Greater Gwent

STATE OF NATURE

100 STORIES OF OUR WILDLIFE

Ariennir gan
Lywodraeth Cymru
Funded by
Welsh Government

Compiled by:

Technical Ecology

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SEWBReC
SOUTH EAST WALES BIODIVERSITY RECORDS CENTRE
CANOLFAN GOFNODION BIOAMRYWIAETH DE DDWYRAIN CYMRU

On behalf of:

A Resilient Greater Gwent

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Caiff y prosiect ei gyllido drwy Grant Galluogi Adnoddau Naturiol a Llesiant Llywodraeth Cymru drwy raglen gwaith 'Gwent Fwyaf Gydnerth'. Mae'r rhaglen yn parhau tan haf 2022 ac mae'n gweithio i sicrhau De Ddwyrain Cymru lle mae adferiad mewn natur a chymunedau cynaliadwy yn gwerthfawrogi eu tirluniau a bywyd gwyllt ac yn cymryd rhan ar gyfer eu hiechyd a'u llesiant eu hunain.

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Front Cover: Common Toad, Common Clubtail, Reed Warbler, Common Lizard and Hedgehog. All images by Andy Karran. Cover design by Jacqui Whitehouse.

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This report is dedicated to all those who collect, verify and curate biological data; those who go out hunting obscure species in inhospitable places and inclement weathers, those who sift and sort through barely legible field notes, and those who champion detail and accuracy; without you, we would know nothing.

Contents

Foreword

In 2013, a collaboration of 25 nature conservation and research organisations produced the first UK State of Nature.[1] Described as a 'health check of nature', it compiled quantitative data on over 3,000 species, across eight broad habitat types, to give the first authoritative assessment of the biodiversity of the UK and UK overseas territories.

The picture was sobering and alarming. More species were declining than increasing. Habitat loss was widespread, and those habitats that remained were degraded. More than one in ten species assessed using Red List criteria were thought to be under threat of extinction in the UK.

Amazingly, the authors were positive. The scope and quality of the State of Nature data was testament to the power of collaborative working, as well as the dedication of thousands of conservation professionals and volunteers. They hoped that by highlighting nature's disappearance, greater efforts would be made to save it.

Subsequent State of Nature reports in 2016 and 2019 show that little has changed. Of the species assessed in 2019, 15% were threatened with extinction, and the UK will not meet most of its 2020 Aichi targets for biodiversity recovery.[2] However, the collective response for nature is growing: there are massive increases in areas designated for protecting nature, air pollution continues to decrease, and conservation volunteering is at an all-time high.

Our knowledge and understanding of nature are also increasing. The number of species assessed in the State of Nature has grown from just over 3,000 to over 8,400. Equally, the number of people and organisations involved in the State of Nature, and wildlife recording in general, is higher than ever.

Several efforts have also been made to distil this wealth of biodiversity data down to regional and local levels in order to guide conservation efforts on the ground. Given that funding for nature conservation is always limited, it is vital that any action is prioritised and targeted to give maximum results, and that we monitor the effectiveness of our actions.

This is just one of such efforts.

Aims

This report aims to describe what is known about the status and trends of a selection of species within Greater Gwent, and the threats affecting them. Species are both a component and product of our ecosystems, so looking at what is happening to individual species can indicate what is happening within the wider environment. The species included are a wide selection from different groups and different habitats, chosen with the aim of providing a snapshot that represents much of the biodiversity that is to be found within this diverse region.

A secondary aim of this report is to examine the availability of biological data at the regional level; to demonstrate what can be shown with the wealth of data that has already been collected; and to highlight where there are knowledge gaps or data issues. This report, therefore, is as much a 'State of data' analysis, as a State of Nature.

It is hoped that this report will be used by conservation practitioners, policy makers and recorders for:

- planning conservation projects, in terms of location, focus or activity
- providing a baseline to assess the effectiveness of conservation work
- demonstrating the need for policy change and action
- targeting recording to fill evidence gaps
- awareness raising and education.

Finally, this report uses biological data to show broad, regional-scale species status and trends. Recorders and practitioners are encouraged to explore further and find ways that existing biological data can support their work, as well as generating and sharing new data.

Ecosystem resilience

Ecosystem resilience has been defined in Wales as 'the capacity of ecosystems to deal with disturbances, either by resisting them, recovering from them, or adapting to them, while retaining their ability to deliver services and benefits now and in the future'.[3]

Resilience is difficult to directly assess because ecosystems are complex and dynamic, the responses to disturbances vary greatly in scale and duration, and many of the underlying mechanisms are not understood. This can be overcome by using four ecosystem attributes of diversity, extent, condition and connectivity and their emergent properties as proxies for resilience (see figure 1).

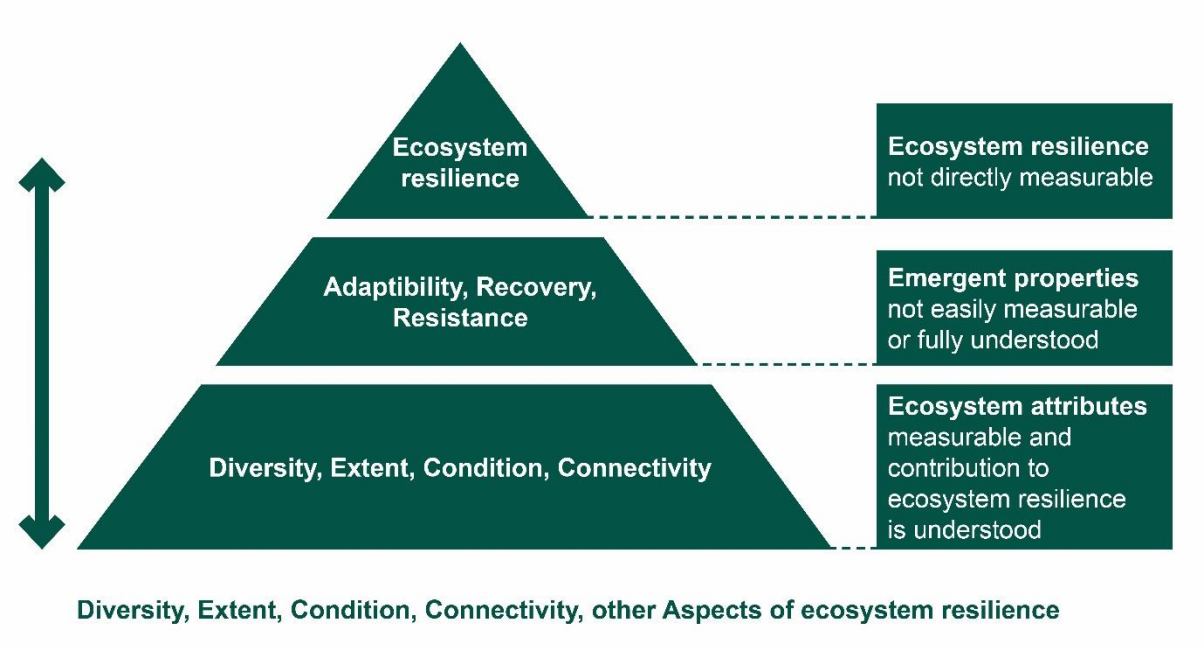


Figure 1: DECCA framework showing the relationship between the attributes and the emergent properties of resilience.

Diversity matters at every level and scale, from genetics to species, and from habitats to landscapes. The size of an ecosystem (**extent**) will affect its capacity to adapt, recover or resist disturbance. Fewer species can survive in a smaller patch, and the demography of species is altered when habitat is lost, leading to species loss and ecosystem decay. The **condition** of habitats is affected by multiple and complex pressures that affect the resilience of ecological communities and their capacity to resist, persist or recover. **Connectivity** refers to the links between and within habitats and for any given species; connectivity is related to the relative distance that species can move to feed, breed and complete lifecycles that may need different environments. Connectivity is a major driver for spatial variation which affects diversity and the abundance of living organisms. The ability to adapt, resist or recover from pressures or demands on the ecosystem is an emergent property of the four attributes.

Ecosystem resilience is core to the new, integrated approach to the environment, which is based on the flow from ecosystems, through ecosystem services and benefits, to well-being. Sustainable Management of Natural Resources (SMNR) is the means by which the Welsh environment is managed to achieve this flow, and resilience is the property of ecosystems that allows the flow to persist in the face of impacts and change.

Assessment of Ecosystem Resilience in Wales: The Natural Resources Wales (NRW) State of Natural Resources Report 2020 (SoNaRR) found that resilience is low to moderate across all ecosystems in Wales.[4] The main pressures and demands bearing down on the quality of ecosystem resilience and services are:

- habitat loss and deterioration
- climate change
- pollution
- invasive non-native species, pests and diseases
- over-exploitation.

Actions to build ecosystem resilience and aid species recovery: The speed and success of nature recovery and species climate-change adaptation will mainly depend on actions that maintain or enhance all four attributes of resilience (Figure 1). The Welsh Government National Natural Resources Policy recommends the maintenance and restoration of Resilient Ecological Networks ats a landscape-scale approach to building ecosystem resilience.[5] Effective Resilient Ecological Networks are defined as connected landscape features that:

- have networks of habitat in good ecological condition that link protected sites and other biodiversity hotspots across the wider landscape
- enable the movement of species across landscapes to fulfil their life cycle or respond to climate change
- provide important ecosystem services and maximum benefit for well-being.

Networks of integrated habitats create permeable landscapes that support species with different range capacity and niche requirements for each stage of their lifecycle. In general, effective habitat management and creation will sustain larger populations of species. However, for certain species, specific management measures within the network may be necessary to improve species populations. For example, mobile species can often require a combination of elements within a landscape to survive.

Assessment of ecosystem resilience in Gwent: The SoNaRR 2020 assessed ecosystem resilience at a national level. No analysis has been made at a regional level, but many of the species and habitats recorded across Wales are found in Gwent, along with the same five key pressures that will be impacting on ecosystem resilience across the region.

Species form the building blocks of ecosystems. Species distribution and abundance are strongly linked to aspects of ecosystem resilience and will respond to the five key pressures. Thus, the species featured within this report can be used as indicators of change within ecosystems.

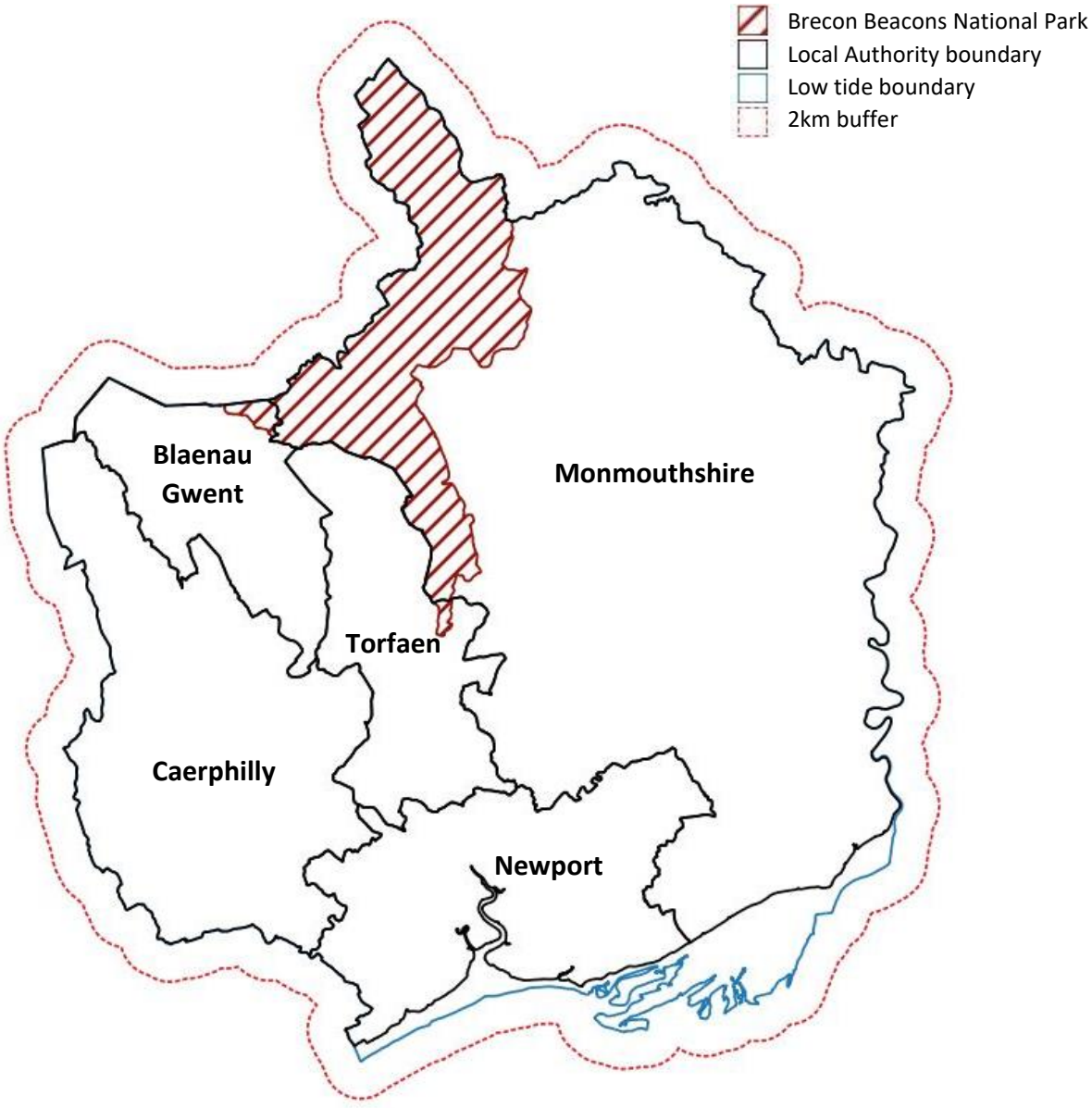
Using this report

In this report, 'Greater Gwent' is used to refer to the area covering all five local authorities, to the low tide mark; 'Gwent' is used to refer to the old unitary authority boundary and vice county 35; and 'the study area' is used to refer to Greater Gwent, plus a 2km buffer zone.

Throughout the report, the same background map is used. This shows local authority boundaries, low tide mark, the part of the Brecon Beacons National Park within Greater Gwent, and a 2km buffer.

The map is often divided into 1 km grid squares (monads). Only grid squares that fall entirely within the study area are included in the mapping and analysis, giving 1916 monads.

The Greater Gwent background map



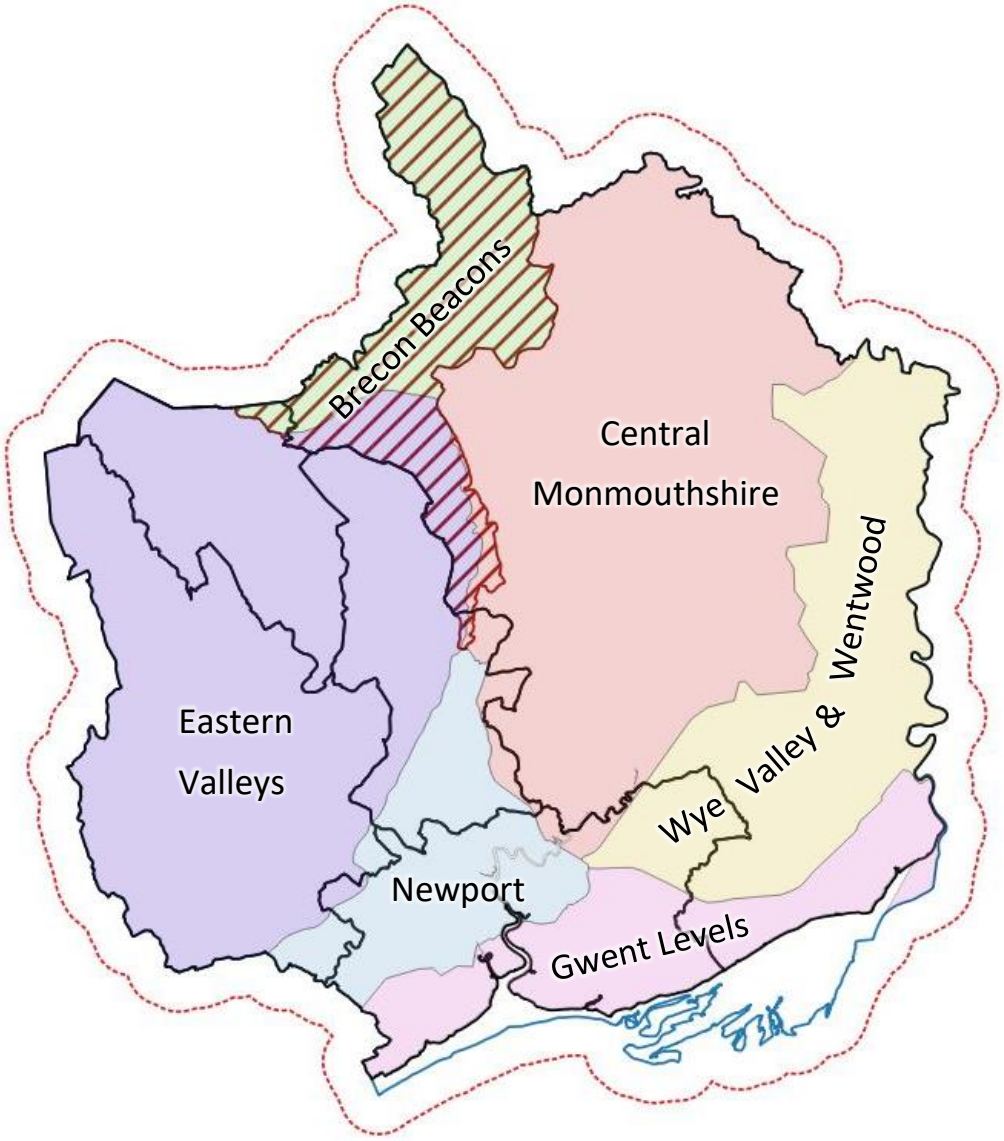
About Greater Gwent

Greater Gwent is an area of South East Wales comprising of the local authorities of Blaenau Gwent, Caerphilly, Monmouthshire, Newport and Torfaen. The counties are very different in both landscape and social demographics; the boundary corresponds to that of the old unitary authority of Gwent, and the historic county of Monmouthshire (Watsonian vice-county 35), expanded to include the whole of Caerphilly borough. It is also the area covered by the South East Wales Area Statement.[6]

This diversity of character across a relatively small area of 1,616 square km (to low tide mark) means that Greater Gwent holds a wealth of both natural and cultural heritage, from the historic castles along the English border to the east, to the cradle of the Industrial Revolution, the Blaenavon World Heritage Site, in the west. Greater Gwent is home to 591,100 people.[7]

For the South East Wales Area Statement, key stakeholders co-produced a series of Landscape Profiles (2019). For this purpose, the terrestrial area was divided into six distinct characteristic landscapes (see map below): the woodlands of the Wye Valley and Wentwood; farmland of central Monmouthshire; the urban area of Newport; the Gwent Levels; the Eastern Valleys; and the Brecon Beacons and Black Mountains. These Landscape Profiles consider the resilience of the eight UK broad habitats, as defined by the National Ecosystem Assessment and used in SoNaRR, and how they interact at a landscape scale. Although the Landscape Profile approach is a spatial one, it is underpinned by the Ecosystem Approach Principles, as set by the Convention on Biological Diversity (CBD). Each individual Landscape Profile, which can be made available upon request, supports a collective common evidence base on which to begin reaching a consensus for collaborative nature recovery action.

Landscape profiles within Greater Gwent



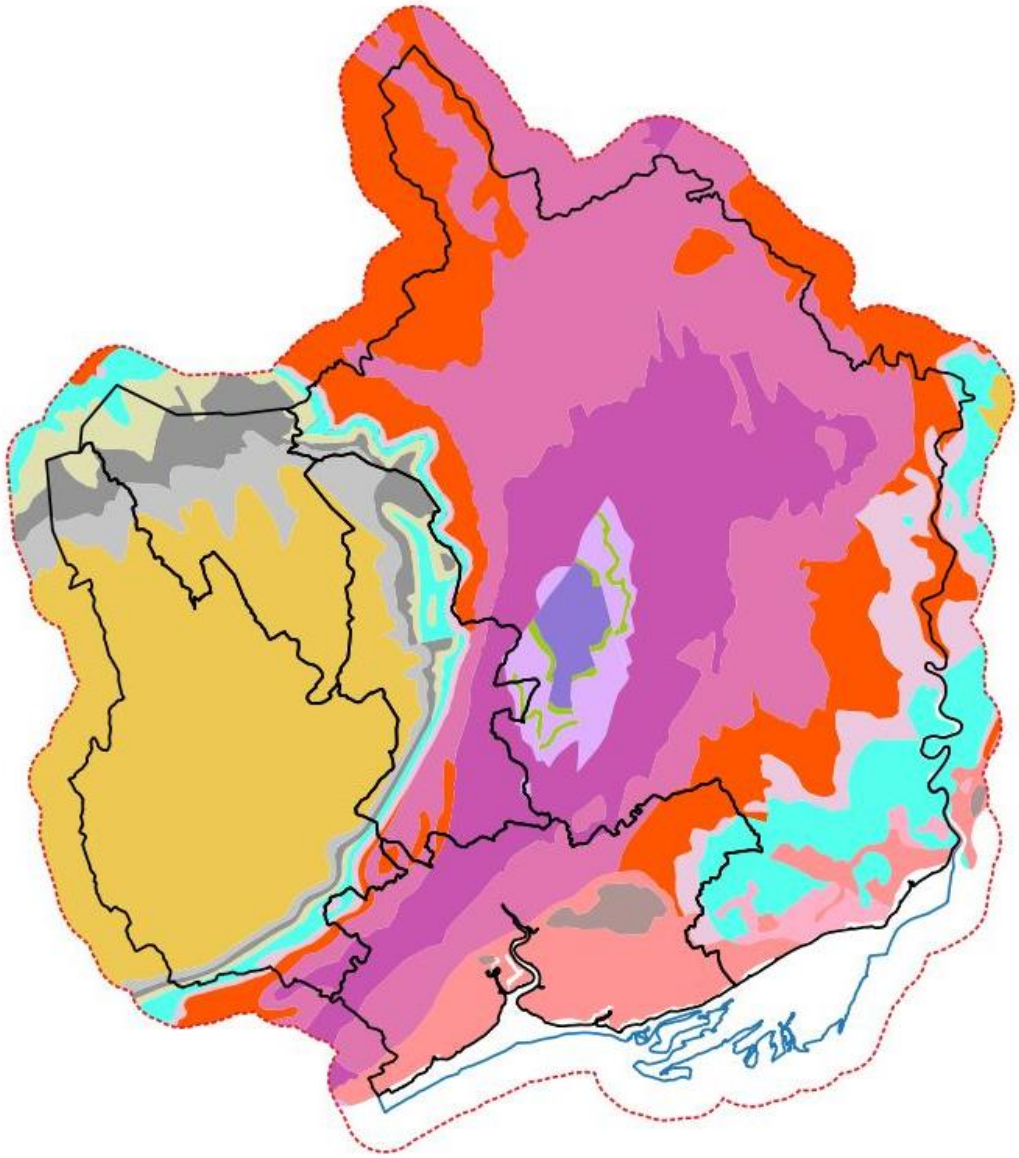
Geology and soils

Much of the diversity of landscapes and habitats across Greater Gwent is due to the underlying geology and soils. Most of Monmouthshire is underlain by the Old Red Sandstone rocks, with the older Usk Inlier in the centre. Parts of the Old Red Sandstone series, known as the Brownstones formation, form the Black Mountains, Sugarloaf, and Trellech Ridge.

In the south of the region, a band of limestone extends from the east, and is then overlain by younger sandstone rocks, which border the Severn Estuary. The differing colours of the rocks give many place names, such as Goldcliff and Black Rock.

To the west of the region, the younger South Wales Coal Measures dominate, surrounded by a band of limestone outcrop. Together, these provided the coal, iron and lime that fuelled the Industrial Revolution – a legacy that shapes the landscape seen today.

Bedrock geology of Greater Gwent[8]

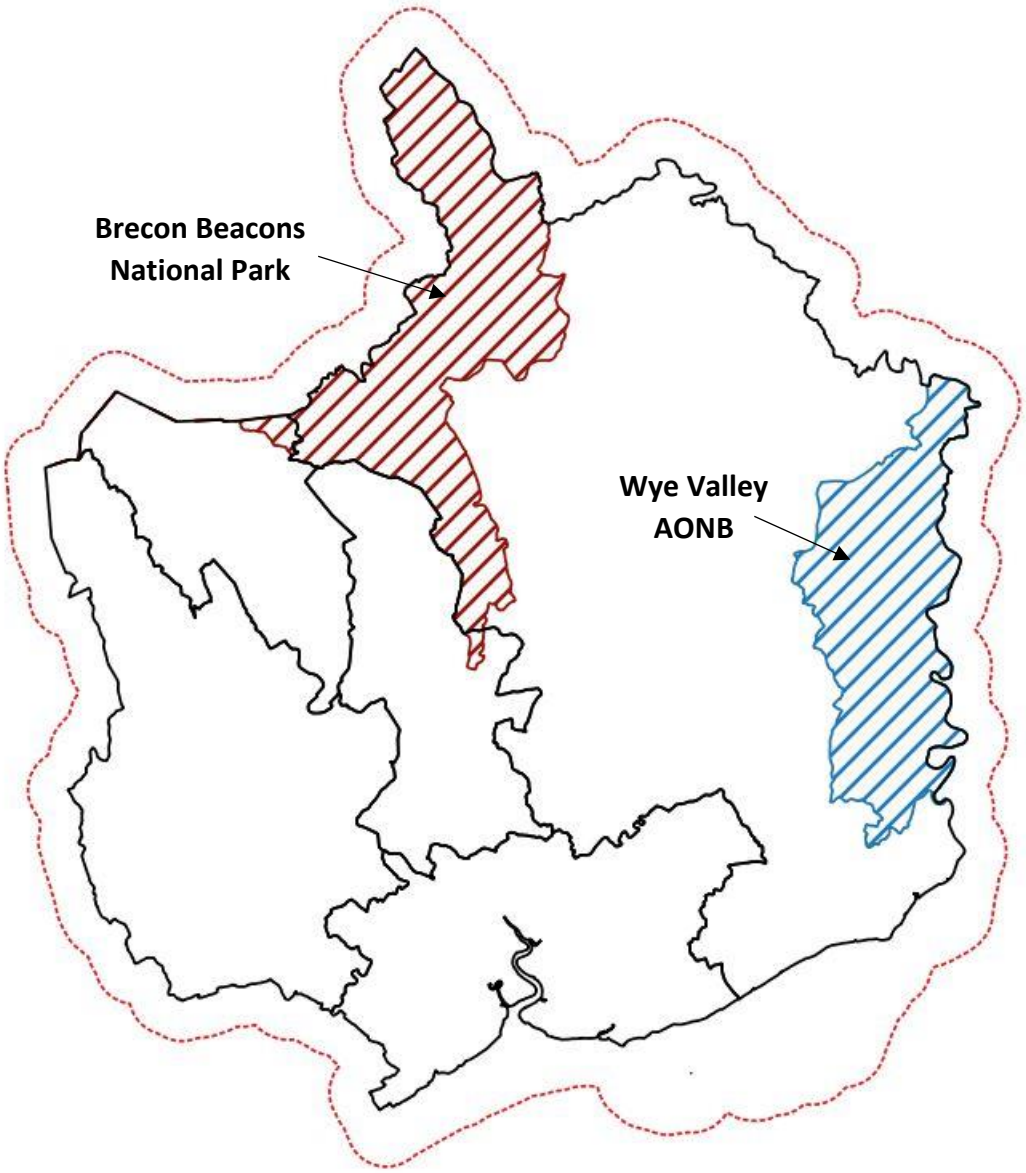


- Lias Group - Mudstone, Siltstone, Limestone and Sandstone
- Triassic Rocks (Undifferentiated) Mudstone, Siltstone and Sandstone
- Triassic Rocks (Undifferentiated) Sandstone and Conglomerate, Interbedded
- South Wales Upper Coal Measures Formation - Mudstone, Siltstone, Sandstone, Coal, Ironstone and Ferrous rock
- South Wales Middle Coal Measures Formation (Undifferentiated)
- South Wales Lower Coal Measures Formation (Undifferentiated)
- Millstone Grit Group - Mudstone, Siltstone and Sandstone
- Dinantian Rocks (Undifferentiated) Limestone with subordinate Sandstone and Argillaceous Rocks
- Upper Devonian Rocks (undifferentiated) Sandstone and Conglomerate, Interbedded
- Lower Devonian Rocks (Undifferentiated) Mudstone, Siltstone and Sandstone
- Lower Devonian Rocks (Undifferentiated) Sandstone and Conglomerate, Interbedded
- Pridoli Rocks (Undifferentiated) Mudstone, Siltstone and Sandstone
- Ludlow Rocks (Undifferentiated) Mudstone, Siltstone and Sandstone
- Wenlock Rocks (Undifferentiated) Mudstone, Siltstone and Sandstone
- Silurian Rocks (Undifferentiated) Limestone, Mudstone and Calcareous Mudstone

Protected areas

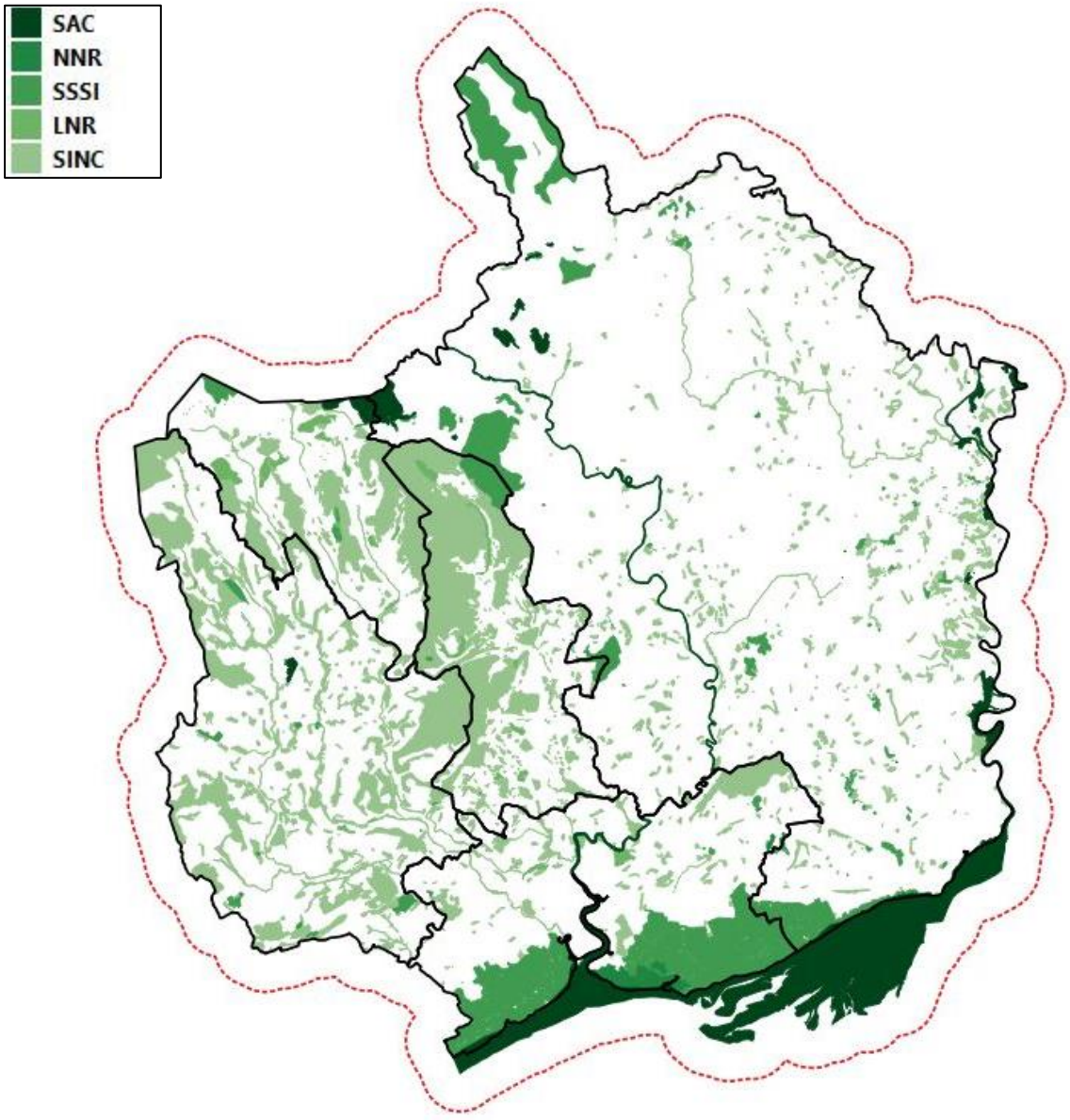
Greater Gwent contains two protected landscapes. Part of the Brecon Beacons National Park, totalling 153km^2 falls within Monmouthshire, Torfaen and Blaenau Gwent, and extends north and west into Powys and beyond. The Wye Valley Area of Outstanding Natural Beauty (AONB) has 117km^2 within Monmouthshire, running along the English border and extending into Gloucestershire and Herefordshire.

Protected landscapes within Greater Gwent[9]

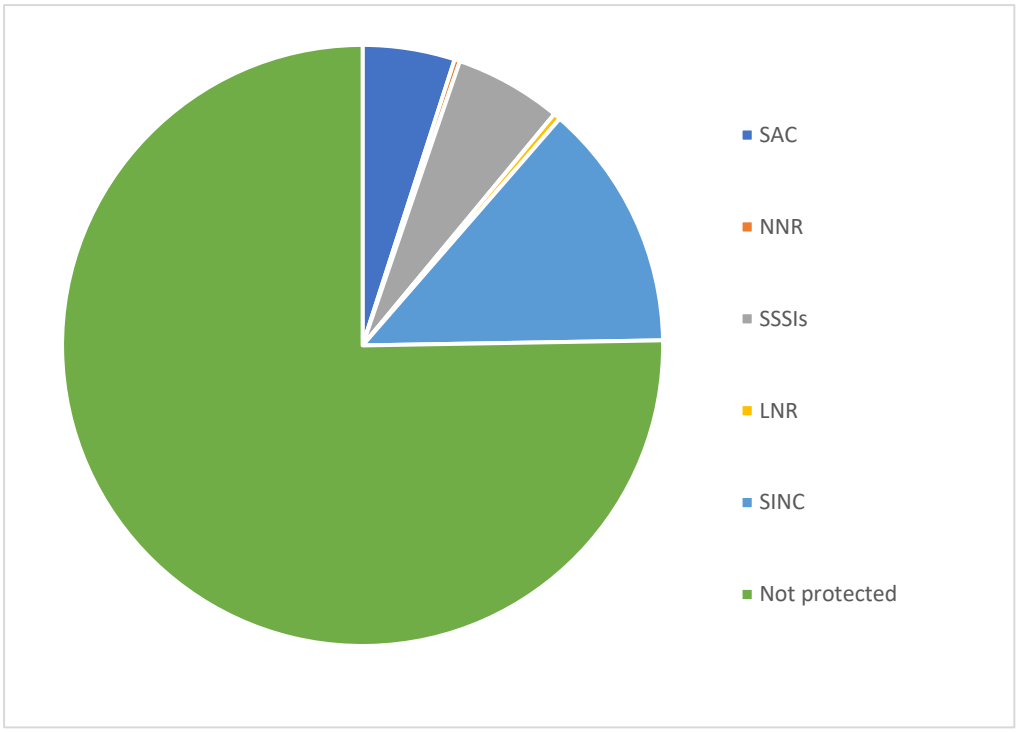


A quarter (25%) of Greater Gwent is protected for biodiversity reasons, with 13 Special Areas of Conservation (SACs). One of these, the Severn Estuary, is also a Special Protected Area (SPA) and Ramsar Site. There are also 5 National Nature Reserves, 94 Sites of Special Scientific Interest (SSSIs), 25 Local Nature Reserves (LNRs), and over 1,600 Sites of Importance for Nature Conservation (SINCs).

Protected areas by highest level of designation[9]



Percentage of land with nature conservation designation in Greater Gwent



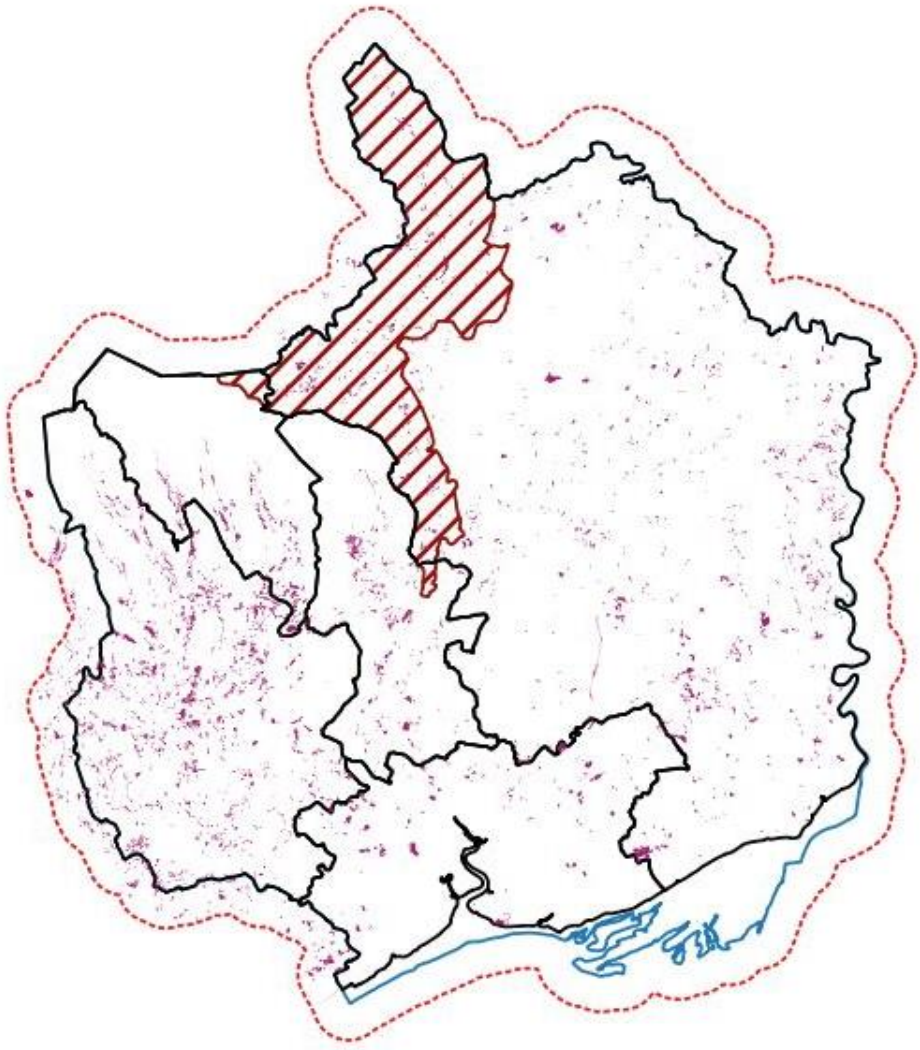
Terrestrial ecosystems in Greater Gwent

Grassland ecosystems

Greater Gwent is considered a stronghold for the UK's few remaining species-rich grasslands, which have suffered drastic declines. Fortunately, many are now protected, such as the Aberbargoed Grasslands Special Are of Conservation (SAC) and National Nature Reserve (NNR), and Sites of Special Scientific Interest (SSSI) grasslands at Pentwyn, Brockwells Meadows and Penllywn. Management is crucial for species-rich grassland, as lack of management can be as damaging as over-grazing or fertiliser applications.

Species associated with species-rich grassland included in this report include Marsh Fritillary Butterfly, Grassland Waxcaps, Greater Butterfly Orchid, Greenwinged Orchid, Small Blue, Shrill Carder Bee, Brown Banded Carder Bee and Pollinators.

Lowland Grasslands (below 300m(asl)) in the study area in 1997[10]



Farmland ecosystems

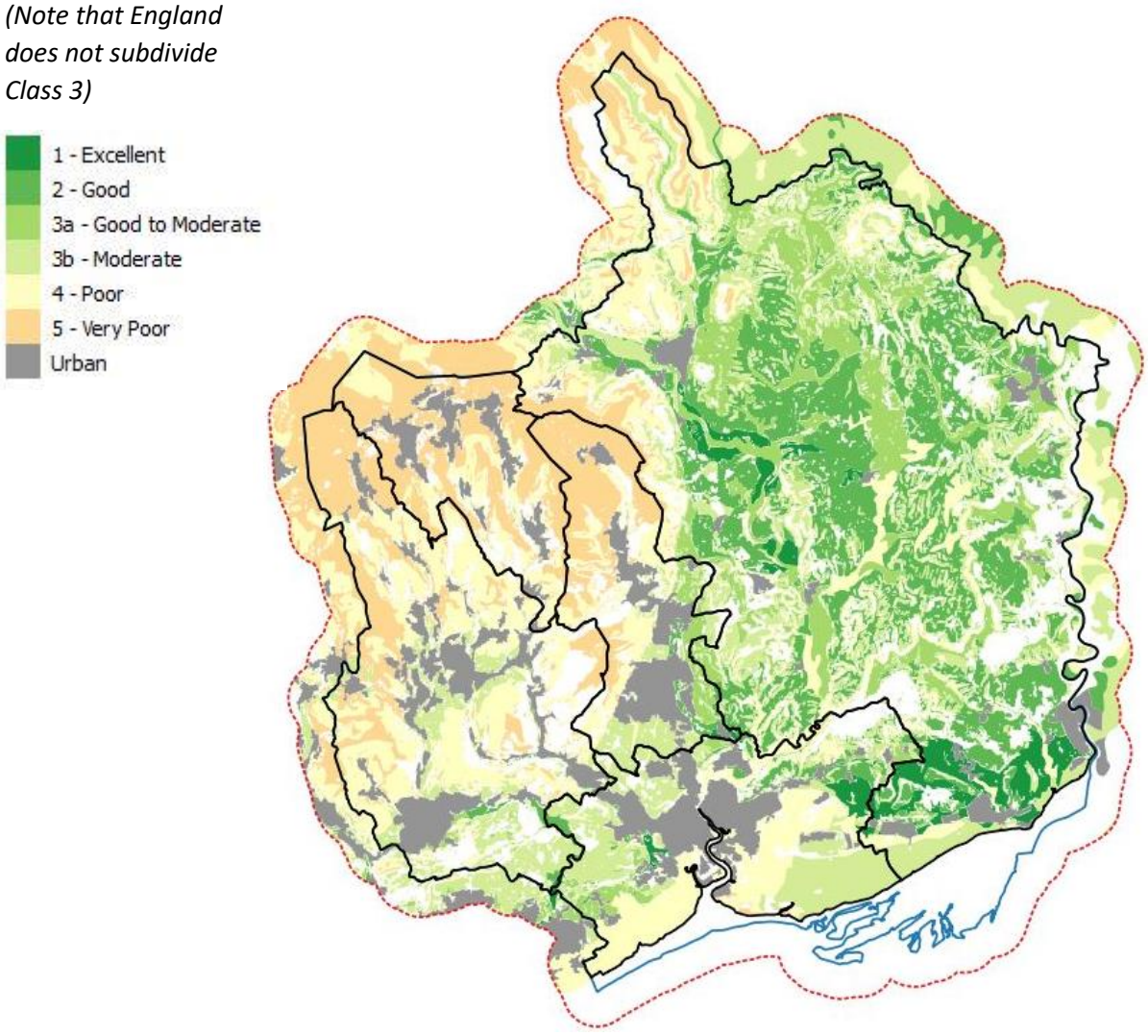
Farming shapes much of the landscape of Greater Gwent. The Agricultural Land Classification (ALC) assesses land based on criteria for climate, soil and situation to determine the highest quality agricultural land. Higher quality land is more valuable and is protected through the planning process. Only 7% of the land in Wales falls within the 'best and most versatile' agricultural land, grades 1 to 3a.[11]

Farmland ecosystems are hugely important for food production, but the drive for increasing yields has led to the loss of many species associated with the traditional farmed landscape. In quantifying the impact of drivers of change, the 2016 State of Nature report concluded that the intensification of agriculture had caused the largest long-term negative impact on wildlife.[12] Farming, while supporting wildlife, is promoted through the Glastir agri-environment scheme, but uptake in Greater Gwent is below the Welsh average, with less than 10% of farms (12% of farmed area)[13] participating.

Species in this report associated with farmland include Harvest Mouse, several bat species, arable vascular plants and bryophytes, Lapwing, Tree Sparrow, and Barn Owl.

Agricultural Land Classification of the study area in 2017–18[14,15]

(Note that England does not subdivide Class 3)



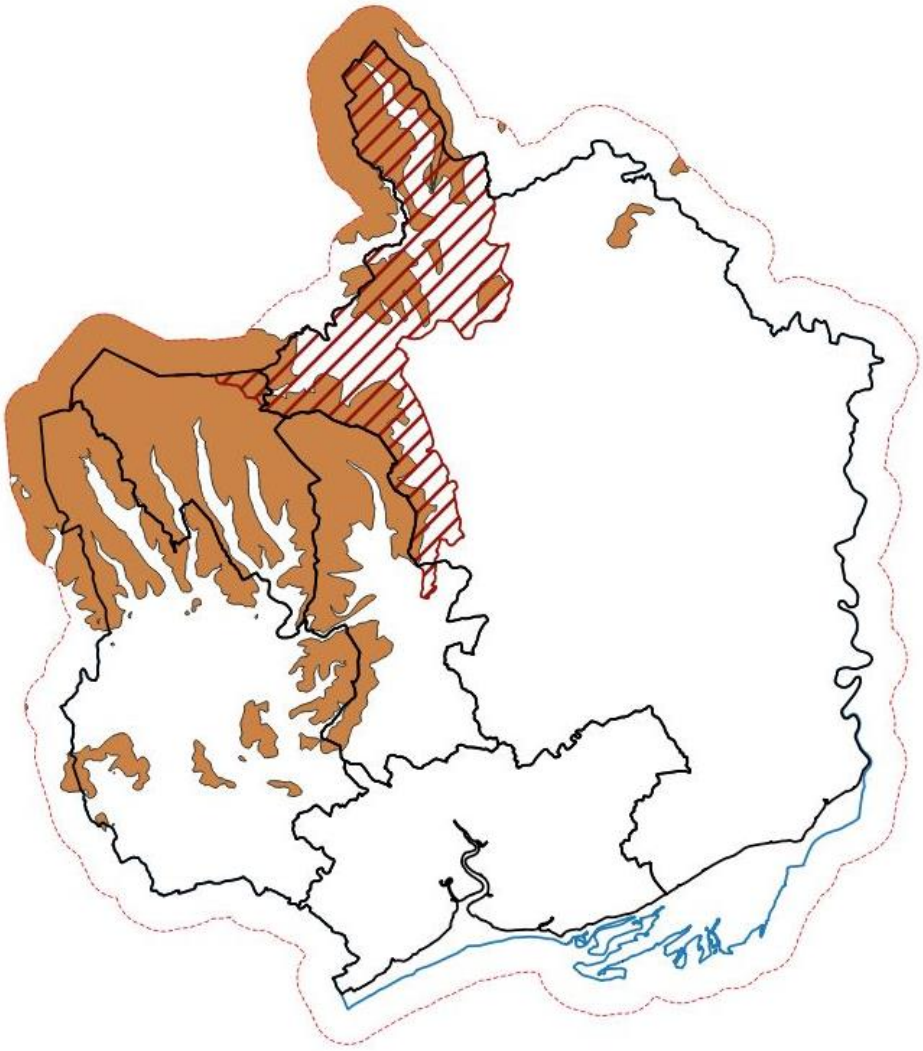
Upland ecosystems

A large area of Greater Gwent is classified as upland. Generally, this is land at an altitude above 300m(asl), although in reality there is a gradient from lowland to upland character. In Wales, this upland fringe is called ffridd, and can be an important habitat. In Greater Gwent, the uplands are a complex mosaic of heathland, acidic grassland, bracken, blanket bog and flushes, with areas of woodland and scrub. Uplands are valuable ecosystems, particularly as the underlying peat deposits can provide significant carbon storage.

Upland ecosystems in Greater Gwent are threatened by many issues, including lack of appropriate grazing, lack of connectivity between areas of higher biodiversity, historic drainage of wetlands, and landscape crime such as off-roading, fly tipping and arson.[16]

Species in this report associated with uplands include Ring Ouzel, Red Grouse, Hen Harrier, Brown Hare, the Silurian moth, Small Pearl-Bordered Fritillary and Scarce Blue-Tailed damselfly.

Area of study area above 300m(asl)[17]



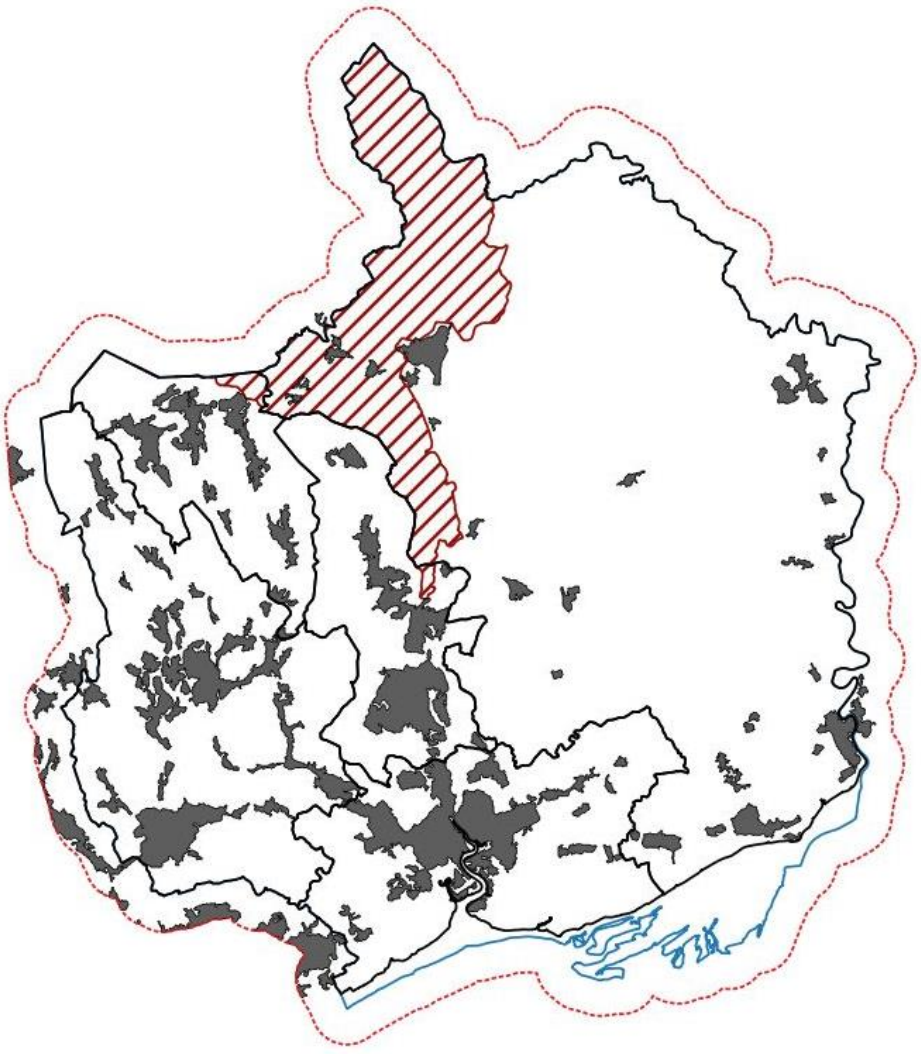
Urban and post-industrial ecosystems

Urban areas can support a surprising biodiversity, and people value the wildlife on their doorstep very highly. Access to green spaces is hugely important for health and well-being, and green infrastructure provides valuable ecosystem services such as shading, air quality and drainage, as well as recreation and amenity. Despite this importance, urban greenspaces suffer from development pressures, high disturbance, and fragmentation.

In Greater Gwent, post-industrial land includes coal spoil tips – large areas of the uplands that form distinctive features, hosting a unique wildlife community. Coal spoil forms a mosaic of bare ground with grass and heath, which is particularly important for invertebrates, lichens and bryophytes.

Species in this report associated with urban and post-industrial land include House Sparrow, Peregrine, Hedgehog, Sandstone Roof Tile mosses, coal spoil invertebrates group, Grayling and Grizzled Skipper. Japanese Knotweed is also relevant.

Built up areas within the study area in 2011[18]

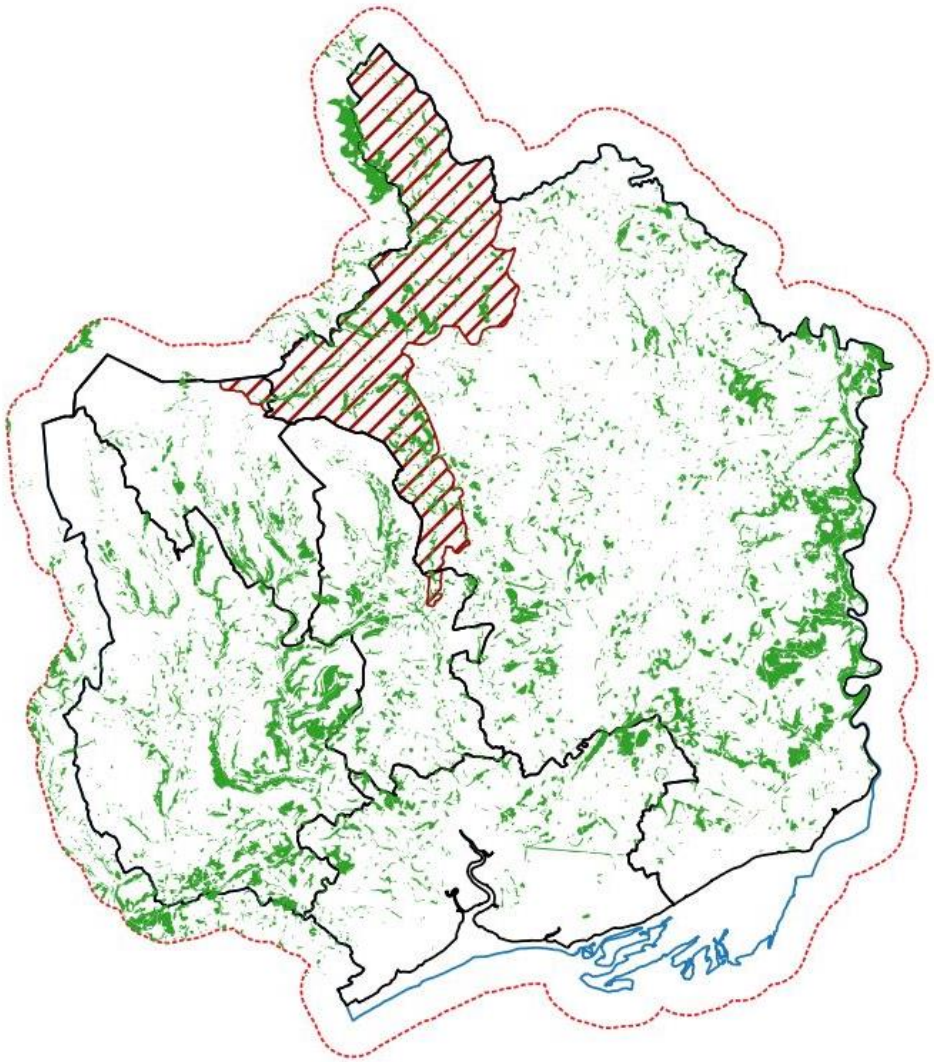


Woodland ecosystems

Woodlands are found across Greater Gwent, with important woodlands designated as SACs along the Wye Valley, at Cwm Clydach, Coed y Cerrig and the Sugarloaf. Greater Gwent has around 20,000ha of woodland.[14] Woodlands across the UK have declined historically and are slowing recovering, but much of the younger woodlands are commercial plantations of limited wildlife value.[2] Woodland ecosystems are threatened by lack of management, disturbance, pollution and disease.[2]

Species in this report associated with woodland include Dormouse, Pine Marten, bat species, Beech and Oak fungi, Hawfinch, Pied Flycatcher, Marsh Tit, Willow Tit, Wood White, and Spreading Bellflower. Ash Dieback is also included.

Woodland cover within the study area in 2018[19]



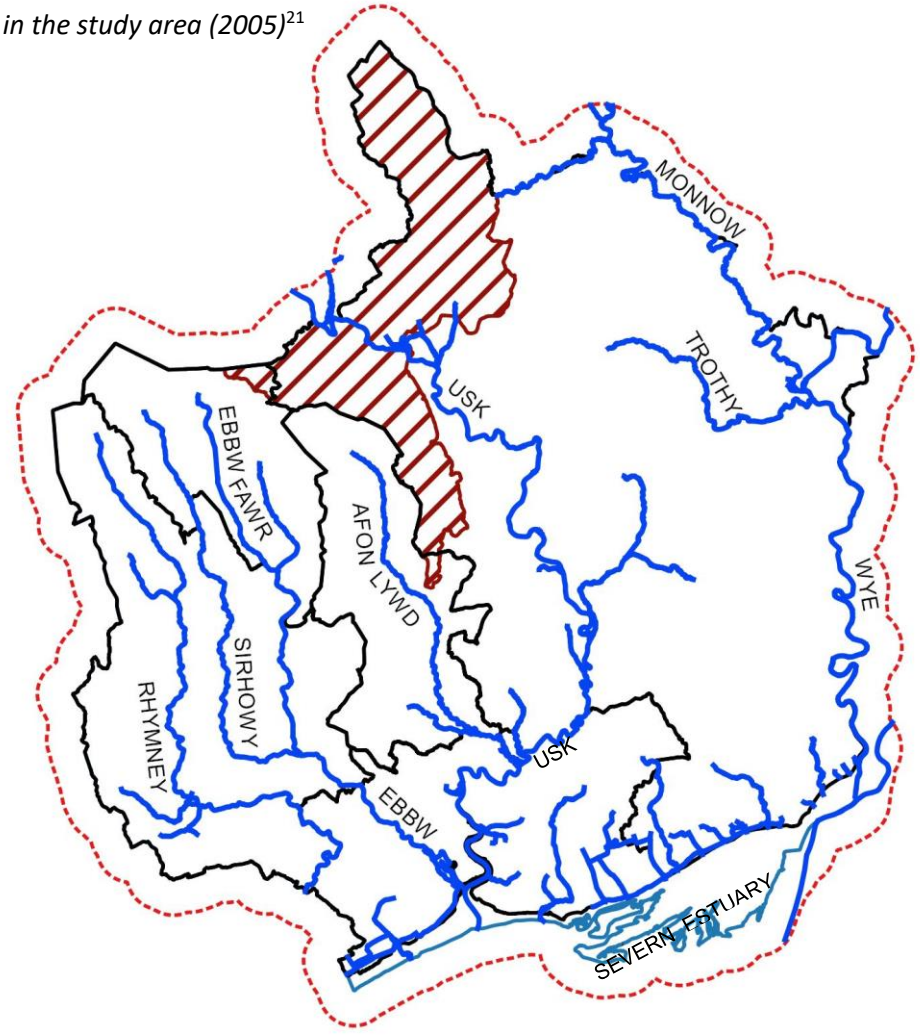
Freshwater and wetland ecosystems

There are just under 500km of main rivers (not including the Severn Estuary) within Greater Gwent. The Monmouthshire & Brecon Canal within Greater Gwent measures 38.1km, with the Crumlin arm adding another 11.6km. Both the Usk and Wye rivers are designated as SACs for their habitat quality and importance for migratory fish and Otter. Rivers are regularly monitored through the Water Framework Directive. Most of the rivers in Greater Gwent are failing to achieve overall Good Status.[20] Reasons for failing to achieve Good Status are similar across all three areas: pollution, physical modification, invasive non-native species and poor habitat quality.

Greater Gwent also has a rich resource of ponds, lakes and wetlands, such as Llandegfedd Reservoir and Nedern Brook Wetlands SSSIs. The Gwent Levels, an extensive historic landscape of fields and drainage ditches, stretches across Newport and Monmouthshire (see map on coastal section). The Gwent Levels are protected as SSSIs for the invertebrate interest within the drainage ditches.

Species associated with freshwater and wetlands included in this report include Otter, Water Vole, Common Toad, Great Crested Newt, migratory fish, European Eel, Dipper, Snipe, Cetti's Warbler, Bittern, Reed Warbler, all odonata, and invertebrates of the Gwent Levels. Invasive species Giant Hogweed, Himalayan Balsam, Japanese Knotweed and Signal Crayfish are also relevant.

Main rivers in the study area (2005)[21]



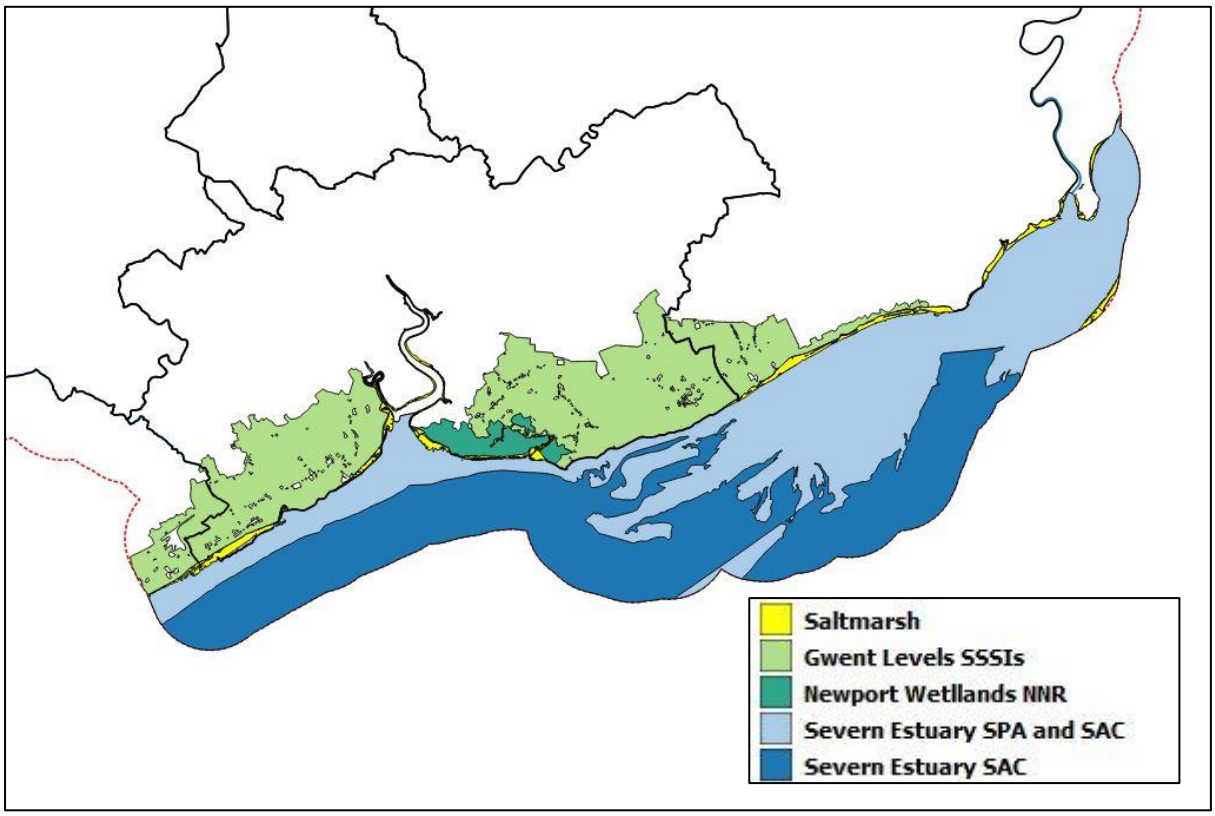
Coastal ecosystems

Greater Gwent has an unusual coastline. The transition from terrestrial to marine is very abrupt in places because much of the Levels were claimed from the sea and are now protected by a sea wall. Greater Gwent is bounded by the Severn Estuary, a SPA, SAC and Ramsar site. The Severn has the second highest tidal range in the world at over 12m and is one of only six estuaries in Britain to accommodate over 100,000 waders at peak times. It supports internationally important populations of Bewick's Swan, Curlew, Dunlin, Redshank, Gadwall, and European White-Fronted Goose. It is also a key migratory route for Salmon, Sea Trout, River and Sea Lamprey, and Twaite and Allis Shad.[22]

Important habitats along the coastline include mudflats, which provide internationally important wader feeding grounds, saltmarsh, which forms a narrow band along parts of the coast, and the saline lagoons at Newport Wetlands NNR.

Species associated with the coast included in this report include Dunlin, Redshank, Black-Tailed Godwit, Little Egret, migratory fish, and European Eel. The flora along the sea wall is important for Shrill Carder Bee, Small Blue and other pollinators.

Coastal habitats and protected areas within the study area (2016)[23]



The 100 Species Stories

The species were chosen through consultation with local conservation bodies, local authorities, Local Nature Partnerships and species experts. Species were chosen based on their local conservation interest, particularly those species that could indicate changes in ecosystems.

The 100 stories of our wildlife are comprised of:

- 15 mammals, and 1 group of mammals (bats)
- 36 birds
- 6 reptiles and amphibians
- 2 fish
- 17 invertebrates, and 4 groups of invertebrates
- 3 groups of fungi
- 3 plants, and 1 group of plants
- 2 bryophytes, and 5 groups of lichens and bryophytes
- 5 invasive species and plant diseases (3 plants, 1 fungus, and 1 invertebrate)

Because of the groupings, these 100 stories represent over 500 species. However, it should be noted that this is a small fraction of the 25,000 species that have been recorded in Gwent and Glamorgan.[24]

Each story shows what information we have for that species or species group, and what is happening to them over time. Some are success stories of population growth, range increase, or the eradication of a harmful species. But many are the opposite, and for some, the story is that there is not enough information to know what is happening.

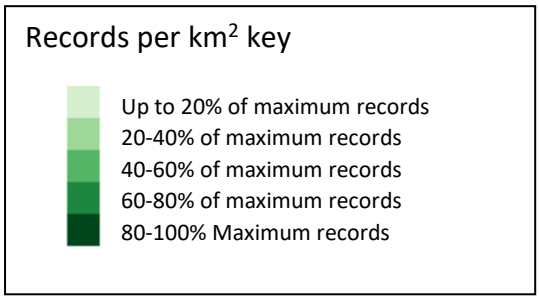
There is likely to be bias in the selection of species towards rare and declining species, as they are of more interest to conservationists, but it is still sobering to consider at least 42 of the 100 stories are thought to be tales of decline. Of the Mammals, one is Critically Endangered, one Endangered, and four are Vulnerable at the Wales level, according to International Union for Conservation of Nature (IUCN) criteria. Of the birds, 14 are Red listed at the Wales level.

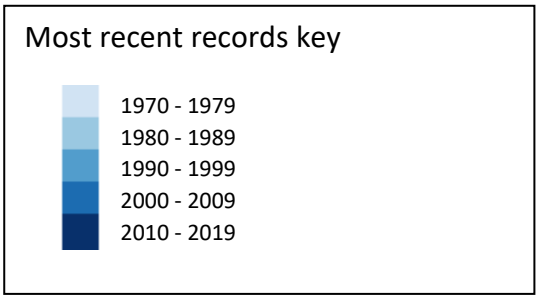
Each species or species group has its own descriptive section with maps showing distribution and dates of records. The sections are grouped taxonomically, with references at the end of each group.

Interpreting the species stories

In each section, there are two maps giving the density of available records from 1970 to 2019 for the species and the decade of most recent record within each grid square. The maps should be viewed together, as this will indicate locations for current populations, that is, areas where there are high numbers of recent records. Note that records are placed within the centre of their grid reference, which can lead to inaccuracy and false hotspots where a number of low-resolution records are together. This is highlighted in the text when it occurs.

The same keys are used throughout, where the maximum number of records per square km is stated for each species:





For each species there is also text describing:

- **Status –**any legal protection and conservation status.
- **Data availability** – a subjective judgement of how much data is available and how accurately it represents the range and population of the species, together with the number of records within the study area.
- **Context –** brief description of the species ecology, with any known national trends and conservation issues.
- **Outlook** – predictions for the species with regard to current and future pressures.
- **Greater Gwent range** – current range and historic changes in range within Greater Gwent.
- **Population trends** – where possible, data is used from national recording schemes to generate population trends at the regional level (where this is not possible, national trends are referred to).
- **Protected Sites** – numbers of records from protected sites within Greater Gwent (records are only counted once, under their highest level of designation).

Where the section is about a group of species such as rare arable plants or coal spoil invertebrates, this will include a species list (where practical). The same maps and text headings are used, with the addition of a map of species richness.

It is important to note that numbers and locations of records may not accurately reflect species abundance and distribution, depending on levels of recording and mobility of species. See State of Greater Gwent Data for more information about data quality and bias.

For detailed technical methodology, see Appendix 1.

Biodiversity recording in Greater Gwent

Recording wildlife has a long history in Gwent. During the surge of scientific interest in the Victorian era, the first president of the Cardiff Naturalist Society in 1867 was William Adams, a surveyor who had worked all over Greater Gwent, particularly in Ebbw Vale and Tredegar.[25] Despite being based outside of the area, the society regularly conducted field trips to Gwent sites; in 1873 this meant a visit to Tintern, including a carriage ride to Wyndcliffe, which was 'a most agreeable and enjoyable day'.[26] The society still exists, and recently celebrated its 150th anniversary.

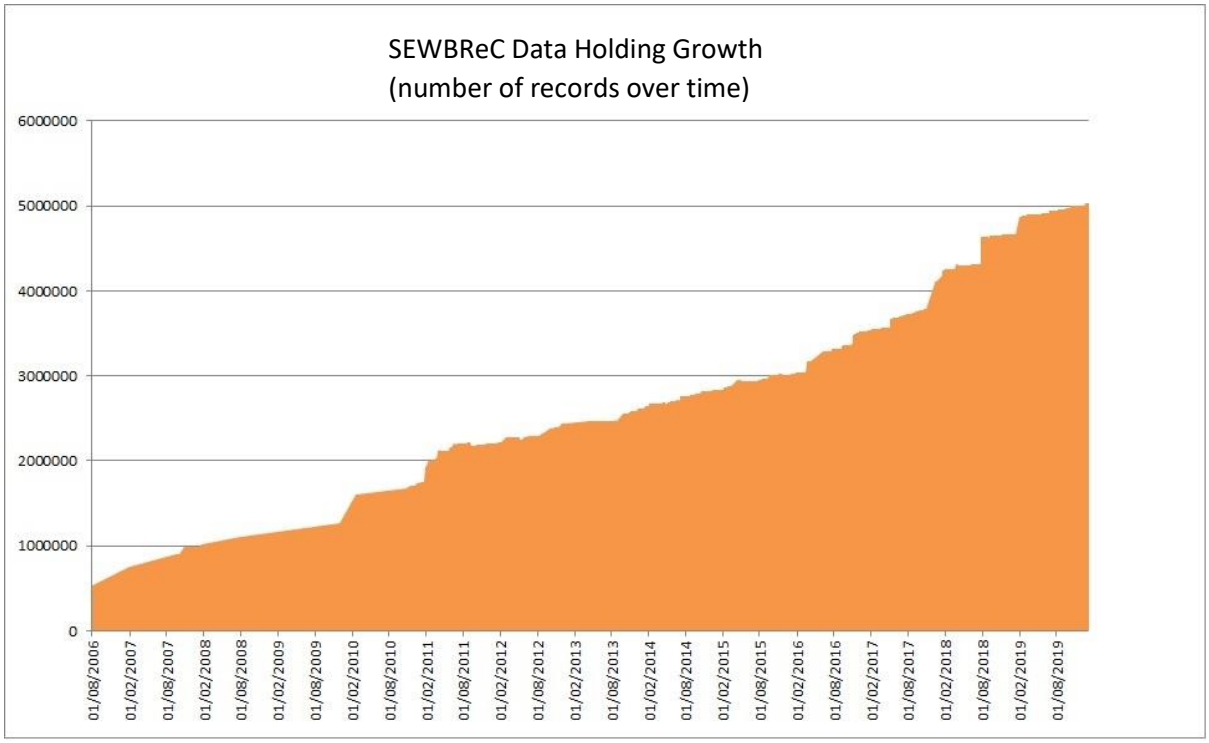
Progress towards national systems of wildlife recording was halted by the First and Second World Wars, but the following decades saw the establishment of the Brecon Beacons National Park in 1957, the founding of the Gwent Ornithological Society in 1961, and Gwent Wildlife Trust purchasing its first nature reserve, Magor Marsh, in 1963. At a UK level, this coincided with the publication of the first Botanical Society of Britain and Ireland (BSBI) Atlas in 1962 (using an amazing 1.5million records, which were sorted mechanically), which led the establishment of the Biological Records Centre (BRC) in 1964.[27]

It was only in the 1980s that concerns were raised about biological recording; the concept of a network of local records centres had been suggested in the 1970s by the BRC, but only one had been established. Subsequently, NGOs, museums, local recording groups and national schemes all began setting up their own systems for collating, verifying and distributing data, with no common standards or co-ordination. By the 1990s, over 2,000 different UK organisations were collecting and storing biological records.[28] At the same time, demand for high quality biological information was growing as a result of the 1992 Rio Convention on Biodiversity and planning policy placing greater emphasis on taking local habitats and species and their conservation into account when making strategic plans and planning decisions.

The response to this situation in Greater Gwent was the establishment of the South East Wales Biodiversity Records Centre (SEWBReC) in 2003. It was the second Local Environmental Record Centre (LERC) in Wales, after the Biodiversity Information Service covering Powys and the Brecon Beacons National Park. By the end of 2007, Wales had complete LERC coverage. The Association of Local Environmental Records Centres (ALERC) was formed in 2009, and the UK now has complete coverage. The LERCs aim to collate and disseminate local biological data, working on improving data consistency and supporting local recording.

State of Greater Gwent data

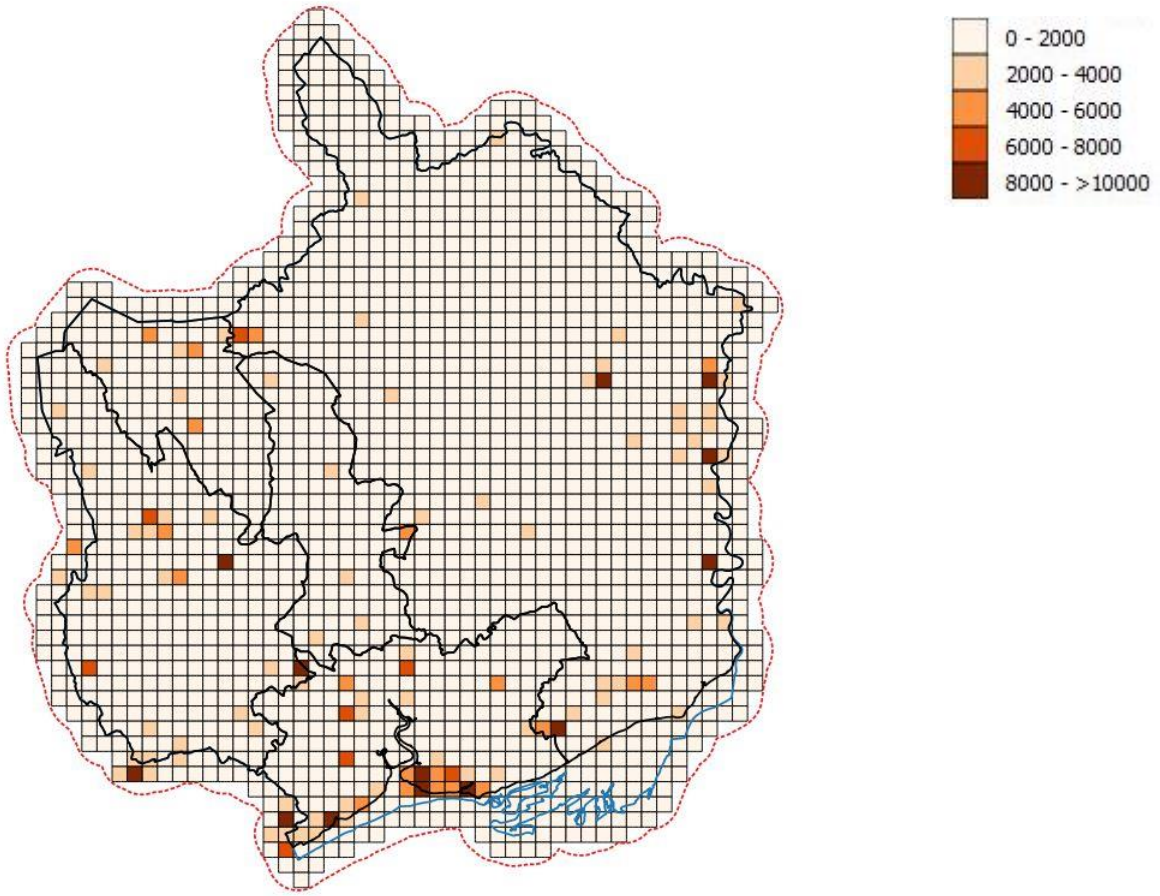
This report utilises almost 120,000 records to provide information for over 500 species. This represents a phenomenal level of recording, curating and provision, which would not have been possible just 20 years ago. This volume of biological data, through local and national records centres, and from national recording schemes, has not been available until recently. This growth is demonstrated by the SEWBReC holdings, which have grown to just over 5 million records within 20 years (includes Gwent and Glamorgan records).



However, this data is not evenly spread temporally, spatially or taxonomically. Although significant efforts have been made to digitise older records, such as the Mary Gillham Archive Project,[29] the majority of species in the report have very few records prior to the 1990s. This means that increased recording effort can mask trends in population and range.

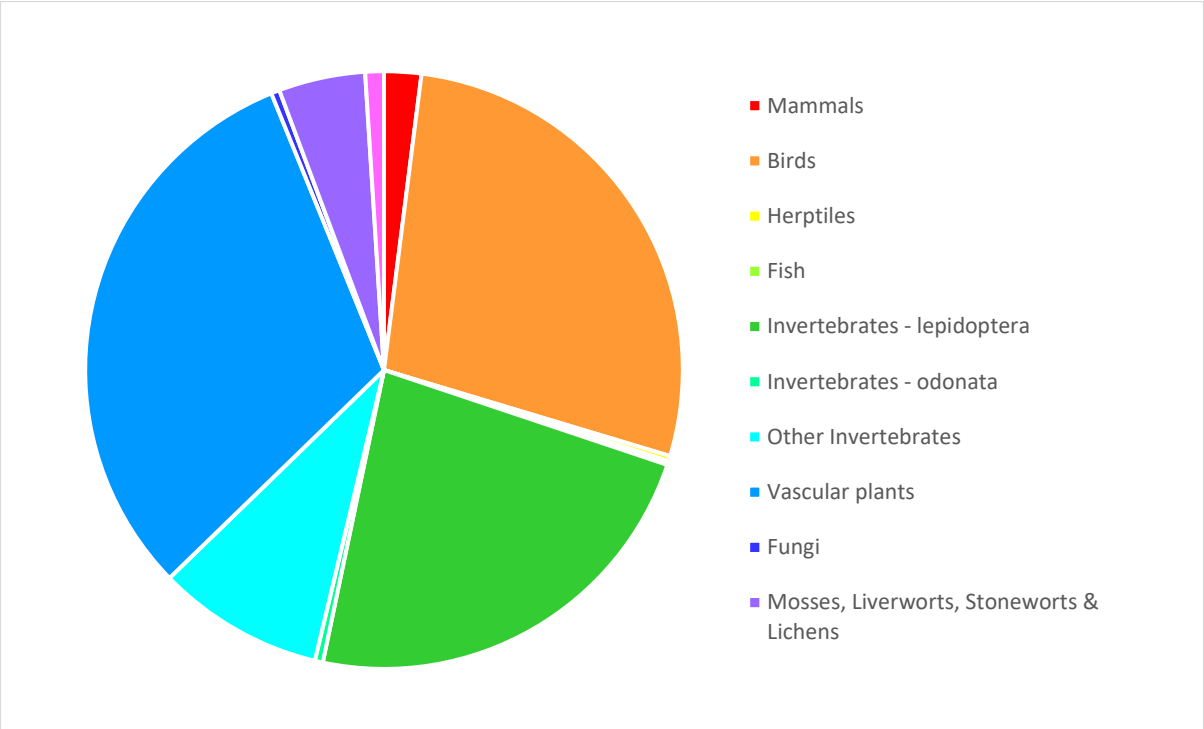
Spatial bias of records is highly skewed towards protected sites and other wildlife-rich areas, such as Peterstone Wentlooge, Newport Wetlands and Pentwyn Grasslands. Discounting grid squares within the Severn Estuary, 11% of the terrestrial squares across Greater Gwent have fewer than 100 records within 50 years, while the average number of records is 787 per monad. Most of these poorly recorded grid squares occur in upland or rural areas, such as central Monmouthshire and the Torfaen borders.

Density of records (1970–2019) within Greater Gwent



Taxonomic bias within Greater Gwent is towards birds, lepidoptera and plants, meaning ranges and trends calculated for those species is more likely to be accurate (subject to the spatial bias). Herptiles, fungi and invertebrates other than lepidoptera are particularly, underrepresented. In fact, there are almost 100 bird records for every reptile or amphibian record.

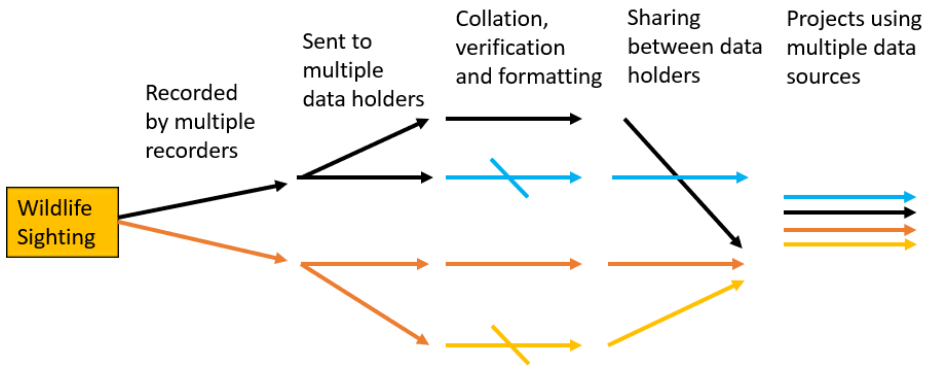
Greater Gwent Records (1970–2019) by species group



Data quality and reliability also varied considerably. Duplication of records within and between different datasets was a significant issue. The figure below shows how record duplication can occur at multiple stages from recorder to data user. The differing record formats from the three LERCs and NBN Atlas meant that duplicates could not be identified and removed by automated processes. Within datasets, some duplication could be removed but not all duplication could be detected or easily removed. Species where duplication seemed to be a particular issue included Otter and Shrill Carder Bee. Improving data pathways is a current priority for SEWBreC.

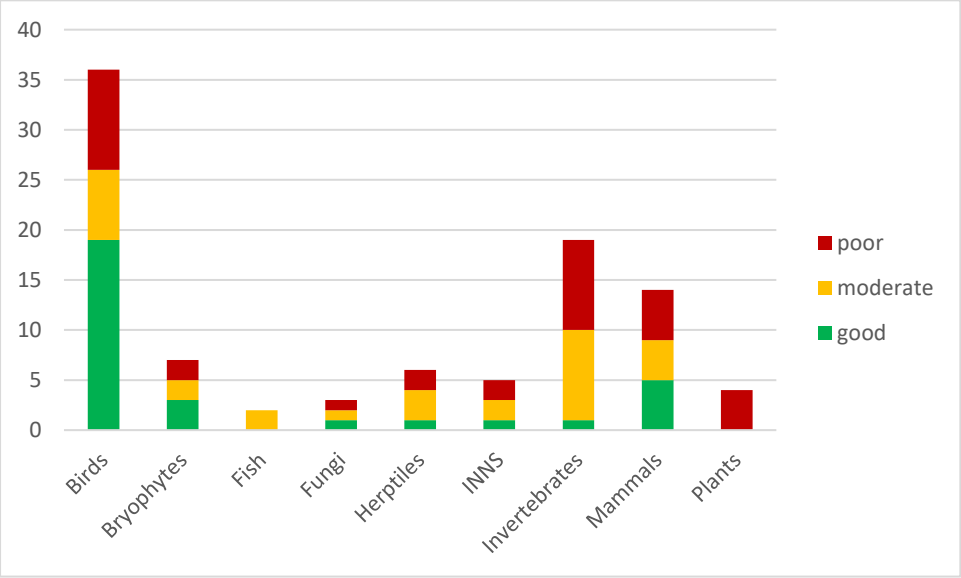
There were also some datasets where information was not reaching LERCs or the NBN Atlas, from local recorders, recording groups, recording schemes or from statutory agencies (termed data disconnects). This was particularly the case for Ash Dieback, fish and bats.

Potential duplication pathways



Each of the Greater Gwent species or species groups was given a subjective assessment of data quality, based on factors such as number, date and distribution of records, as well as local knowledge. Data classified as 'Good' quality means that the data was likely to give a more accurate representation of the species status. Data for 31 species or species groups was classified as Good, 30 as Moderate and 35 as Poor. Four were not classified due to variation in data quality across species groups, or lack of records altogether. Birds had the most reliable data, but this was not equal across all species. All plants had Poor data, but this was probably influenced by the choice of species included in the report, as they are all rare species with few records.

Subjective data quality



Reliable population trend data at the regional level was only available for birds and two mammals (Lesser Horseshoe Bat and Otter). This broadly reflects the UK, where structured sampling data is available for birds, bats, butterflies and plants.[30] If participation in national recording schemes was increased, trends could theoretically be calculated for a further 6 of the mammals/mammal groups,

all 6 herptiles and the 11 Lepidoptera. As a rough guide, producing a reliable regional trend requires around 40 data collection points, evenly distributed through the area.

Attention must also be drawn to the lack of information regarding conservation action. Any details of local conservation work within the species sections relied heavily on the knowledge of local experts, which is often limited to 'working memory' of about 10 years. Although some organisations and groups have archived their newsletters, many have not, so information about former projects or schemes has often been a matter of chance. The national Biodiversity Action Reporting System, which aimed to catalogue and map such action, failed due to limited uptake, and was closed and archived in 2016. This lack of available information means that knowledge and understanding gained from previous actions is less likely to be used.

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Terrestrial mammals

The recent Red List for Wales's mammals reports that 1 in 3 of the 39 native or formerly native mammals in Wales are threatened with extinction, with 51% in need of urgent action.[1] There are 17 mammal species on the Section 7 list of Priority Species for Wales, all of which, except the Red Squirrel, are found in Greater Gwent.

Mammals occupy a great variety of ecological niches, from predators such as the Otter and Pine Marten, and grazers and browsers such as deer, to important prey species such as voles and mice. They are found in a large variety of habitats including woodland, grassland, upland and wetlands. The use of mammals as an indicator of ecosystem health varies according to the species and ease of recording. For example, Otter spraints have often been used as indicators of water quality and fish populations, as Otter spraint is easily identified with little risk to disturbing the animal.

The variety of mammal species, their ecology and visibility means that mammal recording is equally varied. Some, such as Dormouse, Water Vole and Otter, have their own recording schemes, with coverage discussed in each individual section. Others, particularly small mammals, are less well recorded and only covered by casual recording, or overall surveys such as the Living with Mammals survey (PTES)[2] and the Breeding Bird Survey (BTO)[3] which added a mammal section in 1995.

In this section there are 11 mammals, ranging from the widespread, such as Badger and Otter, to the rarely recorded Harvest Mouse and Water Shrew. There are notable success stories, namely the return of the Otter to many watercourses, and the successful reintroduction of Water Vole to the Gwent Levels. The current situation regarding the return of Beavers to Wales is also summarised.

Note that bats are included in a separate section.