

A National Park for Galloway

Biodiversity Report



**GALLOWAY
NATIONAL
PARK
ASSOCIATION**

Acknowledgements

Front cover

Marshland at RSPB Mersehead reserve ©Christine Dudgeon

Natterjack Toad ©Julia Wittman, licensed under Creative Commons attribution license (cc-by)

Perennial Flax ©Mark Pollitt

Red Kite © Paul Biseker, licensed under Creative Commons attribution license (cc-by)

Back Cover

Birds-foot Trefoil on shoreline at Carrick ©Mark Pollitt

Image collages produced using Canva Pro



Report prepared by South West Scotland Environmental Information Centre. Commissioned by Galloway National Park Association.

Norman, P & Pollitt, M.S. 2023. *A National Park for Galloway: Biodiversity Report*. South West Scotland Environmental Information Centre, Kirkgunzeon, Dumfries. p60.

A National Park for Galloway

Biodiversity Report

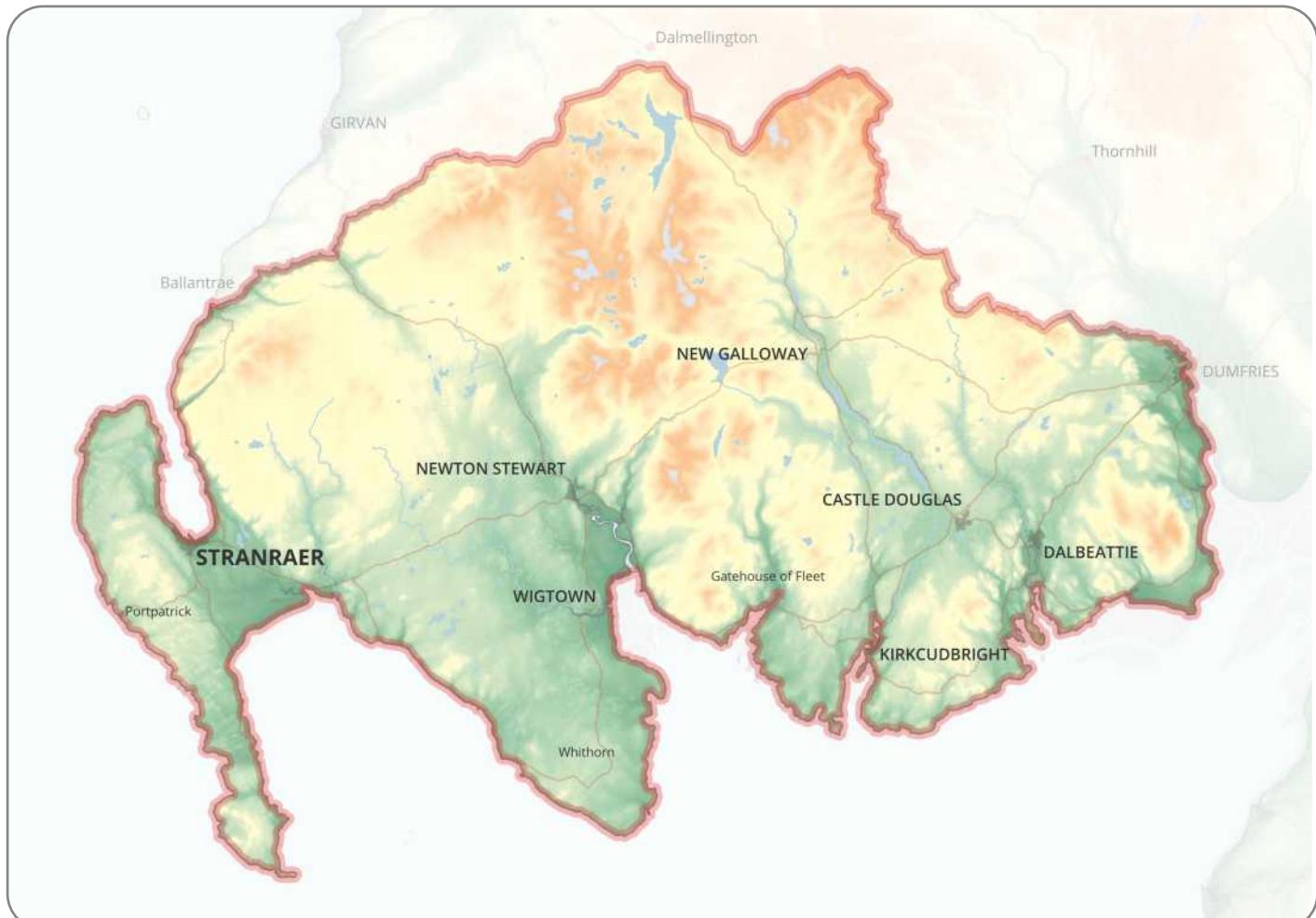
Preface

South West Scotland Environmental Information Centre (SWSEIC) was commissioned by the Galloway National Park Association (GNPA) to examine the biodiversity of an area of south west Scotland that could potentially become a National Park.

This study involved analysis of information held on the SWSEIC database, which currently (August 2023) includes almost 3.5 million species records, various habitat data and information relating to protected species and designated sites. The analysis was carried out by SWSEIC Project Officer and former Biodiversity Officer for Dumfries and Galloway, Peter Norman, with the assistance of Mark Pollitt, Centre Manager at SWSEIC since 2004. Collectively Peter and Mark have more than 52 years of

experience relating to the biodiversity of south west Scotland.

The study area, chosen following discussion with GNPA, includes the whole of Galloway (the historic counties of Kirkcudbrightshire and Wigtownshire), together with that part of the historic district of Carrick that lies south of the River Stinchar. Geologically, this approximates to the area of western Scotland lying to the south of the Southern Uplands Fault. Historically, Carrick was formerly once part of the medieval Kingdom of Galloway, whose lords ruled it until 1186, though the precise boundaries were somewhat ill-defined at that time.



“I fixed on Galloway as the best place to go. It was the nearest wild part of Scotland, so far as I could figure it out, and from the look of the map was not over thick with population.”

John Buchan, author
The Thirty-nine Steps (1915)

Summary

As Richard Hannay, the central character in Buchan's adventure story, was to discover, Galloway is a largely rural part of Scotland with its central core and much of its coastline characterised by rugged and wild topography.

One of the special qualities of Galloway's biodiversity is the diversity of habitats found in a relatively small area. For example, it would be possible on a single 20 mile walk from Ravenshallow Point to Cairnsmore of Fleet to pass through every habitat listed in this report, from sandy beach to mountain summit. Few other areas of Scotland, or indeed the UK, offer such a range of habitats in a comparatively small area.

The area covered by this report includes:

- Around 25% of Scotland's saltmarsh habitat
- Around 200 km of coastal cliff and slope
- The largest sand dune system in southern Scotland
- The only region with all of Scotland's bat species.
- The only region with all of Scotland's native reptiles and amphibians.
- The greatest diversity of butterfly and moth species in Scotland.
- A mix of northern/highland and southern/lowland species. For example, Golden Eagles and Nightjars, Pine Martens and Harvest Mice, Scotch Argus and Small Skipper butterflies,

Oysterplants and Bee Orchids.

- Local names for landscape features/habitats, such as heughs, cleughs, inks and merse.
- A total area of 330 sq km designated for its biodiversity or geodiversity.
- A minimum total of 8090 different species recorded in the study area.

But Galloway has not escaped from the global biodiversity crisis and is in need of protection and restoration. The area has:

- Suffered a greater loss of peatlands than any other part of Scotland, making the restoration of existing sites even more critical.
- A legacy of acidification of rivers and waterbodies.
- Low coverage of native broadleaved woodland, and a high proportion of ancient woodland planted with non-native trees.
- Considerable loss of open moorland, historically and culturally the most characteristic habitat of inland Galloway.
- Threatened species such as Willow Tit, Bog Bush-cricket, Perennial Flax, which if lost, would probably result in their extinction from Scotland as a whole.

Galloway in the snow ©Mark Pollitt



Background

The biodiversity of Galloway and the surrounding area is a combined result of its geological history and its changing climate, together with more than 7000 years of ever-increasing modification by people.

Five hundred million years of geological history are recorded in the rocks of south-west Scotland. The area is mainly composed of sedimentary greywackes (hard sandstones) and shales of the Ordovician and Silurian periods (488-416 million years ago), with the major intrusive granite masses of Criffel, Cairnsmore of Fleet and Loch Doon. These rocks have proven resistant to erosion resulting in the extensive Southern Upland range, which has been much modified by the relatively recent scouring of a vast ice sheet, resulting in a landscape typified by rounded domed hills, with more rugged hills in places. Younger, softer sedimentary rocks also occur and are more easily eroded, resulting in lowland landscapes such around Stranraer and Luce Bay.

The retreat of the last ice sheet some 14,000 years ago left behind a post-glacial landscape of open grasslands and treeless tundra, and created raised beaches and relict cliff lines along the coast. This was gradually colonised by flora, including trees suited to a temperate climate. Birch, Juniper and willows were followed by Hazel, then oaks and elms and finally Scot's Pine and Alder. Large mammals of open habitats, such as Giant Elk and Reindeer were replaced by Auroch and Brown Bear, probably together with Beaver, Wolf and Lynx.

There is evidence from the fifth millennium BC for human intervention in the landscape, but palaeo-botanical evidence suggests more dramatic intervention from the third millennium BC, with ground cleared for cereal cultivation and the introduction of domesticated livestock.

The climate deteriorated around 2250 BC and again around 1650 BC, and pollen evidence in buried sediments shows a sudden decline in tree pollen about 2200 BC with localised deposits of blanket peat beginning to form, accumulating more rapidly from the 2nd millennium BC. It still dominates the uplands today.

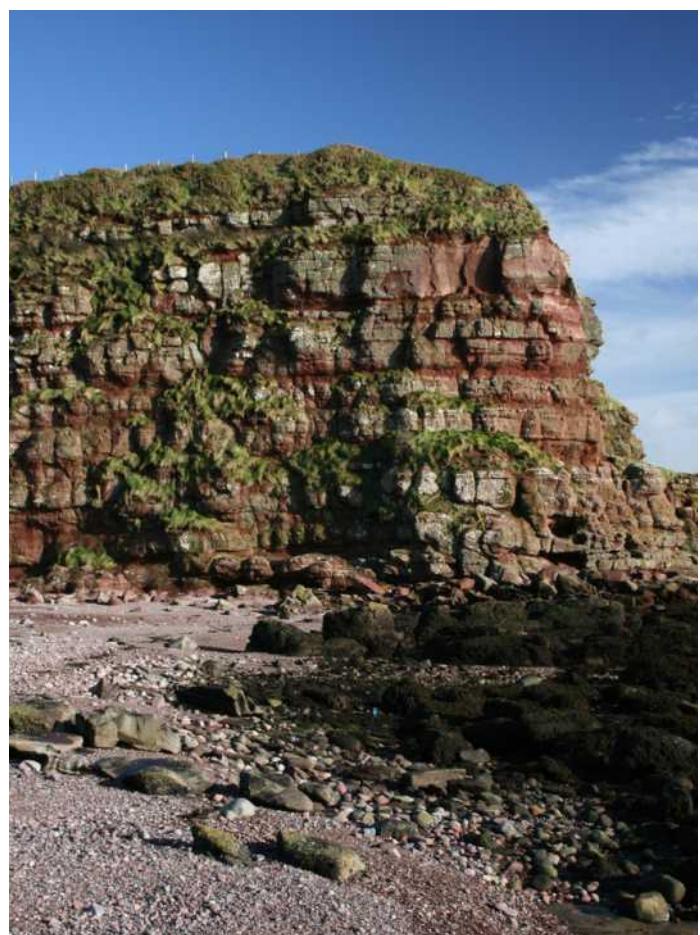
Around the middle of the first century BC, a greater degree of social, economic and political organisation resulted in larger-scale farming. Much of the landscape's current character of open farmland and moorland punctuated by wooded areas and extensive peat in the uplands had been created by the time the Roman Army established its fort at Glenlochar.

Further woodland clearance took place throughout the medieval and post-medieval periods, primarily for agricultural purposes, with almost full deforestation by the time General Roy's Military Survey of Scotland was completed in 1755.

Increases in soil acidification at Round Loch of Glenhead indicate the effects of industrialisation from the 1840s, with a particularly significant increase from 1900 to the present, even though the area itself has never been subject to high levels of industrialisation.

Afforestation of large upland areas took place during the late 20th century largely using non-native conifers, which continues to have a significant impact on the area's biodiversity.

Barlocco Bay ©Mark Pollitt



Nature Conservation and Designated Sites

Managing land for the purposes of conserving nature is a relatively new activity, effectively dating in the UK only from the 1940s. Its roots, however, go much further back into history.

Early Designated Sites in Galloway

The Forest of Buchan was a medieval hunting reserve, reputedly established by the Earl of Buchan in the 13th and 14th centuries. The Earls took their title from the district of Buchan in north east Scotland, but Alexander Comyn, 6th Earl of Buchan became Sheriff of Wigtownshire. The exact boundaries of this Forest are not known, but it probably covered most of the area we now know as the Galloway Hills. This area would have been subject to Forest Law, effectively to protect the game, especially the deer, which the Earls wished to hunt. Other areas with similar controls were managed by other nobles, as well as by the larger ecclesiastical houses such as Whithorn, Dundrennan and Sweetheart.

Jumping forward several centuries, the lands of Threave, near Castle Douglas, were bought in 1867 by William Gordon, a successful Liverpool businessman, mainly to pursue his interest in wildfowling. In 1948, the estate was donated by Major Alan Gordon to the National Trust for Scotland, with a request that it should be managed as a wildfowl refuge, no doubt inspired by Sir Peter Scott, a friend of the Gordon family and occasional visitor to Threave, who had established the

Wildfowl Trust at Slimbridge two years previously. This makes Threave possibly the longest established nature reserve in south west Scotland, though that term has only been applied to it much more recently.

Statutory Designated Sites in Galloway

Around the same time as Threave Wildfowl Refuge was being established, the government was taking the first steps into nature conservation. In 1949, they were persuaded of the principle that a proportion of the land should be set aside for nature, and The National Parks and Access to the Countryside Act was passed with all-party support. This provided the framework for the creation of National Parks and Areas of Outstanding Natural Beauty. It also addressed public rights of way and access to open land, and established the principle of scheduling areas of land as Sites of Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs).

However, it was not until the Wildlife and Countryside Act of 1981 that **Sites of Special Scientific Interest** gained a degree of legal protection. SSSIs have been the mainstay of site-based biological and geological conservation ever since, with numerous modifications to the legislation through both the UK and Scottish Parliaments. As of 2023, there is a total of 72 SSSIs in the study area, encompassing 7.8% of the land area.

Cairnsmore of Fleet NNR ©Mark Pollitt





Carstramon Wood SSSI ©Mark Pollitt

National Nature Reserves (NNRs) are areas of land set aside for nature and the accolade is given to Scotland's best wildlife sites to promote their conservation and enjoyment. There is one NNR in the study area at Cairnsmore of Fleet, extending to 1922ha.

Local Nature Reserves (LNRs) are areas of local importance for natural heritage and are designated by the local planning authority. There is one LNR in the study area, at Wigtown Bay, extending to 2845ha, the largest LNR in the UK.

Special Protection Areas (SPA) were designated under the European Union (EU) Birds Directive as sites to protect one or more rare, threatened or vulnerable bird species listed in Annex I of the Directive, or certain regularly occurring migratory species. **Special Areas of Conservation** (SAC) were designated under the EU Habitats Directive as sites to protect one or more special habitats and/or species listed in the Directive. The designations and the legislation governing them remains unchanged following the departure of the UK from the EU. There are currently 4 SPAs and 13 SACs within the study area.

Ramsar sites are classified under the Convention on Wetlands of International Importance. There are currently 4 Ramsar sites within the study area.

The **Galloway and Southern Ayrshire Biosphere** designation was awarded in 2012 by the United Nations Educational, Scientific and Cultural Organisation (UNESCO), and the boundaries were extended in 2023. The Biosphere is a centre for learning and research, and for testing solutions to some of the most critical challenges of our time. It does not offer any additional biodiversity protection to sites, other than that provided by the statutory designations listed above.

Non-statutory Designated Sites in Galloway

Local Wildlife Sites have been identified across Dumfries and Galloway by the Dumfries and Galloway Biodiversity Partnership as locations outwith statutory protected sites where the habitat and/or species are of region-wide importance and worthy of protection and appropriate management. All have been identified with the co-operation of the owners, and their importance is recognised by Dumfries and Galloway Council through a policy in the Local Development Plan. A similar system operates in Ayrshire. There are currently 74 Local Wildlife Sites within the study area.

Policies relating to biodiversity in the wider countryside

In addition to the approach of designating sites, a wide range of broader policy initiatives relating to biodiversity have been implemented over the last 70 years. Some have been biodiversity-led, sometimes even relating to a single species, but many have been part of broader initiatives relating to, for example, agriculture, forestry and town & country planning. There are too many to go into detail here, but perhaps the most important have been the UK Biodiversity Action Plan, and the plans that have followed it – the Scottish Biodiversity Strategy, and locally the Dumfries & Galloway and Ayrshire Local Biodiversity Action Plans.

All of the above designations and policy have had a degree of success. None, either individually or collectively, have succeeded in halting the decline in biodiversity. The decline may have slowed in the late 20th and early 21st centuries, but if anything, global biodiversity may now be declining at a faster rate than any other time in history, and Galloway is not immune to this decline.

Biodiversity Loss

Biodiversity is in crisis – globally, nationally and locally. For many species and habitats, in many locations, there are no comprehensive and up to date data to enumerate or catalogue the losses. Wherever data have been collected and analysed, the present position is clear, stark and indisputable.

Due to its geographical position, species new to Scotland are frequently discovered in the south west. These species are invariably ‘generalists’ that have a wide range of habitat and ecological requirements, and are therefore able to adapt to human-modified environments and free to move as the climate changes. A simple count of numbers of species, however, masks the conversion of biodiversity-rich to biodiversity-poor habitats and the decline, in many cases to local extinction, of ‘specialist’ species that are dependent on them. This loss frequently goes unreported.

Nationally, many research reports have highlighted the current position, most notably The State of Nature Report (2019). Though data from south west Scotland forms only a small part of all these reports, key findings from them are applicable to Galloway. A brief selection of the findings include:

- 49% of all species in Scotland have decreased in abundance and 33% have declined in distribution. (State of Nature 2019)
- 53% of our native plants have declined in

Argent and Sable *Rheumaptera hastata* ©Peter Norman



Sheep's-bit *Jasione montana* ©Mark Pollitt

Britain due to human impacts such as agricultural intensification and climate change. (Plant Atlas 2020)

- Non-native plant species now outnumber native plant species in the wild. (Plant Atlas 2020)
- Four times as many moth species decreased in abundance than increased. (State of Britain's Moths 2021)
- A study of 353 wild bee and hoverfly species that are responsible for pollination found a net loss of over 2.7 million occupied 1km grid squares between 1980 and 2013. (Widespread Losses of Pollinating Insects in Britain 2019).

The national decline has been driven by agricultural management, climate change, hydrological change, urbanisation, woodland management, pollution, invasive non native species (INNS) and upland management.

Restoring Nature

The justification for restoring nature has been expanded in recent years to encompass the benefits for people, as well as the intrinsic value of biodiversity and the ethical reasons for its conservation. Human benefits from biodiversity have been termed **ecosystem services**. These include services which can have a direct market value, such as timber or clean drinking water, but also include those with an indirect market value, such as outdoor recreation and landscape amenity, as well as those with no market value, such as the value people place on the existence of a particular habitat or species. The total stock of biodiversity which provides these ecosystem services to society has been termed **natural capital**, which also includes non-living aspects of the natural world such as rocks, soils and water.

The ability of natural capital to provide ecosystem services is determined by their quality, quantity and location. These are affected by background pressures, both physical, such as climate change, and non-physical, such as economics and politics. These in turn affect management practices.

As outlined previously, nature conservation policy and management over the last 80 years has relied heavily on designated sites, and to a lesser extent, species-specific management. In recognition that this has not halted the decline in biodiversity, additional measures and/or alternative approaches have been advocated.

Designated sites have tended to be small in extent, with large sites mostly confined to the uplands or to the coastal-marine environment. Small sites have limited capacity to adapt to a changing climate, and are also vulnerable to external factors that may damage or even destroy their biodiversity value and their natural capital. It is therefore now recognised that nature conservation, where possible, should operate at the **landscape-scale**.

Natural processes, such as photosynthesis, nutrient-cycling, pollination, decomposition and many others, are fundamental to the ecological well-being of the land. However, some previous management practices have attempted to restrict or divert natural processes. It is now accepted that, wherever possible, management should work with, rather than against natural processes.

Where species have been lost as a result of previous human activities, it is now being widely advocated that these species should be reintroduced. In particular, **reintroduction of keystone species** is increasingly being proposed. These are species, such as the Beaver, which impact on the environment in ways which enhance the habitat and provide opportunities for other species. There may be opportunities in Galloway for such reintroductions, but all will need to be properly assessed in advance and carefully managed according to international guidelines. It is usually more cost-effective to prevent species extinction than to resort to reintroduction.

All of the above actions have been combined into an approach that has been popularly termed **rewilding**. However, much of the land in the UK, even in sparsely populated areas such as Galloway, is required for housing, agriculture, recreation and other human land uses and can never be subject to the full rewilding approach. It can, however, produce biodiversity and ecosystem services. Some may result from the adoption of new techniques and practices, but in many places, it is likely that **traditional management** practices, such as coppicing and hay-making, may have a role to play in addressing biodiversity loss. It is these practices, sometimes with a history that stretches back over many centuries, that has created many of the biodiverse-rich habitats that we value today, even if they cannot be considered to be entirely wild or natural habitats.

Nature cannot be restored using a single ideologically-based approach. It will require a range of methods, both tried and trusted, and new and innovative, applied over a wide area, but always appropriate for the location.

Beaches and Dunes

"here grew heather and bent in tufts and patches, but with no look of permanence in their tenure; and those swelling billows, those deep troughs and far-drawn ridges of sand – were they not like a tormented sea arrested in its commotion?"

Rev. C. H. Dick, author (referring to Torrs Warren)
Highways & Byways in Galloway & Carrick (1916)

FUTURE VISION

An unspoilt coastline where the numerous beaches and dunes provide both a habitat for wildlife and a peaceful haven for people to enjoy.

Current Extent and Distribution

Sandy beaches are frequent along the Solway and Rhins coast. Many are small and secluded, nestling between the rocky headlands, but there are also a few larger beaches that are popular with visitors. In

Top: Ardwell Bay ©Peter Norman

Below: Front Bay, Monreith ©Peter Norman

many cases, the sand is interspersed with areas of shingle. Extensive **shingle beaches**, many of them supporting specialist plant and invertebrate communities of national importance, are a feature of Luce Bay. **Dunes** are not common in Galloway, with the notable exception of Torrs Warren at the head of Luce Bay, the largest and most complex dune system in southern Scotland.

Key Species

Due to the mobile nature of sand grains, most of the biodiversity of sandy beaches is buried deep out of sight, though the strandline can be alive with **Sandhoppers** *Talitrus saltator*, food for birds such as **Turnstones** *Arenaria interpres*. In the more stable environment of the upper shore plants such as **Sea Rocket** *Cakile maritima* and **Prickly Saltwort** *Salsola kali* subsp. *kali* become established, and the sandy grassland at Brighouse Bay is the only Scottish site for **Perennial Flax** *Linum perenne*, a favourite subject of Scottish artist E. A. Hornel.

Sea Kale *Crambe maritima* often dominates vegetated shingle beaches, but the best sites also have **Yellow-horned Poppy** *Glaucium flavum*, near the northern edge of its range, and **Oysterplant** *Mertensia maritima*, which despite being near the southern edge of its range, can be found in densities only surpassed in Orkney and Shetland.

Dune vegetation is dominated by **Marram** *Ammophila arenaria* but stable dunes, lichen-dominated dune heathland and wet hollows (dune slacks) support a number of specialist species, some of them nationally rare. Species include **Isle of Man Cabbage** *Coincyia monensis* subsp. *monensis*, **Coralroot Orchid** *Corallorrhiza trifida* and **Dung Bird's-nest** *Cyathus stercoreus*, a fungus known only from Torrs Warren and a handful of dune systems in Wales.



Dune heath, scrub and slack at Torrs Warren ©Peter Norman

Important Sites

A number of places have been named after their sandy beaches – **Sandhead**, **Sandyhills** and **Sandgreen**. Other extensive beaches include **Killantringan Bay**, **Port Logan**, **Ardwell Bay**, **Cardoness** and **Mossyard**, with many small beaches at other locations. The now tranquil beach at **Rigg Bay**, enclosed by the wooded parkland of Galloway House, was a practice ground for the D-Day landings in World War II.

The eastern shore of **Luce Bay** (SAC) is dominated by shingle beaches, stretching around 25kms in length. They include some of the most important vegetated shingle in Scotland, if not the UK. **Ballantrae** (SSSI) also has a large shingle beach.

Vegetate coastal shingle at Port Logan ©Mark Pollitt



Torris Warren (SSSI, SAC, SPA) is the only dune system of any significant size, but smaller areas of dune can be found at **Sandyhills**, **Monreith** (SAC) and **Port Logan**, and a small area of dune grassland at **Brighouse Bay** (SSSI).

Opportunities for Enhancement

Future developments should respect the unspoilt nature of almost all of the coastline, whilst at the same time providing enhanced opportunities for quiet recreation.

Continued improvement of water quality, for both biodiversity and bathing, could be achieved by management of inland activities causing diffuse pollution.

Sandy and shingle beaches require little management, other than ensuring that damaging operations such as mineral extraction and mechanical beach cleaning, both of which have taken place in the past, are avoided. Plastic debris, which is both unsightly and a risk to wildlife, can be removed by hand, but much better if it is kept out of the sea in the first place.

The MoD has begun a restoration programme on the dunes at Torrs Warren, including tree removal and reintroduction of cattle grazing, which it is hoped will bring back some of the rare species previously known from the site.



Beaches and Dunes

1) Yellow Horned Poppy ©Peter Norman

2) Dune Club *Clavaria agriphila* ©Montanature/Getty Image Signature

3) Oysterplant ©Peter Norman

4) Ringed Plover ©toumovaa/Getty Images

5) Dark Green Frillary ©Simon002/Getty Images

Beaches and Dunes

1) ***Cassida nobilis*** ©Peter Norman

2) **Hare's-foot Clover** ©Peter Norman

3) **Perennial Flax** at Brighouse Bay
© Christine Dudgeon; inset © Peter Norman





Saltmarshes

“Well, come again to Galloway. Sit down i' the gloaming dewfall on the green merse side amang the flowers”

Attributed to Jean Walker, poet
Remains of Nithsdale and Galloway Song (1811)

FUTURE VISION

Extensive saltmarshes supporting characteristic wildlife, providing storm protection for coastal communities and producing high quality livestock from carefully controlled grazing.

Current Extent & Distribution

Saltmarshes are so characteristic of the Solway that they have acquired not one, but two, local names. In Dumfriesshire and Kirkcudbrightshire it is known as 'merse' but in parts of Wigtownshire it is sometimes referred to as 'the inks'.

There are extensive saltmarshes in the outer Solway, particularly in Wigtown Bay. In the inner Solway, Kirkconnell Merse, near New Abbey is one

of the largest sites. Though saltmarsh creation is a natural process, several of the larger sites including those at Kirkconnell at Creetown, have only formed following construction of breakwaters in the 19th century.

Saltmarsh continues to expand in sheltered coastal locations, as the tidal currents of the Solway results in greater deposition of sediment than erosion. They provide a habitat for a range of specialised plants and animals. It is estimated that only around 3% (5,400ha) of the Scottish coastline consists of saltmarsh vegetation, but 40% of this is found in the Solway Firth.

Key Species

Galloway saltmarshes are best known for their wintering wildfowl, including nationally important numbers of **Whooper Swans** *Cygnus cygnus*, **Pink-footed Geese** *Anser brachyrhynchus* and **Barnacle Geese** *Branta leucopsis*, the latter having spread to the outer Solway from their core feeding sites around the Nith estuary. Waders such as **Redshanks** *Tringa tetanus* and **Oystercatchers** *Haematopus ostralegus* are amongst the breeding birds found here.

Top: Auchencairn Bay ©Peter Norman

Below: Merse near Palnackie ©Peter Norman





Saltmarsh at Luce Bay ©Peter Norman

Saltmarsh vegetation is dominated by plants specially adapted to this hostile environment, such as **Sea Lavender** *Limonium vulgare* and **Saltmarsh Grass** *Puccinellia maritima*. **Holy-grass** *Hierochloe odorata*, a nationally rare plant, is usually found in wetlands, except in south west Scotland where it is found along the upper edge of saltmarshes. Similarly, **Short-winged Conehead** *Conocephalus dorsalis* is not exclusively coastal, but was first recorded in Scotland in 2016 on saltmarsh. It remains confined to this habitat in Galloway.

Important Sites

The largest saltmarsh sites are **Wigtown and Creetown Merse** (SSSI) and **Kirconnell Merse** (SSSI, SAC, SPA) on the west bank of the Nith estuary. Smaller areas are found in **Luce Bay** (SSSI, SAC, SPA), **Fleet Bay, Auchencairn & Orchardton Bays** (SSSI), **Kirkcudbright Bay** and **Rough Firth**.

Opportunities for Enhancement

Biodiversity is greatly influenced by levels of grazing, which needs to be carefully controlled to match local conditions. Grazing can produce in premium quality meat if correctly managed and marketed.

As well as being important for biodiversity, saltmarshes protect our coasts by stabilising shorelines.

Southwick Merse ©Peter Norman





1



2

Saltmarshes

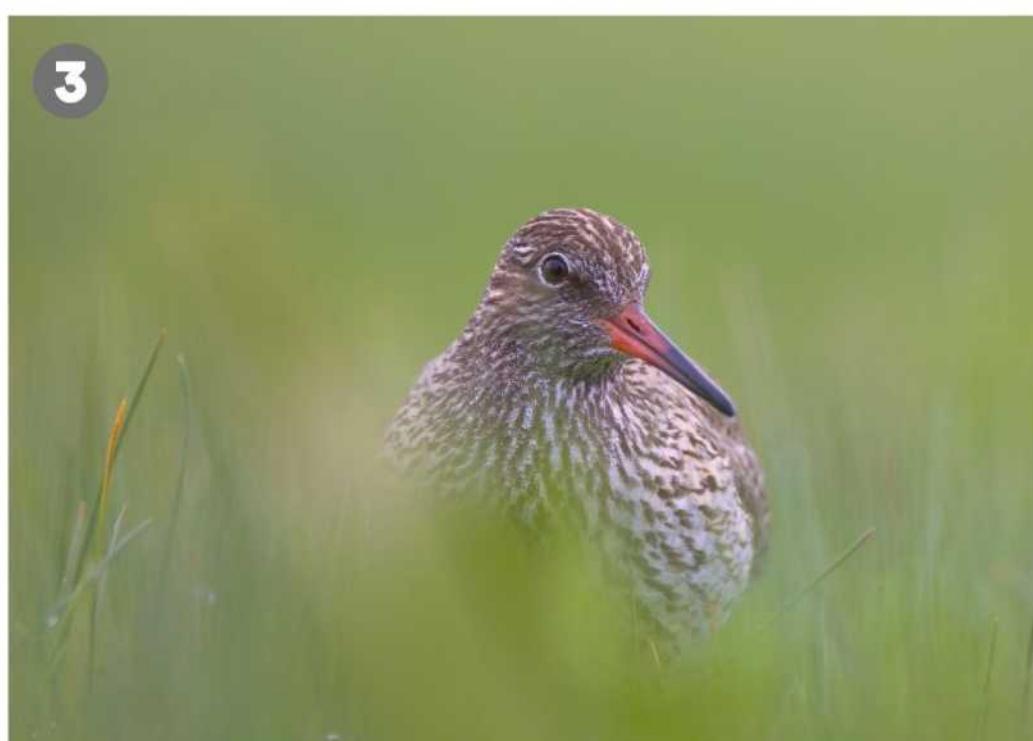
1) **Barnacle Geese** ©Mantonature/
Getty Images

2) **Sea Lavender** ©Peter Norman

3) **Redshank** ©Coica/Getty
Images

4) **Natterjack Toad**
©Mantonature/Getty Images

5) **Holy-grass** ©Peter Norman



3



4



5

Saltmarshes

1) Short-winged Conehead

©CreativeNature_nl/Getty Images

2) Pink-footed Goose

©Dennis Jacobsen/
Getty Images

3) Oystercatchers

© rockptarmigan/Getty
Images



Coastal Cliffs

“When we came in sight of the sea from the grass cliffs (called ‘heughs’ in Galloway, and practically unpronounceable) it looked sparkling like imperfectly smoothed silver-paper; we had our own word for this – ‘shinkly’ and the ‘shinkliness’ added to our exhilaration because it added even more light and movement to the sky and the salt wind in our faces.”

Gavin Maxwell, author and naturalist
House of Elrig (1965)

FUTURE VISION

Thriving wildlife on inaccessible cliffs, mixed with low-intensity farming on coastal slopes and broad areas of clifftop habitat, providing an exhilarating walking and wildlife experience.

Top: Slew-whan Point, Dunman Heughs ©Peter Norman

Below: Borth Point ©Peter Norman



Current Extent and Distribution

The cliffs, headlands, coastal slopes and heaths of Galloway are some of the finest habitats in the UK. As the only extensive stretch of south-facing coastline in Scotland, and influenced by a mild oceanic climate, it supports many species (particularly plants and invertebrates) that are unknown further north. **Coastal heath** survives at several sites in the Rhins. Sheltered coastal slopes harbour important grassland communities and a few remnants of once extensive coastal woodlands, the trees contorted by salt laden winds. Sheer **rocky cliffs** and the **offshore islands** support colonies of nesting seabirds, some of national and international importance.

Key Species

Spring Squill *Scilla verna*, a speciality of western Britain, carpets coastal grassland, whilst Rock **Samphire** *Crithmum maritimum*, at the northern extreme of its range, clings to rock faces. **Golden Samphire** *Limbara crithmoides* is much rarer, confined in Scotland to Mull of Galloway. **Sticky Catchfly** *Silene viscaria* is another nationally rare plant with only 18 known locations, mostly in the uplands, but found on two coastal slopes in Kirkcudbrightshire.



Coastal heath at Barncorkrie Moor ©Peter Norman

Invertebrates have not been studied in detail, but the Galloway coastline is known to have the greatest diversity of moths and butterflies in Scotland, including **Forester** *Adscita statices* and **Northern Brown Argus** *Aricia artaxerxes*. Other scarce invertebrates of coastal cliffs and slopes include **Rose Chafer** *Cetonia aurata*, **Bloody-nosed Beetle** *Timarcha tenebricosa*, **Speckled Bush-cricket** *Leptophyes punctatissima* and **Dark Bush-cricket** *Pholidoptera griseoaptera*, with the Galloway coast being the Scottish stronghold of many of these species.

Nesting seabird colonies are not large when compared with sites further north, but all the main species breed, including **Razorbills** *Alca torda*, **Guillemots** *Uria aalge*, **Black Guillemots** *Cephus grylle*, **Kittiwakes** *Rissa tridactyla*, **Fulmars** *Fulmarus glacialis*, **Shags** *Gulosus aristotelis*, **Cormorants** *Phalacrocorax carbo* and a few **Puffins** *Fratercula arctica*. There are also **House Martins** *Delichon urbicum* nesting on sea cliffs, their natural habitat before people built houses. And Scar Rocks has around 4000 nesting **Gannets** *Morus bassanus*, one of only around 16 ganntries in the UK and fewer than 50 in the world. **Choughs** *Pyrrhocorax pyrrhocorax*

historically bred along much of the coastline with an occasional pair recorded more recently.

Important Sites

Mull of Galloway (SSSI, SAC), Scotland's most southerly point, is the best known and locally the best studied site for most plants and invertebrates. It also has the largest seabird colony, with smaller numbers at **Meikle Ross** (SSSI), **Balcary Heughs** (SSSI) and **Burrow Head** (SSSI). However, there are numerous smaller cliffs, interspersed with coastal slopes along much of the Galloway and South Ayrshire coastline.

Opportunities for Enhancement

Clifftop habitats, including coastal heaths and grasslands, have been squeezed by farming, often with intensive farming up to the fence-line, but little or no grazing on the coastal side. A broader clifftop would allow for better habitat management and enhanced recreation opportunities.

Seabird populations are affected by wider policies of a national and international nature, rather than site-based management actions.



Burrow Head ©Peter Norman



Coastal Cliffs

1) Forester moth ©Rosemarie

Kappler/Getty Images

2) Spring Squill ©Peter Norman

3) Black Guillemot ©Maria

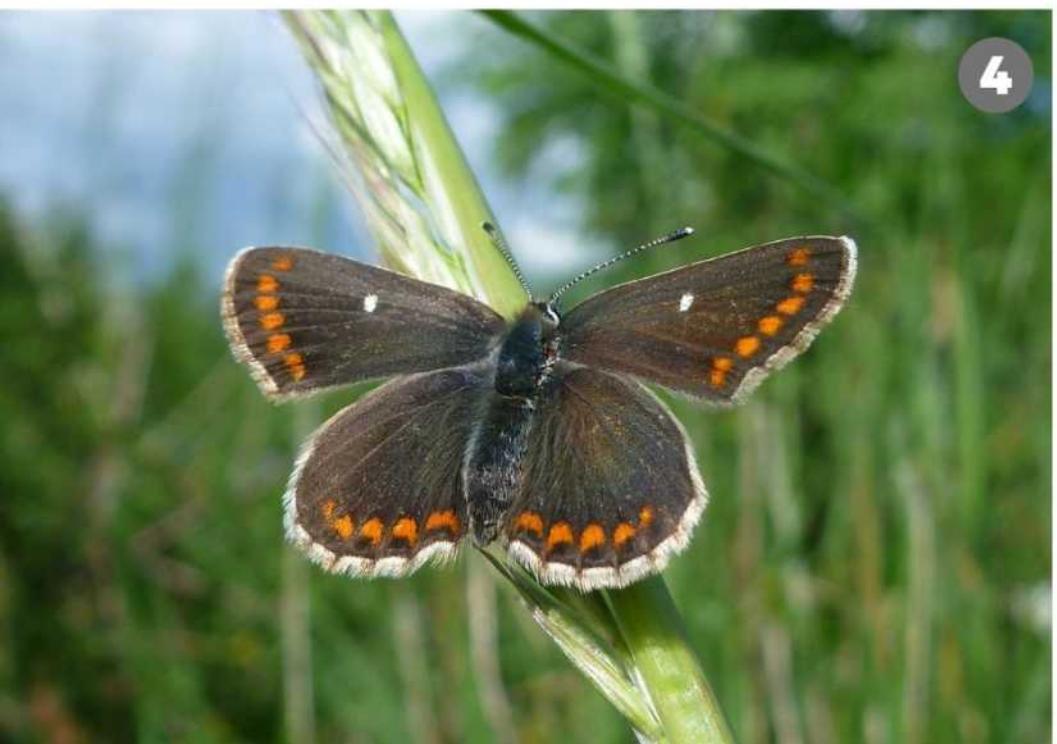
Gaellman/Shutterstock

4) Northern Brown Argus ©Nic

Coombey

5) Bloody Cranesbill ©Peter

Norman





1



2



3



4



5



6

Coastal Cliffs

1) Rose Chafer ©gui00878/Getty

Images

2) Dark Bush-cricket ©Peter

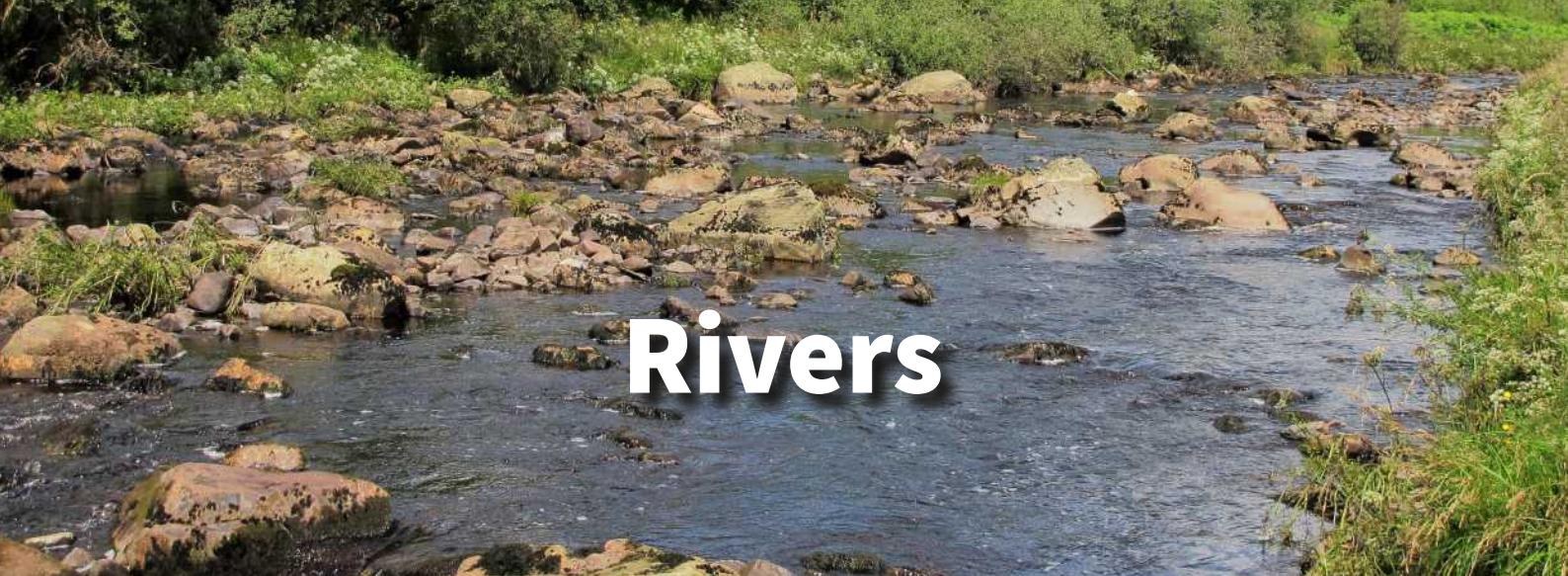
Norman

3) Rock Samphire © Ian Redding/
Getty Images

4)Juniper © Peter Norman

5)Carline Thistle ©Peter Norman

6) Razorbill ©zixian/Getty Images



Rivers

*“Ye flowery banks o' bonnie Doon,
How can ye bloom sae fair”*

Robert Burns, National Bard
The Banks O' Doon (1791)

FUTURE VISION

Clean, cool rivers and riverbanks where natural processes are allowed to operate wherever possible.

Current Extent and Distribution

Unlike much of Scotland, there is no single major river system draining a large area. Rather, the main rivers, the Luce, Bladnoch, Cree, Fleet, Ken/Dee, Urr and Nith, flow predominantly southwards from the hills to the Solway. The River Stinchar lies to the north of the high ground and flows westwards to enter the Firth of Clyde. All their **headwaters**

consist of fast-flowing stretches where the water is mostly shallow and its surface is constantly broken and disturbed, whilst **lowland rivers** have slow-flowing stretches where the water is deeper and its surface flows smoothly. Areas of **exposed river shingle** are a particularly important biodiversity habitat.

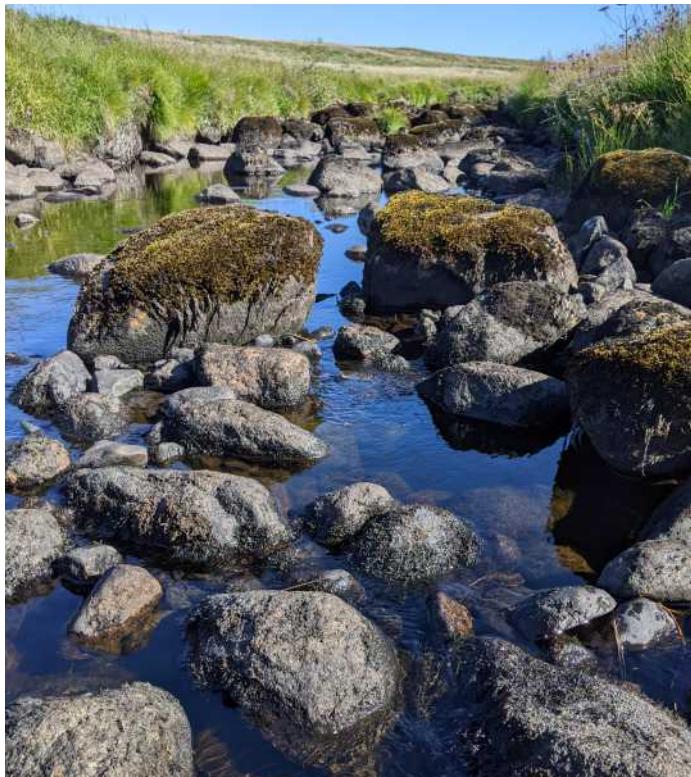
Almost all UK rivers have a long history of human modification, with their banks being constrained and sometimes even their courses diverted. Most Galloway rivers have a history of acidification resulting from atmospheric pollution, which has been exacerbated by a naturally acidic geology, draining of peatlands and extensive conifer planting. The Ken-Dee system has been modified by a series of dams and power stations, built in the 1930s. Lowland rivers can be affected by invasive species, nutrient enrichment and diffuse pollution from farming operations.

Key Species

Atlantic Salmon *Salmo salar* are found in all the major river systems, but like the **European Eel** *Anguilla anguilla*, their populations are affected by both river management and by marine issues, which impact on the part of their lifecycle spent at

Top: Cross Water of Luce ©Peter Norman
Below: River Bladnoch at Glassock ©Peter Norman





Upland burn at Grobdale ©Peter Norman

sea. All three species of **lamprey** are found throughout most of the Galloway rivers. Similarly, **Sparling** (or Smelt) *Osmerus eperlanus* were formerly abundant in the Solway Firth, ascending the rivers in spring, but they are now hardly known as a freshwater fish, other than small numbers in the Cree, one of only three breeding populations in Scotland.

Otters *Lutra lutra* have always maintained a strong population in the rivers of Galloway, as well as lochs and coastal waters, even when populations in much of the rest of the UK were near extinction. However, **Water Voles** *Arvicola amphibius*, are now believed to be very scarce in the region.

The region once supported many populations of **Freshwater Pearl Mussel** *Margaritifera margaritifera*, two of which currently survive in Galloway rivers.

Dippers *Cinclus cinclus* are the characteristic bird of the headwaters, whilst **Kingfishers** *Alcedo atthis* are found on lowland rivers.

Important Sites

The **River Bladnoch** (SAC) is designated for Atlantic Salmon and the lower **River Cree** (SSSI) is designated for Sparling. Given that the whole hydrological network is inter-connected, all of the rivers, including their tributaries, support extensive biodiversity.

Opportunities for Enhancement

Ensure that natural processes are allowed to operate where possible, with in-river engineering works only carried out where essential.

Establish riparian woodlands to increase the resilience of rivers to climate change and mitigate the risk of increasingly hot summer temperatures, drier summers and more extreme winter floods.

Address acidification which has had a detrimental effect on many species of fish.

Management of river catchments, particularly around the headwaters could be enhanced to benefit water quality, improve biodiversity and limit flood risk.

Restoration or creation of low-intensity habitats, such as wetlands, unmanaged grassland and native woodland, will not only benefit biodiversity, but will assist with water quality and flood mitigation.



Gairland Burn ©Peter Norman



1



2

Rivers

- 1) **Otter** ©Gannet77/Getty Images
- 2) **Kingfisher** ©Peter Norman
- 3) **Water Vole** ©Dave Dunn/Getty Images
- 4) **European Eel** ©Michael Viard/Getty Images
- 5) **Dipper** ©Frank Fichtmüller



3



4



5



1



2

Rivers

1) **Goosander** ©hannurama/Getty Images
2) **Purple Loosestrife** ©Peter Norman
3) **Banded Demoiselle** © Pete Rose/Getty Images

3





Lochs and Ponds

“it is pleasant to be on Enoch-side when the sun shines – not so marvellous, indeed, as to see its whitening surges through the driving snow-swirls as the short fierce days of winter close in. Still...there is ever a sense up there that somehow heaven is near, and the evil things of the earth remote.”

S. R. Crockett, author
Raiderland. All about Grey Galloway (1904)

FUTURE VISION

A landscape of lochs and ponds and associated habitats, with unpolluted water and naturally appropriate nutrient levels.

Current Extent and Distribution

The climate and topography of Galloway has led to the formation of numerous lochs, which are widespread in both upland and lowland environments. They cover a wide range of sizes and

nutrient levels, from the high altitude **oligotrophic** Loch Enoch (50 hectares, 36m deep), to the **mesotrophic** Milton Loch (58 hectares, 4.6m deep), to many small, shallow, lowland eutrophic lochans. Most lochs are entirely natural in origin, but some such as Loch Doon and Loch Ken have been modified by damming, creating the two largest waterbodies in the region, and there are a few that are entirely man-made **reservoirs**, including Clatteringshaws Loch, the third largest waterbody. Nutrient levels have often been artificially increased due to surrounding land-uses.

Smaller waterbodies and **ponds**, notably millponds that were once found on virtually every farm, have declined in both quantity and quality, but are still widespread across the landscape.

Key Species

Arctic Charr *Salvelinus alpinus* is still found in Loch Doon, but populations in two other Galloway lochs are believed to be extinct. **Black-throated Diver**

Top: Knowetop Lochs ©Mark Pollitt

Below: Loch Trool ©Peter Norman



Gavia arctica has bred on a hill loch, and several lochs hold important aggregations of wintering wildfowl. **Ospreys** *Pandion haliaetus* are once more becoming a familiar sight fishing the region's lochs.

Slender Naiad *Najas flexilis* is known only in the south of Scotland from Loch Kindar but is rare and threatened throughout its European range. **Pillwort** *Pilularia globulifera* is a semi-aquatic fern that grows (or perhaps is just more easily observed) on the bed of lochs with fluctuating water levels, such as Loch Ken.

Hairy Dragonfly *Brachytron pratense* is restricted to a few lochs, whilst the nationally scarce **Variable Damselfly** *Coenagrion pulchellum* is locally widespread. New dragonfly species, such as **Emperor** *Anax imperator*, **Southern Hawker** *Aeshna cyanea* and **Black-tailed Skimmer** *Orthetrum cancellatum* appear to be colonising the area, no doubt as a result of climate change.

Ponds provide valuable breeding habitat for amphibians, notably a strong population of **Great Crested Newts** *Triturus cristatus*. **Medicinal Leech** *Hirudo medicinalis*, a species now restricted to a handful of sites in the UK, has recently been confirmed as present in two ponds in Galloway.

Important Sites

In the Galloway Hills, lochs such as **Enoch**, **Neldricken** and **Valley** (all SSSI, SAC) may appear lifeless, but support specialised freshwater species, as well as being important landscape features. **Mochrum Lochs** (SSSI, SAC) form an important group, linked by the surrounding moorland landscape. **Loch Doon** (SSSI) is important for its fish population.



Pond in the Fleet Valley ©Peter Norman

Lowland lochs vary in their value for flora and fauna, but of particular importance are **Loch Ken** (SSSI, SPA), **White Loch/Lochinch** (SSSI, SPA), **Carlingwark Loch** (SSSI), and **Milton Loch** (SSSI).

Carrick Ponds (SSSI) are particularly noted for their water beetles and other invertebrates, whilst the groups of ponds at **Burrow Head** (SSSI) are an important amphibian breeding site.

Opportunities for Enhancement

Create new pond landscapes, but not at the expense of existing ponds which are best left to develop naturally, with minimal intervention.

There are sufficient lochs and ponds in the region to enable potential disturbance from recreational activities to take place on those of lower conservation value, but some larger lochs may require appropriate management of activities.

Clatteringshaws Loch ©Jan Holm/Shutterstock



Lochs and Ponds

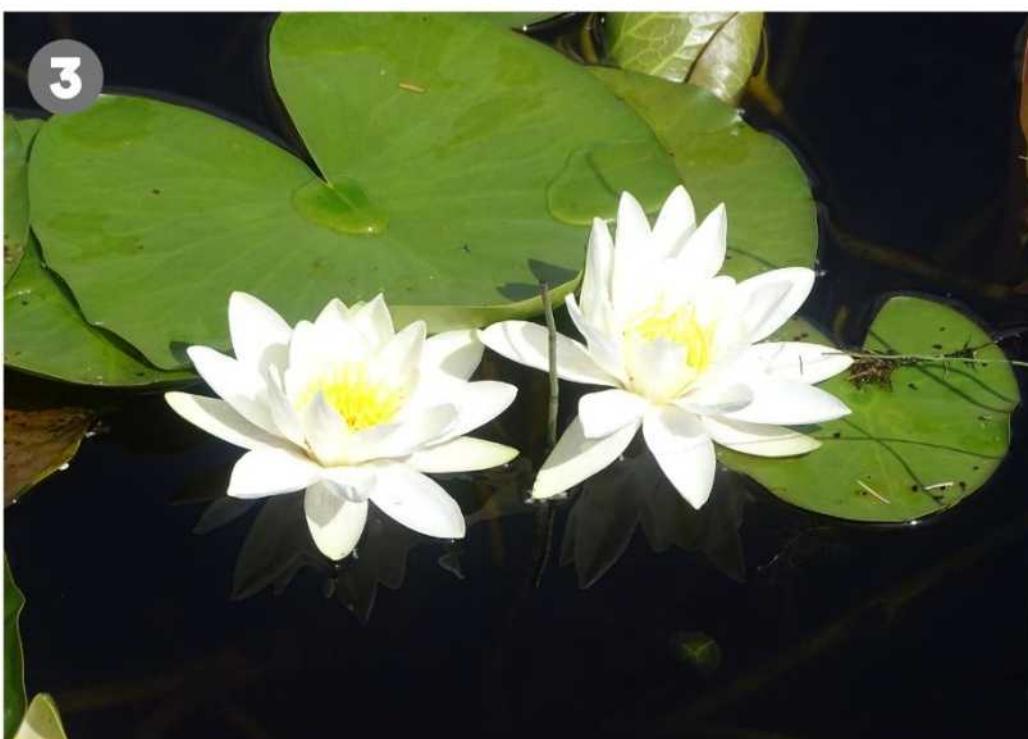


1

1) Hairy Dragonfly ©Mantonature/Getty Images



2



3



4



5



1



2



3



4

Lochs and Ponds

- 1) **Great Crested Newt** ©Tiberiu Sahlean/Shutterstock
- 2) **Pike** ©intst/Getty Images
- 3) **Water Lobelia** © David Bird
- 4) **Emperor Dragonfly** ©Leo Lazaro/ Getty Images
- 5) **Osprey** ©6381380/Getty Images



5



Reedbeds, Marshes and Swamps

“My first acquaintance with the Ken/Dee marshes was in June 1948 when old Henry Maxwell at Crossmichael lent me his boat to row across to the west side...to watch and paint birds. A boat among the reeds was idyllic on a summer’s day.”

Donald Watson, naturalist, author and artist
One Pair of Eyes (1994)

FUTURE VISION

Unpolluted, biodiversity-rich wetlands, which have a slow run-off from the land, thereby mitigating flooding.

Current Extent and Distribution

Reedbeds and swamps are habitats where the water table is above the ground throughout the year. Marshes are permanently damp, but with above-ground standing water present only during certain seasons. However, these three habitats are often present at the same location and frequently merge to form a wetland mosaic, with marshes usually

being the most common of them.

Individual sites are rarely extensive, usually constrained by the topography. They are often scattered in small pockets across the landscape, being found in hollows between hills or fringing freshwater lochs and riversides in both upland and lowland environments. Reedbeds tend to occur more frequently in the lowlands, and are also found in association with saltmarsh in brackish water along the coast.

Top: Marshes at Mersehead ©Christine Dudgeon
Below: Newly created marshland at Threave ©Peter Norman



These habitats are still subject to drainage, though often through piecemeal efforts on their fringes, rather than wholesale drainage of entire sites.

Key Species

Marshes and swamps can be botanically very rich with scarce plants such as **Marsh Stitchwort** *Stellaria palustris*, **Cowbane** *Cicuta virosa*, along with commoner, but nonetheless spectacular species such as **Northern Marsh Orchid** *Dactylorhiza purpurella*. They also support an abundance of different sedges and mosses.

Marshes and swamps are equally rich in invertebrates, with locally strong populations of **Small Pearl-bordered Fritillary** *Boloria selene* and the day-flying **Silver Hook** moth *Deltote uncula*, common in Dumfries and Galloway and Argyll, but virtually absent from the rest of Scotland.

Reedbeds are botanically much simpler, being dominated by a single species – **Common Reed** *Phragmites australis*. In the last decade or two, Galloway reedbeds have been colonised by species previously restricted to England, including **Reed Warbler** *Acrocephalus scirpaceus*, and the moths **Obscure Wainscot** *Leucania obsoleta* and **Brown-veined Wainscot** *Archana dissoluta*. **Marsh Harriers** *Circus aeruginosus* are rare breeding birds in Scotland but have bred in Galloway.

Harvest Mice *Micromys minutus* may have been present in Galloway for many years, but this has only been confirmed relatively recently, with areas of reed and marshy grassland being their preferred habitat, rather than the arable fields that their name might suggest.

Important Sites

At the head of Loch Ken, **Kenmure Holms** (SSSI, SPA) is one of the most extensive areas of reedbeds, marsh and swamp. At the other end of the Loch are **Blackpark Marsh** (SSSI, SPA) at Threave, and **Torrs Moss** (SSSI) near Castle Douglas. One of the largest coastal reedbeds is found at **Tongland**. There are many small marshes between the drumlins in Wigtownshire, and along the lower reaches of the **River Bladnoch floodplain**.

One wetland site, **Auchrochar Moss** (SSSI), formed after an unsuccessful attempt to drain a bog in the 19th century.

Fen, marsh and swamp has been created over the last two decades by the RSPB at **Mersehead**.

Opportunities for Enhancement

Species-rich marshes cannot be artificially created over a short time period, if at all, but new swamps and especially reedbeds, can be rapidly created.

Bitterns, which last bred here in the 18th century, could be encouraged return in the future through the creation of reedbeds.

Reedbeds, marshes and swamps, particularly when located adjacent to watercourses, intercept and slow water running off the land, thereby assisting in flood mitigation.

Reedbeds have also been used in the treatment of polluted water.

Reedbeds at Tongland ©Peter Norman





1



2

Reedbeds, Marshes and Swamps

1) Snipe ©Jeff Kingma/Getty Images

Images

2) Harvest Mouse ©Stacy Woolhouse/Getty Images

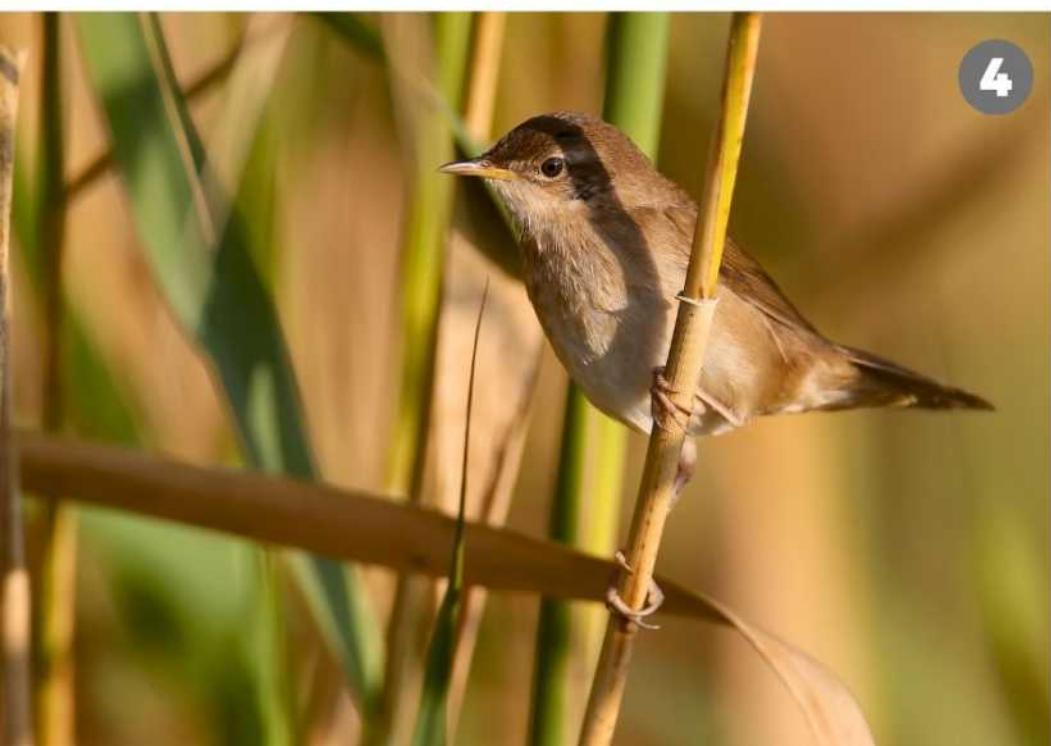
3) Small Pearl-bordered Fritillary ©ilyasov/Getty Images

4) Reed Warbler ©Volodymyr Kucherenko/Getty Images

5) Globeflower ©Peter Norman



3



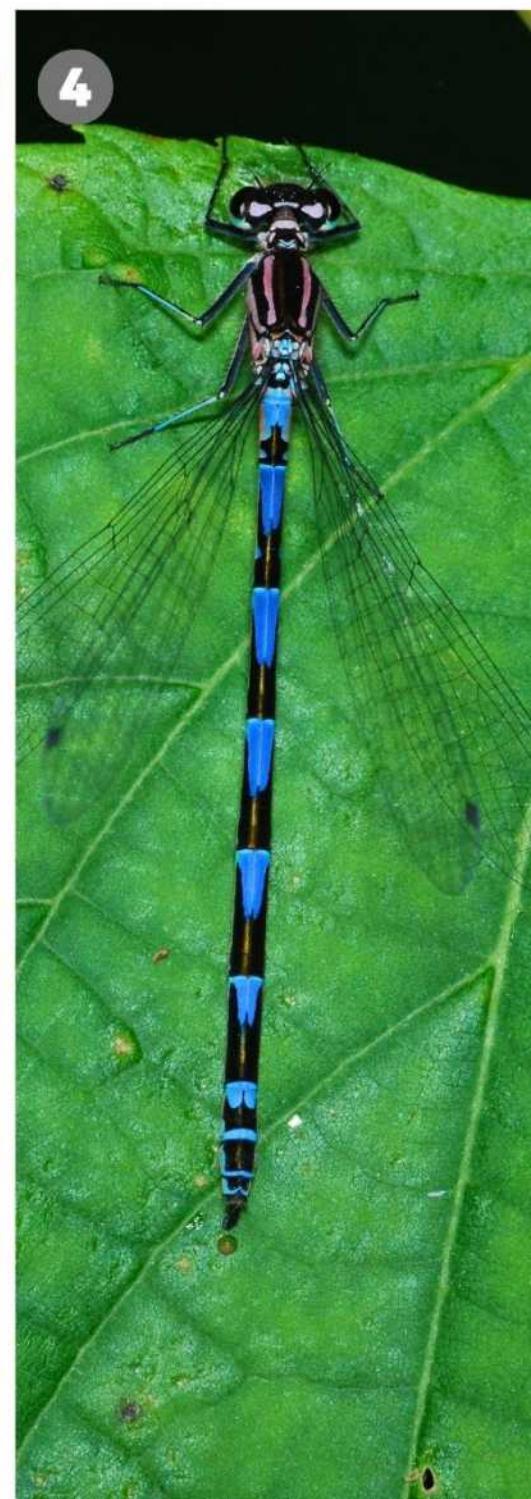
4



5

Reedbeds, Marshes and Swamps

- 1) **Marsh-marigold** ©Peter Norman
- 2) **Marsh Harrier** ©kwasny221/Getty Images
- 3) **Northern Marsh-orchid** ©daverhead/Getty Images
- 4) **Variable Damselfly** ©Richard Eagles





Bogs and Fens

“everything for miles...is untamed land of peat-bog and heathery hills, of Sphagnum moss and myrtle and waving bog cotton”

Gavin Maxwell, author and naturalist
House of Elrig (1965)

FUTURE VISION

All surviving peatlands are restored to fully functioning, peat-accumulating, biodiversity-rich habitats.

Current Extent and Distribution

Bogs and fens are both peatlands. The former are fed entirely by precipitation and atmospheric moisture, the latter are also fed by ground water. **Raised bogs** are found primarily in the lowlands, and **blanket bogs** on the hills, but there are also bogs that are intermediate between the two. **Fens** tend to be much less extensive, and can occur in conjunction with bogs (some fens were an earlier stage in bog formation) but they can also be found on their own. Locally, these habitats were known as

Top: Kirkconnell Flow ©Peter Norman

Below: Bog pools at Silver Flowe ©Malcolm Haddow



mosses and flow(e)s, though the distinction between them does not match modern ecological definitions.

The loss of peatlands from Galloway represents the biggest single loss of any broad habitat in the area in historical times, much of it within living memory. Out of 56 mosses and flows in Wigtownshire named and shown on the first edition OS map (c1850), 57% had been mainly or entirely destroyed by forestry by 2010, 11% drained for farmland, and 18% were still present, though the majority of them in a much degraded condition. Though peatlands were probably never as extensive in Kirkcudbrightshire, percentage losses have probably been even more severe here.

Key Species

Bogs are seldom rich in terms of the number of species associated with them; their value for biodiversity lies with the fact that many of the species are habitat specialists that do not occur elsewhere, and like the habitat, some are globally rare. Conversely, some fens can be extremely rich botanically.



Sphagnum mosses ©Peter Norman

Bog Rosemary *Andromeda polifolia* is a bog specialist, restricted in Britain mainly to the country between Wales and central Scotland, but found on nearly all of Galloway's bogs. **Elongated Sedge** *Carex elongata* is a nationally rare plant with a strong population on the fen at Wood of Cree.

Large Heath *Coenonympha tullia* is a butterfly restricted to peatlands where its cottongrass larval foodplant grows. It is listed as vulnerable on the European Red List, but found on many Galloway bogs. However, populations of the dragonfly **Azure Hawker** *Aeshna caerulea* at Silver Flowe, its only known site outside of the Highlands, may have already ceased to be viable. **Bog Bush-cricket**

Metrioptera brachyptera is currently known from a single area in Scotland at Aucheninnes Moss, near Dalbeattie.

Important Sites

Many of the intact raised bog sites have been designated. They include **Silver Flowe** (SSSI, SAC), **Kirkconnell Flow** (SSSI, SAC) and **Carsegown Moss** (SSSI, SAC), whilst blanket bog is included within other designated sites including **Cairnsmore of Fleet** (SSSI, NNR). The rich fen on the **River Cree** (SSSI, SAC), adjacent to Wood of Cree, is probably the most important site in the region for this habitat.

Opportunities for Enhancement

Bog restoration techniques have developed rapidly in recent years and are now beginning to demonstrate success on several local sites, and could be expanded to all sites in restorable condition. The process is slow and requires continued commitment over several decades.

Peatlands lock up a huge amount of carbon, far more than woodlands. Whilst restoration can temporarily release methane, another climate changing gas, in the long term, the benefits for the climate are enormous.

Restored peatlands can help address acidification, act as natural flood management and help river flows to be more natural.

Carsegown Moss ©Mark Pollitt



Bogs and Fens

1) Round-leaved Sundew ©Bjorn

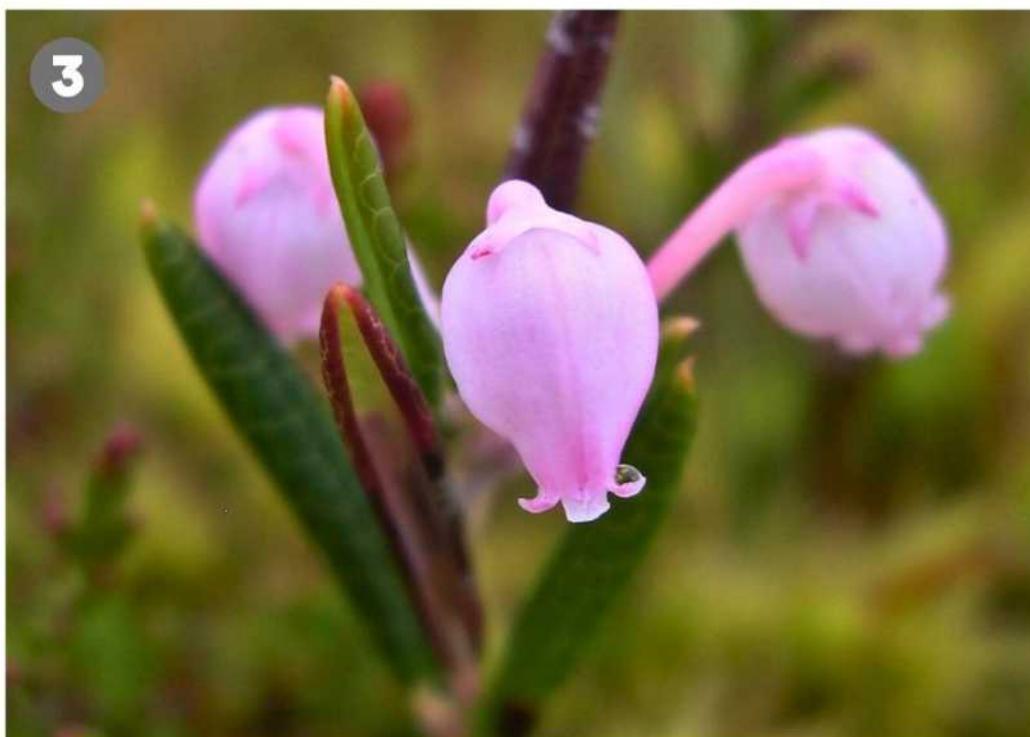
Stefanson/Getty Images

2) Bog Bush-cricket ©SWSEIC

3) Bog Rosemary ©Peter Norman

4) Keeled Skimmer ©Rotislav Kralik/
Getty Images

5) Manchester Treble-bar ©Peter
Norman



1



2



3



Bogs and Fens

1) Bog Asphodel ©Peter Norman

2) Adder ©Michal Fuglevic/Getty Images

3) Large Heath © Mark Pollitt

Semi-natural Grassland

“The peewit is about the pasture and makes his call in spring and early summer...Before he comes back his brother, the golden plover, will be on the grassland, tinkling and swirling in rapid flight.”

Ian Niall, author
Pastures New (1952)

FUTURE VISION

All surviving unimproved lowland grassland is managed in a way consistent with its biodiversity importance.

Current Extent and Distribution

Semi-natural or unimproved grassland has never been ploughed, reseeded or subject to heavy fertiliser application. It is composed of many different species of grass and wildflower but is far less common than areas of agriculturally improved grassland, usually dominated by just a handful of species. It has been estimated that the UK has lost 95% of its unimproved grassland in the 20th century.

Top: Hay meadow, Rockcliffe ©Peter Norman

Below: Acid grassland near Carsphairn ©Peter Norman



By far the most common type is **acid grassland**, primarily found in the uplands on poor soils. Some of this has a long history as grassland, but other areas may have resulted from the degradation of other habitats such as heather moorland or blanket bog. **Neutral grassland** would once have been just as common, but found in lowland situations where its main use would have been as hay meadows. It is now very restricted in extent, often confined to road verges. **Calcareous grassland** is usually found on shallow soils that overlie lime-rich rocks. It is very rare in Galloway, but small areas are found overlying limestone in Ayrshire.

Purple moor grass and rush pasture is a particular type of species-rich grassland found on poorly drained, usually acidic soils in lowland-upland fringe areas. The vegetation has a distinct character, with local names in southwest England and Wales where it is most common. It is not common in Scotland, but there are important areas in Galloway.

On some sites, the different types of unimproved grassland can merge with each other, and form a mosaic with improved grassland, with semi-improved grassland types in between. On such sites,

rocky outcrops are likely to support the most valuable unimproved grassland, due to the difficulty of using standard farm machinery on such areas. However, even these areas have been removed in recent years using heavy earth-moving machinery.

In lowland areas, **springs and flushes** are likely to have been drained many years ago, but such features still exist in many upland and coastal areas, where they can be very valuable features with base-rich water producing a flora similar to calcareous grassland in an area otherwise composed of acid grassland.

Key Species

Upland acid grassland is not botanically rich, but extensive areas can be valuable for their breeding and wintering bird communities, including **Skylarks** *Alauda arvensis*, **Lapwings** *Vanellus vanellus*, **Curlews** *Numenius arquata* and **Hen Harriers** *Circus cyaneus*.

Spignel *Meum athamanticum* is an aromatic herb of neutral grassland which in the UK is mostly found in Scotland, with Galloway being one of its main strongholds. Other typical species of this habitat include **Yellow Rattle** *Rhinanthus minor*, **Pignut** *Conopodium majus* and the day-flying moth **Chimney Sweeper** *Odezia atrata*.

Distinctive plants of calcareous grassland include **Greater Butterfly Orchid** *Platanthera chlorantha* and **Rockrose** *Helianthemum nummularium*.

Scotch Argus *Erebia aethiops* is a common butterfly in many parts of Galloway but is virtually absent south of here. Its caterpillars feed on **Purple Moor-**

grass *Molinia caerulea*, typically growing in pastures with **Sharp-flowered Rush** *Juncus acutiflorus*.

Short unimproved grassland can support an extremely important and colourful group of fungi, the most prominent of which are the waxcaps, including the bright red **Scarlet Waxcap** *Hygrocybe coccinea*. Waxcap grasslands are seriously threatened throughout the UK and Europe.

Important Sites

Feoch Meadows (SSSI) near Barrhill is one of the best surviving areas of neutral grassland, mixed with wetter habitats. **Auchaulton** (SSSI) on the site of a former limeworks has important calcareous grassland. **Skyreburn** (SSSI) contains some of the best examples of Purple Moor-grass and rush pasture.

Opportunities for Enhancement

Unimproved lowland grassland is now such a scarce habitat that all sites should be protected, but they require appropriate management to be maintained.

Creation of new areas of unimproved grassland is a difficult and often lengthy process, but not impossible.

Upland acid grassland can be managed through cattle grazing to improve its species composition, but in some cases it may be appropriate to attempt reversion to its original habitat of heather moorland, blanket bog, or even native woodland.

Wet meadow with Whorled Caraway at Threave ©Peter Norman





Semi-natural Grassland

1) Scarlet Waxcap ©Peter Norman

2) Scotch Argus ©xalexmak72427/
Getty Images

3) Whorled Caraway ©Peter Norman

4) Red-tailed Bumblebee ©Mark Pollitt

5) Bulbous Buttercup ©Peter Norman



Semi-natural Grassland

1) Cuckoo ©Michael Viard/Getty Images

2) Greater Butterfly Orchid ©Tom Meaker/Getty Images

3) Common Blue © HHelene/Getty Images

4) Spignel ©Peter Norman

5) Pyramidal Orchid ©Christine Dudgeon





Mountain and Moorland

“In the remote parts of this great mountain [Lamachan], are very large Red Deer; and about the top thereof, that fine bird called the Mountain Partridge, or by the commonalty, the Tarmachan...makes its protection in the chinks and hollow places of thick stones from the insults of the eagles which are in plenty, both the large gray and the black.”

Andrew Symson, Minister of Kirkinner
A Large Description of Galloway (1692)

FUTURE VISION

A diverse upland environment where natural processes are encouraged with minimal human intervention.

Current Extent and Distribution

The mountains and moorlands at the heart of Galloway and Carrick are formed from a massive block of Ordovician and Silurian strata, more than 400 million years old, interrupted by granite intrusions and scoured by ice. Merrick, the highest mainland peak in southern Scotland, is only 843m in height, much lower than the mountains of the Highlands. Together with several other hills over

600m, it forms an extensive area of open, rolling moorland, with areas of mossy **montane heath** on the summits and fragments of heathery **upland heath**. Exposed and **craggy outcrops** host a flora and fauna that includes species more usually associated with northern Scotland. This no longer includes the Ptarmigan mentioned by Symson above, and the eagles (presumably Symson meant both Golden and White-tailed Eagles). They are not now “in plenty”, but the potential for restoration of this wild and rugged landscape is enormous.

Top: Heather moorland, Bengairn ©Peter Norman

Below: Cairnsmore of Fleet in winter ©Mark Pollitt





Clints of Dromore ©Peter Norman

Key Species

The Galloway Hills support a small number of scarce plant species known as arctic-alpines. Numbers are low in comparison to the Highlands and even the nearby Lake District, but with careful management these species could be encouraged to spread. For example, **Purple Saxifrage** *Saxifraga oppositifolia* is found in just a single location, and **Downy Willow** *Salix lapponum*, a scarce species of shrub, is not currently present in sufficient quantity to create montane scrub habitat.

Golden Eagles *Aquila chrysaetos* were once widespread in southern Scotland, with more than a dozen pairs historically known in Dumfries & Galloway. They were extinct by 1878, but returned in the 20th century and there are currently two breeding pairs.

Mountain Hares *Lepus timidus* are found in low density, and are all thought to be descendants of animals introduced in historic times.

Black Grouse *Lyrurus tetrix* is now considered a species of the upland fringe, but was formerly more widespread, almost down to sea level.

Important Sites

Many of the hills are gently rounded with plateau summits, but there are mountain corries, such as

on **Merrick** (SSSI, SAC), rocky crags as at the **Clints of Dromore** (SSSI, NNR) and **Black Gairy** (SSSI, SAC), and extensive boulder fields, particularly on **Craignaw** (SSSI, SAC).

The hills around **Glen App** (SSSI, SPA) represent some of the best remaining areas of heather moorland.

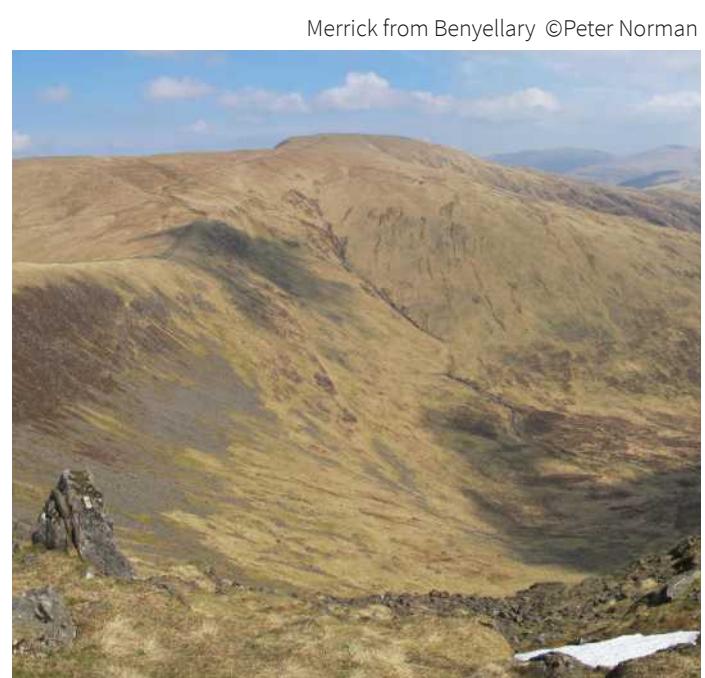
Opportunities for Enhancement

Grazing levels of both domestic and wild herbivores play a major role in the biodiversity of upland areas, but it can be difficult to find the ideal solution for each scenario and results are rarely achieved quickly.

In certain circumstances, greater tree cover may enhance biodiversity, but the species best suited to the conditions are likely to be low and slow-growing native species, with no commercial value.

Montane heath is an extremely fragile habitat that requires protection from inappropriate recreation and development. However, dealing with the issues of climate change and atmospheric nitrogen enrichment will require national and international policy changes.

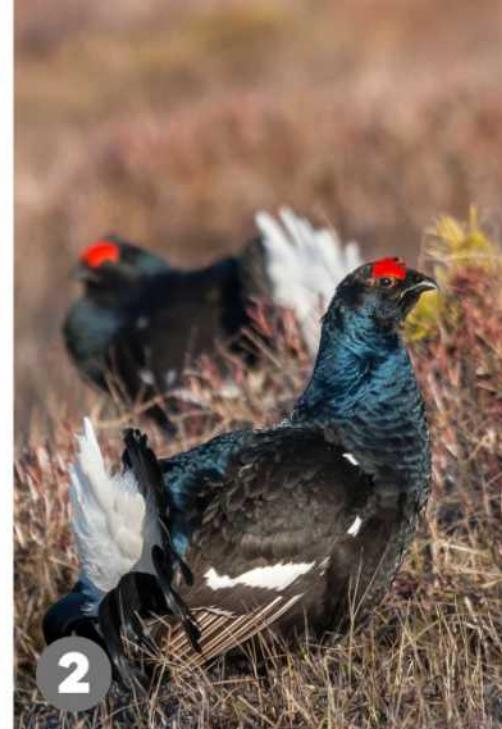
Golden Eagles have been released as part of a long-term programme in southern Scotland and released birds could bolster the Galloway population if sufficient feeding habitat is maintained.



Merrick from Benyellary ©Peter Norman



1



2

Mountain and Moorland

1) Grass of Parnassus ©Peter

Norman

2) Black Grouse ©Mikko

Karjalainen/Getty Images

3) Hen Harrier ©Sader Meertins/

Getty Images

4) Mountain Hare ©MikeLane45/

Getty Images

5) Fir Club-moss ©Juan Fancisco

Moreno Gamez/Getty Images



4



5





Mountain and Moorland

1) **Golden Eagle** ©Denisa Mikesova/
Shutterstock

2) **Butterbur** ©Peter Norman

3) **Mossy Saxifrage** © Peter Norman

4) **Purple Saxifrage** ©Peter Norman



Native Woodland

“Some of these oakwoods...have wonderful carpets of bluebells. Carstramon and Wood of Cree are particularly delightful in late May, with sheets of blue and rich fragrance from the myriad flowers.”

Derek Ratcliffe, former Chief Scientist, Nature Conservancy Council
Galloway & the Borders (2007)

FUTURE VISION

A landscape where woodland composed of native tree species, sustainably managed for biodiversity and utilised, where possible, for timber and other products, is equally as widespread as non-native plantations managed primarily for commercial production.

Current Extent and Distribution

Woodland composed of native tree species currently forms only a very minor component, less than 2%, of the area's land cover, and is predominantly found in the river valleys.

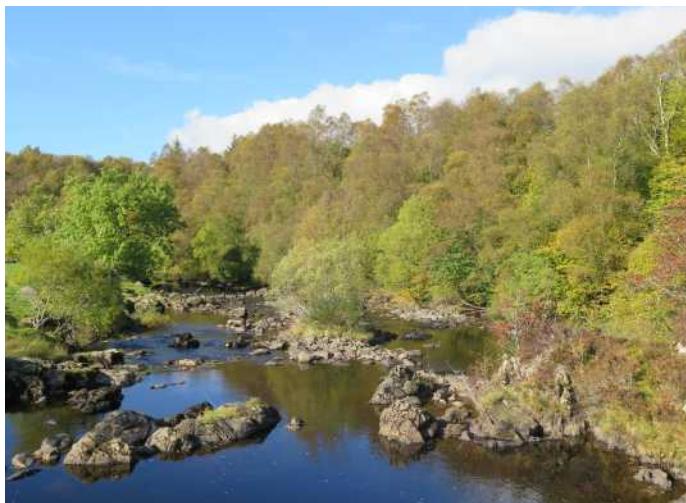
Ash woods tend to be found on more fertile soils, so are frequently restricted to narrow cleuchs that are unsuitable for agriculture. Prior to Dutch Elm

disease, Elm would also have been an important component of these woods. **Oak woods** are the most extensive type, probably due to their historical value for coppice products, but again are mainly located on poor agricultural land, often rocky and steeply sloping ground. **Birch woods** are found in similar locations. **Wet woods**, consisting of species such as Downy Birch, Alder and willows are widespread and frequent, but often limited to very small areas fringing (or colonising) lochs and other wetlands. **Scrub woods** are usually of more recent origin, with Hawthorn, Blackthorn or Gorse colonising coastal or inland slopes where farming has been abandoned. There are a few longer established sites, notably some small Hazel woods in Wigtownshire and a few Juniper bushes and mountain willows.

Semi-natural woodland is that considered to have originated from natural regeneration, rather than planting. From a biodiversity perspective, sites comprising semi-natural and especially **ancient woodland** are the most valuable, but these are even more restricted in extent, consisting of less than 1% of all wooded land. Ancient woodland is defined in Scotland as any site that has been continuously

Top: Carstramon Wood ©Mark Pollitt

Below: College Brow Wood ©Peter Norman



wooded from 1750 or earlier, but this date is based on convenience because the earliest comprehensive mapping of Scotland dates from this time. However, depiction of woodland on this map (and the inventory produced from it) is known not to be totally accurate. In reality each site is unique and requires individual study, both historical and ecological, to establish continuity of woodland cover. This is not possible for every site. Therefore, in the knowledge that ancient woodland is irreplaceable, it is advisable to treat all native woods that lack a documented history as if they are ancient woodland.

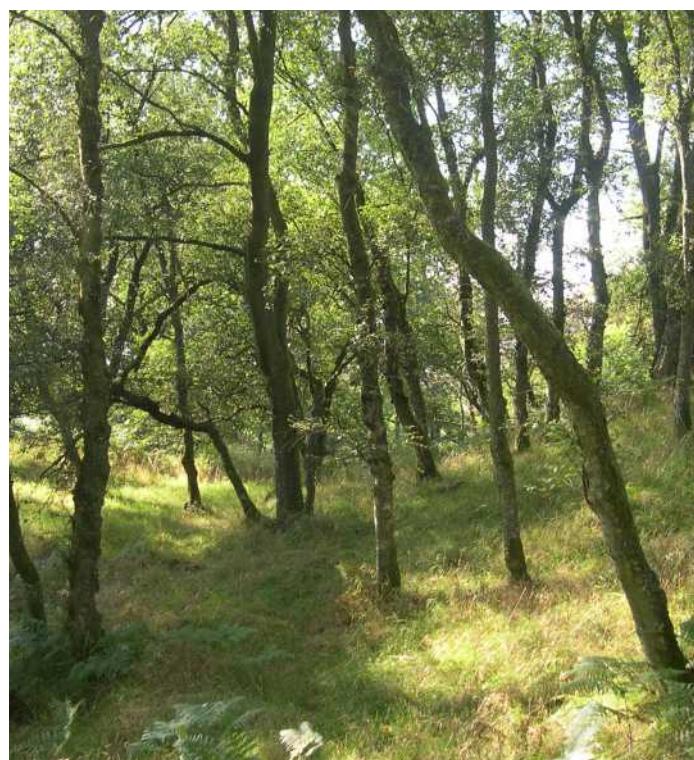
New native woodland has been planted in recent years. It can rapidly support large populations of mobile species, such as birds and mammals, and has the potential to become the ancient woodland of the future. Planted woods take many decades, if not centuries, to acquire the specialised biodiversity of ancient woodland.

Key Species

The flowering of plants in native woods is concentrated during springtime, prior to leafing of the tree canopy, with carpets of **Wood Anemone** *Anemone nemorosa*, **Dog's Mercury** *Mercurialis perennis*, and especially **Bluebell** *Hyacinthoides non-scripta*. Wet flushes are a valuable micro-habitat, typically supporting **Wild Garlic** *Allium ursinum* and **Opposite-leaved Golden Saxifrage** *Chrysosplenium oppositifolium*. Rarer species include **Toothwort** *Lathraea squamaria*.

In autumn, native woods display the greatest quantity and diversity of fungi. Few detailed surveys have been carried out, but rare species are known to be present, including **Veined Moss-ear** *Rimbachia bryophila* at Carstramon Wood and **Tan Pinkgill** *Rhodocybe gemina* in the Cree Valley. Bryophytes are similarly under-recorded but a recent survey of Wood of Cree found a good population of the nationally scarce **Autumn Flapwort** *Syzygiella autumnalis*.

Wet woodland in Galloway forms the last remaining Scottish stronghold for the **Willow Tit** *Poecile montanus*, one of the most rapidly declining UK birds. **Pied Flycatcher** *Ficedula hypoleuca* and **Redstart** *Phoenicurus phoenicurus* are amongst the characteristic birds of oak woods.



Barscobe Wood ©Peter Norman

Important Sites

There are few large native woods, the largest being the oak wood at **Wood of Cree** (SSSI, SAC). This wood, together with **Caldons, Buchan and Glenhead Woods** (SSSI, SAC) in Glentrool, probably constitutes the best examples of what has recently been popularly termed temperate rainforest, with a high diversity of bryophytes and lichens. **Ness Glen** (SSSI) is similarly important for these non-flowering plants. **Carstramon Wood** (SSSI, SAC) and **Killiegowan Wood** (SSSI, SAC) in the Fleet valley, plus **Hannaston Wood** (SSSI) near New Galloway, are also important oak-dominated woods.

Opportunities for Enhancement

Convert a proportion of other conifer plantations into native woodland.

Encourage further restoration of plantations on ancient woodland sites (PAWS), particularly privately-owned sites.

Reinstatement of traditional management techniques such as coppicing is rarely likely to be feasible, so management of individual native woods requires careful consideration on a site by site basis.

Remnants of montane scrub, augmented through planting by Forestry and Land Scotland in the central Galloway Hills could be expanded.



1



2

Native Woodland

1) Clouded Magpie ©Ian Redding/

Getty Images

2) Sulphur Polypore ©Peter

Norman

3) Tree Lungwort ©Peter

Norman

4) Willow Tit ©Andre Howe/Getty

Images Signature

5) Bugle ©Peter Norman



3



4



5



Native Woodland

1) Dog's-mercury ©Peter Norman

2) Pied Flycatcher ©bearacreative/
Getty Images

3) Wood Anemone ©Peter Norman

4) Redstart ©Andyworks/Getty
Images

5) Purple Stocking Webcap ©Peter
Norman

Plantations and Forests

“Sitka spruce, introduced from British Columbia, has been planted throughout the Forest Park from the lowest ground to the upper plantable limit, on rich brown old woodland soils, on clays, loams, sands and peats.”

Hugh V. S. Dier
Forestry Commission Guide. Galloway Forest Park. (1974)

FUTURE VISION

Plantations that are more diverse in species composition, designed to deliver increased biodiversity and greater habitat connectivity, rather than entirely focused on timber production.

Top: Mature conifer plantation ©Mark Pollitt

Below: Planted Beech at Cally Woods ©Peter Norman



Current Extent and Distribution

Tree planting is a relatively recent activity in Scotland, with only small scale plantings until the 19th century, and no extensive conifer forest planting until the second half of the 20th century. However, Galloway is now the most afforested part of the UK and **conifer plantations** composed mainly of species such as Sitka and Norway Spruce, cover more than a third of the land area. Most are felled before they reach maturity, but small areas are managed as long-term retention. **Broadleaved plantations**, consisting of species such as Beech and Sycamore, are much less extensive, but are also widespread.

Key Species

Crossbills *Loxia curvirostra* are specially adapted to feed on conifer seeds, including non-native spruces, pines and firs. A number of rare birds of prey also breed in conifer plantations, often secretive species that make use of the extensive area of undisturbed habitat rather than any specific habitat features.

They include **Goshawk** *Accipiter gentilis* and **Long-eared Owl** *Asio otus*, the latter probably assisted by the inability of its main competitor, the **Tawny Owl** *Strix aluco*, to make use of extensive conifer forests. Similarly **Red Squirrels** *Sciurus vulgaris* breed at low density in these plantations, where they have a competitive advantage over the non-native invasive **Grey Squirrel** *Sciurus carolinensis*, and may benefit from control of the latter by **Pine Martens** *Martes martes*.

The flora is usually sparse in conifer plantations, whilst broadleaved plantations take a long time to acquire the flora of ancient woods.

Invertebrates and fungi can be abundant in plantations, mostly composed of common species, but including some species that otherwise would not be present without tree planting. These include **Pink Disco** *Aleurodiscus wakefieldiae*, a crust fungus



Pine plantation at Torrs Warren ©Peter Norman

Retain more trees to allow them to reach maturity/over maturity, thereby supporting the considerable biodiversity associated with dead and decaying wood.

Convert large single-species dominated forests to more diverse plantations, including greater use of native broadleaves.

Ensure that all new planting requires a comprehensive assessment of the existing biodiversity of the site.

Plantations are robust habitats that can withstand heavy recreational use, which may take the pressure off more sensitive habitats.



Forestry near Scree ©Peter Norman

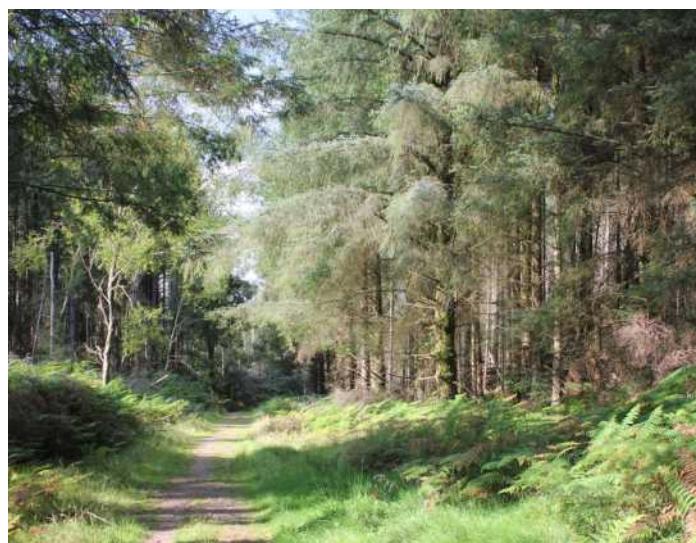
that grows on fallen Beech and is rare in the UK, but appears fairly common in the Fleet valley. **Larch Bolete** *Suillus grevillei*, and the moths **Dwarf Pug** *Eupithecia tantillaria* and **Pine Beauty** *Panolis flammea* are entirely dependent on non-native trees. Most new arrivals in plantations have been benign, but future arrivals, such as the **European Spruce Bark Beetle** *Ips typographus* may become pests.

Opportunities for Enhancement

Due to the scale of existing plantations and forests, there are considerable opportunities to enhance biodiversity.

Remove existing forestry where it is damaging habitats such as peatland and freshwater habitats.

Mark Hill ©Christine Dudgeon





Plantations and Forests

1) Common Groundhopper

©Wirestock/Getty Images

2) Common Crossbill

©bereta/
Getty Images

3) Red Squirrel

©SMWPHOTO/
Getty Images

4) Pine Marten

©CreativeNature_nl/Getty Images

5) Pink Disco

©Peter Norman



Plantations and Forests

1) **Goshawk** ©Piotr Krzeslak/Getty Images

2) **Eyeless Ladybird** ©Tobias Schönberg

3) **Deadly Webcap** ©Peter Norman

1



2



3





Farmland

“the Galloway of brown bent and red heather, of green knowe and grey gnarled thorn, of long low-built farm-town and wild gipsy raid, of Levellers and love-making, of sea-mew and whaup.”

S. R. Crockett, author,
Raiderland - All about Grey Galloway (1902)

FUTURE VISION

An agricultural landscape where biodiversity is universally accepted as an important part of a successful farming business.

Current Extent and Distribution

Crockett's description above of a Galloway farm may well present a romanticised image of the past. It was one that fellow Galloway author Ian Niall still recognised several decades later (see *A Galloway Childhood*, 1968), and one which can still be identified on scattered upland farms of Galloway today, with their rough pastures the homeland of the region's famous hardy Galloway cattle.

Scattered trees are often associated with **rough pastures**, which were formerly valued for the

Top: Farmland at Orchardton ©Peter Norman

Below: Farm pond at Burrow Head ©Peter Norman



shelter and the browsing they provided for livestock. They are also valuable for species associated with open-grown and **veteran trees**. Many such **wood pastures** survive in Galloway.

Modern lowland farming in Galloway is dominated by dairy farming with large silage fields of **improved grassland**, of limited biodiversity value, typical of much of the Rhins, Machars and the coastlands between Gatehouse of Fleet and Dumfries. However, there is considerable variation within this area, with pastoral farmland interspersed with **arable fields**, as well as the semi-natural habitats covered elsewhere in this report. Even in the most intensive areas, there are considerable opportunities to enhance biodiversity through, for example, management of **field margins** and **traditional field boundaries**, including locally distinctive variations of dykes (drystone walls) and hedges.

Key Species

Rough grassland on farms was once the stronghold of breeding **Lapwings** *Vanellus vanellus* and **Curlews** *Numenius arquata* but numbers have declined

rapidly in recent years. **Skylarks** *Alauda arvensis* remain widespread, but may also have declined.

The native **Wild Apple** *Malus sylvestris* is the progenitor of the domestic apple but is now threatened by hybridisation with cultivated strains, with up to half of all apple trees in the wild being hybrids. Areas of rough grazing and wood pasture in Galloway provide one of the strongholds of pure Wild Apples in Scotland.

Geese and swans are some of the few species to feed on improved grassland. The study area supports important numbers of wintering **Whooper Swans** *Cygnus cygnus* and **Greenland White-fronted Geese** *Anser albifrons flavirostris*, the latter with a global population of no more than 20,000 birds and in rapid decline.

Field boundaries with hedges and stone dykes, and field margins, particularly those of arable fields, support breeding and wintering birds such as **Yellowhammer** *Emberiza citrinella*, **Tree Sparrow** *Passer montanus* and **Linnet** *Linaria cannabina*, as well as beetles and other insects, many of which are important predators of crop pests. Field margins also provide habitat for **Brown Hares** *Lepus europaeus*.

Opportunities for Enhancement

Expansion of sustainable and regenerative agriculture has the potential to restore habitats, ecosystems and biodiversity.



Wild Apple and Belted Galloways at Skyreburn ©Peter Norman

Improvements to national agri-environment schemes may be able to reverse long-term declines of farmland species.

There is a need for a high-quality, independent biodiversity advisory service for farmers, of the type formerly provided by the Farming and Wildlife Advisory Group (FWAG).



Lowland farmland near Auchencairn ©Peter Norman



1



2

Farmland

1) Curlew ©Nico van Gelder/Getty Images

2) Corn Spurrey ©fern Wildtruth

3) Skylark ©chris2766/Getty Images

4) Rook ©CreativeNature_nl/ Getty Images

5) Brown Hare ©Peter Norman

3



4



5



Farmland

1) Common Toad

©CreativeNature_nl/Getty Images

2) Tree Sparrow

©Alessandro Tramonti/Getty Images

3) Yellowhammer

© Stanley Sutton/Getty Images

4) Whooper Swan

©Neil Bowman/Getty Images

5) Wild Apple

©Peter Norman





Built Habitats

“towns and villages with real character, fine farmsteads and engineering works, often built with the local rich red sandstones and sparkling grey granites”

John R. Hume, architectural historian & author
Dumfries and Galloway. An Illustrated Architectural Guide (2000)

FUTURE VISION

A built environment where all available opportunities in design, construction and maintenance are taken to provide for biodiversity.

Top: Dry stone wall with lichens ©Peter Norman

Below: Town park at Castle Douglas ©Peter Norman



Current Extent and Distribution

Galloway is largely a rural area, but it still has a large number of built habitats that are of value to biodiversity. As well as many scattered small towns and villages with **buildings**, **churchyards**, **parks** and **greenspaces**, there is an extensive **road network**, several miles of disused **railway line**, and scattered **mines**, **quarries** and other industrial sites, both active and abandoned. All of these uses have land not required for their primary purposes, and could be managed to support biodiversity.

Key Species

Galloway supports all Scottish species of bat, with a particularly strong population of **Leisler's Bat** *Nyctalus leisleri*, which is otherwise rare in Scotland. Many species use buildings and bridges as maternity roosts.

Swifts *Apus apus*, **Swallows** *Hirundo rustica* and **House Martins** *Delichon urbicum* are almost entirely dependent on buildings for nest sites. **Barn Owls** *Tyto alba* (which have a strong Galloway population) also frequently nest in buildings, whilst **Peregrines**



Kirkmabreck Quarry ©Peter Norman

Falco peregrinus occasionally choose nest sites on buildings but are frequent on quarry faces. Some plants, such as **Fairy Foxglove** *Erinus alpinus* and **Rustyback Fern** *Asplenium ceterach*, are typical of old building walls with lime mortar.

It is not the case that grass needs to be left long to benefit biodiversity. Several churchyards that are

Bee Orchids on road verge ©Peter Norman



regularly mowed, but not treated with fertiliser or pesticide, support interesting plant and fungal communities, including **Pink Waxcap** *Porpolomopsis calyptiformis*. They are also the best place in Dumfries and Galloway to find veteran **Yew** *Taxus baccata* trees.



Disused railway line and bridge, Machars ©Peter Norman

Opportunities for Enhancement

Simple measures such as bat bricks and Swift boxes can be installed at very low cost during construction.

Areas within parks, sports pitches and urban greenspaces can be set aside and managed for biodiversity enhancement.

Disused industrial sites can be restored for biodiversity, often requiring little more than allowing natural recolonization.



1



2

Built Habitats

1) **Swift** ©Denja1/Getty Images

2) **Pink Waxcap** ©Peter Norman

3) **Rustyback** ©Peter Norman

4) **Common Pipistrelle**

©CreativeNature_nl/Getty Images

5) **Tawny Mining-bee** ©Mark

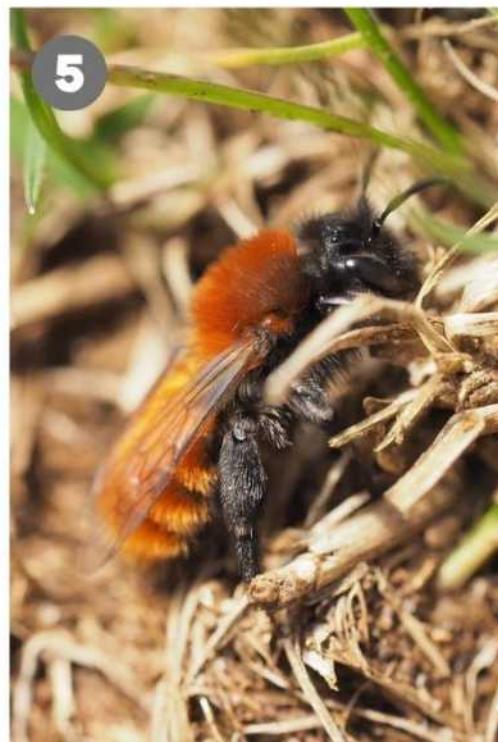
Pollitt



3



4



5

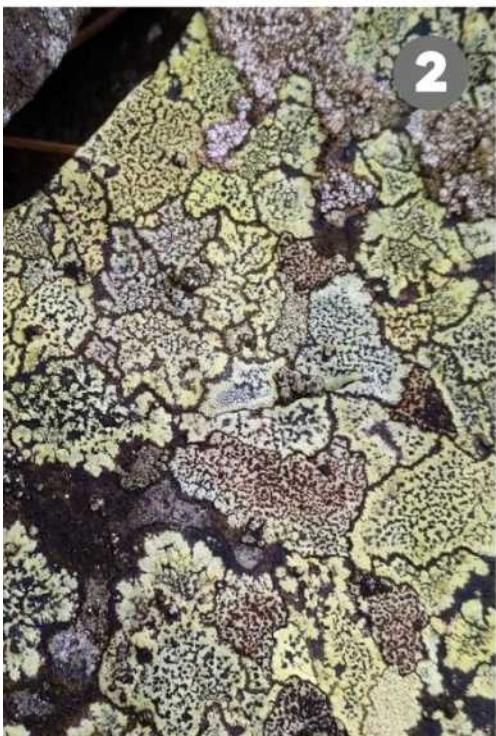
Built Habitats

1) Ruby-tailed Wasp ©John Ceulemans/Getty Images

2) Map Lichen ©Peter Norman

3) Peregrine © Harry Collins/Getty Images

4) Swallow ©BorislavFilev/Getty Images





**GALLOWAY
NATIONAL
PARK
ASSOCIATION**

gallowaynationalpark.org



South West Scotland
**Environmental
Information
Centre**

swseic.org.uk

October 2023