. It is on the northern edge of its range in Britain, where approximately 25% of the global population is located in the south and west. The Pebblebed Heaths represent one local stronghold, where the species occurs at base-rich, shallow streams with a constant slow-to-moderate flow and relatively high water temperature. Here it is associated with the National Vegetation Classification habitat M14. Marsh St John's-wort (*Hypericum elodes*) and Bog Pondweed (*Potamogeton polygonifolius*) are used by Southern Damselfly for oviposition at the majority of heathland sites.

One of the primary reasons for the decline of the Southern Damselfly in Britain in recent decades has been the decline in grazing regimes at many sites. The re-introduction of grazing to the Pebblebed Heaths benefits this species through controlled poaching of watercourse margins and the creation of the diversity of tussock structure preferred by this species.

Southern Damselfly
(*Coenagrion mercuriale*)

Orthoptera and allies

Common Grasshopper
(*Chorthippus parallelus*)

Orthoptera and allies

- 14 species of Orthoptera (grasshoppers and crickets), three species of Dictyoptera (cockroaches) and one species of Dermaptera (earwigs) have been recorded from the SSSI.
- Most of these are habitat generalists that are relatively widespread throughout southern England. The Bog Bush-cricket (*Metrioptera brachyptera*) shows the greatest degree of affinity with lowland heathland habitats.
- The Wood Cricket (*Nemobius sylvestris*) is a Key Species identified for Conservation in Devon.

Bog Bush-cricket
(*Metrioptera brachyptera*)

Appendix 14. Orthoptera and allies recorded in the SSSI

Species in **bold** have a particularly strong association with heathland.

Family	Common Name	Scientific Name	Devon BAP (1998)
Dictyoptera (cockroaches)	*Ectobius lapponicus*	Dusky Cockroach	
	E. pallidus	Tawny Cockroach	
	E. panzeri	Lesser Cockroach	
Demaptera (earwigs)	*Forficula auricularia*	Common Earwig	
Orthoptera (grasshoppers and crickets)	*Chorthippus brunneus*	Common Field Grasshopper	
	C. parallelus	Meadow Grasshopper	
	Conocephalus discolor	Long-winged Conehead	
	C. dorsalis	Short-winged Conehead	
	Leptophyes punctatissima	Speckled Bush-cricket	
	Meconema thalassinum	Oak Bush-cricket	
	Metrioptera brachyptera	**Bog Bush-cricket**	
	Myrmeleotettix maculatus	Mottled Grasshopper	
	Nemobius sylvestris	Wood Cricket	●
	Omocestus rufipes	Woodland Grasshopper	
	O. viridulus	Common Green Grasshopper	
	Pholidoptera griseoaptera	Dark Bush-cricket	
	Stenobothrus lineatus	Stripe-winged Grasshopper	
	Tetrix undulata	Common Groundhopper	

Marshall, J, A., & Haes, E. C. M. 1988. Grasshoppers and Allied Insects of Great Britain and Ireland. Harley Books. 252 pp.

Orthoptera and allies continued

True flies: Diptera
Mayflies: Ephemeroptera
Scorpionflies: Mecoptera
Stoneflies: Plecoptera
Caddisflies: Trichoptera

Hornet Robberfly
(*Asilus crabroniformis*)

True flies, Mayflies, Scorpionflies, Stoneflies and Caddisflies

- **The following groups (and species) have been recorded: Diptera (575), Ephemeroptera (5), Mecoptera (2), Plecoptera (7) and Trichoptera (19); these are certainly under-estimates of the true diversity present.**
- **19 species, all Diptera, are Nationally Notable or Nationally Scarce (recorded from 16-100 10km squares in Britain).**
- **One species (a hoverfly: *Pelecocera tricincta*) is Nationally Rare1 (recorded from 15 or fewer 10km squares in Britain).**
- **One species (Hornet Robberfly *Asilus crabroniformis*) is a Species of Principal Importance in S41 of the NERC Act and a UK BAP (2007) Priority Species.**

All of the species with recognised conservation significance that have been recorded in the SSSI are true flies (order Diptera).

Key Species

Hornet Robber Fly (*Asilus crabroniformis*)

The Hornet Robber Fly is a species of open, unimproved or semi-improved pasture, heathlands, dunes and occasionally wide forest roads. In the UK, it has only been found in southern England and Wales. The species is believed to be declining across its range, although has been found in over 100 hectads and as such is considered to be of Least Concern using Red Data Book criteria. It requires grazed, unimproved grassland or heath. The eggs are laid in animal dung and dung beetles are important prey items for the adults, as are grasshoppers, bees, wasps and other robber flies. They generally hunt from bare ground or low-lying vegetation.

A hoverfly (*Pelecocera tricincta*)

This species is restricted to heathland and is possibly associated with damp mud or vegetation at the edges of bogs. Adults are recorded from May to September and have been observed visiting the flowers of various dandelion-type composites and Heather (*Calluna vulgaris*).

A Hoverfly
(Pelocecera tricincta)

Table 14. True flies (Diptera) of conservation significance

Family	Scientific name	Common name	NERC S41	UKBAP	Nationally Notable 1991[i]	Nationally Scarce 2005[ii]	Rare (1991)[iii]
Asilidae	*Asilus crabroniformis*	Hornet robberfly	●	●	●		
Dolichopodidae	*Tachytrechus consobrinus*	Fly				●	
Empididae	*Rhamphomyia curvula*	Dagger Fly				●	
Heleomyzidae	*Oecothea praecox*				●		
Limoniidae	*Atypophthalmus inustus*	Crane Fly			●		
Limoniidae	*Dicranomyia lucida*	Crane Fly			●		
Limoniidae	*Pilaria fuscipennis*	Crane Fly			●		
Limoniidae	*Tasiocera robusta*	Crane Fly			●		
Micropezidae	*Micropeza lateralis*	Stilt Fly				●	
Mycetophilidae	*Leia bilineata*	Fungus Gnat				●	
Mycetophilidae	*Trichonta icenica*	Fungus Gnat				●	
Sarcophagidae	*Blaesaxipha plumicornis*	Flesh Fly			●		
Sciomyzinae	*Tetanocera phyllophora*	Marsh Fly			●		
Stratiomyidae	*Beris fuscipes*	Soldier Fly			●		
Syrphidae	*Brachyopa insensilis*	Hoverfly			●		
Syrphidae	*Didea fasciata*	Hoverfly			●		
Syrphidae	*Pelecocera tricincta*	Hoverfly					●
Syrphidae	*Sphegina verecunda*	Hoverfly			●		
Syphidae	*Xanthandrus comtus*	Hoverfly			●		
Tipulidae	*Tipula yerburyi*	Crane Fly			●		

i) Falk, S.J. 1991. *A review of the scarce and threatened flies of Great Britain. Part 1.* 194 pp. Research and Survey in Nature Conservation Report No. 39. Joint Nature Conservation Committee, Peterborough.
ii) Falk, S.J. and Chandler, P.J. 2005. *A review of the scarce and threatened flies of Great Britain. Part 2:* Nematocera and Aschiza not dealt with by Falk (1991). Species Status 2, 1-189. Joint Nature Conservation Committee, Peterborough.
iii) Falk, S.J. and Crossley, R. 2005. *A review of the scarce and threatened flies of Great Britain. Part 3:* Empidoidea. Species Status 3, 1-134. Joint Nature Conservation Committee, Peterborough.

True flies, Mayflies, Scorpionflies, Stoneflies and Caddisflies continued

Appendix 15. Diptera, Ephemeroptera, Mecoptera, Plecoptera and Trichoptera recorded in the SSSI

Species in **bold** have a particularly strong association with heathland or mire habitats.

Order	Family	Scientific name
Diptera (two-winged flies)	Acroceridae (small-headed flies)	*Acrocera orbiculus*
	Agromyizidae (leaf-miner flies)	*Cerodontha sp.*
		Phytomyza ilicis
	Anisopodidae	*Sylvicola cinctus*
		S. punctatus
	Anthomyiidae	*Anthomyza collini*
		A. gracilis
		Delia florilega
		D. lamelliseta
		D. platura
		Hydrophoria ruralis
		Hylemya vagans
		H. variata
		Leucophora grisella
		Mycophaga testacea
		Pegomya geniculata
	Asilidae (robber/assassin flies)	***Asilus crabroniformis***
		Dioctria baumhaueri
		D. linearis
		Leptogaster cylindrica
		Machimus atricapillus
	Asteiidae (blow flies)	*Asteia amoena*
	Bibionidae (March flies)	*Bibio Lepidus*
		B. marci
		Dilophus febrilis
	Bolitophilidae	*Bolitophila hybrid*
		B. saundersii
	Bombyliidae (bee flies)	*Bombylius major*
	Calliphoridae (blow flies)	*Bellardia pandia*
		B. viarum
		Calliphora vicina
		C. vomitoria
		Lucilia caesar
		L. richardsi
		L. sericata
		Pollenia amentaria
		P. angustigena
		P. rudis
		Protocalliphora azurea
	Ceratopogonidae	*Atrichopogon muelleri*

Order	Family	Scientific name
		Palpomyia flavipes
		Stilobezzia gracilis
	Chloropidae	*Cryptoneura flavitarsis*
		Lasiochaeta pubescens
	Conopidae	*Sicus ferrugineus*
		Thecophora atra
	Diastatidae	*Campichoeta obscuripennis*
		Diastata fuscula
	Ditomyiidae	*Symmerus annulatus*
	Dixidae (meniscus midges)	*Dixa dilatata*
		D. nebulosa
		D. puberula
		Dixella martini
	Dolichopodidae (long-legged flies)	*Anepsiomyia flaviventris*
		Argyra argentina
		A. leucocephala
		A. perplexa
		Campsicnemus compeditus
		C. curvipes
		C. loripes
		C. scambus
		Chrysotus gramineus
		C. obscuripes
		Diaphorus nigricans
		Doliochopus atratus
		D. atripes
		D. brevipennis
		D. campestris
		D. discifer
		D. griseipennis
		D. lepidus
		D. plumipes
		D. signatus
		D. simplex
		D. ungulates
		D. vitripennis
		Hercostomus aerosus
		H. celer
		H. chetifer
		H. cupreus
		Hydrophorus bipunctatus
		Lamprochromus bifasciatus

True flies, Mayflies, Scorpionflies, Stoneflies and Caddisflies continued

Order	Family	Scientific name
		Medetera dendrobaena
		M. saxatilis
		M. truncorum
		Neurigona quadrifasciata
		Poecilobothrus nobilitatus
		Rhaphium monotrichum
		R. riparium
		Scellus notatus
		Sciapus contristans
		S. platypterus
		Sybistroma obscurellum
		Syntormon bicolorellum
		Syntormon denticulatum
		S. sulcipes
		S. tarsatum
		S. zelleri
		Tachytrechus consobrinus
		T. notatus
		Lamprochromus bifasciatus
	Drosophilidae (fruit flies)	*Drosophila cameraria*
		D. phalerata
		Scaptomyza graminum
		S. pallida
	Dryomyzidae	*Neuroctena anilis*
	Empididae (dance flies)	*Rhamphomyia longipes*
		Chelifera precatoria
		Clinocera fontinalis
		C. stagnalis
		Dolichocephala irrorata
		D.ocellata
		Empis aestiva
		E. chioptera
		E. femorata
		E. livida
		E. nigripes
		E. picipes
		E. praevia
		E. trigramma
		Hilara angustifrons
		H. interstincta
		H. litorea
		H. manicata

Order	Family	Scientific name
		H. maura
		H. nigrina
		H. rejecta
		Phyllodromia melanocephala
		Rhamphomyia albipennis
		R. anomalipennis
		R. crassirostris
		R. curvula
		R. erythrophthalma
		R. longipes
		R. nitidula
		R. nigripennis
		R. stigmosa
		R. sulcata
		R. tarsata
		R. tibiella
		R. umbripennis
		Trichopeza longicornis
	Ephydridae (shore flies)	*Discocerina obscurella*
		Ditrichophora calceata
		D. fuscella
		Hydrellia griseola
		H. maura
		H. nigricans
		Ilythea spilota
		Notiphila cinerea
		N. dorsata
		N. maculata
		N. riparia
		N. venusta
		Ochthera mantis
		Parydra coarctata
		P. hecata
		P. littoralis
		Scatella paludum
		S. stagnalis
		S. tenuicosta
	Fanniidae	*Fannia serena*
	Heleomyzidae	*Eccoptomera longisteta*
		Heteromyza rotundicornis
		Oecothea praecox
		Suillia atricornis

True flies, Mayflies, Scorpionflies, Stoneflies and Caddisflies continued

Order	Family	Scientific name
		S. bicolor
		S. flava
		S. imberbis
		S. variegata
	Hippoboscidae (louse flies)	*Lipoptena cervi*
	Hybotidae (dance flies)	*Drapetes ephippiata*
		Euthyneura gyllenhali
		E. halidayi
		E. myrtilli
		Hybos culiciformis
		H. femoratus
		Ocydromia glabricula
		Oedalia flavipes
		O. holmgreni
		Platypalpus ciliaris
		P. clarandus
		P. notatus
		P. pallidiventris
		P. pectoralis
		Trachypeza nubila
	Keroplatidae (fungus gnats)	*Isoneuromyia semirufa*
		Macrocera anglica
		M. angulate
		M. centralis
		M. fasciata
		M. phalerata
		M. stigma
		M. vittata
		Macrorrhyncha flava
		Monocentrota lundstroemi
		Neoplatyura flava
		N. nigricauda
		Orfelia nemoralis
		O. fasciata
		O. unicolor
	Lauxaniidae	*Meiosimyza platycephala*
		M. rorida
		Minettia inusta
		M. longipennis
		M. lupulina
		Sapromyza halidayi
		Tricholauxania praeusta

Order	Family	Scientific name
	Limoniidae (craneflies)	*Antocha vitripennis*
		Atypophthalmus inustus
		Austrolimnophila ochracea
		Cheilotrichia cinerascens
		Crypteria limnophiloides
		Dicranomyia autumnalis
		D. chorea
		D. fusca
		D. lucida
		D. mitis
		D. modesta
		D. morio
		Dicranophragma adjunctum
		Eloeophila apicata
		E. maculate
		E. submarmorata
		Epiphragma ocellare
		Erioptera flavata
		E. fuscipennis
		E. lutea
		Euphylidorea aperta
		E. dispar
		E. meigenii
		Gonomyia dentata
		G. lucidula
		Helius flavus
		H. longirostris
		Ilisia maculata
		Limonia dilutior
		L. nubeculosa
		Lipsothrix remota
		Metalimnobia quadrinotata
		Molophilus appendiculatus
		M. cinereifrons
		M. bifidus
		M. flavus
		M. griseus
		M. medius
		M. obscurus
		M. ochraceus
		M. occultus
		M. undulatas

True flies, Mayflies, Scorpionflies, Stoneflies and Caddisflies continued

Order	Family	Scientific name
		Neolimnomyia filata
		N. nemoralis
		Neolimonia dumetorum
		Ormosia nodulosa
		Paradelphomyia dalei
		P. senilis
		Phylidorea ferruginea
		P. fulvonervosa
		Pilaria discicollis
		P. fuscipennis
		Pseudolimnophila lucorum
		P. sepium
		Rhipidia maculata
		Symplecta stictica
		Tasiocera robusta
	Lonchopteridae (spear-winged flies)	*Lonchoptera bifurcata*
		L. lutea
		L. tristis
	Micropezidae	*Micropeza lateralis*
	Muscidae	*Coenosia femoralis*
		C. mollicula
		C. tigrina
		Eudasyphora cyanella
		Helina reversio
		Musca autumnalis
		Schoenomyza litorella
		Spanochaeta dorsalis
	Mycetophilidae	*Acnemia nitidicollis*
		Allocotocera pulchella
		Allodia alternans
		A. lugens
		Allodiopsis rustica
		Apolephthisa subincana
		Boletina dispecta
		B. gripha
		B. griphoides
		B. lundstroemi
		B. pallidula
		B. plana
		B. rejecta
		B. sciarina
		B. silvatica

Order	Family	Scientific name
		B. trispinosa
		Brevicornu fissicauda
		B. griseicolle
		B. nigrofuscum
		B. sericoma
		Cordyla crassicornis
		C. fissa
		C. murina
		C. parvipalpis
		Dynatosoma fuscicornis
		Exechia confinis
		E. contaminata
		E. fusca
		E. repanda
		E. separate
		E. seriata
		Exechiopsis clypeata
		Leia bilineata
		L. bimaculata
		L. cylindrical
		L. winthemi
		Monoclona rufilatera
		Mycetophila abiecta
		M. alea
		M. autumnalis
		M. blanda
		M. Britannica
		M. curviseta
		M. dentate
		M. finlandica
		M. formosa
		M. fraterna
		M.fungorum
		M. ichneumonea
		M. marginata
		M. ocellus
		M. ornata
		M. perpallida
		M. rudis
		M. ruficollis
		M. signatoides
		M. sordida

True flies, Mayflies, Scorpionflies, Stoneflies and Caddisflies continued

Order	Family	Scientific name
		M. unicolor
		M. unipunctata
		M. vittipes
		Mycomya annulata
		M. cinerascens
		M. circumdata
		M. marginata
		M. neohyalinata
		M. parva
		M. tumida
		M wankowiczii
		M. winnertzi
		Neoempheria pictipennis
		Palaeodocosia janickii
		Paratinia sciarina
		Phronia cinerascens
		P. forcipata
		P. humeralis
		P. nitidiventris
		P. obtusa
		P. siebeckii
		Platurocypta punctum
		P. testata
		Pseudobrachypeza helvetica
		Rondaniella dimidiata
		Rymosia fasciata
		Sceptonia costata
		S. cryptocauda
		S. fumipes
		S. membranacea
		S. nigra
		Stigmatomeria crassicornis
		Synapha fasciata
		S. vitripennis
		Syntemna hugarica
		Tetragoneura silvatica
		Trichonta falcata
		T. icenica
		T. melanura
		T. vulcani
		Zygomyia humeralis
		Z. notate

Order	Family	Scientific name
		Z. pictipennis
		Z. semifusca
		Z. valeriae
		Z. valida
		Zygomyia humeralis
	Opomyzidae	*Geomyza tripunctata*
		Opomyza florum
		O. germinationis
	Pallopteridae	*Palloptera scutellata*
	Pediciidae (hairy-eyed craneflies)	*Dicranota claripennis*
		D. pavida
		Pedicia littoralis
		P. rivosa
		Trycyphona immaculata
		Ula sylvatica
	Piophilidae	*Liopiophila varipes*
	Pipunculidae	*Eudorylas obliquus*
	Platypezidae	*Polyporivora picta*
	Psychodidae	*Pericoma fuliginosa*
		Psychoda albipennis
		P. brevicornis
		P. grisescens
		P. phalaenoides
		P. pilularia
		P. trivialis
		Tinearia alternata
		Philosepedon humeralis
	Ptychopteridae (phantom crane flies)	*Ptychoptera albimana*
		P. lacustris
	Rhagionidae (snipe flies)	*Chrysopilus asiliformis*
		C. cristatus
		Rhagio lineola
		R. scolopaceus
		R. tringarius
	Rhinophoridae	*Tricogena rubricosa*
	Sarcophagidae (flesh flies)	*Blaesoxipha plumicornis*
		Miltogramma punctata
		Sarcophaga carnaria
		S. subvicina
		Senotainia conica
	Scathophagidae	*Norellisoma spinimanum*
		Scathophaga furcata

True flies, Mayflies, Scorpionflies, Stoneflies and Caddisflies continued

Order	Family	Scientific name
		S. inquinata
		S. stercoraria
	Scatopsidae	*Apiloscatopse flavicollis*
		Colobostema nigripenne
		Scatopse notata
		Scatopsciara fluviatilis
		Swammerdamella acuta
		S. brevicornis
	Sciaridae	*Bradysia amoena*
		B. fungicola
		B. nitidicollis
		B. placida
		Corynoptera flavicauda
		Cratyna colei
		C. falcifera
		C. nobilis
		Ctenosciara hyalipennis
		Epidapus atomarius
		Leptosciarella rejecta
		Phytosciara flavipes
		Schwenckfeldina carbonaria
	Sciomyzidae (marsh flies)	*Hydromya dorsalis*
		Pherbellia ventralis
		Renocera pallida
		Tetanocera elata
		T. hyalipennis
		T. phyllophora
		Tetaneura pallidiventris
	Sepsidae	*Nemopoda nitidula*
		Sepsis cynipsea
		S. duplicata
		S. flavimana
		S. fulgens
		S. orthocnemis
		S. punctum
		S. violacea
	Sphaeroceridae	*Crumomyia roserii*
		Leptocera lutosa
	Stratiomyidae (soldierflies)	*Beris chalybata*
		B. fuscipes
		B. morrisii
		B. vallata

Order	Family	Scientific name
		Chloromyia formosa
		Sargus flavipes
		S. iridatus
	Syrphidae (hoverflies)	*Baccha elongata*
		Brachyopa insensilis
		Chalcosyrphus nemorum
		Cheilosia albitarsis
		C. fraterna
		C. variabilis
		C. vernalis
		Chrysogaster hirtella
		C. virescens
		Chrysotoxum bicinctum
		Criorhina berberina
		Dasysyrphus venustus
		Didea fasciata
		Epistrophe elegans
		Episyrphus balteatus
		Eristalinus sepulchralis
		Eristalis arbustorum
		E. horticola
		E. intricarius
		E. nemorum
		E. pertinax
		E. tenax
		Eumerus strigatus
		Eupeodes corollae
		E. latifasciatus
		Ferdinandea cuprea
		Helophilus pendulus
		H. trivittatus
		Lejogaster metallina
		Leucozona lucorum
		Melanogaster hirtella
		Melanostoma mellinum
		M. scalare
		Meliscaeva auricollis
		M. cinctella
		Microdon myrmicae
		Myathropa florea
		Neoascia podagrica
		N. tenur

True flies, Mayflies, Scorpionflies, Stoneflies and Caddisflies continued

Order	Family	Scientific name
		Orthonevra nobilis
		Paragus haemorrhous
		Parasyrphus punctulatus
		Pelecocera tricincta
		Pipiza fenestrata
		Platycheirus albimanus
		P. angustatus
		P. clypeatus
		P. granditarsus
		P. manicatus
		P. occultus
		P. peltatus agg.
		P. rosarum
		P. scutatus
		Rhingia campestris
		Scaeva pyrastri
		Sericomyia lappona
		S. silentis
		Sphaerophoria interrupta
		S. philanthus
		S. scripta
		Sphegina clunipes
		S. verecunda
		Syritta pipiens
		Syrphus ribesii
		S. torvus
		S. vitripennis
		Trichopsomyia flavitarsis
		Volucella bombylans
		V. pellucens
		Xanthandrus comtus
		Xylota segnis
		X. sylvarum
		Xanthogramma pedissequum
	Tabanidae (horse-flies)	*Chrysops caecutiens*
		C. relictus
		C. viduatus
		Haematopota crassicornis
		H. pluvialis
		Tabanus autumnalis
		T. bromius
	Tachinidae	*Ceromya bicolor*

Order	Family	Scientific name
		Cinochira atra
		Cylindromyia interrupta
		Eriothrix rufomaculata
		Linnaemya vulpina
		Lydina aenea
		Tachina grossa
		Tephritis neesii
	Tephritidae (fruit flies)	*Campiglossa plantaginis*
		Tephritis bardanae
		T. vespertina
		Xyphosia miliaria
	Tipulidae (crane flies)	*Dolichopeza albipes*
		Nephrotoma quadrifaria
		N. scurra
		Tipula confusa
		T. fulvipennis
		T. irrorata
		T. lateralis
		T. maxima
		T. oleracea
		T. paludosa
		T. scripta
		T. variicornis
		T. varipennis
		T. vernalis
		T. yerburyi
	Trichoceridae	*Trichocera hiemalis*
		T. major
	Ulidiidae	*Herina frondescentiae*
		Physiphora alceae
	Xylophagidae	*Xylophagus ater*
Ephemeroptera (mayflies)	Baetidae	*Baetis rhodani*
		Cloeon dipterum
	Ephemeridae	*Ephemera danica*
	Heptageniidae	*Ecdyonurus torrentis*
	Leptophlebiidae	*Paraleptophlebia submarginata*
Mecoptera (scorpionflies)	Panorpidae	*Panorpa communis*
		P. germanica
Plecoptera (stoneflies)	Chloroperlidae	*Siphonoperla torrentium*
	Leuctridae	*Leuctra hippopus*
		L. fusca
		L. nigra

True flies, Mayflies, Scorpionflies, Stoneflies and Caddisflies continued

Order	Family	Scientific name
	Nemouridae	*Nemoura avicularis*
		Nemoura cinerea
		Nemurella pictetii
Trichoptera (caddis flies)	Beraeidae	*Beraea maurus*
	Glossosomatidae	*Agapetus fusiceps*
	Goeridae	*Silo pallipes*
	Hydropsychidae	*Diplectrona felix*
	Lepidostomatidae	*Crunoecia irrorata*
	Leptoceridae	*Adicella reducta*
	Limnophilidae	*Halesus* spp.
		Limnephilus centralis
		L. marmoratus
		L. rhombicus
		Micropterna lateralis
		Potamophylax latipennis
	Phryganeidae	*Agrypnia obsoleta*
		A. varia
	Polycentropodidae	*Holocentropus dubius*
		Plectrocnemia conspersa
		Polycentropus flavomaculatus
	Rhyacophilidae	*Rhyacophila oblitera*
	Sericostomatidae	*Sericostoma personatum*

Stiltfly
(*Micropera lateralis*)

Hymenoptera:
ants, bees and wasps

Large Velvet Ant
(*Mutilla europaea*)

Hymenoptera: ants, bees and wasps

- **This order has been poorly studied to date, with 94 species recorded, nine of which have particular conservation significance.**
- **One species (*Philanthus triangulum*, *Crabronidae*) is Vulnerable.**
- **One species (*Formica rufa*, *Formicidae*) is Near Threatened.**
- **Two species (*Eucera longicornis*, *Eumenes coarctatus*) are Nationally Notable A (recorded in 16-30 hectads in Britain).**
- **Three species (*Crossocerus binotatus*, *Mutilla europaea* and *Tiphia minuta*, *Tiphiidae*) are Nationally Notable B (recorded in 31-100 hectads).**
- **Three species (*Bombus ruderatus*, *Eucera longicornis* and *Andrena tarsata*) are listed on S41 of the NERC Act and are Priority Species under the UK BAP (2007).**

Tormentil Mining Bee
(*Andrena tarsata*)

Table 14. Conservation Status of Hymenoptera

Family	Scientific Name	NERC S41	UK BAP	Vulnerable 1991[i]	Near Threatened[i]	Nationally Notable A[ii]	Nationally Notable B[ii]	Devon BAP
Andrenidae (Mining Bees)	*Andrena tarsata*	●	●					
	Bombus ruderarius	●	●					
	Eucera longicornis	●	●			●		
Crabronidae (Digger Wasps)	*Crossocerus binotatus*						●	
	Philanthus triangulum			●				
Formicidae (Ants)	*Formica rufa*				●			●
Mutilidae (Velvet Ants)	*Mutilla europaea*						●	
Tiphiidae (Tiphiid Wasps)	*Tiphia minuta*						●	
	Eumenes coarctatus					●		

i) IUCN 2010. The IUCN Red List of Threatened Species.
ii) Falk, S J. 1991. *A review of the scarce and threatened bees, wasps and ants of Great Britain.* Research & Survey in Nature Conservation, No. 35. Published by JNCC. 342 pp.

Heath Potter Wasp
(*Eumenes coarctatus*)

Hymenoptera of conservation concern

Heath Potter Wasp (*Eumenes coarctatus*)

Restricted to southern counties, this species requires heathlands with patches of exposed clay soil and sources of water, e.g. ponds, streams and bogs. Nests (pots) are constructed on Heather, Gorse and occasionally dead grass stems.

Red-tailed Carder-bee (*Bombus ruderarius*)

This species has seen a catastrophic decline in its abundance and distribution throughout Britain since the first half of the century. It is a small species, emerging in late spring and nesting on the surface of the ground amongst dense vegetation. Although it can be found in gardens, marshes, farmland and heathland, it is more typical of dry species-rich grassland.

Long-horned Bee (*Eucera longicornis*)

The Long-horned Bee is one of the UK's largest solitary bees. Males are extremely distinctive due to their long antennae. It requires large areas of unimproved, legume-rich habitat and is the host for the rare Six-banded Nomad Bee (*Nomada sexfasciata*). Adults emerge in May and forage until early July. Females obtain pollen from legume flowers, while males also visit Bee Orchid and Yellow Archangel. Female Long-horned Bees dig burrows in bare or sparsely-vegetated ground, typically a south-facing slope. Being a solitary bee, each female excavates her own nest, though females will nest in aggregations. The species was once widespread across southern Britain, both inland and along the coast, but now survives at just a few dozen sites nationally; most of these are concentrated along the south coast and it is now very rare inland. A variety of habitats are exploited, including soft-rock cliffs, flowery meadows, coastal grazing marsh, quarries and woodland clearings. Known sites are characterised by a combination of suitable nesting habitat plus an abundance of key legumes species, such as Meadow Vetchling, Kidney Vetch, clovers and Bird's-foot-trefoil.

Tormentil Mining Bee (*Andrena tarsata*)

The Tormentil Mining Bee is widely distributed across Britain, primarily on heathland and moorland where Tormentil (*Potentilla erecta*) is present, but has been declining since the 1970s. It likes abundant Tormentil in warm sheltered spots and south-facing slopes and banks to nest in.

Large Velvet Ant (*Mutilla europaea*)

This wasp species is very local, but generally distributed. It is perhaps most closely associated with lowland heaths. It parasitises various bumblebees (*Bombus* spp.) and also occasionally enters Honey Bee (*Apis mellifera*) hives. The female oviposits inside bee cocoons containing prepupae or young pupae. The *Mutilla* larva eats these immature stages and then spins a cocoon within that of the host. The size of the emerging wasp depends partly on the size of its host: *Mutilla* emerging from honey bee cells are generally smaller than those from bumble bee cells. On emergence, the adult *Mutilla* feeds on the host honey stores. Females overwinter as adults, but males leave the host nest soon after emergence and do not survive beyond the autumn. Females sometimes remain in the host nest throughout the winter.

Hymenoptera: ants, bees and wasps

Appendix 16. Provisional list of Hymenoptera recorded in the SSSI

Species in **bold** are those with a strong association with heathland vegetation

Family	Scientific Name	Common Name
Andrenidae (mining bees)	*Andrena bicolor*	
	A. barbilabris	
	A. carantonica	
	A. clarkella	Gwynne's Mining Bee
	A. fucata	
	A. fuscipes	
	A. haemorrhoa	Early Mining Bee
	A. subopaca	
	A. tarsata	**Tormentil Mining Bee**
	A. thoracica	
Apidae (bees)	*Anthophora furcata*	Fork-tailed Flower Bee
	Apis mellifera	Honey Bee
	Bombus hortorum	Small Garden Bumblebee
	B. lapidarius	Large Red Tailed Bumblebee
	B. lucorum	White-tailed Bumblebee
	B. lucorum sens. strict.	White-tailed Bumblebee
	B. pascuorum	Common Carder-bee
	B. pratorum	Early Bumblebee
	B. ruderarius	Red-tailed Carder-bee
	B. terrestris	Buff-tailed Bumblebee
	Eucera longicornis	Long-horned Bee
	Hylaeus confusus	
	Lasioglossum morio	Brassy Mining Bee
	L. prasinum	
	L. zonulum	
	Megachile versicolor	
	Nomada ruficornis	Red-horned Nomad Bee
	N. rufipes	Goldenrod Nomad Bee
	Sphecodes sp.	
Chrysididae (cuckoo wasps)	*Chrysis mediata*	
	Trichrysis cyanea	
Crabronidae (digger wasps)	*Astata boops*	
	Cerceris arenaria	Sand Tailed Digger Wasp
	Crossocerus binotatus	
	C. cetratus	
	C. megacephalus	

Family	Scientific Name	Common Name
	C. quadrimaculatus	4-spotted Digger Wasp
	Ectemnius continuus	
	Nysson spinosus	Large Spurred Digger Wasp
	Pemphredon lugubris	Mournful Wasp
	Philanthus triangulum	Bee Wolf
	Rhopalum clavipes	
	Spilomena enslini	
	Trypoxylon clavicerum	Club Horned Wood-borer Wasp
	T. figulus	
Eumenidae (potter wasps)	***Eumenes coarctatus***	**Heath Potter Wasp**
	Ancistrocerus trifasciatus	
Formicidae (ants)	*Formica fusca*	Negro Ant
	F. lemani	
	F. rufa	Red Wood Ant
	Lasius alienus sens. lat.	
	L. flavus	
	L. niger sens. lat.	
	Myrmica ruginodis	
	M. sabuleti	
	M. scabrinodis	
	Tetramorium caespitum	Turf Ant
Ichneumonidae (Ichneumon wasps)	*Rhyssa persuasoria*	
Megachilidae (bees)	*Megachile versicolor*	Leaf-cutter Bbee
Mutilidae (velvet ants)	***Mutilla europaea***	**Large Velvet Ant**
Pompilidae (spider wasps)	*Anoplius nigerrimus*	
	A. viaticus	Black-banded Spider Wasp
	Arachnospila spissa	
	Caliadurgus fasciatellus	
Siricidae (horntails)	*Urocerus gigas*	Greater Horntail Wasp
Sphecidae (thread-waisted wasps)	*Ammophila sabulosa*	Red-banded Sand Wasp
Tenthredinidae (sawflies)	*Empria pumila*	
	E. tridens	
	Eutomostethus luteiventris	
	Euura mucronata	
	Monostegia abdominalis	
	Nematus cadderensis	
	N. lucidus	
	Nesoselandria morio	
	Pachynematus apicalis	

Hymenoptera: ants, bees and wasps

Family	Scientific Name	Common Name
	Pontania viminalis	
	Priophorus pallipes	
	P. pilicornis	
	Pristiphora moesta	
	Protoemphytus carpini	
	Rhogogaster chlorosoma	
	R. viridis	
	Strombocerus delicatulus	
	Strongylogaster lineata	
	Tenthredo atra	
	T. balteata	
	T. maculata	
	T. scrophulariae	
	Tenthredopsis coquebertii	
Tiphiidae (Tiphiid wasps)	*Tiphia minuta*	Small Tiphia
Vespidae (hornets and wasps)	*Ancistrocerus. trifasciatus*	Mason Wwasp
	Eumenes coarctatus	**Heath Potter Wasp**
	Vespa crabro	Hornet
	Vespula austriaca	Cuckoo Wasp

Coleoptera: beetles

Green Tiger Beetle
(*Cicindela campestris*)

Coleoptera: beetles

- This order has been relatively poorly studied, 243 species being recorded to date, of which 21 have high conservation significance.
- One species (*Poecilus kugelanni*) is Endangered (based on pre-1994 IUCN criteria) and is also a Species of Principal Importance for Conservation (NERC S41 list) and a UK BAP (2007) Priority Species.
- One species (*Stenus kiensenwetteri*) is Vulnerable (based on pre 1994 IUCN criteria).
- Six species are Nationally Notable A (recorded from 30 or fewer hectads in the UK).
- Eight species are Nationally Notable B (recorded from 31–100 hectads in the UK).
- Five species are Nationally Scarce (recorded from 16–100 hectads in the UK).

Key Conservation Species

Kugelann's Ground Beetle (*P. kugelanni*)

Kugelann's Ground Beetle is medium-sized (12–14 mm long) and inhabits heathlands in England, with historic records also from south Wales[51]. The beetle favours warm, south-facing heathland slopes. It is diurnal and breeds in the spring, the larvae developing over the summer and emerging as adults in August and September. This species is a Red Data Book 1 (Endangered) species in Britain, known from only 18 sites: one in Cornwall, seven in Devon, two in Dorset, seven in Hampshire and one in Norfolk.

Kugelann's Ground Beetle
(*Poecilus kugelanni*)

Table 15. Coleoptera of high conservation significance recorded in the SSSI

Family	Scientific Name	NERC S41	UK BAP (2007)	Endangered[i]	Vulneraable[ii]	Nationally Notable A[i]	Nationally Notable B[i]	Nationally Scarce[iii]
Anthribidae (fungus weevils)	*Platystomos albinus*						●	
Carabidae (ground beetles)	*Amara equestris*						●	
	Elaphrus uliginosus						●	
	Poecilus kugelanni	●	●	●				
Cerambycidae (long-horn beetles)	*Leptura aurulenta*					●		
	Prionus coriarius					●		
Chrysomelidae (leaf beetles)	*Calomicrus circumfusus*					●		
	Longitarsus parvulus					●		
Coccinellidae (ladybirds)	*Coccinella magnifica*					●		
	Hyperaspis pseudopustulata						●	
Curculionidae (snout beetles)	*Caenopsis fissirostris*						●	
Dytiscidae (water beetles)	*Deronectes latus*						●	
Eucnemidae (false click beetles)	*Melasis buprestoides*						●	
Gyrinidae (whirligig beetles)	*Gyrinus paykulli*							●
Hydrophilidae (water-scavangers)	*Helochares punctatus*							●
Scirtidae (marsh beetles)	*Elodes elongata*							●
Silphidae	*Nicrophorus interruptus*						●	
Staphylinidae (rove beetles)	*Aleochara kamila*							●
	Bledius femoralis					●		
	Myllaena kraatzi							●
	Stenus canescens						●	
	Stenus kiensenwetteri				●			

i) Hyman, P. S. (updated by Parsons, M. S.), 1992. *A review of the scarce and threatened Coleoptera of Great Britain.* Part 1. JNCC: UK Nature Conservation No. 3. 250 pp.
ii) Hyman, P. S. (updated by Parsons, M. S.), 1994. *A review of the scarce and threatened Coleoptera of Great Britain.* Part 2. JNCC: UK Nature Conservation No. 3. 248 pp.
iii) Foster, G.N. 2010. *A review of the scarce and threatened Coleoptera of Great Britain Part 3.* Water beetles of Great Britain. Species Status 1. Joint Nature Conservation Committee.

Coleoptera: beetles continued

Appendix 17. List of Coleoptera recorded in the SSSI

Species in **bold** are those with a strong association with heathland vegetation.

Family	*Scientific Name*	Common Name
Anobiidae (wood borers)	*Ptilinus pectinicornis*	Fan-bearing Wood-borer
Anthribidae (fungus weevils)	*Platystomos albinus*	
Byturidae (fruitworms)	*Byturus tomentosus*	Raspberry Beetle
Cantharidae (soldier beetles)	*Cantharis cryptica*	
	Malthodes minimus	
	Rhagonycha fulva	Common Red Soldier Beetle
	R. lignose	
	R. limbata	
Carabidae (ground beetles)	*Abax parallelepipedus*	
	Acupalpus dubius	
	A. meridianus	
	Agonum fuliginosum	
	A. gracile	
	A. viduum	
	Amara aenea	Common Sun Beetle
	A. communis	
	A. convexior	
	A. equestris	
	Anisodactylus binotatus	
	Bembidion articulatum	
	B. lampros	
	B. lunulatum	
	B. mannerheimi	
	B. quadrimaculatum	
	B. nitidulum	
	B. tetracolum	
	B. tibiale	
	Bradycellus harpalinus	
	Caladromus spilotus	
	Calathus rotundicollis	
	Carabus arvensis	
	C. granulatus	
	C. violaceus	Violet Ground Beetle
	C. problematicus	
	Cychrus caraboides	
	Cicindela campestris	**Green Tiger Beetle**
	Cychrus caraboides	Snail Hunter
	Dromius meridionalis	
	Elaphrus cupreus	
	E. uliginosus	
	Harpalus affinis	
	H. latus	
	H. rubripes	

Family	*Scientific Name*	Common Name
	Leistus brevicollis	
	Nebria salina	
	Notiophilus biguttatus	
	N. germinyi	
	N. palustris	
	N. rufipes	
	Ocys harpaloides	
	Olisthopus rotundatus	
	Paradromius linearis	
	Paranchus albipes	
	Philorhizus melanocephalus	
	Poecilus cupreus	
	P. kugelanni	**Kugelann's Ground Beetle**
	P. diligens	
	P. madidus	Black Clock
	P. melanarius	
	P. niger	
	P. nigrita	
	Syntomus foveatus	
	Synuchus vivalis	
	Trechus obtusus	
	T. quadristiatus	
Cerambycidae (long-horn beetles)	*Clytus arietis*	Wasp Beetle
	Grammoptera ruficornis	
	Leiopus nebulosus	
	Leptura aurulenta	
	Pachytodes cerambyciformis	
	Prionus coriarius	Tanner Beetle
	Rhagium bifasciatum	
	R. mordax	
	Rutpela maculata	
Chrysomelidae (leaf beetles)	*Calomicrus circumfusus*	
	Chalcoides aurata	Willow Flea Beetle
	Lochmaea crataegi	
	L. suturalis	**Heather Beetle**
	Longitarsus parvulus	
	Luperus longicornis	
	Neocrepidodera transversa	
	Oulema rufocyanea	
	Phyllobrotica quadrimaculata	Skullcap Leaf Beetle
	Phyllotreta undulata	Small Striped Flea Beetle
	Timarcha tenebricosa	Bloody-Nosed Beetle
Coccinellidae (ladybirds)	*Adalia bipunctata*	2-spot Ladybird
	A. decempunctata	10-spot Ladybird
	Anatis ocellata	**Eyed ladybird**
	Coccinella magnifica	Scarce Seven-spot Ladybird

Coleoptera: beetles continued

Family	*Scientific Name*	Common Name
	C. septempunctata	7-spot Ladybird
	Harmonia axyridis	Harlequin Ladybird
	Hyperaspis pseudopustulata	
	Myzia oblongoguttata	Striped Ladybird
	Propylea quattuordecimpunctata	14-spot Ladybird
	Psyllobora virgintiduopunctata	22-spot Ladybird
Curculionidae (snout beetles)	*Anthonomus pedicularis*	
	Caenopsis fissirostris	
	C. waltoni	
	Cionus scrophulariae	Figwort Weevil
	Curculio villosus	
	Micrelus ericae	Small Heather Weevil
	Neliocarus nebulosus	
	Otiorhychus singularis	
	Phyllobius glaucus	
	P. pomaceus	
	P. pyri	Common Leaf Weevil
	P. roboretanus	Small Green Neetle Weevil
	Sitona lineatus	Pea-leaf Weevil
	Strophosoma melanogrammum	
Dasytidae	*Dasytes aeratus*	
Dytiscidae (water beetles)	*Agabus bipustulatus*	
	A. guttatus	
	Deronectes latus	
	Dytiscus marginalis	Great Diving Beetle
	Dysticus spp.	
	Hydroporus nigrita	
	H. pubescens	
	Hyphydrus ovatus	
	Ilybius montanus	
	Strichotarsus duodecimpustulatus	
Elateridae (click beetles)	*Agriotes pallidulus*	
	Athous haemorrhoidalis	
	Dalopius marginatus	
	Denticollis linearis	
	Hemicrepidius hirtus	
	Melanotus castanipes	
Elmidae (riffle beetles)	*Elmis aenea*	
Eucnemidae (false click beetles)	*Melasis buprestoides*	
Geotrupidae (earth-boring scarab beetles)	*Anoplotrupes stercorosus*	
	Geotrupes spiniger	
	Typhaeus typhoeus	**Minotaur Beetle**
Gyrinidae (whirligig beetles)	*Gyrinus natator*	
	G. paykulli	
Haliplidae	*Haliplus ruficollis*	

Family	*Scientific Name*	Common Name
Histeridae	*Hister unicolor*	
	Margarinotus striola	
	M. ventralis	
	Saprinus semistriatus	
Hygrobiidae (screech beetles)	*Hygrobia hermanni*	
Hydrophilidae (water-scavenger beetles)	*Anacaena globulus*	
	A. lutescens	
	Coelostoma orbiculare	
	Heliphorus aequalis	
	H. aquaticus	
	H. brevipalpis	
	Hydrobius fuscipes	
	Laccobius bipunctatus	
	L. atratus	
	Paracymus scutellaris	
	Sphaeridium lunatum	
	S. scarabaeoides	
Lampyridae (fire flies)	*Lampyris noctiluca*	Glow-worm
Latridiidae (minute brown scavenging beetles)	*Corticarina fuscula*	
Leiodidae	*Sciodrepoides fumatus*	
Malachiidae (soft-wing flower beetles)	*Malachius bipustulatus*	Malachite Beetle
Melandryidae (false darkling beetles)	*Orchesia undulata*	
Nitidulidae (sap-feeding beetles)	*Meligethes aeneus*	Common Pollen Beetle
	M. viridescens	
Noteridae	*Noterus clavicornis*	
Oedemeridae (false-blister beetles)	*Oedemera nobilis*	Swollen-thighed Beetle
Scaphidiidae (shining fungus beetles)	*Scaphidium quadrimaculatum*	
Scarabaeidae (dung and scarab beetles)	*Aphodius erraticus*	
	A. granarius	
	A. haemorrhoidalis	
	A. prodromus	
	A. rufipes	
	A. sphacelatus	
	Onthophagus coenobita	
	O. similis	
Scirtidae (marsh beetles)	*Elodes elongate*	
Scraptiidae (false flower beetles)	*Anaspis frontalis*	
	A. maculate	
	A. rufilabris	
Scydmaenidae	*Cephennium gallicum*	
Silphidae (carrion beetles)	*Necrodes littoralis*	Shore Sexton Beetle
	Nicrophorus interruptus	Sexton Beetle
	N. vespillo	Common Burying Beetle

Coleoptera: beetles continued

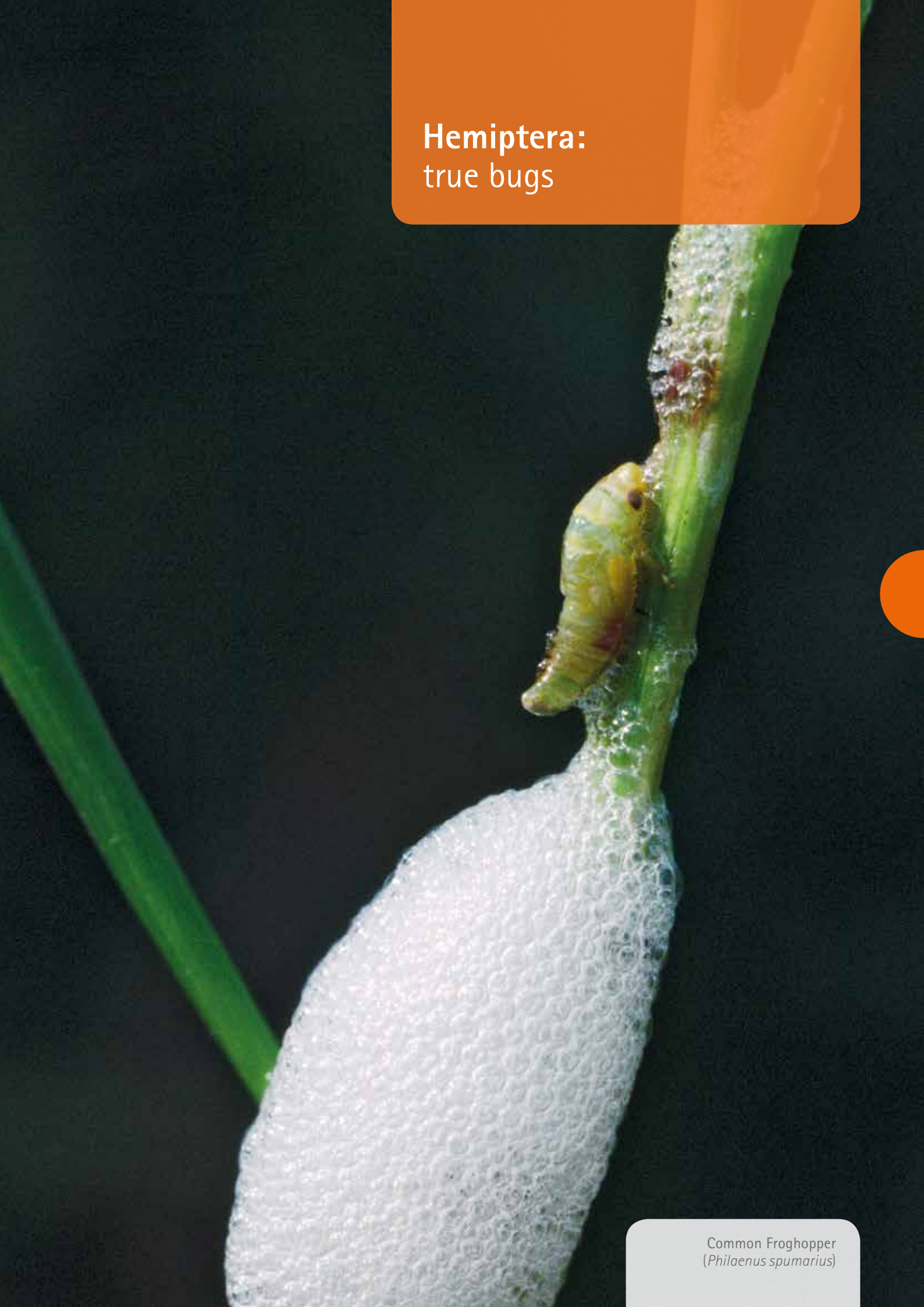
Family	*Scientific Name*	Common Name
	N. vespilloides	
	Thanatophilus rugosus	
	T. sinuatus	
Staphylinidae (rove beetles)	*Aleochara curtula*	
	A. intricate	
	A. kamila	
	Aloconota gregaria	
	Amisha decipiens	
	Anotylus rugosus	
	A. sculpturatus	
	Atheta aquatic	
	A. castanoptera	
	A. crassicornis	
	A. fungicola	
	A. graminicola	
	Bledius femoralis	
	Bolitobius cingulatus	
	Drusilla canaliculata	
	Erichsonius cinerascens	
	Geostiba circellaris	
	Gyrohypnus fracticornis	
	Lathrobium brunnipes	
	Lordithon thoracicus	
	Mocyta fungi	
	Myllaena kraatzi	
	Ocalea picata	
	Ocypus olens	Devil's Coach-horse
	Olophrum piceum	
	Ontholestes murinus	
	Othius angustus	
	O. punctulatus	
	Oxytelus laqueatus	
	Paederus littoralis	
	Philonthus carbonarius	
	P. cognatus	
	P. laminatus	
	P. politus	
	P. varians	
	Phyllodrepa florialis	
	Platydracus stercorarius	
	Proteinus brachypterus	
	Quedius aridulus	
	Q. fumatus	
	Q. maurorufus	
	Q. maurus	
	Q. molochinus	

Family	*Scientific Name*	Common Name
	Q. nigriceps	
	Q. persimilis	
	Quedius picipes	
	Staphylinus dimidiaticornis	
	Stenus canescens	
	S. flavipes	
	S. impressus	
	S. kiensenwetteri	
	S. nitidiusculus	
	S. pallitarsis	
	S. picipennis	
	S. tarsalis	
	Tachinus rufipes	
	T. signatus	
	Tachyporus hypnorum	
	T. obtusus	
	Xantholinus longiventris	
Tenebrionidae	*Nalassus laevioctostriatus*	
Throscidae (false click beetles)	*Trixagus carinifrons*	
Zopheridae	*Bitoma crenata*	

Great Diving Beetle
(*Dytiscus marginalis*)

Coleoptera: beetles continued

Hemiptera: true bugs



Common Froghopper
(*Philaenus spumarius*)

Hemiptera: true bugs

- 25 species have been recorded from the SSSI.
- None of the species currently has conservation designations.

Birch Shield Bug
(*Elasmostethus interstinctus*)

Appendix 18. List of Hemiptera recorded in the SSSI

Family	Scientific Name	Common Name
Acanthosomatidae	*Acanthosoma haemorrhoidale*	Hawthorn Shield Bug
	Elasmostethus interstinctus	Birch Shield Bug
	Elasmucha grisea	Parent Bug
Alydidae	*Alydus calcaratus*	
Anthocoridae	*Anthocoris nemoralis*	
	A. nemorum	Common Flower Bug
Aphrophoridae	*Aphrophora alni*	
	Philaenus spumarius	Common Froghopper
Cicadellidae	*Euscelis incisus*	
	Limotettix striola	
	Speudotettix subfusculus	
	Thamnotettix dilutior	
Cixiidae	*Cixius nervosus*	
	Cixius similis	
	Tachycixius pilosus	
Coreidae	*Coreus marginatus*	Dock Bug
Corixidae	*Corixa* spp.	
	Hesperocorixa moesta	
	H. sahlbergi	
	Sigara dorsalis	
Nabidae	*Hemacerus mirmicoides*	Ant Damsel Bug
Notonectidae	*Notonecta glauca*	Common Backswimmer
	N. viridis	
	N. oblique	
Reduviidae	*Coranus subapterus*	Heath Assassin
Saldidae	*Saldula saltatoria*	Common Shore Bug

Arachnids:
spiders and allies

Raft spider
(*Dolomedes frimbriatus*)

Arachnids: spiders and allies continued

- 121 species of Arachnids from four Orders (110 Araneae, eight Opiliones, two Pseudoscorpionida and one Thrombidiformes) have been recorded from the SSSI.
- One species of spider has a conservation designation.

Arachnids with conservation designations

Family	Scientific Name	Rare[i]
Theridiidae	*Episinus maculipes*	●

i) Bratton, J H. 1991. Updates the National Review of non-marine Molluscs (1983), using the old (pre-1994) IUCN categories and criteria. Published by JNCC.

Four-spot orb-weaver
(*Araneus quadratus*)

Appendix 19. List of Arachnids recorded in the SSSI

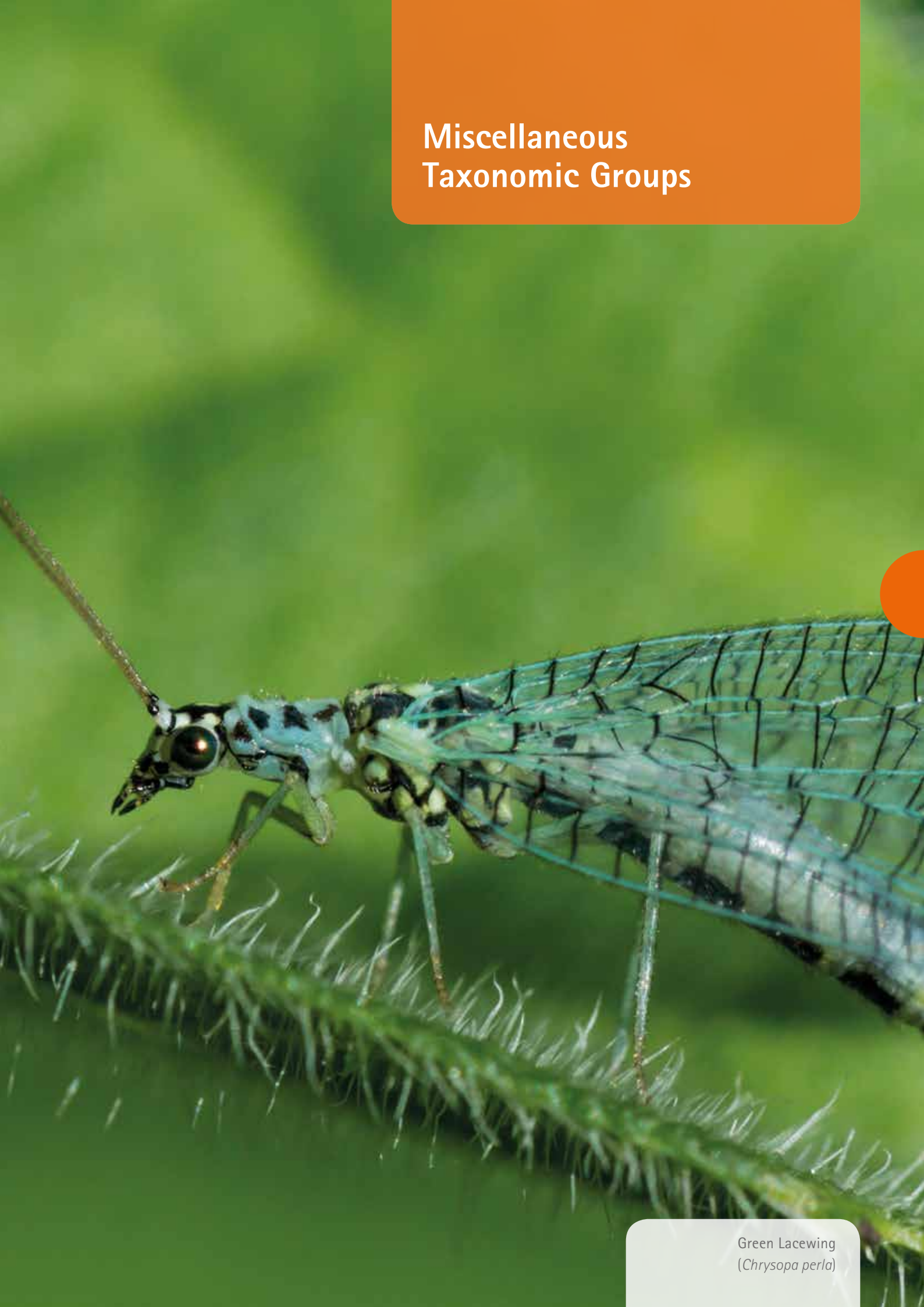
Order/Family	Scientific Name
Araneae (spiders)	
Agelenidae	*Agelena labyrinthica*
	Malthonica sylvestris
	Tegenaria silvestris
Amaurobiidae	*Amaurobius fenestralis*
Araneidae	*Araneus diadematus*
	A. quadratus
	Araniella cucurbitina sensu lato
	Gibbaranea gibbosa
	Larinioides cornutus
	Mangora acalypha
	Nuctenea umbratica
	Neoscona adianta
	Zygiella atrica
	Zygiella x-notata
Clubionidae	*Clubiona diversa*
	C. lutescens
	C. reclusa
	C. terrestris
	C. trivialis
	Dictyna arundinacea
Corinnidae	*Phrurolithus festivus*
Dictynidae	*D. latens*
Dysderidae	*Dysdera erythrina*
	Harpactea hombergi
Erythraeidae	*Leptus killingtoni*
Gnaphosidae	**Drassodes cupreus**
	D. lapidosus
	Haplodrassus signifer
	Micaria pulicaria
	Zelotes latreillei
Linyphiidae	*Bathyphantes gracilis*
	Ceratinella brevipes
	Dismodicus bifrons
	Erigone atra
	E. dentipalpis
	Floronia bucculenta
	Gonatium rubens
	Gongylidiellum vivum
	Kaestneria pullata
	Labulla thoracica
	Lepthyphantes ericaeus
	L. tenuis
	L. zimmermanni
	Linyphia hortensis
	L. triangularis
	Maso sundevalli
	Metopobactrus prominulus
	Micrargus apertus
	M. herbigradus sensu stricto
	Microlinyphia pusilla
	Minyriolus pusillus
	Neriene clathrata
	N. peltata
	Oedothorax fuscus
	Peponocranium ludicrum
	Pocadicnemis pumila
	Saaristoa abnormis
	Tapinopa longidens
	Walckenaeria acuminata
	W. atrotibialis
	W. cuspidata
	W. nudiplapis
Liocranidae	*Agroeca brunnea*
	A. proxima
Lycosidae	*Arctosa leopardus*
	A. perita
	Pardosa hortensis
	P. nigriceps
	P. prativaga
	P. pullata
	Pirata latitans
	P. tenuitarsis
	P. uliginosus
	Trochosa terricola

Arachnids: spiders and allies continued

Order/Family	Scientific Name
Mimetidae	*Ero cambridgei*
Miturgidae	*Cheiracanthium erraticum*
	C. virescens
Philodromidae	*Philodromus aureolus*
	P. cespitum
	Tibellus oblongus
Pisauridae	*Pisaura mirabilis*
	Dolomedes fimbriatus
Salticidae	*Euophrys frontalis*
	Marpissa muscosa
	Neon reticulatus
	Salticus scenicus
Segestriidae	*Segestria florentina*
Tetragnathidae	*Meta menardi*
	Metellina mengei
	M. segmentata
	Pachygnatha clercki
	Tetragnatha extensa
	T. montana
Thomisidae	*Xysticus audax*
	X. cristatus
Theridiidae	*Anelosimus vittatus*
	Enoplognatha ova sensu lato
	Episinus angulatus
	E. maculipes
	Theonoe minutissima
	Theridion bimaculatum
	T. simile
	T. sisyphium
	T. varians
Theridiosomatidae	*Theridiosoma gemmosum*
Thomisidae	*Misumena vatia*
	Ozyptila atomaria
	Xysticus audax
	X. cristatus
Zoridae	*Zora spinimana*
Opiliones (harvestmen)	
Leiobunidae	*Dicranopalpus ramosus*
Nemastomatidae	*Nemastoma bimaculatum*
Phalangiidae	*Lacinius ephippiatus*
	Leiobunum rotundum
	Mitopus morio
	Oligolophus tridens
	Paroligolophus agrestis
	Phalangium opilio
Pseudoscorpionida (false scorpions)	
Chernetidae	*Chernes cimiocoides*
Neobisciidae	*Neobisium carcinoides*
Thrombidiformes (mites)	
Erythraeidae	*Leptus killingtoni*

Labyrinth Spider
(*Agelena labyrinthica*)

Miscellaneous Taxonomic Groups



Green Lacewing
(*Chrysopa perla*)

Appendix 20. Miscellaneous taxonomic groups

Actinopterygii (bony fish)

Species name	Common name	NERC S41	UKBAP
Anguilla anguilla	European Eel	●	●
Barbatula barbatula	Stone Loach		
Gasterosteus aculeatus	Three-spined Stickleback		
Salmo trutta	Brown Trout	●	●

Amphipoda (sandhoppers and allies)

Species name	Common name	NERC S41	UKBAP
Amphipoda sp.			
Crangonyx pseudogracilis			
Gammarus pulex			

Chilopoda (centipedes)

Species name	Common name
Lithobius variegatus	

Decapoda (crayfish and allies)

Species name	Common name
Decapoda sp.	A crayfish

Gastropoda (snails and allies)

Species name	Common name
Ancylus fluviatilis	River Limpet
Cepaea nemoralis	Brown Lipped Snail
Potamopyrgus antipodarum	Jenkins' Spire Snail
Physa fontinalis	Common Bladder Snail
Radix balthica	Wandering Snail

Three-spined stickleback
(*Gasterosteus aculeatus*)

Ispododa (woodlice)

Family	Species name	Common name
Oniscidae	*Oniscus asellus*	Common Shiny Woodlouse
Philosciidae	*Philoscia muscorum*	Common Striped Woodlouse
Porcellionidae	*Porcellio scaber*	Common Rough Woodlouse
Trachelipidae	*Trachelipus rathkei*	Rathke's Woodlouse
Trichoniscidae	*Trichoniscus pusillus*	Common Pygmy Woodlouse

Myriapoda (millipedes)

Family	Species name	Common name
Glomeridae	*Glomeris marginata*	Pill Millipede
Julidae	*Cylindroiulus punctatus*	Blunt-tailed Snake Millipede
	Julus scandinavius	
Polydesmidae	*Polydesmus* sp.	

Neuroptera (lacewings)

Family	Species name	Common name
Chrysopidae	*Chrysopa perla*	
	Chrysoperla lucasina	
	Chrysopidia ciliata	
	Cunctochrysa albolineata	
Coniopterygidae	*Coniopteryx tineiformis*	
	Conwentzia psociformis	
Hemerobiidae	*Hemerobius humulinus*	
	H. lutescens	
	H. stigma	
	Wesmaelius subnebulosus	

Rhynchobdellida (jawless leeches)

Species name	Common name
Helobdella sp.	

Common Shiny Woodlouse
(*Oniscus asellus*)

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