

## Other invertebrates

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Although lepidoptera and odonata are considered in separate sections, they are a small fraction of the invertebrate diversity within Greater Gwent. Unfortunately, most invertebrates are very under-recorded, due to lack of interest, their cryptic nature and the level of expertise needed to identify some species.

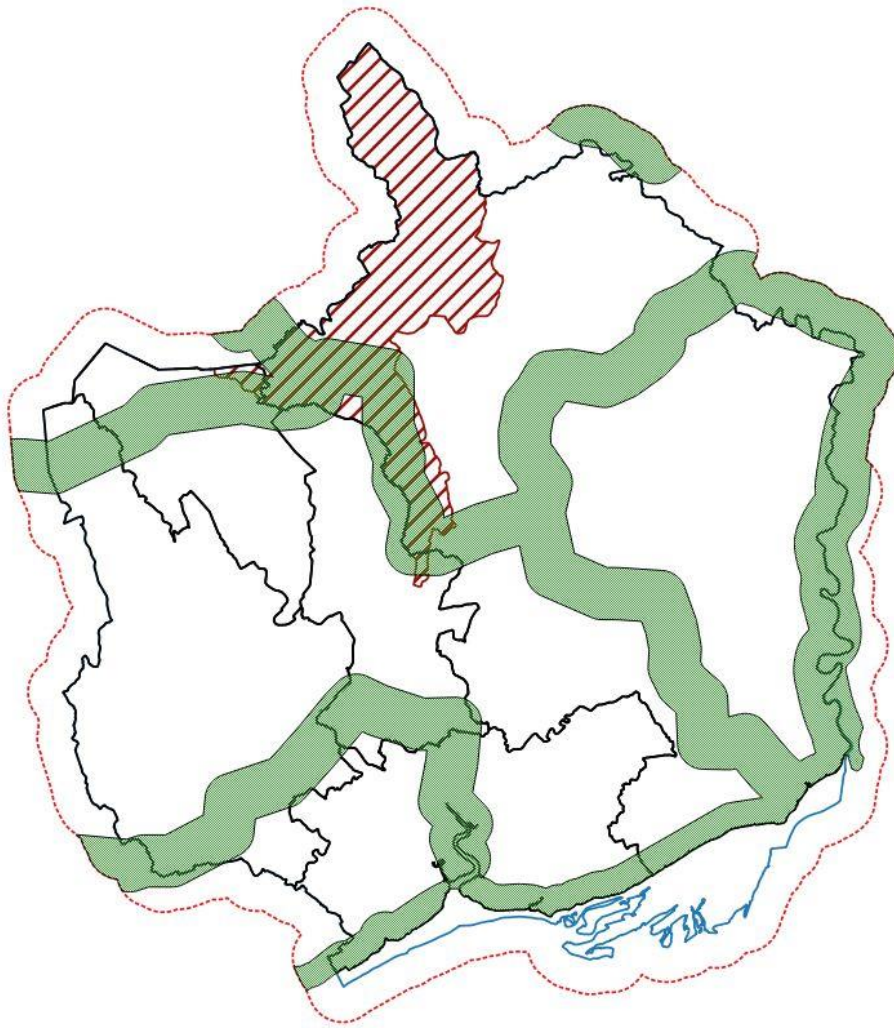
Insect populations are in crisis. It is thought that if current rates of decline continue, 41% of the world's insect species could be extinct within the next few decades.<sup>1</sup> Insects make up over half the species on Earth and carry out fundamental roles such as pollination and nutrient cycling, as well as being a food source for birds, mammals, reptiles and amphibians. Yet many people still think of insects as pests, even though over 99% of insects are actually beneficial.<sup>2</sup>

Threats to invertebrates include habitat loss and fragmentation, chemical use (such as insecticides) pollution (including light pollution), invasive non-native species and climate change. This section includes two rare bumblebees, the Shrill Carder Bee and Brown-Banded Carder Bee, as well as pollinators as a group. Also included are special groups of invertebrates that are found in Greater Gwent and a few other places: coal spoil invertebrates, and the freshwater invertebrates of the Gwent Levels.

Across the UK, Buglife has mapped B-Lines – areas connecting the best habitats and opportunities for habitat creation for insects, particularly pollinators.<sup>3</sup> The aim is to enable insect population recovery and allow for adaptation to climate change. The B-Lines network within Greater Gwent is shown below. Work to identify Important Invertebrate Areas within Greater Gwent has also begun.

Invertebrate recording is covered in numerous ways, ranging from casual recording to targeted schemes run by specialist organisations and societies. Relevant recording schemes are discussed in individual chapters.

*B-Lines Network in Greater Gwent*



## Brown-Banded Carder Bee *Bombus humilis* (Illiger, 1806)

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**Protection:** None

**Conservation status:** S7 Priority Species

**Data availability:** Moderate (618 records)

**Context:** The Brown-Banded Carder Bee is the scarcest of the three all-ginger carder bumblebees, but is difficult to distinguish from the Common Carder Bee (*B. pascuorum*) and Moss Carder Bee (*B. muscorum*). They are found mainly in the south of England and Wales, in flower-rich habitats. They have a preference for clover (*Trifolium* sp), knapweed (*Centaurea* sp), Red Bartsia (*Odontites vernus*) and similar species.<sup>4</sup>

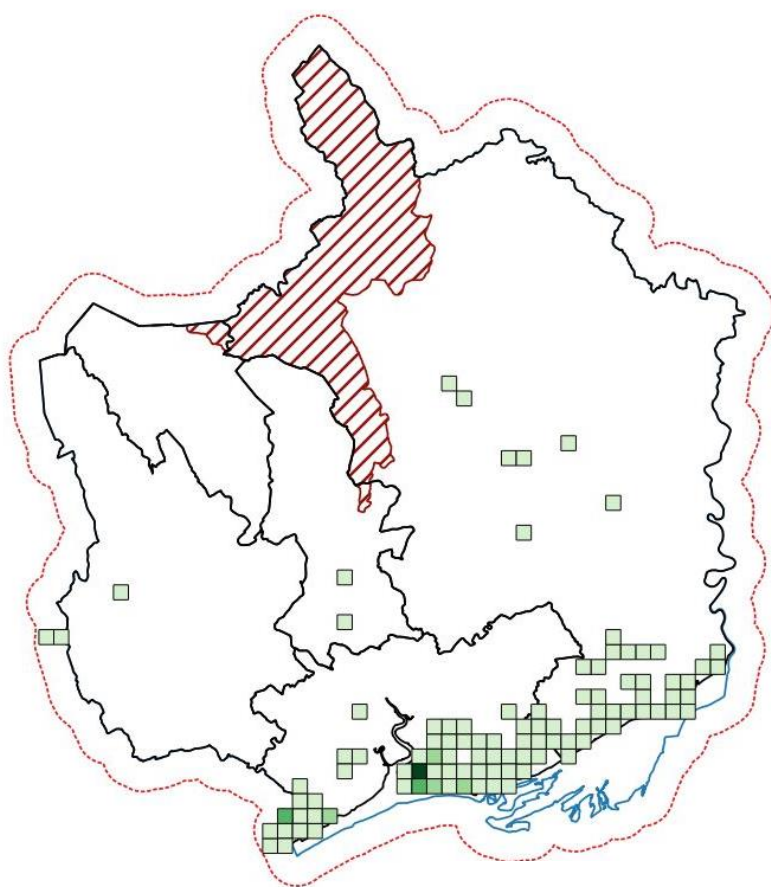
Little is known about Brown-Banded Carder Bee ecology or population trends, but they are thought to have undergone similar, though less extensive, declines to Shrill Carder Bees.<sup>5</sup> Pollinators generally are in serious decline. The UK Pollinator indicator (based on 377 species of bees and hoverflies) has declined by 30% since 1980, with almost half of the species becoming less widespread in the long term.<sup>6</sup> Declines are attributed to multiple pressures – habitat change, loss and fragmentation, disease, invasive non-native species, agro-chemicals and climate change.<sup>7</sup>

**Outlook:** A lack of available monitoring data in Wales means that population trends are currently difficult to determine. New projects such as Skills for Bees Cymru<sup>8</sup> and existing projects such as Pollinating the Levels<sup>9</sup> aim to increase participation in survey and monitoring activities, such as BeeWalk (the Bumblebee Conservation Trust's standardised national monitoring scheme), and improve available data and site management.

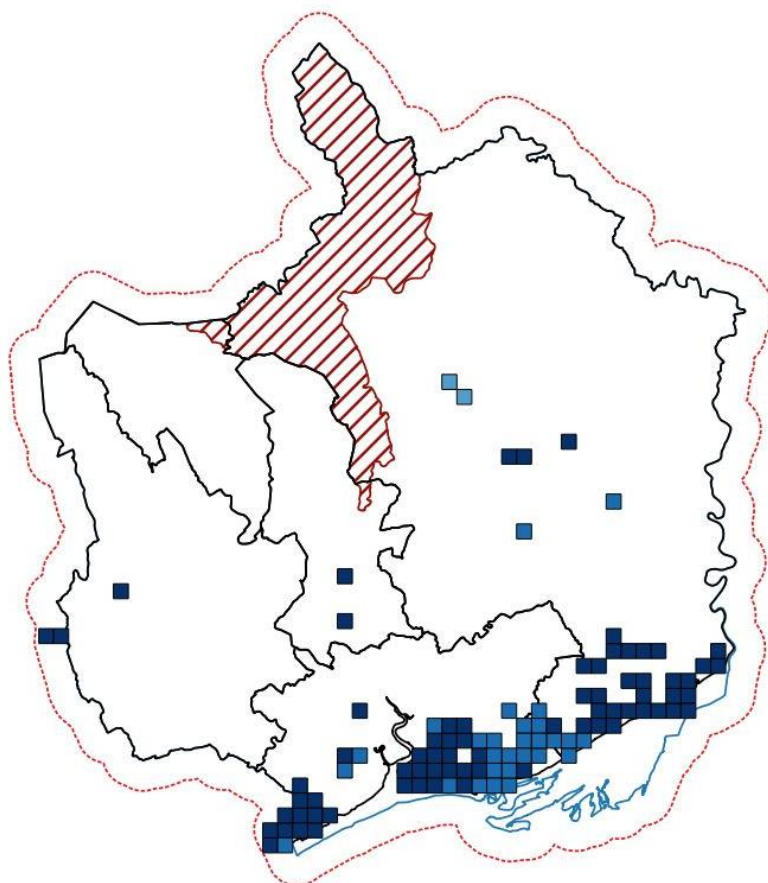
Additionally, actions arising from the Wales Action Plan for Pollinators<sup>6</sup> and Green Infrastructure Action Plan for Pollinators in South East Wales (GIAPP)<sup>10</sup> will also support Brown-Banded Carder Bee populations (see pollinator section).

**Greater Gwent range:** Brown-Banded Carder Bees are found across the Gwent Levels, in a similar pattern to the Shrill Carder Bee. However, the Brown-Banded Carder Bee is more widespread, found further inland and on smaller habitat patches than the Shrill Carder Bee, as it is thought to utilise a wider range of plants and be more tolerant of fragmentation.<sup>5</sup> The most northerly records are from Clytha Park in Monmouthshire, but these are also among the oldest records. More recent records away from the Levels include Penallta in Caerphilly, Kingcoed, Kitty's Orchard in Monmouthshire and Springvale in Torfaen. It is possible that the Brown-Banded Carder Bee is more widespread, and that records are limited by lack of expertise and survey effort.

*Density of Brown-Banded  
Carder Bee records, maximum  
74 records/km<sup>2</sup>*

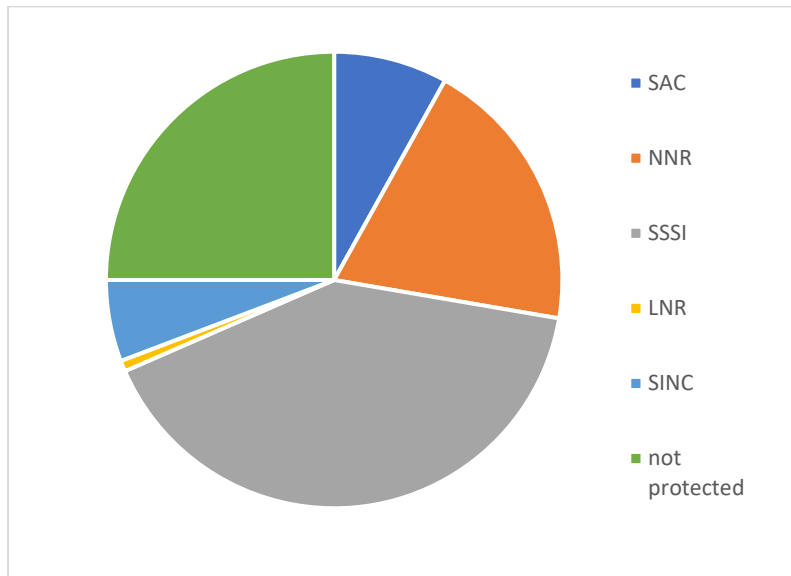


*Brown-Banded Carder Bee  
records by decade*



**Protection:** Three-quarters (75%) of records come from protected sites, with high numbers of records from the Gwent Levels SSSIs and Newport Wetlands NNR. SAC records are likely to be those close to the sea wall included in the Severn Estuary and Usk SACs. There are smaller numbers of records from Springvale and Llwyn Celyn LNRs, and SINC at Rogiet Country Park, The Minnetts and Sudbrook Mill.

*Brown-Banded Carder Bee records from protected sites*



## Coal spoil invertebrates

**Protection:** None

**Conservation status:** Various (see below)

**Data availability:** Moderate (3064 records)

**Context:** Colliery spoil is a unique feature within the landscape of the Gwent Valleys, formed from the overburden, waste material left over from coal mining. Colliery spoil was often discarded indiscriminately onto valley sides or hill tops, heaped into hummocks of every size and shape to create the colliery spoil tips that are so iconic of the South Wales Valleys. Many colliery spoil tips were simply left alone to naturally revegetate, and these tips are now among the most biodiverse habitats within the South Wales Coalfield.

Green Tiger Beetle  
(*Cicindela campestris*)



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The mosaic of different habitats and bare ground is particularly valuable for invertebrates, although colliery spoil tips also support a wide range of vascular plants, fungi and lichens.<sup>11</sup> Recent surveys of 15 colliery spoil sites in the South East Wales Valleys found over 900 invertebrate species, 22% of which were conservation priorities.<sup>12</sup> Individual sites have recorded over 100 invertebrate species.<sup>13</sup>

This section uses a short list of invertebrates commonly found on colliery spoil sites (although they can be found on other semi-natural habitats). Some species are considered Local Priorities in the Guidelines for the Selection of Wildlife Sites in South East Wales<sup>14</sup> or are considered National Priority Species. This is a tiny sample of the rich diversity of species found on colliery spoil – surveys carried out by the Colliery Spoil Biodiversity Initiative have found species from 164 different invertebrate families, including 90 bee species and 173 beetle species.<sup>12</sup> Numbers of records are clearly biased towards the more well-recorded groups: butterflies and dragonflies. Small Pearl-Bordered Fritillary, Dingy Skipper, Grayling, and Scarce Blue-Tailed Damselfly are all considered individually in other chapters, where their reliance on colliery spoil sites is shown.

Species	Common Name	SINC	Section 7 Species/UKBAP	Number of Greater Gwent records
<i>Bembecia ichneumoniformis</i>	Six-Belted Clearwing			35
<i>Boloria selene</i>	Small Pearl-Bordered Fritillary	✓	✓	514
<i>Bombus monticola</i>	Bilberry Bumblebee			57
<i>Cicindela campestris</i>	Green Tiger Beetle			106
<i>Cordulegaster boltonii</i>	Golden-Ringed Dragonfly	✓		359
<i>Erynnis tages</i>	Dingy Skipper	✓	✓	573



<i>Hipparchia semele</i>	Grayling	✓	✓	346
<i>Ischnura pumilio</i>	Scarce Blue-Tailed Damselfly	✓		178
<i>Melanargia galathea</i>	Marbled White			707
<i>Myrmeleotettix maculatus</i>	Mottled Grasshopper	✓		86

**Outlook:** A large programme of land reclamation was implemented in the 1970s and 1980s to remove, re-shape and level many of the old colliery spoil tips. This has left relatively few original tips, and those that remain are threatened with development, removal, exploitation for use as construction aggregate, inappropriate reclamation or ‘restoration’, or simply an absence of management.<sup>12</sup> Fortunately, the drive to reduce carbon emissions has removed the threat of coal extraction from these sites. Planning Policy Wales now states that ‘Proposals for opencast, deep-mine development or colliery spoil disposal should not be permitted.’<sup>15</sup>

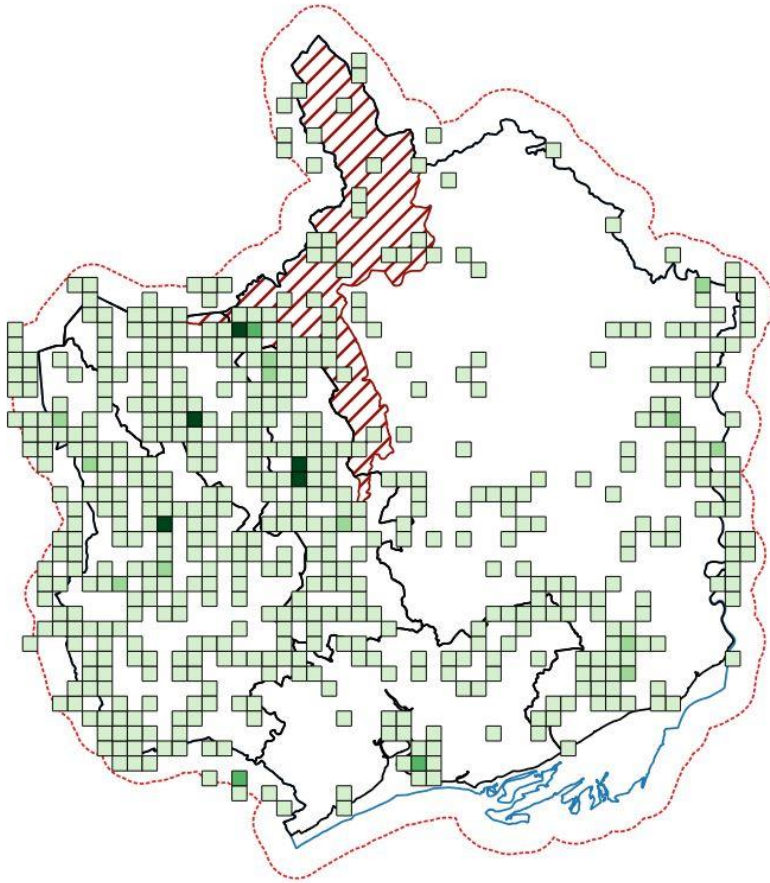
Along with other areas of the uplands, colliery spoil sites are vulnerable to landscape crime, including arson, fly-tipping and illegal off-roading. These can be hugely damaging to biodiversity, as well as negatively impacting amenity and recreation.<sup>16</sup> Various programmes are in place to tackle these issues.

Awareness of colliery spoil sites and their importance for invertebrates is increasing, helped by the Colliery Spoil Biodiversity Initiative and Buglife’s work on Brownfield sites. Open Mosaic Habitats on Previously Developed Land, which include colliery spoil, were made a UKBAP Priority Habitat in 2007, and are now a Wales S7 Habitat. However, relatively few sites have been surveyed thoroughly for invertebrates, meaning that they are less likely to be recognised and protected.

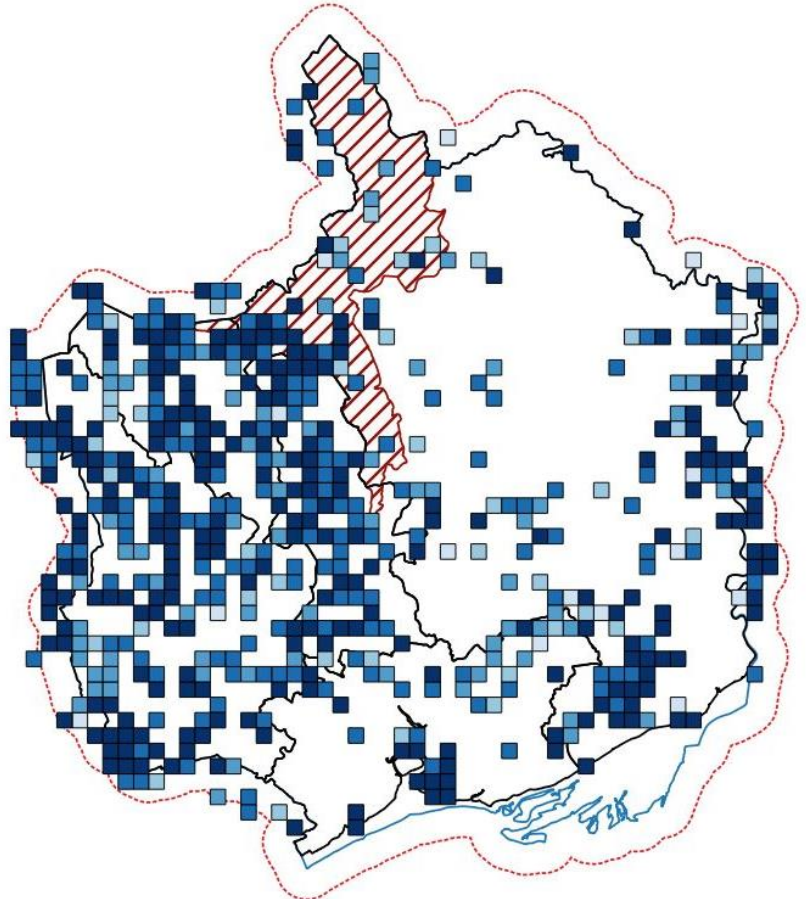
**Greater Gwent range:** These invertebrate species are found across Greater Gwent, but there is a greater concentration within the valleys to the north-west of the study area, corresponding to the South Wales Coal Measures. Note that very few targeted invertebrate surveys have taken place within the study area (most work by the Colliery Spoil Biodiversity Initiative has taken place further west). Recording hotspots correspond to protected sites such as Silent Valley SSSI/LNR and Aberbargoed Grasslands SAC/NNR, as well as the UK Butterfly Monitoring Scheme site at Black Rock. The area around The British and Blaenserchan Valley has been subject to numerous development proposals, leading to additional survey effort. Most areas have recent records, possibly due to the growing interest in colliery spoil sites.

Diversity hotspots are not always associated with the highest recording effort. The most diverse areas are Garn Lakes (forming an extensive area with the surrounding areas of Coity Tips and Canada Tips), The British & Blaenserchan Valley, and the Rhyd y Blew area to the north of Ebbw Vale. Rhyd y Blew is not a colliery spoil site but a series of engineered plateaus that share many characteristics of colliery spoil, such as bare ground and shallow pools. Other diverse areas (including other post-industrial sites and colliery spoil) include Ffos y Fran/Gelligaer Common, Cymynyscoy Quarry, Parc Penallta/Nelson Bog, Aberbargoed, Caerwent, Trellech Quarry, Central Valley and Silent Valley.

*Density of colliery spoil  
invertebrate records,  
maximum set to  
 $\geq 100/\text{km}^2$*

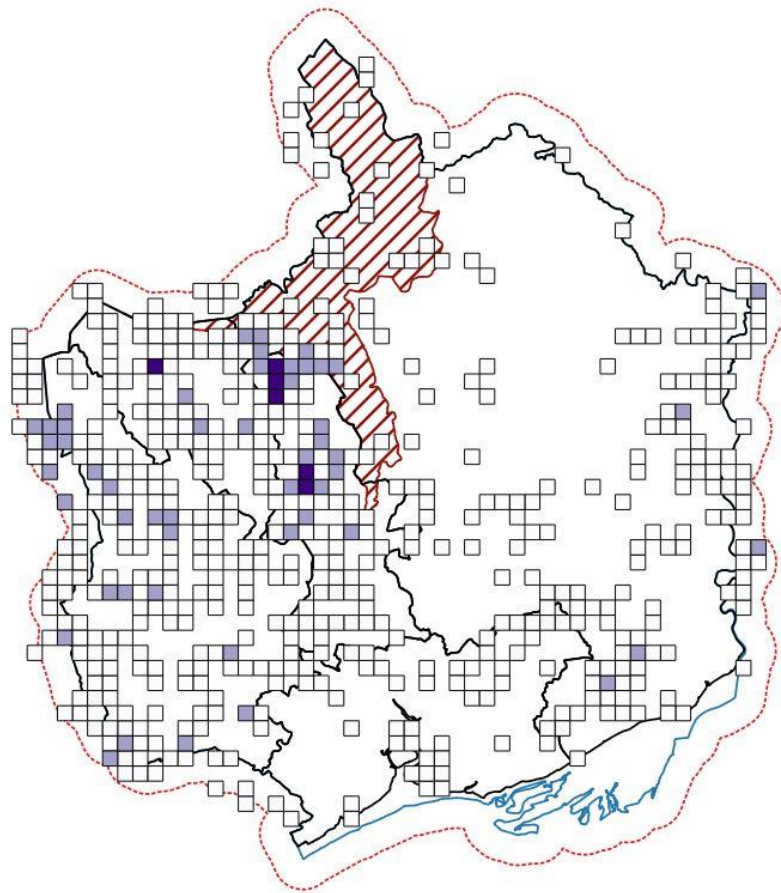
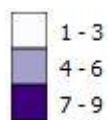


*Colliery spoil invertebrate  
records by decade*

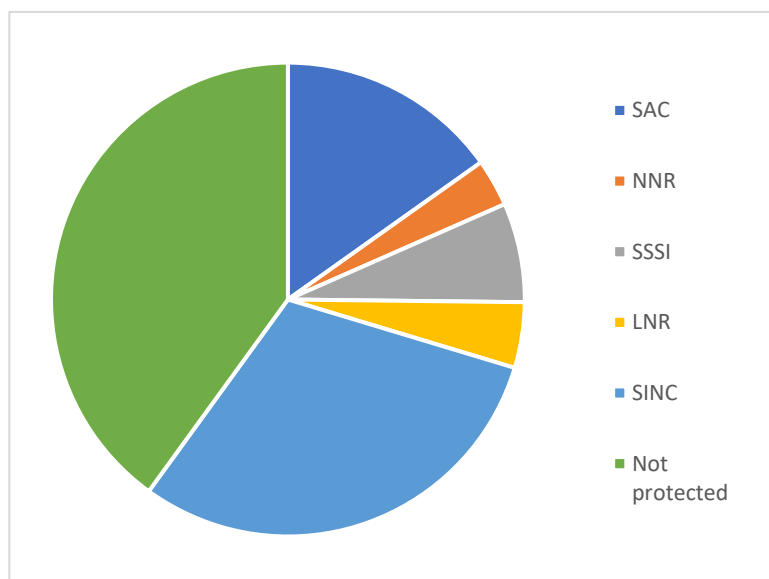




### Diversity of colliery spoil invertebrates



**Protection:** 60% of records come from protected sites, with high numbers of records from Aberbargoed Grasslands SAC/NNR and Blackrock (within the Usk Bat SAC). SSSI records come from a range of sites including the Bloreng, Silent Valley, Llandegfedd, Penllwyn Grasslands and Nelson Bog. The SINC records come from a large number of sites, particularly the large upland SINC that cover much of the eastern valleys area.



*Colliery spoil invertebrate records  
from protected sites*

## Gwent Levels aquatic invertebrates

**Protection:** None, although protection conferred by SSSI designation.

**Conservation status:** See below

**Greater Gwent data availability:** Poor

**Context:** The Gwent Levels are a historic landscape, containing a network of drainage ditches known as reens; there approximately 870 miles of ditches across the entire Levels.<sup>17</sup> The area is divided into seven SSSIs and the Newport Wetlands NNR, and is divided by the River Usk SAC and the city of Newport and bounded by the Severn Estuary SAC/SPA. The Gwent Levels SSSIs are notified for the diversity and rare species of plants and invertebrates in the reens, as well as the presence of Shrill Carder Bee. Magor Marsh is also designated for its fen habitat and breeding birds, with Newport Wetlands also of importance for birds.



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Rare and notable species found within the Gwent Levels ditches include Silver Colonel Soldier Fly (*Odontomyia argentata*), Great Silver Water Beetle (*Hydrophilus piceus*), Hairy Dragonfly (*Brachytron pratense*), Variable Dameslefly (*Coenagrion pulchellum*), Ornate Brigadier (*Odontomyia ornata*), *Physa heterostropha* (a freshwater snail), *Halipus mucronatus* (a crawling water beetle) and *Hydaticus transversalis* (a water beetle).

It is the length and variation available within the ditch network that provides so many opportunities for different invertebrates; the reens can be shallow or deep, light or shaded, open water or full of plants. The reens undergo a regular maintenance programme of clearing, de-silting and casting (dredging) that provides an ongoing cycle of successional stages for the freshwater community. The data in this section is a summary and visual representation of the survey work carried out between 2009 and 2012 on behalf of the Countryside Council for Wales to monitor the invertebrate interest of the Gwent Levels SSSIs, rather than individual species records.<sup>18,19,20</sup>

The table below lists the numbers of freshwater invertebrate species found within each SSSI:

SSSI	Number of recorded freshwater invertebrate species on SSSI citation	Number of Species found by survey <sup>18,19,20</sup>
Magor & Undy <sup>17,21</sup>	>300 (43 nationally rare & notable)	148 (12 nationally rare & notable*) in 49 reens & field ditches
Rumney & Peterstone <sup>22,23</sup>	>164	
Nash & Goldcliff <sup>24,25</sup> (including part of Newport Wetlands)	>350	
Redwick & Llandeenny <sup>26,27</sup>	>200	101 species (8 nationally rare & notable*) in 24 reens
St Brides <sup>28,29</sup>	>200	

Whitson <sup>30,31</sup>	>400 (65 nationally rare & notable)	90 (8 nationally rare & notable*) in 24 reens
Magor Marsh <sup>32</sup>	No details given, although the aquatic invertebrate assemblage is a feature.	

\*Listed in Red Data Book or Nationally Scarce

**Outlook:** The Countryside Council for Wales (CCW) reports<sup>18,29,20</sup> state that diversity in the Gwent Levels reens is generally low compared to other grazing marsh ditches in Britain, such as the Somerset Levels. Although the surveys did not sample every reen, overall species richness and numbers of rare and notable species were low when compared with the SSSI citations. It is generally thought that there are 144 rare and notable invertebrates found in the reens (it is unclear where this figure originally came from), but the surveys only found 19 in total. Some species have been downgraded in recent iterations of the Red Data Books,<sup>19</sup> but this would not account for all of the missing species.

The reports indicate that this low level of diversity and species quality is part of an ongoing decline since the 1980s. The most significant possible cause is eutrophication from farm run-off, leading to an abundance of duckweed (*Lemna* spp.) and algae. This shades out the submerged macrophyte vegetation that many species feed on. Additionally, *Lemna* makes sampling more difficult and can lead to species being overlooked.<sup>28,19,20</sup>

A second factor is the regularity and type of ditch clearance. Too much clearance can result in less availability of species rich, late-successional habitat, which takes time to develop. The angle of the banks can also affect the availability of shallow water margins, favoured by many species.<sup>18,19,20</sup> Conversely, lack of reen maintenance can also result in poor habitat quality, with over-shading or silting also limiting biodiversity. Individual landowners are responsible for management of over 85% of the reen and ditch system,<sup>17</sup> so reen management can vary enormously.

These concerns are consistent with the pressures widely faced by freshwater invertebrates, particularly habitat loss, poor habitat quality and pollution. Smaller water bodies, such as ponds and ditches, have less protection and regulation, but are more vulnerable to losses, and are affected by climate change to a greater degree.<sup>2</sup>

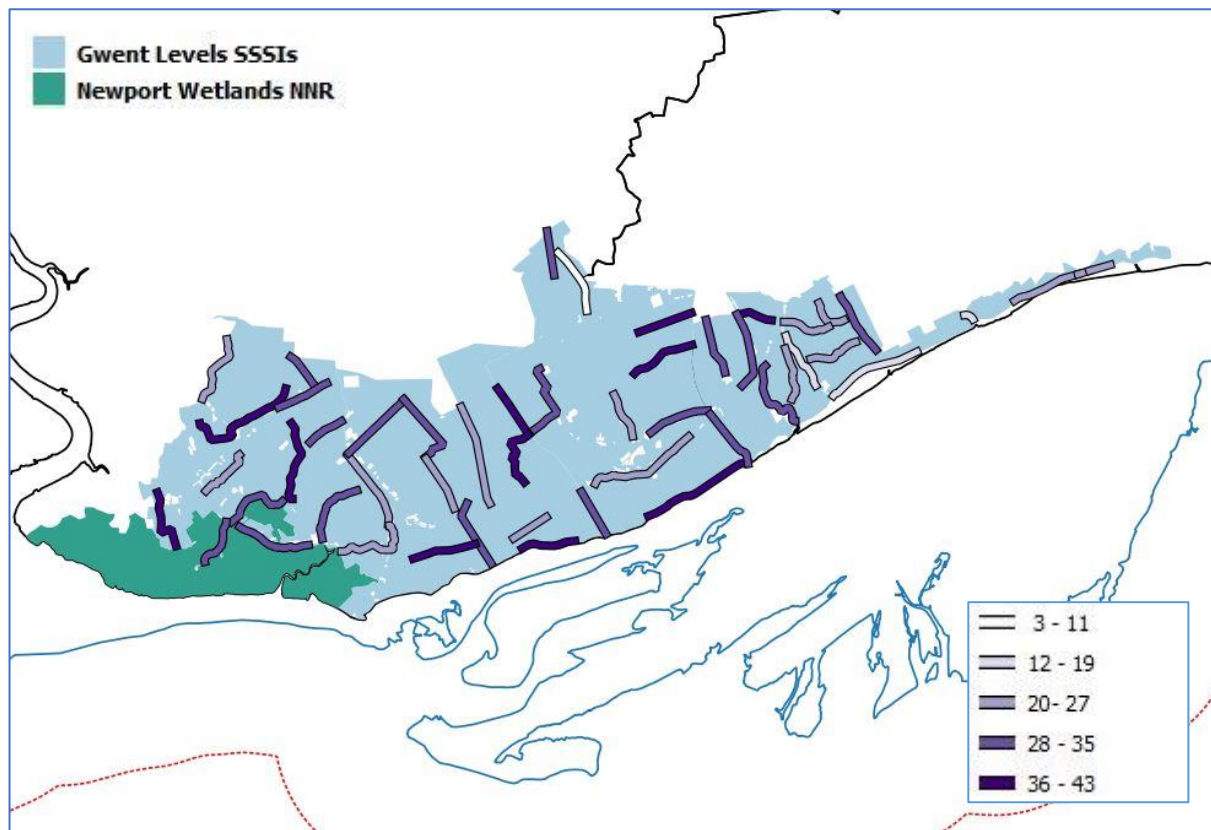
The Living Levels Partnership is currently working to restore some of the ditch network, as well as working with landowners and raising awareness of the importance of the reens.<sup>33</sup>

**Greater Gwent range:** The CCW surveys measured the species richness and Species Quality Index (SQI) of a sample of reens across the Gwent Levels. Species quality is measured by a scoring system for rarity, according to a standard methodology produced by Buglife.<sup>33</sup> Common species score 1, Nationally Rare or Scarce species score 3 and Red List species score 5. The SQI is calculated by dividing the total score by the number of species found.

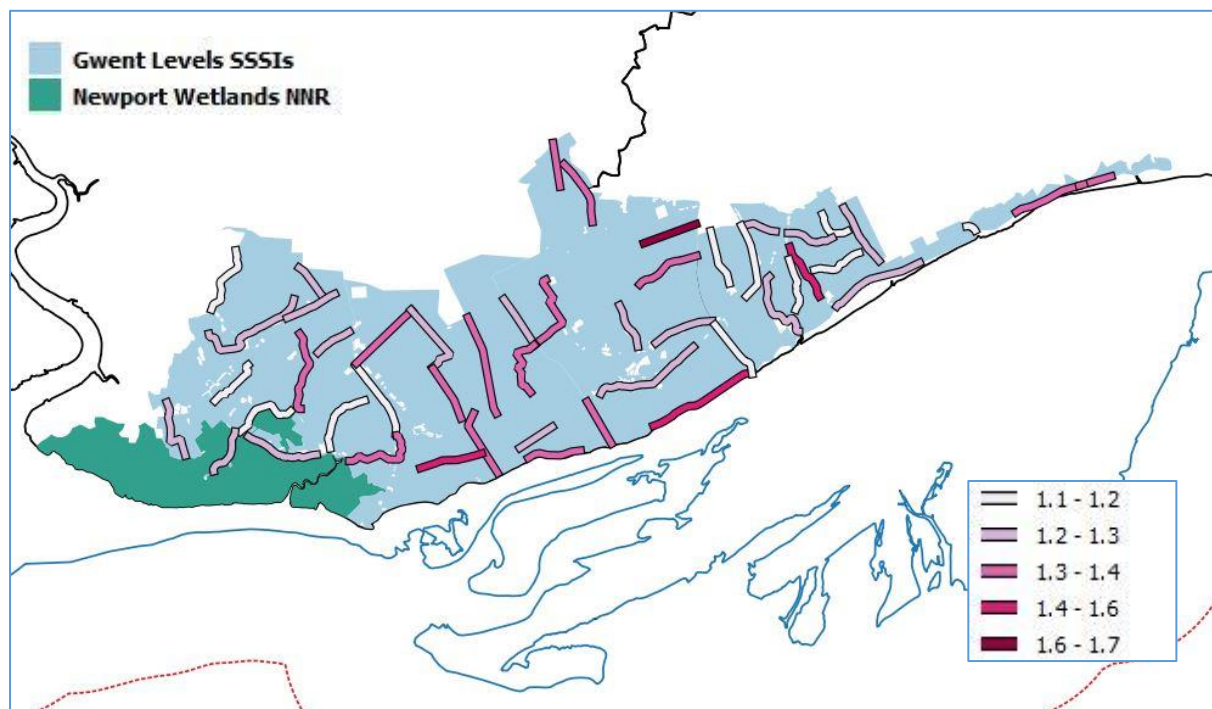
The maximum species richness for any surveyed reen is 43, although many reens and ditches fall within the higher categories of species richness. Reens with lower species richness tend to be towards the edges of the SSSIs. This is far below the overall species richness found by the survey, demonstrating that the high levels of diversity are spread throughout the reen network.

In contrast, very few reens have a high SQI score. Just four reens scored above 1.5, with the maximum being 1.68. This shows that the rarest invertebrates are found in relatively few reens. Undoubtedly the condition of individual reens will have changed since the CCW surveys were carried out, but it is important to bear in mind that while overall diversity is spread across the Gwent Levels, the rare species are not, and both these elements of assemblage and individual species are key features of the Levels SSSIs.

*Species richness of surveyed reens and ditches – Eastern Levels*

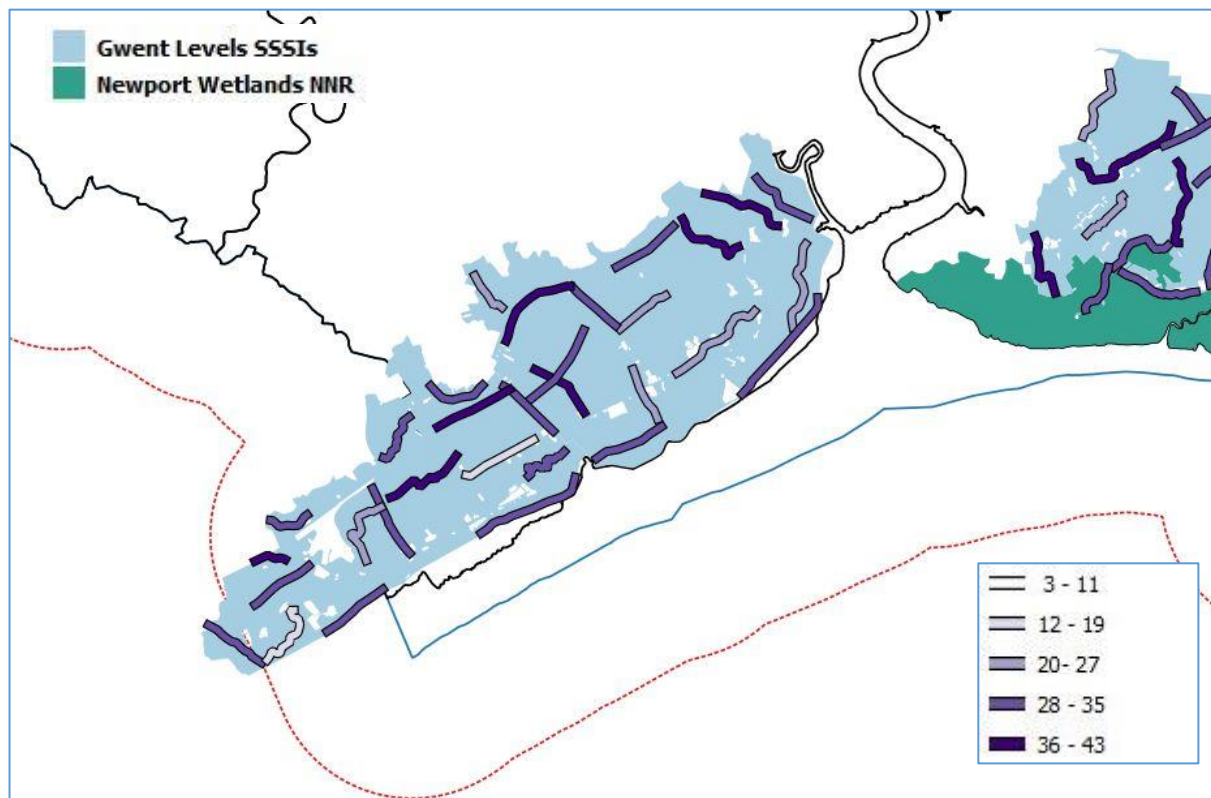


*Species Quality Index of surveyed reens and ditches – Eastern Levels*

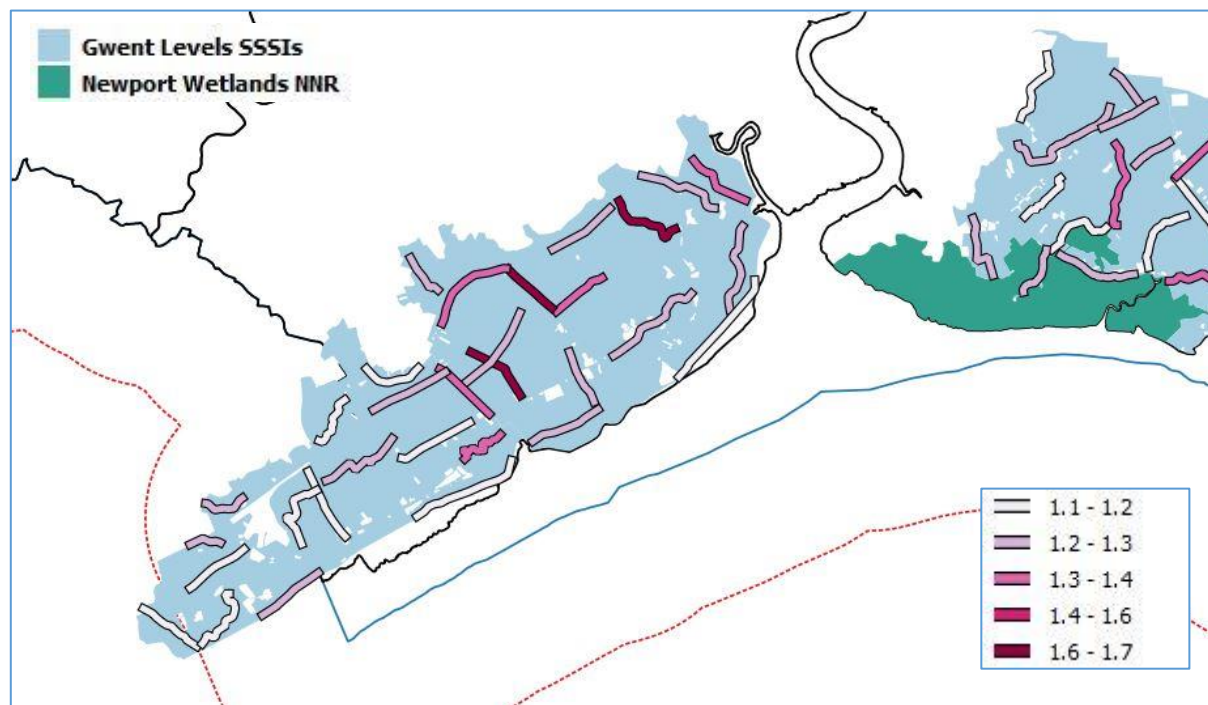




*Species richness of surveyed reens and ditches – Western Levels*



*Species Quality Index of surveyed reens and ditches – Western Levels*



## Pollinators

**Protection:** none

**Conservation status:** The pollinators considered here are S7 Wales Priority Species, but not all pollinators are listed.

**Data availability:** Moderate (30,706 records for 101 species)

**Context:** Pollinators are a fundamental part of our ecosystems: 87.5% of the world's wild flowering plants and more than 75% of global food crops are pollinated by insects and other plants.<sup>34</sup> The value of pollination as a contribution to the UK crop market was £430 million per annum (in 2007).<sup>35</sup> Insect pollinators include bees (both wild bees and farmed honeybees), wasps, flies (especially hoverflies), butterflies and moths. It is important to note that although the honeybee (*Apis mellifera*) is an important pollinator for a number of crops and economically important for wax and honey products, it is just one of around 4,000 species of insect that provide pollination.<sup>36</sup> Some plant species are only pollinated by specialist species, while other crops benefit from being pollinated by a wider diversity of species,<sup>34</sup> so it is crucial to maintain wild pollinator abundance and diversity.



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Pollinator decline is therefore a very serious issue. The UK Pollinator indicator (based on 377 species of bees and hoverflies) has declined by 30% since 1980, with almost half of the species becoming less widespread in the long term.<sup>6</sup> Of those species where a long-term trend could be calculated, 41% of moths<sup>37</sup> and 57% of butterflies<sup>38</sup> have declined in abundance since the mid 1970s. In Wales, honeybees have declined by 23% between 1985 and 2005.<sup>7</sup> Declines are attributed to multiple pressures: habitat change, loss and fragmentation, disease, invasive non-native species, agro-chemicals and climate change.<sup>7</sup>

This section uses the pollinator species listed on the S7 Priority Species list, 101 of which have records within the study area. There is a bias on the S7 list towards moths and butterflies, compared to bees, wasps and hoverflies; this may be due to historic interest and data availability, rather than there being fewer species of bee, wasp or hoverfly in decline or at risk. Note that due to the size of the dataset, this section does not include English records from HBRC, GERC or NBN.

**Outlook:** Considerable efforts are being made to conserve pollinators. The Welsh Government launched its Action Plan for Pollinators (the first of its kind in the UK) in 2013.<sup>7</sup> The plan focuses on four themes: policy, governance and evidence; diverse and connected habitats; healthy pollinator populations; and raising awareness. Successes arising from the action plan include the establishment of the Wales Pollinator Task Force and the national Caru Gwenyn/Bee Friendly initiative, which launched in 2016.

Pollinator populations are now more closely monitored through the UK Pollinator Monitoring Scheme run by UK Centre for Ecology and Hydrology (UKCEH) and numerous casual and structured recording schemes through the Bee, Wasp and Ants Recording Society, Butterfly Conservation (see Lepidoptera section for more details), Bumblebee Conservation, Buglife and Plantlife.

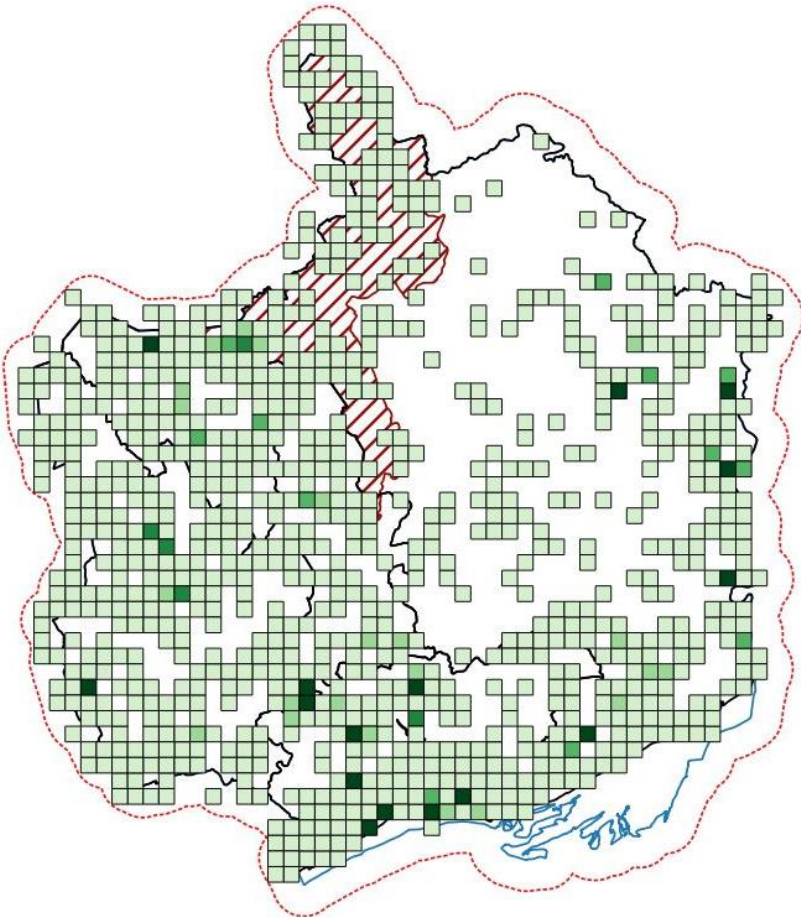
More locally, the award-winning Green Infrastructure Action Plan for Pollinators in South East Wales (GIAPP)<sup>10</sup> was launched in 2015. Monmouthshire was one of the first counties to achieve Bee Friendly status, and Newport is currently working towards becoming a Bee Friendly city. Pollinator work has involved local authorities and the third sector, as well as housing associations, schools and community groups, carrying out activities such as wildflower planting and habitat management.

Pollinator conservation has natural synergy with other conservation initiatives, and work on wildflower meadows, roadside verges, traditional orchards, school and church grounds, and wildlife-friendly farming will all be beneficial for pollinators. Equally, pollinator conservation is likely to improve habitat and connectivity for other species. It is probably too early to tell if this work is having a positive impact: the UK pollinator index is currently showing little change in the short term, although more species are now increasing in distribution compared to the long-term trend.<sup>6</sup>

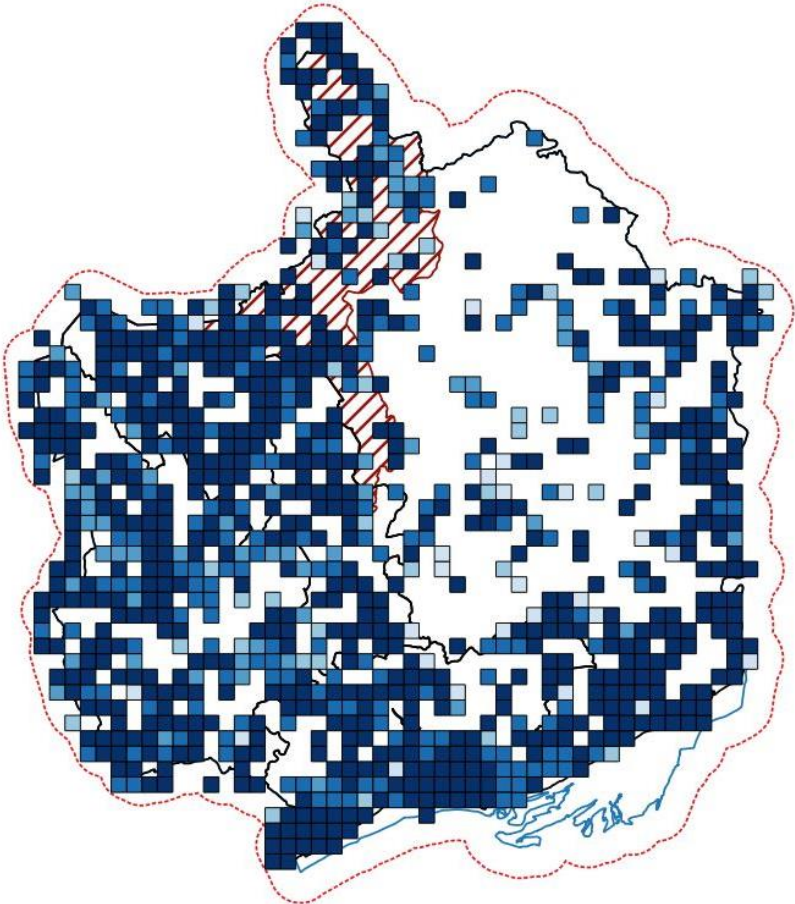
**Greater Gwent range:** The S7 pollinators are found widely, but thinly, across Greater Gwent, with many recent records. However, with a large number of species, there is huge variation: 10 species have less than 5 records within 50 years, and 8 species have more than 1,000 records. The average is 304 records, with the bee and wasp species generally having fewer records than the lepidoptera.

The 'pinprick' pattern of record density and species richness is reflective of recording bias, where specialist recorders make considerable efforts at certain sites. These are sometimes sites known for their invertebrate or overall interest, such as the UKBMS site at Blackrock, Newport Wetlands NNR and Pentwyn Farm SSSI, but recording bias can also reflect long-term recording effort in recorders' gardens. Also of note is the lack of records in central Monmouthshire, which reflects the general recording bias within the study area but is of particular relevance as most of the local agricultural industry is located here.

Density of S7 pollinator records, maximum  $\leq 500$  records/km<sup>2</sup>

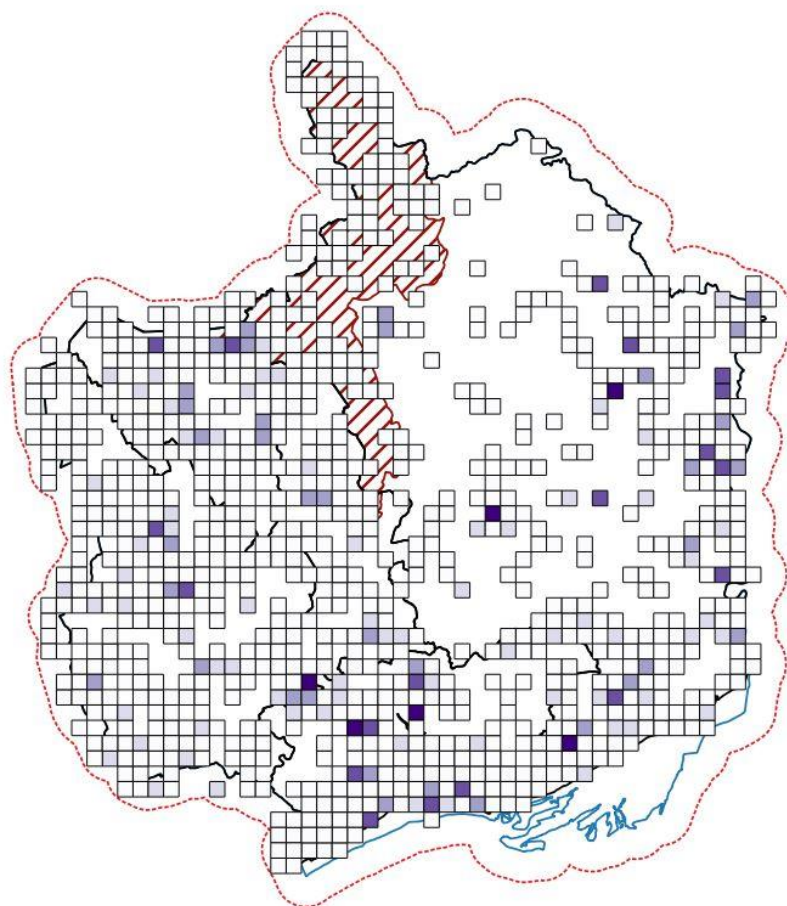
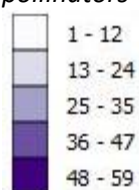


S7 pollinator records by decade



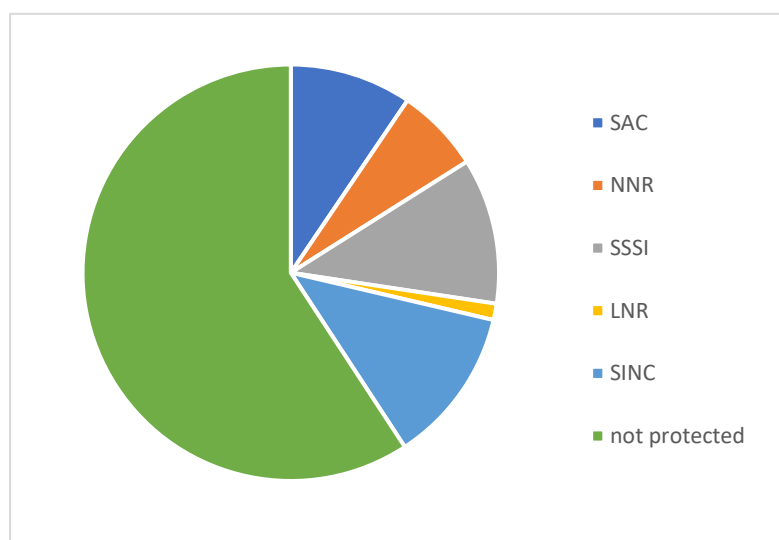


### Species richness of S7 pollinators



**Protection:** 41% of records come from protected sites, with high numbers of records from the Gwent Levels SSSIs and Newport Wetlands NNR. Other key sites include Aberbargoed SAC, Pentwyn Farm SSSI, Silent Valley SSSI/LNR and Blaenserchan Valley SINC. As with overall record distribution, records from protected sites are likely to be biased towards sites favoured by recorders.

### S7 Pollinator records from protected sites





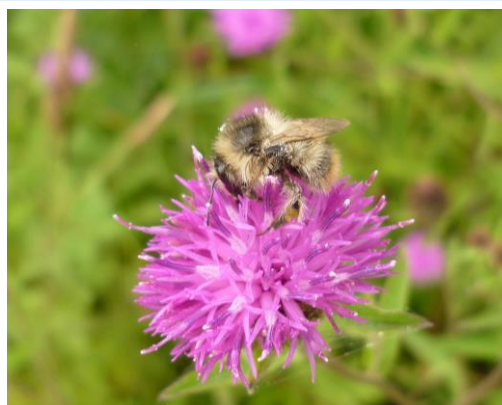
## Shrill Carder Bee *Bombus Sylvorum* (Linnaeus, 1761)

**Protection:** None

**Conservation status:** UKBAP Priority Species, Wales Section 7 Priority Species

**Data availability:** Good (1,012 records)

**Context:** Shrill Carder Bees are one of the rarest bumblebees in England and Wales. Historically they were relatively widespread throughout Southern England and lowland Wales but are now believed to be restricted to just five isolated areas, three of which are in South Wales. The reasons for this significant decline in distribution are not fully understood but are thought to be linked to habitat loss and fragmentation.<sup>39</sup> Shrill Carder Bees require extensive mosaics of flower-rich habitat for feeding, close to tussocky grassland for nesting, as they do not forage far from the nesting sites and are thought to have low dispersal ability. Colonies are relatively small, consisting of 50–70 workers and their queen. Shrill Carder Bees normally fly between May and September.<sup>40</sup>



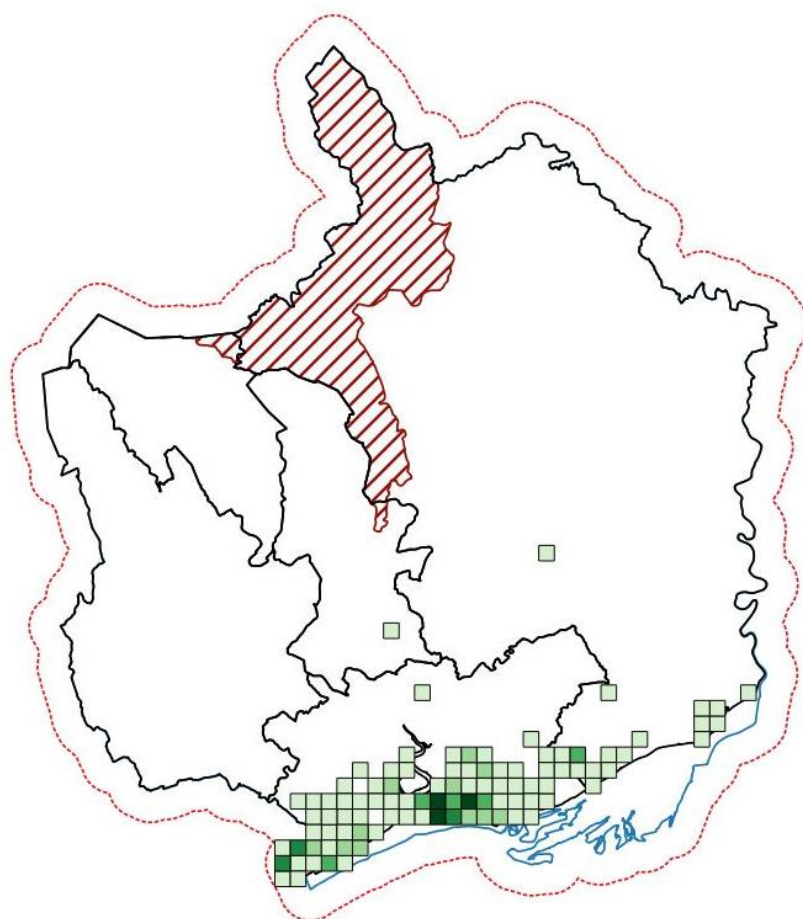
Gabi Horup

**Outlook:** Shrill Carder Bees are still threatened by inappropriate habitat management, development and changes in land-use, and landscape-scale conservation work is required to restore populations. A lack of available monitoring data in Wales means that population trends are difficult to determine.

The Gwent Shrill Carder Bee population is thought to be one of the most significant of the five remaining populations. The Gwent Levels population is thought to be at highest risk from inappropriate management, development, insecticide usage and extreme weather events associated with climate change.<sup>39</sup> Through new projects such as Skills for Bees Cymru<sup>8</sup> and existing projects such as Pollinating the Levels,<sup>9</sup> work is ongoing to increase participation in survey and monitoring activities such as BeeWalk (the Bumblebee Conservation Trust's standardised national monitoring scheme) and improve available data and site management.

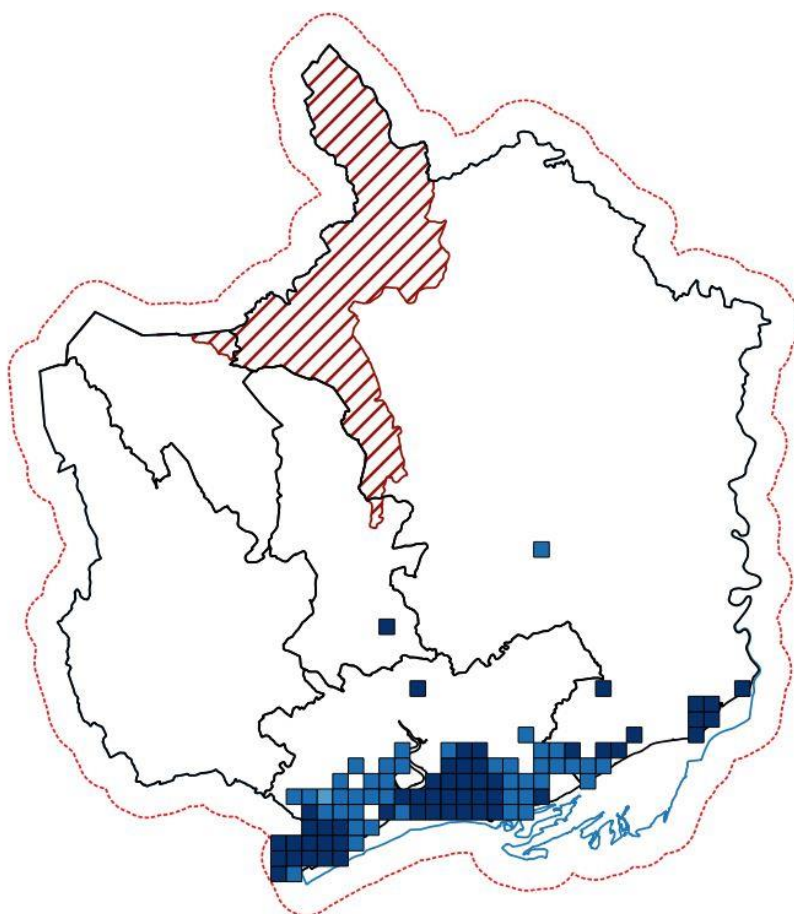
Due to the serious declines of the species, a 10-year conservation strategy (2020–2030) for England and Wales has been produced with a range of partners and stakeholders. The strategy aims to prevent further losses, increase habitat resources and populations, improve knowledge and understanding, and raise awareness.<sup>41</sup> Additionally, actions arising from the Wales Action Plan for Pollinators<sup>42</sup> and Green Infrastructure Action Plan for Pollinators in South East Wales (GIAPP)<sup>10</sup> will also support Shrill Carder Bee populations (see pollinator section).

**Greater Gwent range:** Shrill Carder Bees are found across the south of the study area and are strongly associated with the Gwent Levels. Most records are recent, as the population was only found in 1998 by Mike Pavett, who spotted them while carrying out surveys on the Gwent Levels.<sup>43</sup> Subsequent surveys carried out by the Countryside Council for Wales and National Museums & Galleries of Wales in 2003 found them to be widespread in the central and west of the Gwent Levels, as far as the outskirts of Cardiff, and inland to the edges of Newport, with some sites hosting over 100 workers.<sup>43</sup> Surveys to determine the eastern extent of the population in 2010 found Shrill Carder Bees as far east as Portskewett and the edge of Chepstow, albeit in smaller numbers and not as far inland.<sup>43</sup>



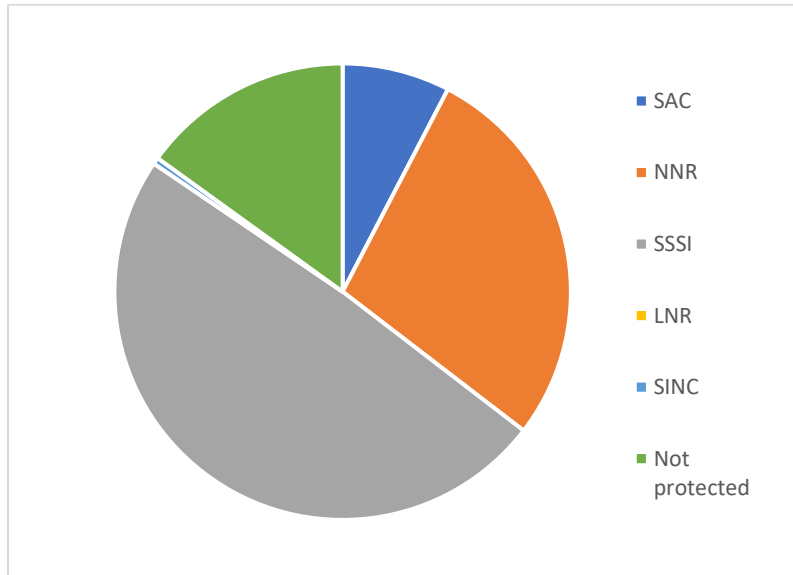
*Density of Shrill Carder Bee records, maximum 58 records/km<sup>2</sup>*

*Shrill Carder Bee records by decade*



**Protection:** 85% of Shrill Carder Bee records come from protected sites within the Gwent Levels Area: the Severn Estuary SAC, Newport Wetlands NNR, and the Gwent Levels SSSIs. As a result of the extensive survey work, Shrill Carder Bees have been added as a qualifying feature on six of the eight Gwent Levels SSSIs.<sup>44</sup>

*Shrill Carder Bee records from protected sites*



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