



State of Nature South of Scotland

Data Report

APRIL 2026



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Report commissioned by



on behalf of the Regional Land Use Partnership

Report compiled by

SUP Services Ltd



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1 Introduction

This report provides a summary of the current (up to end of 2025) state of wild species and habitats across the two most southerly local authority areas of Scotland - Dumfries & Galloway and The Scottish Borders. It also outlines the changes to this wildlife since 2000. For the first time ever, detailed information has been collated to ensure that the report is based entirely on evidence.

However, the report also identifies where there are gaps and weaknesses in the availability of evidence. The State of Nature therefore focuses on metrics where data exists and is available, rather than providing a holistic account of the changing nature of the South of Scotland.

The State of Nature South of Scotland provides a regional perspective on national changes, and as such augments State of Nature Reports produced for the UK and Scotland.

1.1 Policy Context

The Regional Land Use Framework (RLUF) was developed under the Regional Land Use Partnership (RLUP) pilot, following a period of extensive stakeholder engagement. The pilot was co-ordinated by South of Scotland Enterprise (SOSE) in partnership with Dumfries & Galloway Council and Scottish Borders Council, overseen by the Regional Economic Partnership.

The RLUF sets out a concise vision and objectives for land use across the region, providing information on existing land uses (and the benefits they provide) and drivers for land use change. It recognises the urgency of joined up action to address the climate and biodiversity crises and identifies some of the priority changes in land use that are going to be needed. It lays the foundation for the region's journey towards more sustainable use of land across the South of Scotland and was launched by the South of Scotland Regional Economic Partnership in September 2024.

Amongst the priority actions identified in the Regional Land Use Framework is the production of a *South of Scotland State of Nature report*. A preliminary scoping study was commissioned by South of Scotland Enterprise (SOSE), on behalf of the Regional Land Use Partnership Advisory Group in 2025 as a stepping stone to this State of Nature Report.

1.2 The Evidence Base

The period from 2000 to 2025 was one where reliable data from biological monitoring and recording schemes became much readily available than previously. Much of it has been collected by thousands of volunteer recorders as well as professional ecologists. However, substantial data gaps remain, and a large volume of data does not necessarily enable accurate information and trends relating to all aspects of the state of nature to be detected.

The evidence base for the information presented in this report was required to meet the following criteria:

- Data should relate primarily to 2000-2025.

Some datasets were used that included data from prior to 2000, and many datasets did not include data as recent as 2025. However, all datasets primarily related to 2000-2025.

- Data should relate to the South of Scotland as a whole.

Datasets relating to smaller geographical areas or individual sites may not be representative of the South of Scotland as a whole and were therefore excluded from the main analysis. Data relating to single sites or restricted geographical areas has been used as case studies in the summary report but is not used in this data report.

- Consistent data collection methodology should be used.

Datasets that used inconsistent or unclear methodology in data collection were excluded as this can significantly affect the results. Where minor inconsistencies were considered acceptable, their potential impact on the results has been noted.

- Results should be scientifically robust.

The South of Scotland contributes to several national monitoring schemes that meet all the above criteria, such as the Breeding Bird Survey, National Plant Monitoring Scheme, National Bat Monitoring Programme, National Amphibian and Reptile Monitoring Programme, the Pollinator Monitoring Scheme, and many others. Many of these have been established in the last 25 years and provide valuable information on national biodiversity trends. However, due to the limited number of sample sites in the South of Scotland the results are rarely statistically valid below the national scale.

Other datasets could not be used due to constraints relating to the resources (time/budget) available for analysis or limitations relating to accessibility.

1.3 Historical Background

Significant changes to the nature of the South of Scotland are known to have occurred prior to 2000 but detailed evidence of such historical trends at a regional scale is often fragmentary. Therefore, changes prior to 2025 are seldom supported by detailed local evidence of the type available since 2000. Where possible, brief reference is made to historical trends, but this is based on published sources rather than analysis of datasets.

1.4 Measuring the State of Nature

Changes to the state of nature over the last 25 years can be measured in many ways. The best method is to use data relating directly to species and habitats, but this is not without its difficulties.

Regarding species, accurate survey data relating to **abundance** is available for only a very small number of species, tending to be the rarer species from well-recorded groups. For example, we know with a high degree of certainty how many Golden Eagles have bred in the South of Scotland over the last 30 years but are less certain about changes to the breeding House Sparrow population.

Information relating to **distribution** is more widely available, though not for all species. However, distribution data is less valuable than abundance data as the size of a

population may have changed significantly but its distribution remained the same. Furthermore, for some species the data is heavily influenced by recorder effort – in extreme cases distribution maps reflecting where recorders have visited, rather than where species are present.

A third way of measuring changes to species is to use information relating to **diversity**. For many species groups, this is the most widely available metric, but the number of species present in a geographical area is of limited value without data on distribution or abundance.

For the less well-recorded species, such as fungi and many invertebrate groups, there is neither accurate abundance nor distribution data for the South of Scotland, and even diversity data may be incomplete. Indeed, for many of these species, recorders are making new discoveries that are unlikely to reflect recent changes to the abundance or distribution, but simply the first time anyone has searched for them.

The difficulties associated with measuring habitats are even greater. Firstly, despite the availability of numerous habitat classifications, there remains a subjective element to habitat definition. For example, at what density of trees does a grassland become a woodland? And in reality, habitats naturally merge into one another especially at the margins and over time, making it difficult to define where one starts and the other ends. Mapping habitats therefore often involves subjective decisions. Secondly, even ignoring the above difficulty, measuring habitat **extent** does not reflect on the **quality** of the habitat. For example, an area of newly planted trees may be classified as a woodland but is of much less value for nature than an ancient semi-natural woodland.

There are other measures, which do not relate directly to species or habitats, which can be used to assess the state of nature in the South of Scotland. **Indirect measures** include those that relate to factors that affect nature, such as water quality or changes to land-use, or actions that have been put in place to protect nature, such as the designation of land through legislation. The availability of data relating to such measures is variable, and the measures themselves are also subject to difficulties of interpretation. A range of such measures have been included in this report and their limitations identified where appropriate.

In summary, The State of Nature South of Scotland uses the best available data to identify latest trends.

1.5 Future Changes to the State of Nature

The Report also suggests how future changes could be monitored through the use of indicators. Indicators will require the collection of new data that could be compared to existing or previous datasets.

1.6 Review Period

The State of Nature report should be reviewed every 5 years, but it might not be possible to update every indicator within that time period.



2 The Nature of the South of Scotland

2.1 Habitats – Results from National Surveys

The South of Scotland covers a diverse range of habitats. There are numerous ways of classifying, surveying, and mapping habitats, each with their own advantages and disadvantages. Habitat surveys conducted using remote sensing utilise information acquired from satellite, radar, aerial photography, or similar technology. The main advantage of surveys of this type is that they can be applied to large areas, often in a fraction of the time of field surveys and without the need for trained staff or volunteers to conduct on-site observations. However, not all features can be accurately detected by remote sensing technology.

The Scotland National Land Cover Map, which classifies habitats according to the European Nature Information System (EUNIS), provides information on the habitats and land-use of the whole of the South of Scotland (Figure 1, Table 1). At its broadest scale (EUNIS Level 1) the map shows the South of Scotland to be dominated by grasslands (61%), predominantly agricultural grasslands managed as improved pasture, silage (mainly in the west) or cereals (mainly in the east). The second commonest habitat is woodland (22%), predominantly coniferous plantation, with strong concentrations in Galloway, in Eskdalemuir and Craik Forests on the border between Dumfries & Galloway and Scottish Borders, and in Wauchope Forest, bordering Northumberland. Raised and blanket bogs, together with heathland (9%), is less extensive and found mainly in upland areas, with concentrations in the Lammermuir, Moorfoot and Tweedsmuir Hills.

Figure 1. Scotland National Land Cover Map 2022

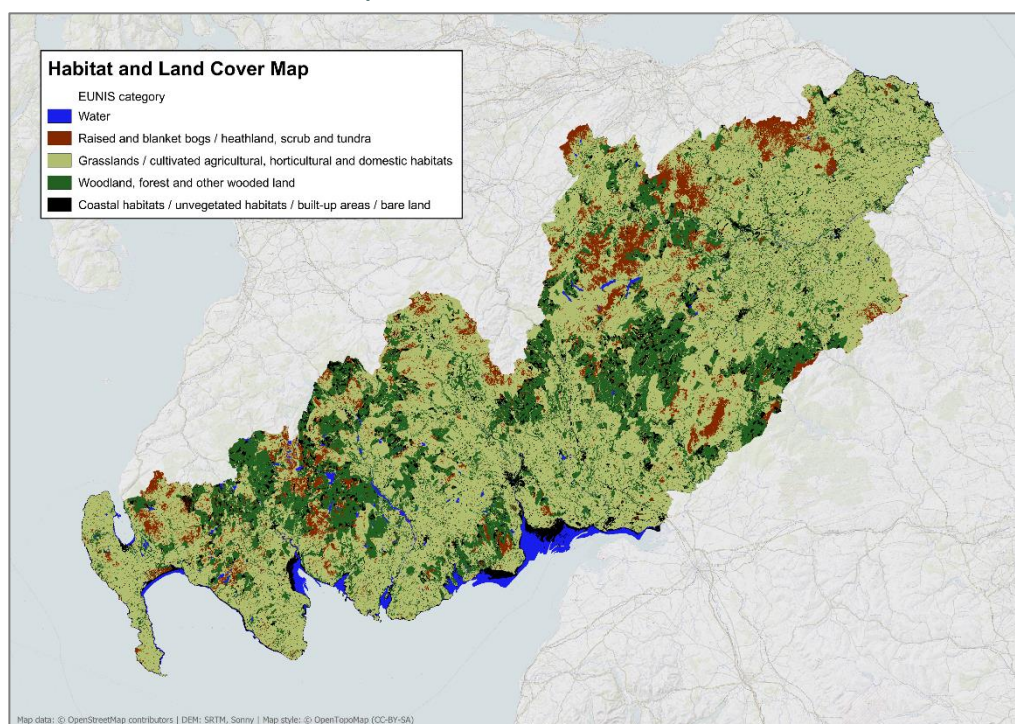


Table 1. EUNIS broad summary (level 1, some habitats combined)

Habitat	Area (sq. km)	%
Water	226.7	2%
Bog and heath	999.7	9%
Grassland	7019.4	61%
Woodland	2509.9	22%
Coast/built up area/unvegetated	663.0	6%
Total	11418.7	100%

More detailed information on land use using EUNIS Level 2 (Table 2) identifies habitats in more detail, though the level of accuracy is reduced. The area covered by the habitats of the South of Scotland is shown in the table below and can be summarised as follows:

- Mesic grassland forms the most extensive single habitat category with around 28% of the land area. This term that encompasses hay meadows, but in the South of Scotland will be predominantly agriculturally improved and reseeded pastures. Approximately 28.5% of this habitat in Scotland is found in the South of Scotland.
- Other grassland types, likely to be less improved for agriculture, make up around 24% of the South of Scotland land area.
- Arable land forms around 8% of the South of Scotland land area.
- Coniferous plantations fall within a number of categories depending on their state of growth but cover at least 13-17% of the South of Scotland land area.
- Peatland, including various types of bogs and fens, appears relatively small in extent but forms a fairly high (c.20%) proportion of this habitat in Scotland. However, the data was collected in such a way that peatland covered in other types of vegetation, such as trees, would not be detected. Soil surveys (see 2.3) also need to be considered to calculate the true extent of peatland.
- The category termed 'woodland fringes and clearings' is likely to include substantial areas of Bracken. It forms less than 3% of the land area, but this constitutes around 27% of the Scottish total for this habitat.

2.1.1 Data Sources

In 2021, NatureScot contracted Space Intelligence to produce a land cover map of Scotland for 2022. Space Intelligence produced the map using their HabitatMapper™ product, created by combining optical data from Landsat and Sentinel-2 satellites and Synthetic Aperture Radar data from the ALOS PALSAR and Sentinel-1 satellites. Final maps included some changes to incorporate feedback from NatureScot. The overall accuracy of the mapping was assessed as for 92.02% EUNIS Level 1 and 79.81% for EUNIS level 2, but this varies between different land classes.

2.1.2 References

Space Intelligence (2023) 2022 Scotland Land Cover Map- Report

https://142260897.fs1.hubspotusercontent-eu1.net/hubfs/142260897/Final%20Report%20Scotland%20LC%20map%202022_web.pdf

Table 2. Extent of main habitats in South of Scotland

Habitat	EUNIS code	South of Scotland Area (sq. km)	South of Scotland Area (%)	Scotland Land Area (Sq. km)	% of Scottish habitat in SoS
Littoral sediment (predominantly saltmarsh)	A2	27.4	0.24%		
Coastal dunes and sandy shores	B1	52.3	0.46%		
Coastal shingle	B2	6.6	0.06%		
Rock cliffs, ledges and shores	B3	15.1	0.13%		
Surface standing and running waters	C	228.9	2.00%		
Raised and blanket bogs	D1	340.0	2.98%	1,328,262	2.56%
Valley mires, poor fens and transition mires	D2	31.6	0.28%	18,835	16.78%
Dry grasslands	E1	1440.6	12.62%	832,195	17.31%
Mesic grasslands	E2	3208.2	28.10%	1,124,054	28.54%
Seasonally wet and wet grasslands	E3	1281.0	11.22%	1,124,054	11.40%
Alpine and subalpine grasslands	E4	33.3	0.29%	142,516	2.34%
Woodland fringes and clearings and tall forb stands	E5	252.4	2.21%	92,900	27.17%
Arctic, alpine and subalpine scrub	F2	0.8	0.01%	41,951	0.19%
Temperate and Mediterranean-montane scrub	F3	41.9	0.37%	24,222	17.30%
Temperate shrub heathland	F4	501.1	4.39%	1,161,468	4.31%
Riverine and fen scrubs	F9	0.9	0.01%	860	10.46%
Broadleaved deciduous woodland	G1	812.2	7.11%	484,295	16.77%
Highly artificial coniferous plantations	G3.F	1121.2	9.82%	576,104	19.46%
Mixed deciduous and coniferous woodland	G4	92.6	0.81%	48,654	19.03%
Lines of trees, small anthropogenic woodlands, early-stage woodland and coppice	G5	450.4	3.94%	172,606	26.09%
Screes	H2	3.9	0.03%	16,628	2.35%
Inland cliffs, rock pavements and outcrops	H3	5.4	0.05%	69,491	0.78%
Arable land and market gardens	I1	928.9	8.13%	572,072	16.24%
Built-up	J	178.0	1.56%	219,003	8.13%
Bare land*	O	299.5	2.62%	126,037	23.76%
Windthrow*	OW	64.6	0.57%	27,094	23.84%

Notes: *In the above table, bare land relates mainly to areas of clear-felled forestry. Windthrow also relates to forestry.

2.2 Habitats – Results from Specific Habitat Surveys

Several surveys of specific habitats have been undertaken in Scotland. These normally employ field survey techniques and are usually considered more accurate than surveys using remote sensing techniques, but they are not available for all habitats. Often, they also classify habitats in different ways so are not directly comparable with each other.

2.3 Peatlands

In the South of Scotland there are approximately 156,827 ha of dystrophic blanket and basin peat, which is most likely to be ‘deep’ peat greater than 50cm in depth (Table 3). Other peatland soil types, mostly less than 50cm in depth but deeper in parts, are often simply referred to as ‘shallow peat’. The deep peat/shallow peat 50cm threshold is significant and often underpins funding for restoration and land use guidance. Shallow peats are increasingly considered important due to their habitats, as well as their extent, capacity to store carbon and maintain hydrology. The Scottish Government has a target to restore 250,000 hectares of degraded peatland by 2030.

Table 3. Summary of ‘peatland’ areas in the South of Scotland

Peatland Type	Summary	Soils Classes	Area (ha)
Deep	Most likely to be >50cm deep	Dystrophic blanket peat, undifferentiated basin peats, dystopic basin peat, peaty gleyed podzols	156,827
Shallow	Most likely to be <50cm deep but could be deep in parts	Peaty gleys, peaty podzols, peaty rankers	248,796

Source: Soil Survey of Scotland (1981).

Degraded peatlands are those not functioning as they should and lacking peat forming vegetation, such as *Sphagnum* mosses, due to a modified ecological or hydrological state, usually a lower than natural water table. Using the Carbon and Peatland Map (2016), derived from both soils and land cover data and intended to give an indication of the extent of carbon rich soils and priority habitats across Scotland, it appears that most peatland soils in the South of Scotland are not in a degraded state. Only 40,575ha are predicted to be areas of high conservation value (Class 1) whilst 145,690ha (Class 2 and 5) can be described as deep peat with restoration potential or deep peat but currently lacking peatland habitat (Figure 2, Table 4). Class 5 describes areas of afforested deep peat of which there is a significant area in the South of Scotland, especially in Galloway.



Figure 2. Carbon and Peatland Map (2016) for South of Scotland

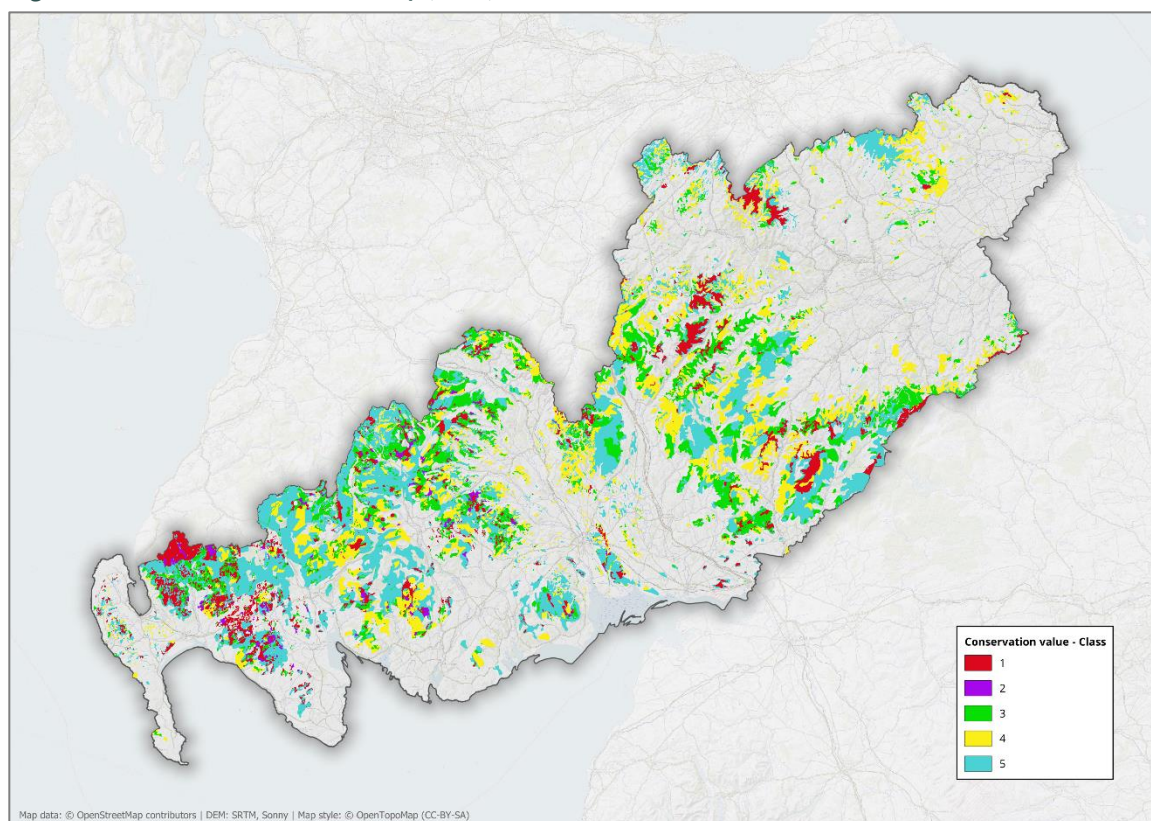


Table 4. Peatland Value Classification

Class	Class Description	Area (ha)
1	Nationally important carbon-rich soils, deep peat and priority peatland habitat - Areas likely to be of high conservation value.	40,573
2	Nationally important carbon-rich soils, deep peat and priority peatland habitat - Areas of potentially high conservation value and restoration potential.	5,177
3	Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat.	8,1452
4	Area unlikely to be associated with peatland habitats or wet and acidic type - Area unlikely to include carbon-rich soils.	94,318
5	Soil information takes precedence over vegetation data - No peatland habitat recorded. May also show bare soil. All soils are carbon-rich soil and deep peat.	140,513

Source: Carbon and Peatland Map (2016)

2.3.1 References

Carbon and Peatland Map (2016)

<https://www.spatialdata.gov.scot/geonetwork/srv/eng/catalog.search#/metadata/51b36efb-3521-4243-9bb0-93f8a7a60a71>

Crichton Carbon Centre & Tweed Forum (2025). An Action Plan for Peatland Restoration and Management in the South of Scotland: A Scoping Review.

Soil Survey of Scotland (1981). Soil maps of Scotland at a scale of 1:250 000. Macaulay Institute for Soil Research, Aberdeen. DOI: 10.5281/zenodo.4646891.

2.4 Native Woodlands

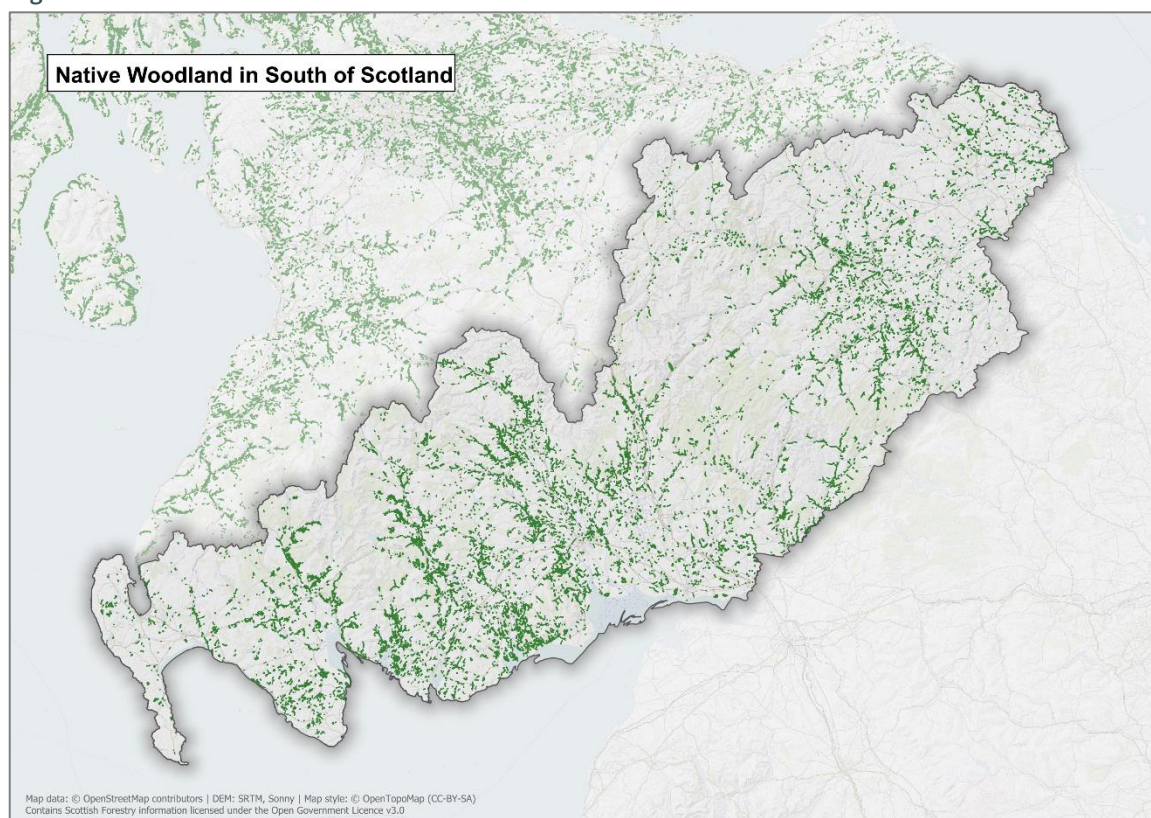
The Native Woodland Survey of Scotland was carried out by Scottish Forestry between 2006 and 2013 using a field-based methodology to identify, map, and assess the condition of woods across Scotland, including: native woodlands, nearly-native woodlands, and plantations on ancient woodland sites (PAWS). It identified 23,780ha of native woodland in the South of Scotland (Table 5, Figure 3).

Table 5. Extent of Native Woodland in South of Scotland 2006-2013

	Extent (ha)	% of land area
Dumfries & Galloway	17,020	2.6%
Scottish Borders	6,760	1.4%
South of Scotland	23,780	2.1%

Source: Native Woodland Survey of Scotland

Figure 3. Native Woodland in South of Scotland



2.4.1 References

Native Woodland Survey of Scotland | Scottish Forestry – <https://www.forestry.gov.scot/native-woodland-survey-scotland>

2.5 Sand Dunes

The Sand Dune Vegetation Survey of Scotland was carried out by Scottish Natural Heritage between 1994 and 1998 using field-based methodology to map all coastal vegetated windblown sand in Scotland. A total of 50,002ha was identified, with 38% on the 10 largest sites (Table 6). Relatively little (3.1%) of this is found in the South of Scotland, with only one large site at Torrs Warren.

Table 6. Extent of Sand Dunes in South of Scotland

	Extent (ha)
Dumfries & Galloway	1,700.9
Scottish Borders	15.5
South of Scotland	1716.4

Source: Sand Dune Vegetation of Scotland

2.5.1 References

Dargie, T.C.D. (1998). *Sand dune vegetation survey of Scotland: South West. Volume 1: Main report*. Scottish Natural Heritage Research, Survey and Monitoring Report No. 125.

Sand Dune Vegetation of Scotland | NatureScot Spatial Data Hub – <https://opendata.nature.scot/datasets/snh::sand-dune-vegetation-survey-of-scotland>

2.6 Coastal Vegetated Shingle

NatureScot has drawn together draw together information sources on coastal vegetated shingle based on field surveys from the 1990s and Aerial Photographic Interpretation. Coastal vegetated shingle is a rare habitat, found in scattered locations around the UK coast, with approximately 1120ha in Scotland. It supports important, often unique, plant and invertebrate communities. In the South of Scotland, there is 121.3ha (Table 7), with particularly important sites in Luce Bay.

Table 7. Extent of Coastal Vegetated Shingle in South of Scotland

	Extent (ha)
Dumfries & Galloway	121.1
Scottish Borders	0.2
South of Scotland	121.3

Source: Coastal Vegetated Shingle Survey

2.6.1 References

Murdock, A.P., Hill, C.T., Randall, R.E., Read, A., Green, J.M. and Smith, J.S. (2014). *Inventory of coastal vegetated shingle in Scotland – field validation*. Scottish Natural Heritage Commissioned Report No. 739.

Coastal Vegetated Shingle Survey | NatureScot Spatial Data Hub – <https://opendata.nature.scot/maps/snh::coastal-vegetated-shingle-survey/about>

2.7 Saltmarshes

A total of 7,704ha was surveyed in Scotland using a field-based methodology, of which 5,840ha was found to consist of saltmarsh vegetation. The South of Scotland supports 38.8% of this habitat in Scotland, all of it in Dumfries & Galloway, which includes three

of the largest saltmarshes in Scotland, at Caerlaverock, Kirkconnell Merse and Wigtown Merse.

Table 8. Extent of Saltmarsh in South of Scotland

	Extent (ha)	% of land area
Dumfries & Galloway	3003	0.45%

Source: Scottish Saltmarsh Survey

2.7.1 References

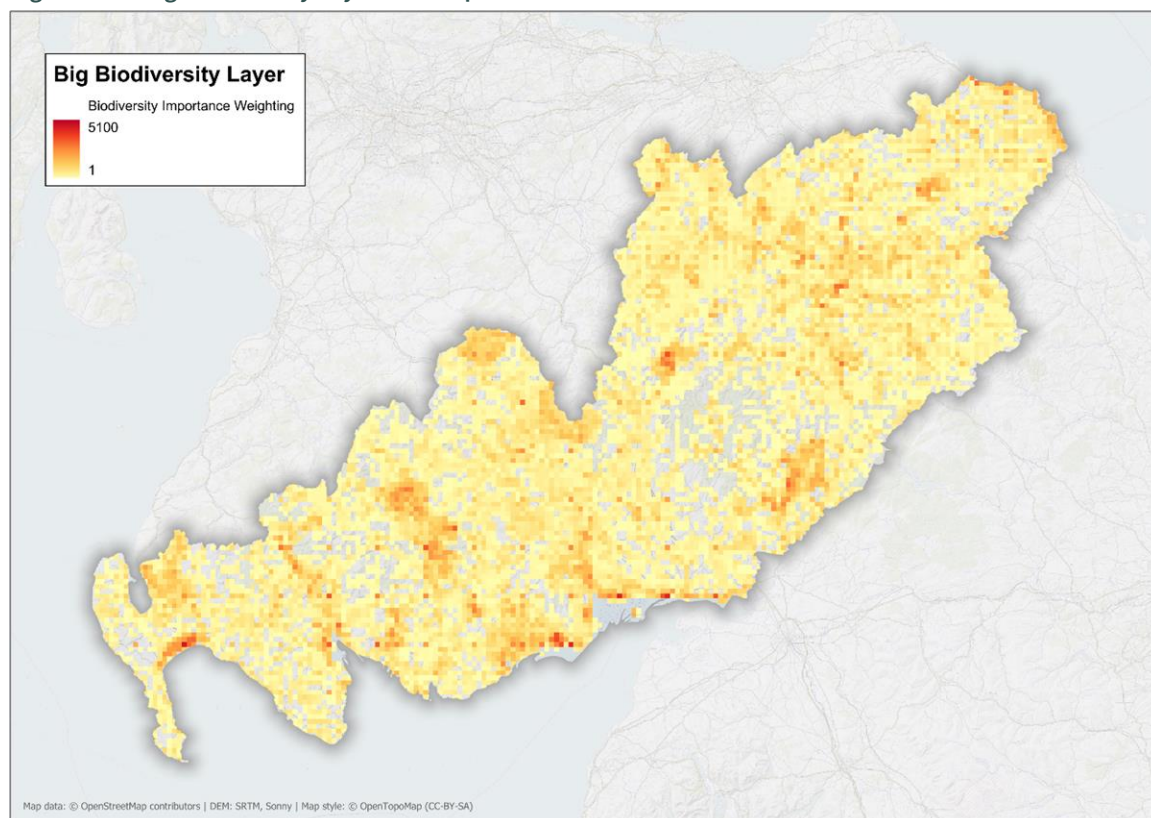
NatureScot Commissioned Report 786 - Scottish saltmarsh survey national report | NatureScot 2016 – <https://www.nature.scot/doc/naturescot-commissioned-report-786-scottish-saltmarsh-survey-national-report>

2.8 Rare, Threatened and Endangered Species and Habitats

The South of Scotland supports species and habitats that are recognised as rare, threatened or endangered. The distribution of these is shown on Big Biodiversity Layer One heat map, prepared by NatureScot (Figure 4).

The map shows biodiversity hotspots clustered around designated sites, including the Berwickshire coast, the Moffat and Langholm Hills, the inner Solway and the head of Luce Bay. Several of the river valleys also stand out, including the mid-Tweed, the lower Nith, the upper Dee-Ken and the Cree. The areas with lowest biodiversity value are those of dense forestry on the Scottish Borders/Dumfries & Galloway border, and in central Galloway, though this may reflect lack of recording effort.

Figure 4. Big Biodiversity Layer One Map



2.8.1 Data Sources

Data Quality: High

The Big Biodiversity Layer (BBL) tool is part of a series of heat maps developed by NatureScot Big Biodiversity Layer One covers rare, threatened or endangered species and habitats and the ecosystems that support them.

To produce the heat map, species and habitat data was combined and a weighting system applied corresponding to biodiversity value. The data was mapped in a 1km x 1km grid across Scotland, providing an overall 'biodiversity value' for each individual grid square. However, areas which do not come out as strong for biodiversity value on the map may be subject to limited data availability and may not necessarily therefore be of low biodiversity value.

The datasets used to produce the map were mainly derived from The NBN Atlas. Additional datasets used for species/habitats records were as follows: Habitat Map of Scotland (HabMoS) dataset and EUNIS base layer, Raised Bogs EUNIS Scotland 2024 dataset, SEPA rivers and lochs electrofishing data, National Electrofishing Programme Scotland (NEPS) fish count data.

Weighting was based on species listed as vulnerable, endangered, or critically endangered on IUCN red lists, or equivalents, or listed as nationally rare or scarce. The species groups included were birds, mammals, herptiles, fish, non-vascular plants (bryophytes), fungi, lichens, vascular plants and invertebrates. The invertebrates included aquatic and semi-aquatic bugs, millipedes (Diplopoda), centipedes (Chilopoda), woodlice (Isopoda), grasshoppers and crickets, various beetle families, selected fly families, scarce and threatened spiders, mayflies (Ephemeroptera), caddis flies (Trichoptera), stoneflies (Plecoptera), dragonflies, molluscs and crustaceans. Habitats were chosen from the European Red List of Habitats and Annex I habitats listed in the Habitats Directive.

2.8.2 References

NatureScot website <https://www.nature.scot/doc/30-30-big-biodiversity-layer-development>

2.9 Designated Sites

2.9.1 Statutory Designated Sites

Designated sites are areas of land protected from certain activities in order to safeguard their natural heritage. Protection arises from international directives and treaties and/or domestic legislation and policy. These designations are termed Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar Wetlands of International Importance. SACs and SPAs are collectively known as Natura Sites.

Designated sites are mostly in private ownership, with others owned by public bodies. NatureScot directly manages some designated sites and advises on the management of others, but many organisations play a role in their management.

As at December 2025, in the South of Scotland there was a total of 185 Sites of Special Scientific Interest (SSSI), 3 National Nature Reserves (NNR), 22 Special Areas of Conservation (SAC), 10 Special Areas of Conservation (SPA), 8 Ramsar Sites and 1

Marine Protected Area (MPA). Note that some sites have multiple designations and in some cases part of the designated site overlaps with an adjacent area outside of the South of Scotland (Figure 5).

A total of 522 features have been identified in the designations. These consist of 68 features relating to earth sciences, 245 habitat features and 209 features relating to species. The condition of these features is assessed periodically (see Table 25).

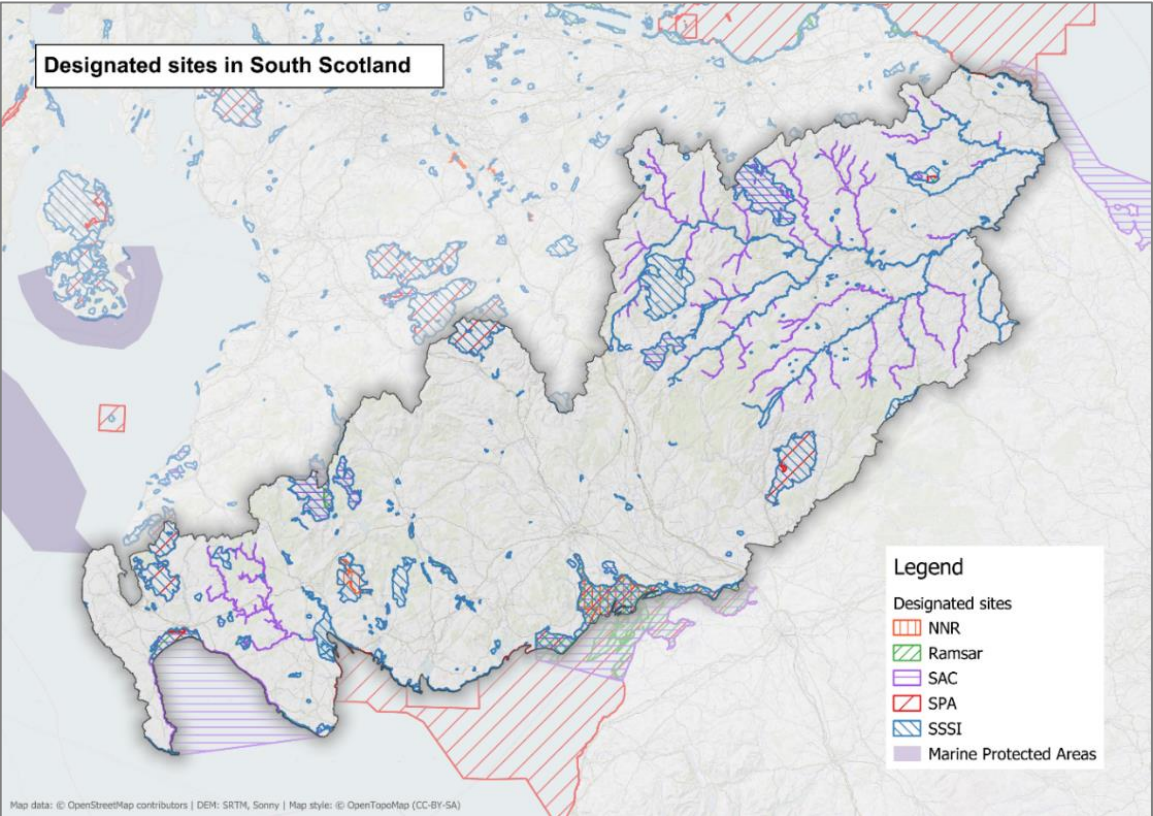
Table 9. Area of land within South of Scotland Covered by Designated Sites (not including Marine Protected Areas and Local Nature Reserves)

	Area of Designated Sites* (sq. km)	% of Land* Under Designations
Dumfries & Galloway	595.3	8.91%
Scottish Borders	288.5	6.08%
South of Scotland	883.8	7.74%

* including intertidal but excluding marine waters

Nature Conservation Marine Protected Areas (MPAs) are designated by Scottish Ministers under the Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010. As of December 2025, there was one MPA in the South of Scotland, the Clyde Sea Sill MPA. This site covered a total of 712 square kilometres, but only a small percentage of this area lies within the coastal waters of the South of Scotland.

Figure 5. Map of Statutory Designated Sites in South of Scotland



2.9.2 Local Nature Reserves

Local Nature Reserves (LNR) are selected by local authorities because of their special natural interest and/ or educational value. They are designated under Section 21 of the National Parks and Access to the Countryside Act 1949 and are therefore statutory

designated sites. However, the level of protection is dependent on the policies of the local authority (including by-laws if necessary). LNRs may include a Site of Special Scientific Interest (SSSI) and/or a Natura site.

As of December 2025, in Dumfries & Galloway there were two Local Nature Reserves in Dumfries & Galloway – Wigtown Bay LNR and Castle & Hightae Lochs LNR. There were no LNRs in the Scottish Borders.

2.9.3 Non-statutory Designated Sites

In addition to sites designated under legislation, there are a number of non-statutory sites in both Dumfries & Galloway and Scottish Borders. Though such sites are not directly protected by legislation, they may receive protection through local plans and policies.

Table 10. Number and Area of Non-statutory Sites in South of Scotland

	No. of Sites	Area (sq.km)
Scottish Borders Local Biodiversity Sites	188	88.9
Dumfries & Galloway Local Wildlife Sites	53	26.0
South of Scotland	241	114.9

Nature30 sites are a non-statutory approach to conserving land to benefit biodiversity and contribute to Scotland's target to reach 30% of land and sea protected by 2030. The first Nature30 sites were recognised in Scotland in October 2025. As of December 2025, no Nature30 sites had been recognised in the South of Scotland.



2.10 Wildlife Recording in the South of Scotland

Wildlife recording in the South of Scotland, particularly that carried out by volunteers, has continued to increase during the period covered by this report, so that it is now greater than at any time in history, both in terms of the number of people involved, the number of taxa recorded, and the number of records submitted. It is worth bearing this in mind for datasets that have not been adjusted for recorder effort.

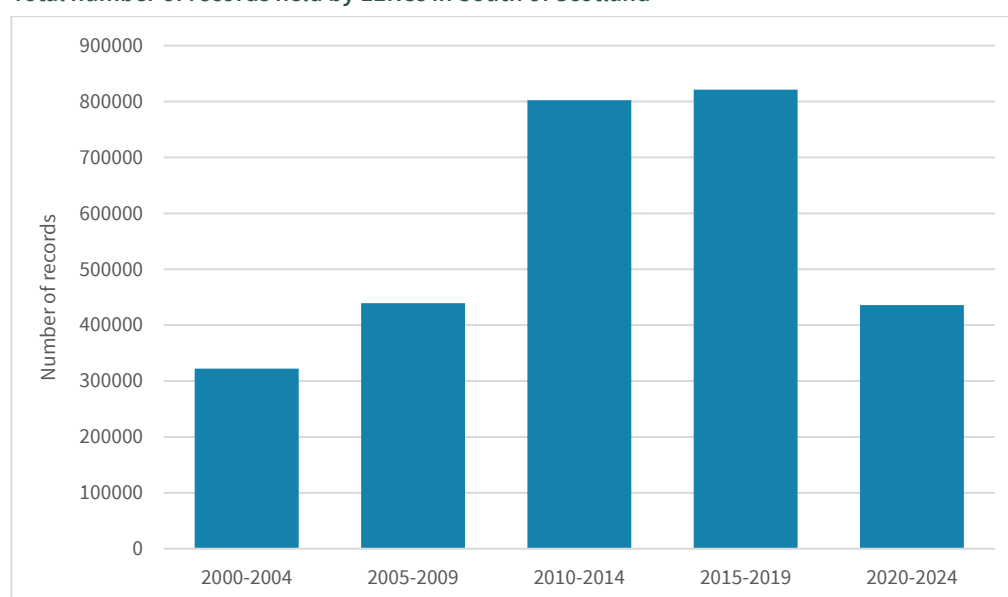
A measure of this increase in recording effort can be gauged from the number of records submitted to the two local environmental records centres (LERCs) in the South of Scotland (Table 11, Figure 6, Figure 7 below). Access restrictions arising from the COVID-19 pandemic will have affected totals in the most recent set of years. There is also a time-lag, sometimes of several years, before all available datasets filter through to LERCs.

Table 11. Total number of records held by LERCs in South of Scotland

	2000-2004	2005-2009	2010-2014	2015-2019	2020-2024
South West Scotland Environmental Information Centre (Dumfries & Galloway)	101,795	221,839	396,393	396,059	245,150
The Wildlife Information Centre (Scottish Borders)	220,479	217,322	405,936	425,170	190,746

Recording effort is not evenly spread across the South of Scotland. The poorest recorded areas are on the boundary between the two regions, along the Pennine boundary with Northumberland, and in the western Southern Uplands, though not the eastern Southern Uplands. One difference with the map showing rare, endangered and threatened species (see Figure 4 above) is that many of the designated sites in the uplands, at least those in the west, are poorly represented in LERC data. This is likely to be a reflection that the surveys of these sites will have largely been carried out by professional surveyors and ecologists, rather than casual visitors, and not made available to LERCs.

Figure 6. Total number of records held by LERCs in South of Scotland

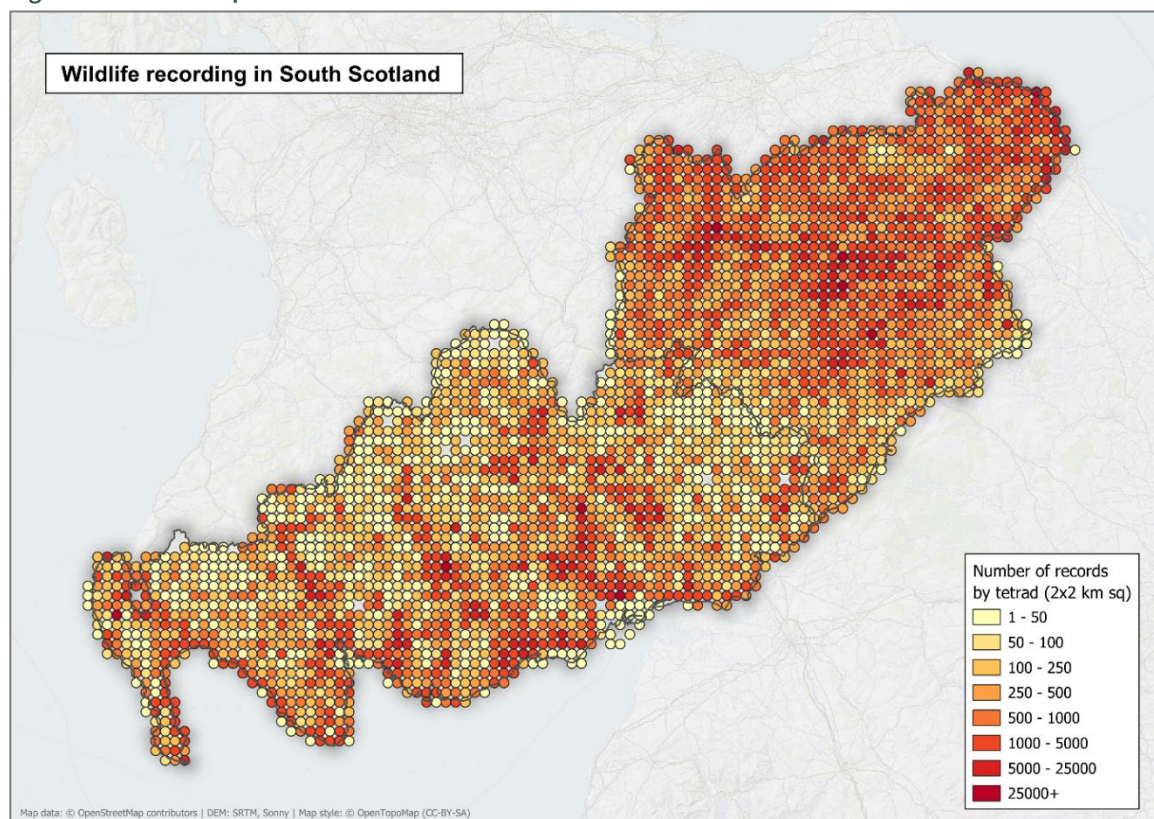




Wildlife recorder by Hermitage Water ©Michael Scott

In general, the poorly recorded areas are all sparsely populated areas with remote moorland and dense conifer plantations, and the lack of records may reflect difficulty of access as well as reduced species diversity. Conversely, the river valleys, the lowlands and the coast are more densely populated and more visited, reflecting increased recording, though there is likely also a genuine greater diversity of species in these areas.

Figure 7 Heat map of number of records





3 The Changing Nature of the South of Scotland

3.1 Abundance of Breeding Seabirds 2000-2021

This metric assesses changes to the abundance of breeding seabirds across the South of Scotland between 2000 and 2021, based on full counts of seabird colonies carried out as part of the national Seabird Monitoring Programme.

3.1.1 International & National Context

The UK supports globally important numbers of seabirds with around 8 million breeding birds, 5 million of which are in Scotland. The coastline of the South of Scotland, with around 60,000 birds counted in the most recent survey, has many fewer than some other coasts and islands, but is still important. For example, the UK supports 60-70% of the global population of Northern Gannets and the established colony on The Scares is one of only around 55 breeding sites for this species in the world, with another recently becoming established at St Abb's Head.

3.1.2 Historical Trends before 2000

There is historical evidence of terns being much more widespread and abundant breeding birds in the 20th century. For example, "large numbers" at Torrs Warren in the early 20th century, 100 pairs on Rough Island in 1947, up to 400 pairs on Hestan Island in the 1950s, 70-90 pairs on the Isles of Fleet in 1966, breeding pairs at Genoch Rocks and several inland sites in the 1980s, and up to 80 pairs at Loch Ryan in 1995. These records mostly concern Common Terns, but include smaller numbers of Sandwich, Arctic and Roseate Terns. Small numbers, up to 10 pairs, of Little Tern formerly bred in Galloway. (Mearns & Mearns, 2007; Dickson, 1992; County Bird Reports.)

Herring and Lesser Black-backed Gulls appear to have been scarce in the early 19th century but abundant by the 20th century, with continued expansion, thereafter, augmented by nesting on urban roofs from the 1980s (Gray & Anderson, 1864; Murray et al., 1998). However, there were few counts at breeding colonies, other than 1500 pairs of Lesser Black-backed Gull at Almorness in 1987 (Watson, 1988). Kittiwakes spend most of their lives at sea, but evidence suggests an increase in breeding birds on sea cliffs until the 1980s with 577 nests at Mull of Galloway in 1984 (Murray et al., 1998; Dickson, 1992).

Razorbills and Guillemots have been recorded breeding in the South of Scotland since the early 19th century and numbers increased at most sites, including the largest colony at St Abb's Head, throughout the 20th century (Murray et al.). Black Guillemots have always been restricted to Galloway but were rarely reported breeding there prior to the 20th century (Gray & Anderson, Dickson). Puffins have seldom bred in large numbers, but up to 104 apparently occupied burrows were recorded at St Abb's Head in 1989 (Murray et al., 1998).

The rapid expansion of Fulmars across the UK in the 19th and 20th centuries was evident in the South of Scotland from 1914 (Murray et al., 1998). By the 1980s, pairs were present on every suitable sea cliff.

Gannets first attempted to colonise Scar Rocks in 1883, but the present colony was established in 1939. By 1983 there were 830 nests (Dickson, 1992) and 2394 nests in 1995 (Mearns & Mearns, 2007).

Cormorants were first recorded breeding in the Borders in 1969 (Murray et al., 1998) but appear to have always been more common in Galloway: “At any season the cormorant is nowhere more abundant than along the shores of Wigtownshire...where fifty or sixty are constantly seen”. (Gray & Anderson, 1864). The breeding colony at Mochrum Loch, a freshwater loch located a short distance inland from Luce Bay, dates to 1663 or earlier (Dickson, 1992) with 415 nests in 1986 (Watson, 1988).

3.1.3 State of Breeding Seabirds 2000-2021

Seabirds bred at several sites on the Berwickshire and Galloway coasts 2000-2021 (Table 12). The data shows a decline in abundance of around 24% from the early 2000s to the late 2010s but the most recent counts pre-date the main outbreaks of Highly Pathogenic Avian Influenza (avian flu) so are likely to underestimate the decline.

Terns, already subject to substantial historical declines (see 3.1.2 above), have declined substantially and may now be extinct, or very nearly so, as breeding birds in the South of Scotland. No comprehensive data exists on the increase in urban nesting gulls, but there has been a substantial decline at their coastal breeding sites, especially of Kittiwakes (down 69%), none of which breed in urban areas. Auk numbers (down 5.5%) have not declined as severely as other species, whilst a small second colony of Gannets was established, and overall numbers remained steady. However, this species is known to have been badly affected by avian flu, so it will be interesting to monitor results in the future.

3.1.4 Drivers of Change

The main drivers of seabird trends, other than avian flu, are likely to be related to the marine environment where all these species, other than some of the gulls, find all their food and spend almost all their lives.

3.1.5 Data Sources

Data Quality: Very High

The Seabird Monitoring Programme (SMP) monitors breeding seabirds throughout the United Kingdom, the Isle of Man and the Channel Islands on an annual basis to provide data for the conservation of their populations. The scheme also provides the foundation in enabling vicennial (once every 20 years) breeding seabird censuses of the UK and Ireland.

Scheme participants, both non-professional and professional surveyors, visit sites at and count all individuals of breeding seabirds and, where possible, their chicks to monitor breeding success. Virtually all breeding sites are visited. Therefore, for most species, the results represent a very accurate count of the majority, if not the entire, breeding population in the South of Scotland.

3.1.6 Proposed Indicator

Future counts of seabird colonies, organised by British Trust for Ornithology (BTO) as part of the Seabird Monitoring Programme, can be used as an indicator.

3.1.7 References

Dickson, R.C. (1992). *The Birds in Wigtownshire*. G.C. Book Publishers Ltd. Wigtown.

Gray, R. & Anderson, T. (1864) *The Birds of Ayrshire and Wigtownshire*. Thomas Murray & Son, Glasgow.

Mearns, R. & Mearns, B. (2007) The Breeding Birds of the Solway Islands. *Transactions of the Dumfriesshire and Galloway Natural History and Antiquarian Society*. Series III, Vol. 81, pp7-34.

Murray, R., Holling, M., Dott, H. & Vandome, P. (1998). *The Breeding Birds of South-east Scotland. A Tetrads Atlas 1988-1994*. Scottish Ornithologists Club, Edinburgh.

Watson, D. (1988). *A Bird Artist in Scotland*. H.F.&G. Witherby Ltd. London.

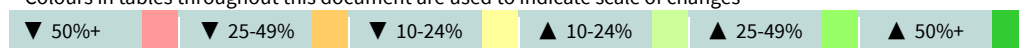
Various authors (1982-2023) Bird Reports for Dumfries & Galloway and Scottish Borders. Accessed via Online Scottish Bird Report (SOC).

Table 12. Abundance of breeding seabirds in the South of Scotland

Species	Berwickshire		Kirkcudbright-shire		Wigtownshire		South of Scotland totals		Change	
	2000-2004	2016-2021	2000-2004	2016-2021	2000-2004	2016-2021	2000-2004	2016-2021	2000-04 – 2016-21	
Arctic Tern	0	0	0	0	6	0	6	0	-100%	
Common Tern	0	0	6	0	55	5	55	5	-91%	
Sandwich Tern	0	0	0	0	70	0	70	0	-100%	
Kittiwake	18739	5859	7	0	456	105	19202	5964	-69%	
Herring Gull	945	733	748	29	453	353	2146	1115	-48%	
Great Black-backed Gull	1	4	7	1	4	4	12	9	-25%	
Lesser Black-backed Gull	1	0	1025	0	17	4	1043	4	-99%	
Puffin	21	0	4	0	N/A	N/A	25	0	-100%	
Black Guillemot	0	0	0	0	180	161	180	161	-11%	
Razorbill	3534	3155	111	94	688	74	4333	3323	-23%	
Guillemot	44636	46543	335	666	5014	807	49985	48016	-4%	
Fulmar	1060	406	84	20	168	61	1312	487	-63%	
Gannet	0	11	0	0	2394	2376	2394	2387	0%	
Cormorant	36	25	313	136	389	105	738	266	-64%	
Shag	349	163	3	4	57	38	409	205	-50%	
All seabirds	69322	56899	2643	950	9951	4093	81910	61942	-24%	

Notes: Information is based on a single annual count at seabird colonies within two time periods, 2000-2004 and 2016-2021. Colonies only counted within one time period were excluded from the results, as were urban and inland breeding sites for gulls and terns (terns rarely breed inland). Note that count units vary between species - they relate to number of individual adult birds (auks), number of apparently occupied sites (Fulmar and Puffin) or apparently occupied nests (all other species).¹

¹ Colours in tables throughout this document are used to indicate scale of changes



3.2 Abundance of Wintering Waterbirds 2000-2024

This metric assesses changes to the abundance of wintering waterbirds (wildfowl and wading birds) across the South of Scotland between 2000 and 2024, based on counts carried out at selected sites as part of the national Wetland Bird Survey (WeBS).

3.2.1 Historical Trends before 2005

Though schemes to count wildfowl in Britain date back to the 1940s, it was not until the creation of the Wetland Bird Survey (WeBS) in 1993 that comprehensive coverage of all waterbirds was achieved. Historical trends are therefore fragmentary.

The history of geese in the South of Scotland is better documented than other water-birds, largely due to the Svalbard-breeding population of Barnacle Geese that winter entirely on the Solway. These numbered only around 300 in 1948/49 until successful conservation action raised the population to 27,000 birds in 2004/05 (Ogilvie, in Forrester et al., 2007). Pink-footed and Greylag Geese were rare before the 19th century, but numbers increased steadily from 1850 (Thom, 1986). In contrast the White-fronted Goose has only ever been present in small numbers and the Bean Goose, once the most abundant grey goose visiting Scotland (Thom, 1986), has been lost — the small flock that wintered near Castle Douglas in the 1940s had gone by the 1980s. Brent Geese (Pale-bellied race) first began regularly wintering in Galloway in the 1990s (County Bird Reports).

Historically, numbers of duck are difficult to assess. Some species, such as Shelduck and Goosander are known to have increased in the 20th century (Murray et al., 1998; Thom, 1986), but for more widespread wintering ducks such as Mallard, Wigeon and Teal it is difficult to be certain about historical abundance trends.

Wintering waders are primarily coastal, and the Solway has long been recognised as an important site, but information on the numbers of each species does not become available until the late 20th century.

3.2.2 National and International Importance

The South of Scotland includes sites that have been identified as being of international importance for the following wildfowl and waders: Pink-footed Goose, Barnacle Goose, Greylag Goose, Pintail, Oystercatcher, Ringed Plover, Redshank, Knot, Dunlin, and Slavonian Grebe.

The South of Scotland includes sites that have been identified as being of national (UK) importance for the following wildfowl and waders: Brent Goose (Light-bellied), Whooper Swan, Shelduck, Shoveler, Wigeon, Pintail, Scaup, Red-breasted Merganser, Golden Plover, Curlew, Sanderling and Little Egret.

3.2.3 Changes to the Abundance of Wintering Waterfowl 2005-2025

The abundance of wintering wildfowl (wildfowl and waders but excluding gulls and terns) was calculated using five-year peak mean counts: the maximum monthly count at selected sites during a single winter, averaged over a five-year period (Table 13). Only sites that had counts in at least three winters in each five-year period were used to calculate averages. Only sites with average counts available in all five-year periods and an average of 100 or more birds in at least one five-year period were selected for inclusion.

The count data covers all of the principal waterfowl sites in the South of Scotland but does not include waterfowl present on minor waterbodies or the wider countryside.

Table 13. Abundance of wintering waterfowl in the South of Scotland

Sites	Five-year peak mean count					Change 2005-2025
	2005-10	2010-15	2015-20	2020-25		
Solway Estuary	119,602	139,763	135,628	131,228		+10%
Wigtown Bay	19,781	19,446	21,354	25,983		+31%
Loch Ryan	4773	6828	5868	5730		+20%
Orchardton & Auchencairn Bays	4527	5538	6590	4484		-1%
Fleet Estuary	876	844	3046	2678		+206%
Rough Firth	2665	1738	1692	2103		-21%
Loch Connell	3593	3981	3189	2125		-41%
Loch Ken	782	2405	1715	1077		+38%
Carlingwark Loch	302	489	451	371		+23%
Auchenreoch Loch	344	378	472	260		-24%
Castle loch, Lochmaben	1572	1090	602	469		-70%
Kirk Loch, Lochmaben	480	498	293	230		-52%
Mill Loch, Lochmaben	425	98	335	189		-56%
Dumfries & Galloway	159,722	183,096	181,235	176,927		+11%
Lower Teviot Valley	2365	612	3098	2639		+12%
Folly Loch & Fairnington Fields	3398	1024	5347	1877		-45%
River Tweed: Kelso to Coldstream	2342	1700	1125	2044		-13%
Hoselaw Loch	407	340	315	251		-38%
Yetholm Loch	474	247	313	216		-54%
Wooden Loch	209	202	222	174		-17%
Ploughlands Pond	167	139	127	125		-25%
Yetholm Pond	138	197	120	60		-57%
West Water Reservoir	44,923	22,701	35,573	5754		-87%
Bemersyde Moss	957	332	1687	326		-66%
Whitrig Bog	2580	3952	1160	429		-83%
Lady Moss	143	51	153	241		+69%
Portmore Loch	135	20	165	161		+19%
Stantling Craigs Reservoir	563	550	621	144		-74%
Holybush Pond	68	68	165	172		+153%
Gun Knowe Loch	102	114	148	150		+47%
Cauldshields Loch	63	127	92	119		+89%
Whitmuir Hall Loch	91	153	163	105		+15%
Hule Moss	6759	6543	11,389	15,079		+123%
Hirsel Lake	449	633	821	530		+18%
Dow Law Dam	1750	288	3229	445		-75%
Millar's Moss Reservoir	210	216	215	101		-52%
Duns Castle Pond	236	276	202	100		-58%
Scottish Borders	68529	40485	66450	31242		-54%
South of Scotland	228,251	223,581	247,685	208,169		-9%

Colours indicate scale of change (see footnote on p25) from previous time period/overall. Data Source: Wetland Bird Survey Counts (BTO 2025). Note that counts for the Solway include both the Scottish and English sides of the estuary.

3.2.4 Drivers of Change

Multiple factors can affect the number of wintering waterbirds. These can include site-specific changes, such as increased disturbance, changes in water quality or, exceptionally, new developments. However, the abundance of wintering waterbirds is also affected by national and international issues, such changes in migration patterns caused by climate change or factors affecting the birds on their breeding grounds.

3.2.5 Data Sources

Data Quality: High

The Wetland Bird Survey (WeBS) is a UK-wide monitoring scheme which monitors wildfowl, waders and other waterbirds to produce population abundance and distribution trends and determine important sites for waterbirds in the UK. WeBS is a partnership between the British Trust for Ornithology (BTO), Royal Society for the Protection of Birds (RSPB), and the Joint Nature Conservation Committee (JNCC). Counts are mostly undertaken by volunteers, including sites across the South of Scotland.

Whilst counts are considered to be very accurate, amalgamation of the data as has been completed above, may mask certain trends. For example, large numbers of roosting geese may greatly outnumber other birds at some sites, but their behaviour may be affected by factors such as the weather on the count day and the fact that they are less site faithful than many other species. Use of five-year averages minimises, but does not exclude, such effects.

3.2.6 Potential Indicator

The Wetland Bird Survey is an ongoing programme and could be used to monitor future trends. There is the potential to analyse the data, including species level data, in more detail than was possible for this report.

3.2.7 References

Forrester, R.W., Andrews, I.J., McInerney, C.J., Murray, R.D., McGowan, R.Y., Zonfrillo, B., et al. (2007) *The Birds of Scotland*. Scottish Ornithologists Club, Aberlady.

Murray, R., Holling, M., Dott, H. & Vandome, P. (1998). *The Breeding Birds of South-east Scotland. A Tetrads Atlas 1988-1994*. Scottish Ornithologists Club, Edinburgh.

Thom, V. (1986). *Birds in Scotland*. T & AD Poyser Ltd.



3.3 Distribution of Threatened Breeding Bird Species 1968-2011

This metric assesses changes to the distribution of threatened breeding bird species across the South of Scotland between 1968 and 2011. Threatened bird species are defined as those listed on the Red List of the Birds of Conservation Concern (BOCC) (2021).

3.3.1 Historical trends before 1968

Two bird species, namely Red Kite and Osprey, are considered to have formerly bred in the South of Scotland but became locally extinct as breeding species in historic times (Gladstone, 1910; Murray et al., 1998). These species were formerly assessed as threatened in the UK (as defined by the BOCC Red List) but due to recovery of UK populations they are no longer considered to be threatened. Both of these species have now returned to breed in the South of Scotland, the former aided by a successful nationwide reintroduction project which included a release site in Dumfries & Galloway.

There are historic references to two species of bird, namely White-tailed Eagle and Bittern, as breeding in the South of Scotland (Gladstone, 1910; Murray et al., 1998). These species were formerly assessed as threatened in the UK but due to recovery of UK populations elsewhere in the UK, they are no longer considered threatened (as defined by the BOCC Red List). However, neither of these species have returned to breed in the South of Scotland.

3.3.2 Changes to the distribution of threatened breeding bird species 1968-2011

The distribution by hectad (10km x 10km Ordnance Survey grid squares), of threatened breeding bird species in the South of Scotland between 1968 and 2011 was analysed (Table 14). Threatened bird species were those identified on the Birds of Conservation Concern 5 (BOCC5 2021) Red List. Distribution data was based on that collected for the three national atlas periods covering 1968-72 (Sharrock, 1976), 1988-91 (Gibbons et al., 1993) and 2007-11 (Balmer et al., 2013).

The first BOCC (1996) Red List consisted of 36 species. Subsequent lists have added or removed species as their status has changed. The most recent Red List (BOCC5 2021) consists of 70 species. The following six species were formerly on a Red List and have bred, or attempted to breed in the South of Scotland during the period covered by the three atlases, but UK populations have recovered sufficiently for them to be removed from the current Red List: Red Kite, Marsh Harrier, Osprey, Nightjar, Pied Flycatcher, Bullfinch, Reed Bunting.

3.3.3 Drivers of Change

Multiple factors can affect the distribution of breeding birds, and these will vary significantly according to species. Factors can include site-specific changes, such as increased disturbance or new developments, but the impact of site-specific changes will rarely affect the regional distribution of a breeding bird species. Of greater impact is likely to be wider economic factors or changes in technology or policy changes that result in cumulative impacts on widespread habitats such as farmland, forestry or uplands. Breeding birds are also affected by national and international issues, such as climate change, or (for migratory species) factors affecting the birds on their wintering grounds.

Table 14. Distribution of threatened bird species in the South of Scotland

Species	Number of hectads (10km x 10km squares) with possible, probable or confirmed breeding.					
	Atlas 1968-72	Atlas 1988-91	Change 1968-1991	Atlas 2008-11	Change 1988-2011	Change 1968-2011
Grey Partridge	122	104	-15% 	51	-49% 	-58% 
Black Grouse	86	62	-28% 	65	5% 	-24% 
White-fronted Goose*	0	1	n/a	0	n/a	n/a
Common Scoter*	2	3	n/a	0	n/a	n/a
Goldeneye*	5	22	n/a	0	n/a	n/a
Pochard	20	17	-15% 	7	-59% 	-65% 
Red-necked Grebe	0	1	n/a	1	n/a	n/a
Turtle Dove*	5	3	n/a	1	n/a	n/a
Swift	100	106	+6% 	100	-6% 	0% 
Cuckoo	122	112	-13% 	116	4% 	-5% 
Corncrake	52	6	-8% 	4	-33% 	-92% 
Shag	18	13	-28% 	11	-15% 	-39% 
Dotterel	0	6	n/a	1	-83% 	n/a
Ringed Plover	63	49	-22% 	40	-18% 	-37% 
Lapwing	127	125	-2% 	125	0% 	-2% 
Curlew	126	124	-2% 	136	10% 	8% 
Dunlin	39	23	-41% 	10	-57% 	-74% 
Woodcock	111	77	-31% 	63	-18% 	-43% 
Kittiwake	13	12	-8% 	5	-58% 	-62% 
Herring Gull	32	98	+306% 	43	-56% 	34% 
Roseate Tern*	1	1	n/a	0	-100% 	-100% 
Puffin	6	5	-17% 	3	-40% 	-50% 
Hen Harrier	39	46	+18% 	30	-35% 	-23% 
Merlin	54	54	0% 	56	4% 	4% 
Marsh Tit	16	14	-6% 	6	-57% 	-62% 
Willow Tit	50	37	-26% 	23	-38% 	-54% 
Skylark	128	128	0% 	145	13% 	13% 
Grasshopper Warbler	98	63	-36% 	100	59% 	2% 
House Martin	120	119	-1% 	142	19% 	18% 
Wood Warbler	55	74	+35% 	52	-30% 	5% 
Starling	127	127	0% 	140	10% 	10% 
Mistle Thrush	122	121	-1% 	139	14% 	14% 
Fieldfare*	1	13	n/a	6	n/a	n/a
Ring Ouzel	69	42	-39% 	32	-24% 	-54% 
Spotted Flycatcher	121	122	+1% 	137	12% 	13% 
Whinchat	120	108	-10% 	107	-1% 	-11% 
House Sparrow	126	112	-11% 	139	24% 	10% 

Species	Number of hectads (10km x 10km squares) with possible, probable or confirmed breeding.					
	Atlas 1968-72	Atlas 1988-91	Change 1968-1991	Atlas 2008-11	Change 1988-2011	Change 1968-2011
Tree Sparrow	67	42	-37% 	37	-12% 	-45% 
Tree Pipit	83	82	-1% 	106	29% 	28% 
Yellow Wagtail	16	14	-12% 	14	0% 	-12% 
Hawfinch	13	5	-62% 	0	-100% 	-100% 
Greenfinch	122	110	-10% 	137	25% 	12% 
Twite	17	15	-12% 	18	20% 	6% 
Linnet	125	118	-6% 	133	13% 	6% 
Redpoll	116	97	-16% 	133	37% 	15% 
Corn Bunting	52	13	-75% 	2	-85% 	-96% 
Yellowhammer	123	111	-10% 	90	-19% 	-27% 

Notes: There is no confirmed evidence of species marked * ever (or very rarely) breeding in the South of Scotland. 'Possible' records almost certainly refer to summering (non-breeding) birds only, although Roseate Tern breeds in Northumberland and there are isolated records of Goldeneye breeding in Northumberland so breeding in the South of Scotland is possible for these species. Note also that some 10km squares overlap regional boundaries and so not all breeding records may relate to South of Scotland. Colours indicate scale of changes (see footnote on p25).

3.3.4 Data Sources

Data Quality: Very High

The BOCC Red List was first published in 1996 and has been updated four times. The most recent list (BOCC5), published in 2021, was used for the analysis. The BOCC lists include bird species that breed or overwinter in the UK, Channel Islands and Isle of Man. The status of each species has been assessed on quantitative criteria relating to historical decline, recent trends in population and range, localisation, international importance and global and European threat status.

The three atlases of breeding birds are based on dedicated fieldwork conducted mainly by volunteer observers with professional help in some remoter areas. Observers visited each 10-km square and recorded the presence of birds, noting breeding status using standardised codes. The most recent atlases also made estimates of abundance (not used in analysis for this metric). All data underwent rigorous data verification and validation, and it is believed that the data represents a true distribution of breeding birds, whilst accepting that there may be gaps for individual hectads. Different criteria for the allocation of breeding evidence in the 1988–91 atlas can cause some anomalous range changes, but these are not thought to be significant in the South of Scotland.

3.3.5 Proposed Indicator

The fieldwork for the next UK Breeding Bird Atlas is scheduled for 2027-2031. Results will be directly comparable to those above.

3.3.6 References

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3.4 Distribution of Threatened Mammal Species 2000-2025

This metric assesses changes to the distribution between 2000 and 2025 of threatened mammal species in the South of Scotland. Threatened mammal species are defined as those listed in The Mammal Society UK Red List (2021).

3.4.1 Historical Trends

Red Squirrels are known to have been very scarce, probably extinct, in the South of Scotland by the mid-19th century but recolonised the area following reintroductions in neighbouring areas. By the late 20th century, numbers were gain in decline (Kitchener, 1998).

Historical information on Hedgehogs and Water Voles in the South of Scotland is sparse, but it is reasonable to assume that they were formerly widespread and abundant, as in most of the rest of the UK prior to the 20th century. By the time of the two UK Water Vole surveys, carried out by the Vincent Wildlife Trust in 1989-90 and 1996-98, a substantial and accelerating rate of decline had been identified for this species.

3.4.2 Changes to the distribution of threatened mammal species in the South of Scotland 2000-2025

Three species present in the South of Scotland were identified as threatened in the list prepared by The Mammal Society in 2021. These were Hedgehog, Red Squirrel and Water Vole. Data was analysed for these species.

Hedgehogs are known to be widespread in the South of Scotland but available data on distribution may be influenced by years when specific surveys were carried out. However, most recent trends suggest a declining distribution in the South of Scotland (Table 15). This is in line with national trends that report stable populations in urban areas but a declining rural population (Wembridge et. al., 2022).

Table 15. Changes in Hedgehog Distribution 2000-2024

	Number of tetrads (2km x 2km Ordnance Survey Grid Squares) with records of Hedgehog				
	2000-2004	2005-2009	2010-2014	2015-2019	2020-2024
Scottish Borders	68	103	226	144	122
Dumfries & Galloway	27	75	56	131	61

Water Vole is very rare in the South of Scotland and difficult to survey without specialist skills. The available data therefore is skewed towards the dates and locations where a small number of dedicated surveys have been undertaken by trained observers. Datasets relating to these this species were therefore not considered reliable enough for use in State of Nature, but it is clear that Water Vole remains a rare species with fewer than 150 total records for the South of Scotland. National trends report a continuing decline (Glossop & Morse, 2024).

Since 2000, a substantial volume of data has been collected on Red Squirrels, most recently by the Saving Scotland’s Red Squirrels project. This has been analysed to show changes in the distribution by tetrad (2km x 2km Ordnance Survey grid squares) between 2000 and 2024. The results show an expansion of Red Squirrel distribution up to 2020, but a subsequent retraction (Table 16).

Table 16. Changes in Red Squirrel Distribution 2000-2024

	Number of tetrads (2km x 2km Ordnance Survey Grid Squares) with records of Red Squirrel				
	2000-2004	2005-2009	2010-2014	2015-2019	2020-2024
Scottish Borders	371	530	917	1077	956
Dumfries & Galloway	880	2892	4788	6421	4606

3.4.3 Drivers of Change

Reasons for national Hedgehog declines are complex, but changes to the rural environment along with the impact of increasing Badger numbers and road traffic may be important. Red Squirrels and Water Voles have also been affected by habitat changes, but the impact of two invasive non-native species has been identified as important reasons in their decline. With Red Squirrels, competition with Grey Squirrels and squirrelpox virus, which can be carried by Grey Squirrels, has been identified as a major factor for decline. For Water Voles, direct predation by American Mink has been identified as a significant cause of decline.

3.4.4 Data Sources

Data Quality: High

Red Lists are a globally recognised way of identifying the threat of extinction to species, using the internationally accepted Red List guidelines developed by the International Union for Conservation of Nature (IUCN). Red list assessments are objective and based on scientific information and ongoing research. The procedure for assessing species at a UK scale was laid out by IUCN in 2012, underlain by more detailed guidelines (IUCN 2019). In Britain, red listing is overseen by an inter-agency working group co-ordinated by Joint Nature Conservation Committee with members from Natural England, Natural Resources Wales and NatureScot. As part of the assessment process, species are placed in one of eleven categories, three of which (Critically Endangered CR, Endangered EN, Vulnerable VU) are classified as ‘threatened’ and included in this metric.

Distribution records, collated by the TWIC and SWSEIC, come from a range of sources but mostly collected by members of the public and verified by experts.

3.4.5 References

Glossop, A. & Morse, A. (2024). *National Water Vole Database Project, Part 1: Project report for period 2013 – 2022*. The Wildlife Trusts.

Kitchener, A. Extinctions, Introductions and Colonisation of Scottish Mammals and Birds since the Last Ice Age. In Lambert, A. (1998). *Species History in Scotland*. Scottish Cultural Press.

Wembridge, D., Johnson, G., Al-Fulaij, N. & Langton, S. (2022). *The State of Britain’s Hedgehogs 2022*. British Hedgehog Preservation Society & People’s Trust for Endangered Species.

3.5 Distribution of Threatened Macro-moth Species 2003-2022

This metric assesses changes to threatened macro-moth species across the South of Scotland between 2003 and 2022. Threatened moth species are defined as those listed in ‘A review of the status of the macro-moths of Great Britain’ (2019).

3.5.1 Historical Trends before 2003

Prior to 2003, most moth recording in the South of Scotland was concentrated around the homes of recorders and, to a lesser extent, on nature reserves, meaning that historical distribution maps for threatened moth species cannot be compared with modern distribution maps. There has been a substantial increase in moth recording since the late 20th century.

3.5.2 Changes to the distribution of threatened moth species 2003-2022

The distribution of threatened moth species in the South of Scotland between 2003 and 2022 has been analysed, based on the number of records for each species in each hectad (10km x 10km Ordnance Survey grid square)(Table 18).

The data shows mixed results with some species increasing over time, some species decreasing, and others showing fluctuating trends. Highly localised species in the South of Scotland, such as V-moth and Spinach remain rare, but Figure of Eight, never known to be widespread, may now be extinct or nearly-so in the South of Scotland, whilst Oak Hook-tip, which has recently colonised Dumfries & Galloway and continues to expand. Apparent increases for species such as Satyr Pug may reflect increased availability of guidance to identify this difficult species. Other increases may be due to increased recording effort.

For most species, the fluctuations over time lie within the range that could be explained by variations in recording effort, and no obvious trends can be identified.

It is important to note that this metric covers only those species considered threatened at a British level, which is a very small number (20) compared to the total number of macro moth species (almost 500) recorded in the South of Scotland. The time required to analyse distribution data for all species would be substantial.

3.5.3 Drivers of Change

Land use is the main driver of change relating to threatened macro moth species as many have particular habitat requirements, especially in their early stages. Chemical and light pollution may also be important in some circumstances. Those species with a restricted distribution may be affected by site-specific changes, but widespread species are more affected by changes brought about through changing economic conditions and local and national land-use policies. With a few exceptions, threatened moth species have not benefitted from climate change in the same way that many common species, since a lack of suitable habitat may prevent colonisation of new sites, even if the climate becomes more suitable.

Table 17. Changes to the distribution of threatened macro-moth species in the South of Scotland 2003-2022 (number of records)

Scientific Name	Common Name	Scottish Borders				Dumfries & Galloway				South of Scotland			
		2003-2007	2008-2012	2013-2017	2018-2022	2003-2007	2008-2012	2013-2017	2018-2022	2003-2007	2008-2012	2013-2017	2018-2022
<i>Stilbia anomala</i>	Anomalous	3	12	47	25	19	13	5	6	22	25	52	31
<i>Hyles gallii</i>	Bedstraw Hawk-moth		2	2	2	11		1	5	11	2	3	7
<i>Ceramica pisi</i>	Broom Moth	171	81	286	200	142	118	201	155	313	199	487	355
<i>Pelurga comitata</i>	Dark Spinach		5		8	4	22	2	7	4	27	2	15
<i>Theria primaria</i>	Early Moth	5	33	16	47	2	12	7	4	7	45	23	51
<i>Diloba caeruleocephala</i>	Figure of Eight	2	7	1	1		1			2	8	1	1
<i>Euxoa nigricans</i>	Garden Dart	9	9	15	59	1	7	5	1	10	16	20	60
<i>Tholera cespitis</i>	Hedge Rustic	7	18	6		22	28	12	43	29	46	18	43
<i>Eupithecia pusillata</i>	Juniper Pug	16	47	42	51	5	14	19	3	21	61	61	54
<i>Scotopteryx mucronata</i>	Lead Belle							1	1	0	0	1	1
<i>Eupithecia inturbata</i>	Maple Pug		3	2	1					0	3	2	1
<i>Erannis defoliaria</i>	Mottled Umber	15	67	176	174	11	50	74	82	26	117	250	256
<i>Amphipyra tragopoginis</i>	Mouse Moth	53	122	103	357	22	22	31	87	75	144	134	444
<i>Watsonalla binaria</i>	Oak Hook-tip						5	1	25	0	5	1	25
<i>Phigalia pilosaria</i>	Pale Brindled Beauty	44	113	158	195	14	77	73	96	58	190	231	291
<i>Trichiura crataegi</i>	Pale Eggar	4	4	13	22	9			3	13	4	13	25
<i>Eupithecia satyrata</i>	Satyr Pug	8	13	23	21	3	2	6	23	11	13	23	44
<i>Eulithis mellinata</i>	Spinach	5							4	5	0	0	4
<i>Lycophotia porphyrea</i>	True Lover's Knot	114	117	384	329	227	166	238	256	341	283	622	585
<i>Macaria wauaria</i>	V-moth	2			4					2	0	0	4
<i>Euxoa tritici</i>	White-line Dart		2	6	16	29	12	16	26	29	14	22	42

3.5.4 Data Sources

Data Quality: Very High

Threatened moth species are identified on the Red List for macro-moths in Great Britain by Fox et al. (2019). Red Lists are a globally recognised way of identifying the threat of extinction to species, using the internationally accepted Red List guidelines developed by the International Union for Conservation of Nature (IUCN). Red List assessments are objective and based on scientific information and ongoing research. The procedure for

assessing species at a UK scale was laid out by IUCN in 2012, underlain by more detailed guidelines by IUCN. In Britain, red listing is overseen by an inter-agency working group co-ordinated by Joint Nature Conservation Committee with members from Natural England, Natural Resources Wales and NatureScot. As part of the assessment process, species are placed in one of eleven categories, three of which (Critically Endangered CR, Endangered EN, Vulnerable VU) are classified as ‘threatened.’

The Red List for macro-moths in Great Britain (Fox et al. 2019) used data collected from two national recording/monitoring schemes: the National Moth Recording Scheme (NMRS) run by Butterfly Conservation, and the Rothamsted Insect Survey (RIS), run by Rothamsted Research. The NMRS brings together records for all (c.900 species) of macro-moths across the UK, Isle of Man and Channel Islands. Records are collected by a network of active recorders, predominantly volunteers, who are co-ordinated by expert County Moth Recorders, who also provide verification of records. The RIS data comes from a network of fixed light-traps across the UK, verified by professional ecologists.

Distribution data for the South of Scotland was based on records collected as part of the National Moth Recording Scheme (NMRS), made available via the two Local Environmental Records Centres (LERCs) – The Wildlife Information Centre (TWIC) and South West Scotland Environmental Information Centre (SWSEIC).

No post-2000 data for the South of Scotland is available from the RIS. All records for the South of Scotland in the last 25 years have come entirely from the NMRS. The increase in moth recording during this time has significantly reduced, though not completely eliminated, the bias in distribution records mentioned in 3.5.1 above. Current knowledge of distribution at the hectad scale is considered very accurate for all but a handful of species that require special survey techniques or are restricted to inaccessible habitats. Some recent increases in distribution may be attributable to this increased recorder effort, but this is not considered to be significant.

3.5.5 Potential Indicator

The National Moth Recording Scheme (NMRS) is an ongoing monitoring programme that could be used to update the data at any point in the future.

3.5.6 References

Fox, R., Parsons, M.S. & Harrower, C.A. (2019). *A review of the status of the macro-moths of Great Britain*. Butterfly Conservation report to Natural England. Butterfly Conservation Report Number S19-17.

Fox R., Dennis E.B., Harrower CA, Blumgart D., Bell J.R., Cook P., Davis A.M., Evans-Hill L.J., Haynes F., Hill D., Isaac N.J.B., Parsons M.S., Pocock M.J.O., Prescott T., Randle Z., Shortall C.R., Tordoff G.M., Tuson D. & Bourn N.A.D. (2021). *The State of Britain's Larger Moths 2021*. Butterfly Conservation, Rothamsted Research and UK Centre for Ecology & Hydrology, Wareham.

3.6 Diversity of Macro-moth Species 2003-2022

This metric assesses changes to the diversity of all macro-moth species across the South of Scotland between 2003 and 2022.

3.6.1 Historical Trends before 2003

Prior to 2000, most moth recording in the South of Scotland was concentrated around the homes of recorders and, to a lesser extent, on nature reserves, meaning that knowledge of moth species diversity was limited. However, there are valuable historical records for several of the species now no longer present or now very rare, including Goat Moth, Portland Moth and White Colon.

3.6.2 Changes to the diversity of macro-moth species in the South of Scotland.

The data on macro-moth species diversity in the South of Scotland shows a continued upward trend in both Dumfries & Galloway and Scottish Borders (Table 18). This is in line with the UK trend which has identified distribution expansions at an increasing rate since the 1960s for many moth species that reach a northern limit to their range within Britain.

Table 18. Species of macro moth recorded in the South of Scotland

	2003-2007	2008-2012	2013-2017	2018-2022
Dumfries & Galloway	427	452	458	472
Scottish Borders	399	415	420	431
South of Scotland	508	520	511	528

It is important to note that data relating to overall abundance is not available at a South of Scotland level for almost all invertebrate groups and increasing diversity and/or distribution does not mean increasing abundance.

3.6.3 Drivers of Change

The South of Scotland has seen more new Scottish macro-moths than any other part of Scotland, mostly arriving after a steady advance through northern England (Leverson & Cubitt 2024). This gives confidence to the theory that the increasing diversity of species is a result of climate change.

Substantial effects of climate change on moths have been reported at a national scale (Fox et. al., 2021) with moths expanding northwards at an increasing rate since the 1960s. However, the extent to which climate change allows moths to spread is limited by habitat availability, so it is therefore common and widespread species with broad habitat requirements that benefit most, rather than the less common habitat specialists.

3.6.4 Data Sources

Data Quality: Very High

All records for the South of Scotland in the last 25 years have come from the National Moth Recording Scheme (NMRS), largely collected by volunteer moth recorders and made available through the two local environmental records centres. Information on species diversity is considered to be very close to 100% accurate.

3.6.5 Potential Indicator

The National Moth Recording Scheme (NMRS) is an ongoing monitoring programme that could be used to update the data at any point in the future.

3.6.6 References

Fox R., Dennis E.B., Harrower CA, Blumgart D., Bell J.R., Cook P., Davis A.M., Evans-Hill L.J., Haynes F., Hill D., Isaac N.J.B., Parsons M.S., Pocock M.J.O., Prescott T., Randle Z., Shortall C.R., Tordoff G.M., Tuson D. & Bourn N.A.D. (2021). *The State of Britain's Larger Moths 2021*. Butterfly Conservation, Rothamsted Research and UK Centre for Ecology & Hydrology, Wareham.

Leverton, R. & Cubitt, M. (2024). *The Larger Moths of Scotland*. Triphosa Publications.



3.7 Changes to Bryophyte Indicator Species 1960-2020

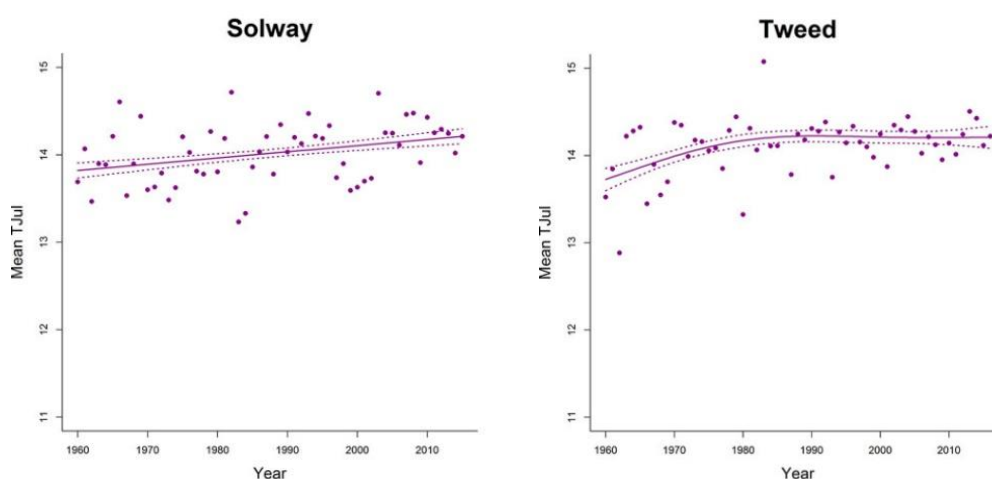
This metric uses records of selected bryophytes (mosses and liverworts) from the South of Scotland as indicators of changing summer temperatures and levels of nitrogen. It forms part of one of Scotland's Ecosystem Health Indicators.

3.7.1 Changes to Bryophyte Indicator Species 1960-2020

The bryophyte summer temperatures indicator provides evidence that bryophytes of warmer climates are becoming more common (Figure 8). This could reflect land use change, as bryophytes of open habitats might be expected to have higher scores, but the changes more likely reflect the increasing summer temperatures observed in Scotland in recent decades.

The trends for the Solway and Tweed River Basin Catchments were similar to those in most of the rest of Scotland, indicating that warming is having an impact on bryophyte communities in the South of Scotland.

Figure 8. Bryophyte Summer Temperature Data for Solway and Tweed River Basin Catchments



Source: Pakeman et al., 2019

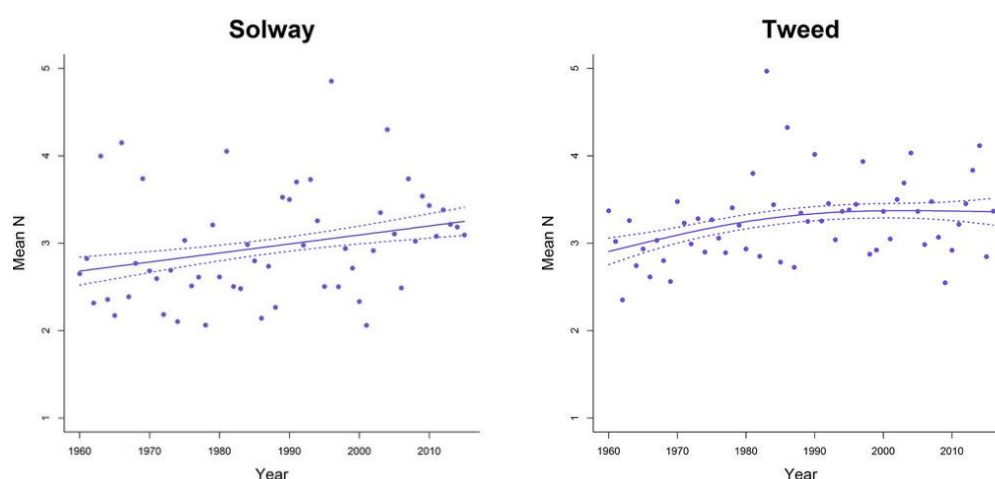
The bryophyte nitrogen indicator provides evidence on whether habitats are becoming more fertile/productive because of increased nitrogen levels (Figure 9). The trend for Scotland suggests that the impacts of nitrogen pollution on habitats has been declining since the late 1990s as the mean indicator value has fallen. This trend is mirrored in the trend for the Tweed River Basin Catchment, but the trend for the Solway River Basin Catchment continues to show an increase in nitrogen pollution.

An increase in bryophytes able to cope with increasing summer temperatures and higher levels of nitrogen pollution is likely to have a negative impact on other species, particularly other bryophytes and lichens, that are found in the affected habitats.

3.7.2 Drivers of Change

Increased nitrogen levels could result from increased fertiliser use, but as most bryophytes are recorded in semi-natural habitats then changes largely reflect changes in atmospheric nitrogen pollution. The causes of increasing summer temperatures in recent decades are numerous and have been widely discussed.

Figure 9. Bryophyte Nitrogen Data for Solway and Tweed River Basin Catchments



Source: Pakeman et al. 2019

3.7.3 Data Sources (Data Quality: High)

These indicators have been prepared by the James Hutton Institute and NatureScot. They use bryophyte records from the National Biodiversity Network (NBN) and links them to information on the habitat preferences of the different species.

The high variability between years reflects the different effort of recorders in different places and in different years. However, the relatively narrow spread of the confidence intervals suggests that the trends shown are robust.

3.7.4 References

Scotland's Environment website <https://www.environment.gov.scot/our-environment/state-of-the-environment-previous-reports/ecosystem-health-indicators/>

Pakeman, R.J., Brooker, R.W., O'Brien, D & Genney, D. (2019). Using species records and ecological attributes of bryophytes to develop an ecosystem health indicator, *Ecological Indicators*, Vol. 104. pp127-136.

Pakeman, R.J., O'Brien, D., Genney, D. & Brooker, R.W. (2022). Identifying drivers of change in bryophyte and lichen species occupancy in Scotland. *Ecological Indicators*, Vol. 139.



3.8 Number of Species Lost from South of Scotland since 2000.

This metric identifies native species recorded in the South of Scotland prior to 2000 but not subsequently. Most of these species will still be present or will have not been recorded for other reasons, but the metric provides a guide to those at risk of local extinction or those that require further work to confirm their continued presence.

3.8.1 Number of Species Lost from South of Scotland since 2000.

The analysis shows a total of 5745 native species have previously been recorded in the South of Scotland but have not been recorded since 2000 (Table 19). Species that have not been recorded since 1900 (potentially long-extinct species – 105 species) were excluded from this analysis. Species not native to the UK have also been excluded.

However, not all these species will have been lost from the South of Scotland. There are many reasons, other than extinction, why a species may not have been recorded since 2000. The main reason is that many species groups are difficult to find or identify, requiring special expertise that is found in only a handful of specialists in the UK and it is often the case that no one with the necessary skills has looked for them recently. Groups with many species that fall into this category include fungi, lichens, algae, many invertebrate groups and most marine groups. Other reasons for a lack of recent records, including from well-recorded species groups, is that the historical records may relate to temporary visitors to the South of Scotland (most birds), or to ‘casual’ species that have temporarily take up residence in the South of Scotland but have never, for a variety of reasons, become permanently established (some plants).

There are several species groups that are sufficiently well monitored to enable identification with a high degree of certainty that formerly established native species have been searched for by recorders with the necessary skills but not found since 2000. These include clubmosses, flowering plants and larger moths (but not micro-moths). However, even in these groups, there is always a possibility that some of these species may be re-found in the future.

3.8.2 Drivers of Change

There are many reasons why new species may have been lost from the South of Scotland. In most cases the reasons are unknown with any certainty. The reason for most species losses is likely to involve land-use change, but other reasons including pollution and climate change may be possible in some cases.

3.8.3 Data Sources

Data Quality: High

Species were identified following analysis of the databases of South West Scotland Environmental Information Centre (SWSEIC) and The Wildlife Information Centre (TWIC). These databases, whilst incomplete, represent the best available data. Data has been collated from a wide range of professional surveys and amateur recorders.

3.8.4 Potential Indicator

It would be possible to repeat the data analysis at any point in the future. However, as noted above, care is required in interpretation of the results.

Table 19. Number of Species in selected groups previously recorded in the South of Scotland but not recorded since 2000.

Species Group	No. of species
bird	9
centipede	4
clubmoss	1
crustacean	134
fern	2
flowering plant	56
fungus	258
harvestman (Opiliones)	1
insect - beetle (Coleoptera)	619
insect - caddis fly (Trichoptera)	18
insect – bee, wasp, ant (Hymenoptera)	123
insect - lacewing (Neuroptera)	12
insect - mayfly (Ephemeroptera)	5
insect – moth (Lepidoptera)	64
insect – grasshopper, cricket (orthoptera)	1
insect - stonefly (Plecoptera)	2
insect - true bug (Hemiptera)	110
insect - true fly (Diptera)	616
lichen	255
liverwort	25
millipede	10
mollusc	93
moss	47
spider (Araneae)	20
stonewort	3

3.9 Number of Species Gained in the South of Scotland since 2000.

This metric identifies the number of native species recorded for the first time in the South of Scotland since 2000. Not all of them will become permanently established, but the metric provides a guide to the increasing rate of change in species composition in the South of Scotland.

3.9.1 Number of Species Gained in the South of Scotland since 2000.

Table 20 shows the number of native species with each species group that have been recorded for the first time in the South of Scotland since 2000. Species not native to the UK have been excluded.

The analysis shows a total of 2617 new species recorded for the first time in the South of Scotland since 2000 (Table 20).

However, there are various reasons why a species might have been recorded for the first time without it necessarily being a new arrival in the South of Scotland. It may be a previously un-recorded species that has been found for the first time using specialist survey or identification skills (especially marine species, fungi and some invertebrate groups) or identified for the first time because of taxonomic changes. There are also some migratory species that have visited the South of Scotland for the first time but have not become established here (many birds).

There are several species groups that are sufficiently well monitored to enable identification with a high degree of certainty that most of the newly recorded species are genuine new arrivals that have become established, rather than the discovery of previously un-recorded species or temporary visitors. These include butterflies, dragonflies, grasshoppers & crickets and some flowering plants. The same applies to larger moths (see 3.6) but not micro-moths.

3.9.2 Drivers of Change

There are many reasons why new species (excluding those resulting from taxonomic changes) will have arrived in the South of Scotland. In most cases the reasons are unknown with any certainty. Accidental (or deliberate) human transport may be responsible for some cases, but it is likely that the majority will have arrived as a result of climate change. The fact that many of the butterflies, dragonflies and larger moths have arrived following a steady spread through northern England provides evidence that they are responding to a changing climate.

3.9.3 Data Sources

Data Quality: High

Species were identified following analysis of the databases of South West Scotland Environmental Information Centre (SWSEIC) and The Wildlife Information Centre (TWIC). These databases, whilst incomplete, represent the best available data. Data has been collated from a wide range of professional surveys and amateur recorders.

3.9.4 Potential Indicator

It would be possible to repeat the data analysis at any point in the future. However, as noted above, care is required in interpretation of the results.

Table 20. Number of Species in selected groups recorded for the first time in the South of Scotland since 2000.

Species Group	No. of species
bird	55
centipede	2
crustacean	40
flowering plant	91
fungus	730
harvestman (Opiliones)	6
horsetail	1
insect - beetle (Coleoptera)	182
insect - booklouse (Psocoptera)	25
insect – butterfly (Lepidoptera)	7
insect - caddis fly (Trichoptera)	7
insect - dragonfly (Odonata)	10
insect - earwig (Dermaptera)	1
insect - flea (Siphonaptera)	4
insect –bee, wasp, ant (Hymenoptera)	170
insect - lacewing (Neuroptera)	4
insect - mayfly (Ephemeroptera)	6
insect – moth (Lepidoptera)	301
insect – grasshopper, cricket (Orthoptera)	2
insect - silverfish (Thysanura)	1
insect - stonefly (Plecoptera)	2
insect - true bug (Hemiptera)	120
insect - true fly (Diptera)	244
lichen	89
liverwort	18
millipede	2
mollusc	58
moss	42
slime mould	10
spider (Araneae)	83

3.10 Number of Records of Invasive Non-native Species (INNS) 2000-2024

This metric assesses changes to the number of non-native species recorded in the South of Scotland between 2000 and 2024 that are considered to be (or could potentially be) invasive. The list of invasive non-native species used was prepared by the Joint Nature Conservation Committee for use as a UK Biodiversity Indicator (2024).

3.10.1 Historical Trends before 2000

Non-native species have been introduced to Britain by people for thousands of years and have arrived through many different pathways, sometimes deliberate, sometimes accidental. Only a small proportion of them have been considered to become invasive due to their impact on the environment or the economy. From the 1960s, the rate of arrival of INNS has been increasing marine, freshwater and terrestrial ecosystems (The Great Britain Invasive Non-Native Species Strategy, 2023).

3.10.2 Changes to the diversity and abundance of INNS in the South of Scotland 2000-2024

Data presented in Table 21 and Table 22 relating to invasive non-native species in the South of Scotland is considered accurate but not comprehensive. Caution is therefore required in interpreting the data, but several trends appear to be evident.

The overall trend since 2000 is for increasing numbers of invasive non-native species (INNS) to be recorded in the South of Scotland. This is in line with national trends.

Table 21. Number of INNS taxa recorded in the South of Scotland by Species Group

Species Group	Number of Records					
	pre-2000	2000-2004	2005-2009	2010-2014	2015-2019	2020-2024
Alga	3	2	2	1	1	1
Bird	5	6	8	8	5	5
Chromist	0	1	1	1	1	1
Crustacean	3	2	2	3	3	3
Flatworm	1	1	2	1	2	2
Flowering Plant	53	40	42	44	54	59
Beetle	0	0	0	1	3	3
True Bug	0	0	0	0	0	1
Mollusc	1	1	1	2	2	3
Moss	1	1	1	1	1	1
Reptile	1	1	1	0	0	0
Terrestrial Mammal	10	11	10	10	11	9
Totals	78	66	70	72	83	88

Source: SWSEIC & TWIC Datasets (February 2026).

Note: Fish data is not considered complete and has been excluded. Conifers have also been excluded due to widespread planting.

Table 22. Selected invasive non-native species in South of Scotland by number of records

Scientific Name	Common Name	Number of Records					
		pre-2000	2000-2004	2005-2009	2010-2014	2015-2019	2020-2024
<i>Branta canadensis</i>	Canada Goose	200	265	729	2547	2637	539
<i>Oxyura jamaicensis</i>	Ruddy Duck	11	831	61	1	0	0
<i>Psittacula krameri</i>	Ring-necked Parakeet	0	0	1	2	17	1
<i>Arthurdendylus triangulatus</i>	New Zealand Flatworm	38	12	14	23	3	14
<i>Australoplana sanguinea</i>	Australian flatworm	0	0	1	0	1	7
<i>Allium paradoxum</i>	Few-flowered Garlic	240	15	42	190	122	163
<i>Crassula helmsii</i>	New Zealand Pigmyweed	6	2	4	1	3	12
<i>Crocasmia aurea x pottsii</i> = <i>C. x crocosmiiflora</i>	Montbretia	22	9	9	25	26	31
<i>Gunnera tinctoria</i>	Giant-rhubarb	1	0	0	2	3	5
<i>Heracleum mantegazzianum</i>	Giant Hogweed	1334	33	276	122	39	1100 3
<i>Hyacinthoides non-scripta x hispanica</i> = <i>H. x massartiana</i>	Hybrid Bluebell	26	4	30	98	69	68
<i>Impatiens glandulifera</i>	Himalayan Balsam	487	48	526	174	642	152
<i>Lamium galeobdolon subsp. argentatum</i>	Variegated Yellow Archangel	17	4	11	32	46	112
<i>Lysichiton americanus</i>	American Skunk-cabbage	5	5	9	16	61	126
<i>Reynoutria japonica</i>	Japanese Knotweed	357	28	230	541	275	607
<i>Harmonia axyridis</i>	Harlequin Ladybird	0	0	0	3	15	29
<i>Macrosiphum euphorbiae</i>	Potato Aphid	0	0	0	0	0	12
<i>Ensis leei</i>	American Jack Knife Clam	0	0	0	0	0	2
<i>Magallana gigas</i>	Pacific Oyster	0	0	0	13	9	2
<i>Potamopyrgus antipodarum</i>	Jenkins' Spire Snail	279	32	80	23	203	125
<i>Campylopus introflexus</i>	Heath Star Moss	104	26	51	115	76	20
<i>Trachemys scripta subsp. elegans</i>	Red-eared Terrapin	2	2	0	0	0	0
<i>Muntiacus reevesi</i>	Muntjac	0	2	0	1	1	0
<i>Neovison vison</i>	American Mink	158	42	34	37	24	43
<i>Sciurus carolinensis</i>	Grey Squirrel	1099	620	2543	4438	9360	1196 5
<i>Corella eumyota</i>	Orange-tipped Sea Squirt	0	0	0	1	16	8
<i>Styela clava</i>	Leathery Sea Squirt	5	4	0	2	1	1

Source: SWSEIC & TWIC Datasets (February 2026).

The most accurate INNS data relating to individual number of records is likely to concern prominent easy-to-identify species. An extreme example is a single Red-eared Terrapin, almost certainly released from captivity, which was observed for several years on a Galloway loch in the early 2000s to such an extent that it was given a local name. It has subsequently died out.



Japanese Knotweed ©GBNNS

The data identifies several species where the increasing number of records may indicate a genuine increasing trend, such as Canada Goose and American Skunk-cabbage. Other INNS, such as Ring-necked Parakeet and Harlequin Ladybird appear to have become recently established in the South of Scotland. Their impact on the environment or economy is currently unknown, but their spread should be monitored.

A relatively small number of INNS have been subject to control or eradication programmes. The data suggests that these have had varying levels of success. Ruddy Duck has never been common in the South of Scotland, and the UK eradication programme was centred elsewhere, but it appears that the programme has successfully prevented the expansion of this species into the South of Scotland (and elsewhere) just as it was beginning. There are no recent records.

Control programmes for riparian plants such as Japanese Knotweed and Himalayan Balsam also appear to have had some success, although it is possible that the media associated with the programmes may have increased recorder effort, resulting in a spike of records that has subsequently declined. The continued increase in records of Grey Squirrel suggests control measures have not succeeded in preventing a population increase of this species but may have slowed the spread.

Data relating to species that require specialist identification skills, specific survey techniques or are confined to habitats that are not easy to access, such as marine or aquatic environments, are likely to be far from comprehensive. For example, targeted research on Signal Crayfish has identified far greater abundance than the data from the local environmental records centres shows. In such cases, the number of records cannot be used as a measure of abundance, merely an indicator of the presence of those species.

3.10.3 Drivers of Change

There are numerous pathways by which new invasive non-native species can arrive and spread in the UK. Those currently prioritised by the GB Non-native Species Secretariat are hull fouling, horticulture escapes, contaminants of ornamental plants, ballast water, stowaways on fishing equipment and zoo or botanic garden escapes.

3.10.4 Data Sources

Data Quality: High

The list of invasive non-native species used for this assessment was prepared by the Joint Nature Conservation Committee for use as a UK Biodiversity Indicator (2024). The metric does not include species that may be native to the UK but non-native to the South of Scotland.

The records are from the databases of South West Scotland Environmental Information Centre (SWSEIC) for Dumfries & Galloway and The Wildlife Information Centre (TWIC) for Scottish Borders. It includes a mix of records from specific surveys and casual observations from both professional and amateur recorders. As such, recording effort has not been consistent either between species or over time. There is also a time lag for some recent records being added to the database, so these may not be fully up to date (particularly notable for birds). Where inconsistencies are considered to significantly affect the results, total number of records has not been used in the analysis and trends over time are not available.

3.10.5 References

DEFRA, Welsh Government & The Scottish Government (2023). *The Great Britain Invasive Non-Native Species Strategy 2023 to 2030*.

GB Non-native Species Secretariat website – <https://www.nonnativespecies.org/>

JNCC website – <https://jncc.gov.uk/our-work/uk-biodiversity-indicators/>

3.11 Forest and Woodland Expansion 2016-2025

This metric assesses the rate of forest and woodland creation in the South of Scotland between 2016 and 2025 using the number of approvals under the Forest Grant Scheme Woodland Creation option. It also assesses the type of forest and woodland expansion.

3.11.1 Historic trends prior to 2016

In line with most of the UK, the native woodland of the South of Scotland was largely cleared in prehistoric times. By the time of General Roy's maps of c.1755, very little woodland remained in the South of Scotland. Planting of forest and woodland began in the late 18th and 19th centuries, and especially after the formation of the Forestry Commission in 1919. In the South of Scotland, there was a rapid expansion of afforestation, particularly from the late 1940s up to the mid-1980s. This primarily consisted of non-native conifers. Its impact on native species and habitats has been documented (Ratcliffe, 2007).

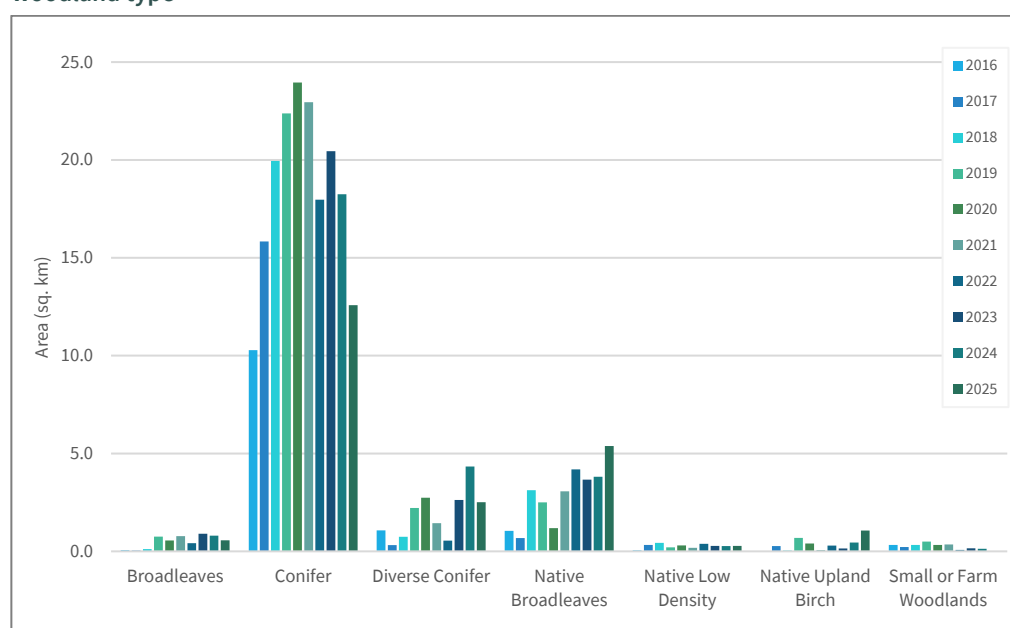
3.11.2 Forest and Woodland Expansion 2016-2025

Forest and woodland creation can have both positive and negative impacts on biodiversity. Much depends on the habitats and species replaced by the forest and woodland, and the type of forest and woodland created. Data on the former is not available. Both conifers and broadleaves can support important biodiversity, but much depends on tree species diversity and structural complexity (2025) which both tend to be greatest in native broadleaves. However, these consisted of only around 15% of all woodland types created in the South of Scotland 2016-2025 (Table 23, Figure 10). Conifers consisted of more than 80% of all woodland types.

Table 23. Forest Grant Scheme Woodland Creation Approvals 2016-2025

	Dumfries & Galloway		Scottish Borders		Total	
	Area (sq. km)	%	Area (sq. km)	%	Area (sq. km)	%
Broadleaves	2.7	2.00%	2.4	2.14%	5.1	2.07%
Conifer	104.5	78.93%	81.2	71.17%	185.7	75.34%
Diverse Conifer	8.2	6.21%	10.3	9.04%	18.5	7.52%
Native Broadleaves	13.6	10.25%	15.0	13.18%	28.6	11.60%
Native Low Density	0.5	0.41%	2.2	1.90%	2.7	1.10%
Native Upland Birch	2.0	1.55%	1.4	1.19%	3.4	1.38%
Small or Farm Woodlands	0.9	0.65%	1.6	1.38%	2.4	0.99%
Grand Total	132.4		114.1		246.4	

Figure 10. Forest Grant Scheme Woodland Creation Approvals 2016-2025 by area (sq. km), year and woodland type



3.11.3 Drivers of Change

Forest and woodland expansion is almost entirely driven by national policy and financial incentives. Forest and woodland creation not supported by the Forest Grant Scheme is likely to be insignificant. Natural woodland expansion through regeneration is difficult to measure but is not likely to be significant.

3.11.4 Data Sources

Data Quality: Very High

The Data is based on approvals made by Scottish Forestry to applications submitted to the Woodland Creation option of the Forest Grant Scheme. Approvals will have been followed by implementation in the following years.

3.11.5 Potential Indicator

This metric could be updated on a regular basis for as long as the Forest Grant Scheme Woodland Creation option is operational.

An additional metric could use data on the area of plantations on ancient woodland sites undergoing restoration.

3.11.6 References

Beesley, J., Slater, H., Barsoum, N., Broome, A. & Watts, K. (2025). *The management and creation of woodland for biodiversity and wider environmental benefits*. Forest Research, Research Note 046.

Ratcliffe, D. (2007). *Galloway and the Borders*. Collins.

Scottish Forestry website FGS statistics - June 2025 | Scottish Forestry - <https://www.forestry.gov.scot/publications/forestry-grant-scheme-statistics-june-2025>

3.12 Changes in the Extent of Seagrass Beds 1993-2023

This metric assesses changes to the extent of seagrass beds in the Solway Firth and Loch Ryan, the only sites where they occur in the South of Scotland. Historic survey dates vary according to location, the oldest being 1993/94. Results have been compared with surveys carried out in 2022/23.

3.12.1 National and International Importance

Seagrass beds are of national and international importance, protected as a Priority Marine Feature through Scotland's National Marine Plan and as an OSPAR Threatened and Declining Habitat.

Seagrass beds are important habitats, providing shelter for a variety of marine life as well as having a role in carbon storage and coastal protection.

3.12.2 Historical Trends before 1993

Seagrass beds naturally go through periods of growth and retraction but significant declines in the extent of Scotland's seagrass beds were noted during the 20th century, which were attributed to poor water quality, the seagrass wasting disease caused by the protist *Labyrinthula zosterae*, and coastal development, such as the construction of causeways. It appears that seagrass beds in the Solway Firth were unaffected by the wasting disease epidemic of the 1930s, but during the late 1980s, concern was expressed of the impact of unregulated mechanical cockle harvesting, with reports that intertidal *Z. marina* had been virtually eliminated from areas where dredging had occurred.

3.12.3 Changes in the extent of Seagrass Beds

A study by Carstairs & Carstairs (2026) examined the status of seagrass populations in Scottish waters, with a particular focus on reviewing evidence of seagrass declines, recoveries, and their potential causes (Table 24).

The term seagrass generally refers to members of the genus *Zostera*, the only genus of marine flowering plants in the UK. Seagrass is also known by the common names of eelgrass or grass-wrack, though seagrass beds can sometimes also include tasselweeds *Ruppia*. Two species of seagrass, *Z. marina* and *Zostera noltii*, occur in Scottish coastal waters, though three species were recognised until a recent taxonomic revision. Both species are found in the South of Scotland but are restricted to the Solway Firth and Loch Ryan.

The study identified substantial declines in the extent seagrass beds in most parts of Scotland. However, significant recoveries of intertidal seagrass populations were recorded in the Solway Firth (increased by 68% in area), and in Loch Ryan (increased by 656% in area).

Table 24. Changes in the extent of seagrass beds in Dumfries & Galloway

Site	1993/94 seagrass bed area (ha)	2022/23 seagrass bed area(ha)	Change (ha)	Change %
Kirkbride Bank	-	6.44		
Baldoon Sands	325.24	535.93	+210.69	+65%
Skyreburn (East)	9.97	17.66	+7.69	+77%
Skyreburn (West)	-	11.34		
Airds Bay	-	2.73		
The Dhoon	-	1.85		
Manxman's Lake	27.24	57.26	+30.02	+110%
Auchencairn Bay	122.07	196.51	+74.44	+61%
Orchardton Bay	-	43.34		
Rough Firth	29.71	57.99	+28.28	+95%
Carse Sands	-	0.004		
Solway Firth total	514.22	931.05	+351.12	+68%

Site	2013 seagrass bed area (ha)	2022-23 seagrass bed area(ha)	Change (ha)	Change %
Wig Bay	2.11	9.46	+7.35	+349%
Stranraer	8.37	69.74	+61.37	+733%
Loch Ryan total	10.48	79.21	+68.73	+656%

Source: Carstairs & Carstairs (2026)

Note: Includes area of all species of *Zostera*

3.12.4 Drivers of Change

The study identified a wasting disease caused by the protist *Labyrinthula zosterae* that had severely affected seagrass beds in other parts of Scotland in the 1930s but found no evidence of this in the Solway or Loch Ryan. Unregulated cockle harvesting is thought to have had a negative impact in the late 20th century, but seagrass beds in the Solway Firth have increased in size following cessation of mechanical cockle harvesting in the early 1990s. Seagrass populations may also have increased in relation to water quality improvements.

Seagrass beds in Loch Ryan have substantially increased in size following relocation of waste water discharges out of the loch and relocation of the ferry terminal away from the head of the loch between 2011 and 2013.

3.12.5 Data Sources

Data Quality: Very High

The extent of seagrass beds at specific locations in the Solway Firth was identified from a survey carried out by Hawker in 1993-94. Maps of individual beds produced for this survey are considered to be of high quality but were located using transect routes across estuaries and therefore some beds potentially could have been missed. In 2024, Carstairs and Carstairs repeated the survey.

Loch Ryan was surveyed in 1988 by Howson. A further survey was conducted in 2013 by Foster and Davidson and compared with a survey by Carstairs in 2022-23.

Caution has been applied when comparing results from the studies as a result of slightly different methodology and interpretation, but overall, the data is considered to be of very high quality. Only a small proportion of the bed increase has been attributed to greater coverage of recent surveys.

3.12.6 Potential Indicator

It would be possible to repeat the surveys of seagrass beds at any point in the future.

3.12.7 References

Carstairs, M. & Carstairs, S. (2026). *Review of Scottish Seagrass Declines*. NatureScot Research Report 1388.



3.13 Condition of Natural Features on Designated Sites

This metric assesses changes to the condition of sites designated under statutory legislation for their biodiversity or geodiversity interest in the South of Scotland.

3.13.1 National and International Importance

Sites of Special Scientific Interest (SSSIs) are areas of land and water considered to best represent natural heritage, flora, fauna, geology, geomorphology or a mix of these features. They are designated under the Nature Conservation (Scotland) Act 2004.

Prior to the UK's departure from the EU, Special Areas of Conservation (SACs) were selected for particular habitats and species listed in Annexes of the Habitats Directive, and Special Protection Areas (SPAs) were selected to protect one or more rare, threatened or vulnerable bird species listed in Annex I of the Birds Directive, or certain regularly occurring migratory species. EU Exit does not alter the standard of protection for these sites.

Ramsar sites are classified under the Convention on Wetlands of International Importance.

3.13.2 Condition of Natural Features on Designated Sites

The condition of designated features on has been assessed (Table 25). It can be assumed that all features were in favourable condition on the date when the sites were designated but no data is available.

The proportion of features in favourable condition in the South of Scotland was assessed at 70% in 2025 with features in the Scottish Borders in slightly better condition (72%) than those in Dumfries & Galloway (68%).

In Scotland the proportion of features in favourable condition was 75.2% in 2025.

Table 25. Condition of Natural Features on Designated Sites

	Dumfries & Galloway		Scottish Borders		South of Scotland	
Features	No. of features	No. (%) in favourable condition	No. of features	No. (%) in favourable condition	No. of features	No. (%) in favourable condition
Earth Heritage	41	40 (98%)	27	27 (100%)	68	67 (99%)
Habitats	134	91 (68%)	111	74 (67%)	245	165 (67%)
Species	131	76 (58%)	78	55 (71%)	209	131 (63%)
All features	306	207 (68%)	216	156 (72%)	522	363 (70%)

Source: NatureScot Dataset (December 2025)

Notes: There is a total of 522 features on designated sites in the South of Scotland. Many sites include multiple features. A small number of sites have not been assessed. Sites which straddle local authority borders are included in the figures for both areas. Figures may not add up due to rounding.

3.13.3 Drivers of Change

There are many drivers affecting the condition of designated sites, both natural and man-made, but these have not been quantified at South of Scotland level. At a national level invasive species is the most frequent pressure (21.3% of all pressures identified), followed by over-grazing (17.8%), water management (8.5%), recreation/disturbance (8.1%), under-grazing (5.9%), agricultural operations (4.0%), natural event (3.7%),

trampling (3.5%), burning (3.3%), forestry operations (2.9%), game / fisheries management (2.7%), no protective management (2.3%), water quality (2.2%), dumping/storing of materials (1.8%) and climate change (1.6%).

3.13.4 Data Sources

Data Quality: High

Each designated site is monitored on a rolling basis through a NatureScot programme called Site Condition Monitoring, which assess the condition of each natural feature of a designated site. Natural features of special interest may be habitats, such as woodlands and freshwater wetlands, species populations, such as Otters and Natterjack Toads, or geological formations, such as caves and fossil beds. The purpose of Site Condition Monitoring is to determine the condition of the natural features within each site to assess whether they are likely to maintain itself in the medium to longer term under the current conditions. Each individual feature's condition is then assigned to one of eight condition categories. Monitoring guidance produced by the Joint Nature Conservation Committee helps to ensure consistency in how features are assessed across the UK.

3.13.5 Potential Indicator

The methodology for Site Condition Monitoring is changing. A directly comparable indicator may not therefore be available in the future.

3.13.6 References

NatureScot website – www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/site-condition-monitoring

Appendix 1 – LERC Data Sources

South West Scotland Environment Information Centre

Beefly records (JK)	Biological Records Centre - BLS Lichen Database: Scotland 1700-2016	Biological Records Centre - Lacewings and allied insects records from Britain and Ireland to 1999
Curculioidea records from national recording scheme (AK)	Biological Records Centre - Brachycera (Diptera) OLD records from Britain and Ireland to 1990	Biological Records Centre - Ladybird Survey of the UK
Wildlife Survey Reports (GS)	Biological Records Centre - Brachycera (Diptera) records from Britain and Ireland to 1990	Biological Records Centre - Mammal records from Britain from the Atlas of Mammals (1993), with some later records
1978 Lochar, Nith, Cluden and Cairn survey plant records	Biological Records Centre - Caddisfly (Trichoptera) records from Britain (excluding Northern Ireland and Channel Islands)	Biological Records Centre - Mammal records from Britain from the Atlas of Mammals (1993), with some subsequent records
Aculeate Records (Neil Robinson)	Biological Records Centre - Cerambycidae Dataset - Biological records centre	Biological Records Centre - Millipede (Diplopoda) records for Britain and Ireland to 2005
Amphibian and Reptile Conservation - Add an Adder Survey	Biological Records Centre - Cerambycidae Dataset [old]	Biological Records Centre - Mosquito Recording Scheme
Amphibian and Reptile Conservation - ARC Species Database	Biological Records Centre - Coccinellidae Data	Biological Records Centre - Muscidae (Diptera) records from Britain and Ireland to 1985
Amphibian and Reptile Conservation - ARC/ARG record pool data	Biological Records Centre - Collembola Recording Scheme	Biological Records Centre - Opiliones (Harvestman) Dataset
Amphibian and Reptile Conservation - The ARC NARRS Data 2007 - 2013	Biological Records Centre - Crane fly (Diptera; Tipuloidea) records for Britain to 2007 updated	Biological Records Centre - Pseudoscorpion Recording Scheme of the UK
Amphibian and Reptile Conservation - The ARC Rare Species Database	Biological Records Centre - Crane fly (Diptera; Tipuloidea) records for Britain to 2016	Biological Records Centre - Reptile and Amphibians Dataset
Annan District Salmon Fishery Board - INNS data from ADSFB	Biological Records Centre - Crayfish (Crustacea; Astacura) data for Britain and Ireland to 2003	Biological Records Centre - Reptiles and Amphibians Dataset
Aquatic Coleoptera Conservation Trust - SNH site condition monitoring of SSSIs for water beetles 2010	Biological Records Centre - Database for the Atlas of Fresh Water Fishes	Biological Records Centre - RISC Botanical Non-Native Species Records
Aquatic Heteroptera Recording Scheme - Aquatic Heteroptera Dataset	Biological Records Centre - Derek Lott Coleoptera Dataset	Biological Records Centre - RISC Heteroptera Non-Native Species Records
Balfour-Browne Club - Water Beetle Surveys from Britain and Ireland	Biological Records Centre - Dixidae (Diptera) records from Britain and Ireland to 1988	Biological Records Centre - Sepsidae (Diptera) records from Britain and Ireland to 1985
Barn Owl ringing records (DI)	Biological Records Centre - Dragonfly and Damselfly (Odonata) records for Britain to 1992, from the former Dragonfly Recording S	Biological Records Centre - Soldier Beetle & Jewel Beetle (Coleoptera; Cantharoidea & Buprestoidea) records Britain & Ire -2000
Bat Conservation Trust - Colony Count Survey	Biological Records Centre - Grasshopper and Cricket (Orthoptera) and related species records from Britain and Ireland to 2007	Biological Records Centre - Temp record June 9th Records
Bat Conservation Trust - Daubenton's Bat Waterway Survey	Biological Records Centre - Grasshopper and Cricket (Orthoptera) and related species records from Britain and Ireland to 2007	Biological Records Centre - Ticks distribution for the British Isles
Bat Conservation Trust - Field Survey	Biological Records Centre - iRecord download (CC 0)	Biological Records Centre - Water Bug (aquatic Heteroptera) data for Britain
Bat Conservation Trust - NBMP Sunset-Sunrise Survey	Biological Records Centre - iRecord download (CC BY)	Birda - Birda - Global Observation Dataset (UK records)
Bat Conservation Trust - Noctule, Serotine and Pipistrelle Field Survey	Biological Records Centre - iRecord download (CC BY-NC)	RM Records VC72-75
Bat Conservation Trust - Roost Count	Biological Records Centre - iRecord download (CC BY-NC-SA)	Botanical Society of the British Isles - BSBI records for Kirkcudbrightshire
Bat Conservation Trust - The BCT/MTUK Bats & Roadside Mammals Survey	Biological Records Centre - iRecord download (CC BY-SA)	Botanical Society of the British Isles - BSBI Records from Wigtownshire
Bat Conservation Trust - The BCT/MTUK old Bats & Roadside Mammals Survey	Biological Records Centre - iRecord records (2024)	Botanical Society of the British Isles - Demonstration set of data downloaded from the BSBI threatened plant database
Bat Conservation Trust - Waterway Survey	Biological Records Centre - Isopoda (Interim dataset)	Botanical Society of the British Isles - Dumfriesshire Rare Plant Register records
Bat Records for Dumfries and Galloway (FS)		
Bat records from R.E. Stebbings correspondence		
Bees, Wasps and Ants Recording Society - Bees, Wasps and Ants Recording Society		
BioBlitz 2009		
BioBlitz events 2013		
BioBlitz events 2014		
BioBlitz events 2015		
Biological Records Centre - Aquatic Heteroptera Recording Scheme		
Biological Records Centre - Atomariine Beetle (Coleoptera) records for Britain and Ireland to 1992		

Botanical Society of the British Isles - Non-plant records from BSBI VC72 index cards

Botanical Society of the British Isles - Wigtownshire BSBI Plant Records

British Bryological Society - Bryophyte data for Great Britain and Ireland from the British Bryological Society held by BRC

British Bryological Society - Field Meetings of the British Bryological Society

British Dragonfly Society - Dragonfly records from the BDS's Dragonfly Recording Network for the period up to 2014

British Dragonfly Society Recording Scheme - Dragonfly records from the British Dragonfly Society Recording Scheme

British Lichen Society - BLS Lichen Database: England 1650-2016

British Lichen Society - BLS Rare and Threatened Lichen Records: England

British Plant Gall Society - British Plant Gall Society field trip 2014

British Trust for Ornithology - Birds (BTO/JNCC/RSPB partnership)

British Trust for Ornithology - Non-avian taxa (BTO+partners)

British Trust for Ornithology - Non-avian taxa (BTO+partners) (2023)

British Trust for Ornithology - Southern Scotland Bat Survey

Buglife - Buglife wildlife records

Buglife - Invertebrate survey of coastal vegetated shingle sites in Dumfries and Galloway

Bugs in Gardens records

Bugs in the Bog surveys

Bumblebee Conservation Trust - BeeWalk bumblebee distributions for Great Britain 2008-2022

Butterfly Conservation - Butterfly Conservation Records

Butterfly Conservation - Butterfly Records for SW Scotland 2018

Caledonian Conservation Ltd - Caledonian Conservation Ltd Incidental Records 2014 onwards

Caledonian Conservation Ltd - Incidental herptile records 2005-16

Caledonian Conservation Ltd - Incidental herptile records 2005-16

Caledonian Conservation Ltd - SNH Invertebrate Site Condition Monitoring 2015: Blind Moss SSSI

Caledonian Conservation Ltd - SNH Invertebrate Site Condition Monitoring 2015: Carrick Ponds SSSI

Caledonian Conservation Ltd - SNH Invertebrate Site Condition Monitoring 2015: Maidens to Doonfoot SSSI

Caledonian Conservation Ltd - SNH Invertebrate Site Condition Monitoring 2015: Perchhall Loch SSSI

Caledonian Conservation Ltd - SNH Invertebrate Site Condition Monitoring of Beetle Assemblage Features 2015: Merrick Kells SSSI

Carscreugh Fell survey (RW)

Castle Loch bryophyte survey

Castle Loch LNR records (DF)

Castle Loch records (AR)

Casual Records

Casual records harvested from Facebook group

Casual records up to 2010

Central Scotland Green Network Trust - Invasive Non-native species data in the Clyde catchment, collated by Central Scotland Forest Trust

Centre for Environmental Data and Recording - Agri-Food and Biosciences Institute Marine Surveys

Centre for Environmental Data and Recording - CEDaR Online Recording

Centre for Environmental Data and Recording - Sea Deep Tagging Data

Cetacean records from RSPB Mull of Galloway

CGO Ecology survey records

Collated public records from various literature sources

Conchological Society of Great Britain & Ireland - Conchological Society of Great Britain & Ireland marine mollusc record

Conchological Society of Great Britain & Ireland - Conchological Society of Great Britain & Ireland non-marine molluscs (1999 Atlas dataset)

Conchological Society of Great Britain & Ireland - Conchological Society of Great Britain & Ireland: non-marine mollusc records

Conchological Society of Great Britain & Ireland - Conchological Society of Great Britain & Ireland: non-marine molluscs (fossil & subfossil records)

Conchological Society of Great Britain & Ireland - Conchological Society of Great Britain & Ireland: rare and scarce species

Cornell Lab of Ornithology - eBird records for SW Scotland (-2014)

Cornell Lab of Ornithology - eBird records for SW Scotland (2015-16)

Cornell Lab of Ornithology - eBird records for SW Scotland (2017)

Cornell Lab of Ornithology - eBird records for SW Scotland (2018)

Cornell Lab of Ornithology - eBird records for SW Scotland (2019)

Cornell Lab of Ornithology - eBird records for SW Scotland (2020-21)

Cornell Lab of Ornithology - eBird records for SW Scotland (2022-23)

County Bird Recorder - County bird records (Dumfries and Galloway) 2000-2005 (incomplete)

County Bird Recorder - County bird records (Dumfries and Galloway) 2007

County Bird Recorder - County bird records (Dumfries and Galloway) 2008

County Bird Recorder - County bird records (Dumfries and Galloway) 2009

County Bird Recorder - County bird records (Dumfries and Galloway) 2010

County Bird Recorder - County bird records (Dumfries and Galloway) 2011

County Bird Recorder - County bird records (Dumfries and Galloway) 2012

County Bird Recorder - County bird records (Dumfries and Galloway) 2013

County Bird Recorder - County bird records (Dumfries and Galloway) 2014

County Bird Recorder - County bird records (Dumfries and Galloway) 2015

County Bird Recorder - County bird records (Dumfries and Galloway) 2016

County Bird Recorder - County bird records (Dumfries and Galloway) 2017

County Bird Recorder - County bird records (Dumfries and Galloway) 2018

County Bird Recorder - WeBS data via county bird recorder

County Moth Recorder - County Moth records for D&G (2018 onwards)

County Moth Recorder - County Moth Records for Dumfries & Galloway

Cumbria Biodiversity Data Centre - CBD records exchange

D&G Local Wildlife Sites

D&G Swift Network Records

David Hawker Ecological Consultancy - Windy Standard invertebrate survey 1997

Dragonfly Recording Network - Dragonfly records from the British Dragonfly Society's Dragonfly Recording Network up to 2014

Dumfries and Galloway Amphibian and Reptile Group - Herpetological records

Dumfries and Galloway Council - 1998 LBAP priority species maps

Dumfries and Galloway Council - INNS records for Dumfries and Galloway recorded by DGC

Dumfries and Galloway Council - Wildlife survey of River Nith, Dumfries

E3 Ecology ecological survey records

Eadha wildlife records

Earthworm Society of Britain - Earthworm Research Records (UK)

Earthworm Society of Britain - National Earthworm Recording Scheme Records (UK)

Earthworm Society of Britain - Soil Biodiversity Group (NHM) Earthworm Records (Great Britain)

East Stewartry NSA Invasive Plants Survey

Environment Agency - England Non Native Species records 1965 to 2017

Environment Agency - Environment Agency England and Wales (2007) freshwater invertebrate species (single species families)

Environment Agency - Environment Agency Rare and Protected Species Records

Environment Agency - Protected and Invasive Species Records Collected Through Environment Agency Survey 1995 - 2021

Forestry Commission (Galloway District) - FCS Galloway District records

Friends of the Earth - Great British Bee Count 2015 - Stage 2 (records verified from photo)	Joint Nature Conservation Committee - Vegetation surveys of coastal shingle in Great Britain	Natural England - Invertebrate Site Register - England (1738-2005).
Fungi Records (RS)	Juniper Survey	Natural England - Marine Nature Conservation Review (MNCR) and associated benthic marine data held and managed by Engl
Galloway Fisheries Trust - Japanese Knotweed spraying for DGC 2015	Keith Alexander - Glow Worms in South Scotland - National Database	Natural England - Natural England Marine Monitoring surveys
Galloway Fisheries Trust - Japanese Knotweed survey of Dee Catchment 2014	Kilsture iNaturalist records (non research grade - CC-0)	Natural England - Riparia - riparian habitat surveys
Galloway Fisheries Trust - RAFTS INNS data for River Esk	Kilsture surveys	Natural Resources Wales - Welsh Invertebrate Database (WID)
Gatehouse Brickworks Pond Plant Survey	Kirkcudbrightshire Botany Group - Kirkcudbrightshire Botanic Surveys	NatureScot - Aculeate Hymenoptera records extracted from Invertebrate Site Register for Scotland
Glasgow Museums - Aculeates Collection	Kob-Web Records (Hoverflies)	NatureScot - ARG-WEB Scottish Adder Survey Records
Glasgow Museums - Crowson & Fergusson records (coleoptera)	Lepidoptera records (Caroline Allen)	NatureScot - Bat Records for Scotland 1970-2007
Glasgow Museums - Crowson records (non-coleoptera)	Lepidoptera records (collated by PN)	NatureScot - Distribution of pine martens in Scotland as determined by field survey
Glasgow Museums - Hosie collection records	Lepidoptera records (Richard/Barbara Mearns)	NatureScot - Expansion zone survey of pine marten (<i>Martes martes</i>) distribution in Scotland, 2012-2013
Glasgow Museums Biological Records Centre - GMBRC records	Lockerbie Wildlife Trust - Eskrigg Wildlife Records	NatureScot - Feral Pigs - Sightings and Cull records - 2014-2015
Glow Worm Records (RS)	Longbridge Muir Recording Project	NatureScot - Feral Pigs - Sightings and Cull records - 2014-21
Hedgehog survey 2016 records	Macrophyte flora survey of Loch Skeen	NatureScot - Feral Pigs - Sightings and Cull records - 2017-2018
Herpetological Records (RM)	MS personal records and images	NatureScot - Feral Pigs - Sightings and Cull records - 2018-2019
Heteroptera and Orthoptera Records (JW)	Mammal Record Sheets	NatureScot - Great Crested Newt Surveys 1995-1996
Highland Biological Recording Group - HBRG Fungus, Lichen & Lower Plants Dataset	Mammal Society - National owl pellet survey	NatureScot - Invertebrate Site Register (limited extract)
Highland Biological Recording Group - HBRG Insects Dataset	Marine Biological Association - 2000-2004 Davis et al. European distribution of <i>Styela clava</i>	NatureScot - Lowland Raised Bog Inventory
Highland Biological Recording Group - HBRG Insects Dataset Vol 1	Marine Biological Association - 2001-2019 The Marine Biological Association of the UK (MBA) Shore Thing Survey	NatureScot - National Lamprey Survey of Scotland (2003-2005)
Highland Biological Recording Group - HBRG Insects Dataset Vol 2	Marine Biological Association - 2008 Graham Saunders Morecombe Bay to Isle of Skye Beach combing, sand sampling, wading, snorkelling	NatureScot - National Water Vole Database & Mapping Project (Scotland data), 2008
Highland Biological Recording Group - HBRG JP Blunt Fungus Dataset	Marine Biological Association - Continuous Plankton Recorder Survey (CPR Survey)	NatureScot - New Zealand Flatworm (<i>Arthurdendyus triangulatus</i>) records for Scotland 2008-2014
Highland Biological Recording Group - HBRG Other Invertebrates Dataset	Marine Biological Association - DASSH Data Archive Centre - Statutory Surveys	NatureScot - Records of otters from Site Condition Monitoring in Scotland 2011-2012
Highland Biological Recording Group - HBRG P.F. Entwistle Insects Dataset	Marine Biological Association - DASSH Data Archive Centre Academic Surveys	NatureScot - Reports of New Zealand Flatworms in Scotland, 1989 - 2005
Highland Biological Recording Group - HBRG Vertebrates (not Badger) Dataset	Marine Biological Association - DASSH Data Archive Centre volunteer sightings records	NatureScot - Scottish Diurnal Lepidoptera Project
International Otter Survival Fund - International Otter Survival Fund (IOSF) records	Marine Biological Association - DASSH Data Archive Centre volunteer survey data	NatureScot - SNH Bat Casework Recording log 2014
Japanese Knotweed survey within Fleet Valley NSA	Marine Environmental Monitoring - Marine Turtles (2023)	NatureScot - SNH Bat Casework Recording log 2015
JDC Ecology - Survey of Aucheninnes Moss	Marine Environmental Monitoring - Marine Turtles (old)	NatureScot - SNH Bat Casework Recording Log 2016
Joint Nature Conservation Committee - England Otter Survey Database	Marine Environmental Monitoring - Marine Turtles NBN (2023)	NatureScot - SNH Bat Casework records 1970-2007
Joint Nature Conservation Committee - Marine Nature Conservation Review (MNCR) and associated benthic marine data held and managed by JNCC	Moffat community Nature Reserve Records (Darren Flint)	NatureScot - SNH Butterfly Records
Joint Nature Conservation Committee - Marine Offshore Seabed Survey data held by JNCC	National Museums Scotland - National Museums Scotland marine strandings Z.2014.21	NatureScot - SNH Galloway Site Files
Joint Nature Conservation Committee - River Macrophytes Database	National Plant Monitoring Scheme - National Plant Monitoring Scheme - England, Scotland, Wales	NatureScot - SNH Great Crested Newt Records
Joint Nature Conservation Committee - Scotland Otter Survey Database	National Trust for Scotland - Grey Mare's Tail Records collated by Dan Watson	NatureScot - SNH Great crested newt records
Joint Nature Conservation Committee - Scotland Otter Survey Database Old	National Trust for Scotland - National Trust for Scotland Species Records	
	National Trust for Scotland - NTS Records Dumfries & Galloway	

NatureScot - SNH records from old site files	(BCTP) in the UK, archived data (2001-2010)	Royal Society for the Protection of Birds (HQ) - Nightjar breeding season surveys in Dumfries and Galloway between 1981 and 2011
NatureScot - SNH Water Vole survey	Royal Society for the Protection of Birds - Corn bunting breeding distribution in Scotland	Royal Society for the Protection of Birds (HQ) - Red-throated diver national surveys in Scotland - raw data
NatureScot - Species data for Scottish waters held and managed by Scottish Natural Heritage.	Royal Society for the Protection of Birds - Corncrake national surveys - raw data	Royal Society for the Protection of Birds (HQ) - Ring ouzel national sample survey in the UK in 1999
NatureScot - Standing Waters Database	Royal Society for the Protection of Birds - Corncrake national surveys - territory centres	Royal Society for the Protection of Birds (HQ) - RSPB Annual Reserve Avian Monitoring
NatureScot - The ecology of <i>Najas flexilis</i> (Slender naiad)	Royal Society for the Protection of Birds - Crossbills, Distribution survey in Great Britain, 1995-2005	Royal Society for the Protection of Birds (HQ) - RSPB Wader Nest Monitoring in Southern Scotland
NatureScot - Vegetation surveys on Peatland Action sites across Scotland in 2014, 2015 and 2021	Royal Society for the Protection of Birds - Farmland bird data collated by RSPB Crossmichael	Royal Society for the Protection of Birds (HQ) - Species on the Edge - 2023 onwards Greenland White-fronted Goose Counts
NatureScot - Wild boar culled on the National Forest Estate Scotland 2015-21	Royal Society for the Protection of Birds - Farmland bird database in Dumfries and Galloway, 1999-2011	Royal Society for the Protection of Birds (HQ) - Spotted crane national survey in the UK in 1999
NatureScot - Wild boar culled on the National Forest Estate Scotland 2018-19	Royal Society for the Protection of Birds - Nightjar monitoring data	Royal Society for the Protection of Birds (HQ) - White-tailed eagle reintroduction in Scotland, 1975 onwards - Sightings data
NatureScot - Wild boar culled on the National Forest Estate Scotland in 2015-16	Royal Society for the Protection of Birds - Odonata records from RSPB Reserves 1970-2009	Scotland TranServ - INNS data from Scotland TranServ
NatureScot - Wild boar SASA sightings record	Royal Society for the Protection of Birds - Redshank nesting on saltmarshes in Britain	Scotland TranServ - Road casualty data from Scotland Transerv
NatureScot - Slender Green Feather Moss (<i>Hamatocaulis vernicosus</i>) Survey in the Moffat Hills SSSI	Royal Society for the Protection of Birds - RSPB Big Garden Birdwatch winter sightings in the UK in 2008	Scotland's Environment Web - Invasive non-native species records from SEWeb
NatureScot - River Cree invertebrate sampling 1986	Royal Society for the Protection of Birds - RSPB Big Garden Birdwatch winter sightings in the UK in 2009	Scottish Borders Biological Records Centre - SBBRC data
NatureSpot - All taxa records for Leicestershire and Rutland	Royal Society for the Protection of Birds - RSPB Reserves breeding bird surveys	Scottish Entomological Gathering records 2014
NatureSpot - All taxa records for Leicestershire and Rutland	Royal Society for the Protection of Birds - RSPB Reserves old breeding bird surveys	Scottish Environment Protection Agency - River macroinvertebrate data for 2005 and 2006
Nith District Salmon Board - Invasive Plant Survey of the Nith Catchment	Royal Society for the Protection of Birds - Swift Mapper Records	Scottish Environment Protection Agency - Scottish river macro-invertebrate records from 2007 collected by SEPA
NNW Adder Survey of Dumfries and Galloway	Royal Society for the Protection of Birds (HQ) - 1921 Onwards, Occupied Swift Nests, UK	Scottish Environment Protection Agency - Selected Scottish freshwater fish records from 2008-2011 (collected by SEPA)
NNW Swallow and House Martin Survey of Dumfries and Galloway	Royal Society for the Protection of Birds (HQ) - 1921 Onwards, Swift Screaming Parties, UK	Scottish Environment Protection Agency - Scottish Ornithologists' Club, The - Clyde Breeding Bird Tetrad Atlas 1985 - 1991 - non-sensitive species
Nocturne Environmental Surveyors Ltd - Bat records from Nocturne Environmental Surveyors Ltd	Royal Society for the Protection of Birds (HQ) - 1921-2014 Swift inventory of nests in the UK	Scottish Ornithologists' Club, The - Clyde Breeding Bird Tetrad Atlas 1985 - 1991 - sensitive species
Otter Survey - Woodside Grange, Gatehouse of Fleet	Royal Society for the Protection of Birds (HQ) - 1921-2014 Swift inventory of screaming parties in the UK	Scottish Ornithologists' Club, The - South East Scotland Tetrad Atlas 1988 - 1994 - sensitive breeding species
Owl Pellets (JS)	Royal Society for the Protection of Birds (HQ) - 1989 Onwards, Previously Occupied Swift Nests, UK	Scottish Ornithologists' Club, The - South East Scotland Tetrad Atlas 2007 - 2013 - non-sensitive winter species
Pauline Swettenham to delete	Royal Society for the Protection of Birds (HQ) - 2012 Onwards Scottish Lowlands and Southern Uplands Black Grouse (excluding Scottish Borders)	Scottish Ornithologists' Club, The - South East Scotland Tetrad Atlas 2008 - 2013 - non-sensitive breeding species
Plant Records for Durisdeer (CA)	Royal Society for the Protection of Birds (HQ) - 2015 Onwards, Swift Nest Boxes, UK	Scottish Ornithologists' Club, The - Swift Records from the D&G County Bird Recorders
Plantlife - Back from the Brink vascular plant species abundance and distribution for Great Britain for the peri	Royal Society for the Protection of Birds (HQ) - 2017 Onwards Muirkirk & North Lowther Uplands SPA species records	Scottish Power - Harestanes Windfarm Environmental Assessment
Plantlife - Plant Invaders Survey	Royal Society for the Protection of Birds (HQ) - Black grouse lek surveys in the Scottish Borders, 2010-201	
Porcupine Marine Natural History Society - Porcupine Marine Natural History Society Dataset	Royal Society for the Protection of Birds (HQ) - Black-throated diver national surveys in Scotland	
Rare bird records for Dumfries and Galloway		
Red Squirrels in South Scotland - Red and Grey Squirrel Records (RSSS/Red Alert)		
Ringling records (DI)		
RC Mersehead Survey		
Royal Society for the Protection of Birds - Bird Conservation Targeting Project (BCTP) in the UK, 2006-2011		
Royal Society for the Protection of Birds - Bird Conservation Targeting Project (BCTP) in the UK, 2006-2011 (sensitive records)		
Royal Society for the Protection of Birds - Bird Conservation Targeting Project		

Scottish Wildlife Trust - Casual records for Scottish Wildlife Trust reserves - Verified data	Solway Firth Partnership - Solway Firth Partnership INNS surveys	Tongland Parish historical records from 1845 statistical accounts
Scottish Wildlife Trust - Commissioned surveys and staff surveys and reports for Scottish Wildlife Trust reserves - Unassessed	Solway Heritage - Ancient Tree Hunt	Total Ecology - Consultancy Wildlife Records
Scottish Wildlife Trust - Commissioned surveys and staff surveys and reports for Scottish Wildlife Trust reserves - Verified	Solway Heritage - Aucheninness tip (former site of) survey	Tyrer Ecological Consultants - Wildlife Records (Tyrer Ecological Consultants)
Scottish Wildlife Trust - Commissioned surveys and staff surveys and reports for SWT reserves	Solway Heritage - Mycological survey of Castle Hill Wood	UK Butterfly Monitoring Scheme - UK Butterfly Monitoring Scheme (UKBMS)
Scottish Wildlife Trust - Survey and monitoring records for Scottish Wildlife Trust reserves from reserve convenors and Trust	Solway Heritage - NVC survey of selected areas of Dumfries and Galloway	UK Butterfly Monitoring Scheme - Wider Countryside Butterfly Scheme (WCBS)
Scottish Wildlife Trust - SWT data exchange	Solway Heritage - Tongland Parish Field Meeting Surveys	Vincent Wildlife Trust - National Polecat Survey
Scottish Wildlife Trust - SWT Reserve Wildlife Survey Reports	Solway Heritage - Upland Breeding Bird Survey 1998	Water beetle records (GF)
Scottish Wildlife Trust - SWT Reserves Invertebrate Survey 2004	South of Scotland Wildlife Hospital - South of Scotland Wildlife Hospital	Water Vole Survey
Scottish Wildlife Trust - SWT Site surveys	South West Community Woodlands - Galloway Native Crab Apple Records	WeBS Counts for Powfoot area (DI)
Scottish Wildlife Trust - The Scottish Squirrel Database	Southern Uplands Partnership - Mountain Hares in Southern Scotland	Wild Surveys Ltd - Wild Surveys Badger Records
Seasearch - Seasearch Marine Surveys in Scotland	Survey of Jessie's Field (Barvennan Moss)	Wild Surveys Ltd - WILD Surveys Brown Long Eared Records
Shell Records (GC)	Swift Nest Record (CD)	Wild Surveys Ltd - Wild Surveys Common Pip Records
Shell Records (SL)	SWSEIC records	Wild Surveys Ltd - Wild Surveys Otter Records
Shore Survey Clashwhannon	Tachinid Recording Scheme - Tachinid Recording Scheme - GB and Ireland records	Wild Surveys Ltd - Wild Surveys Soprano Pip Records
Small Mammal Trapping (AR)	The Conservation Volunteers Scotland - BTCV wildlife counts recording workshops	Wildfowl & Wetlands Trust - Scottish Greylag Goose Survey 2008
Solway Firth Partnership - Marine INNS Settlement Plate Records	The Conservation Volunteers Scotland - HogWatch Scotland Project - West European hedgehog records between 2019 and 2021	Wildlife Recording Review Survey Cards
	The Wildlife Information Centre - Record a Raptor survey	Wildlife records (various recorders)
		Wildlife records at Eskrigg (JR)
		Woodland Guardians
		WWA Training Records
		Yorkshire Wildlife Trust - INNS Mapper

The Wildlife Information Centre

Alec West - Bog and Pond Watchers	Borders Forest Trust - Ettrick Haughlands	Brian Boag, The James Hutton Institute - Scottish New Zealand Flatworm Survey
Amphibian and Reptile Conservation - NARRS Data 2007 - 2013	Borders Forest Trust - Gordon Community Woodland	British Bryological Society Atlas records (Scottish Borders)
ARG-UK and ARC Record Pool data (online recording)	Borders Forest Trust - Heronhill Community Woodland	British Bryological Society- Bryophyte data for GB & Ireland held by BRC:compiled post-Atlas (CC-BY)
Balfour-Browne Club - National Water Beetle Recording Scheme (VC82-84)	Borders Forest Trust - Juniper Survey	British Bryological Society Records - VC78-84
Bat Conservation Trust - Field Survey (OGL)	Borders Forest Trust - Leadburn Community Woodland	British Dragonfly Society - Advanced Records (iRecord)
Bat Conservation Trust - Hibernation Survey (OGL)	Borders Forest Trust - Talla and Gameshope	British Dragonfly Society - Simple Records (iRecord)
Bat Conservation Trust - Roost Count (OGL)	Borders Forest Trust - Upper Ettrick Water Floodplain Hay Meadows Survey	British Dragonfly Society - ADO Records from Internet photos
Bat Conservation Trust - Sunset/ Sunrise Survey (iRecord)	Borders Forest Trust - Veteran Tree Survey	British Dragonfly Society - BirdTrack Odonata
Bat Conservation Trust - Waterway Survey (OGL)	Borders Forest Trust - Woodland Survey	British Dragonfly Society - BRC KSP Dragonflies
Bathgate Family Records	Borthwick Valley Butterfly Survey 2002 - 2003	British Dragonfly Society - Cumbria Biodiversity Data Center Odonata
Berwick Wildlife Group Records	Botanical Society of Britain and Ireland - Atlas Records (1950-1999) RC	British Dragonfly Society - Dumfries & Galloway Odonata
Berwickshire BSBI Botanical Site Register	Botanical Society of Britain and Ireland - Borders Records to 1969	British Dragonfly Society - Durham and Northumberland Dragonflies
Biological Recording In Scotland - Bumblebee Survey	Botanical Society of Britain and Ireland - Borders Survey 1970-86	British Dragonfly Society - Garden Birdwatch Odonata
Biological Recording In Scotland - New Zealand Flatworm Survey	Botanical Society of Britain and Ireland - Borders Survey 1987-99	British Dragonfly society - iRecord Dragonflies
Biological Recording In Scotland - Scotsman Wildlife Surveys	Botanical Society of Britain and Ireland - Borders Survey 2000-08	British Dragonfly Society - iRecord Dragonflies app
Biological Records Centre - Brachycera (Diptera) records from Britain and Ireland to 1990	Botanical Society of Britain and Ireland - Juniper Survey (vc81)	British Dragonfly Society - Migrant Dragonflies
Biological Records Centre - Butterfly Monitoring Scheme	Botanical Society of Britain and Ireland - New Atlas Records (vc78)	British Dragonfly Society - Scotland Dragonflies
Biological Records Centre - Crayfish (Crustacea; Astacura) data for Britain and Ireland to 2003	Botanical Society of Britain and Ireland - Project 2010	British Dragonfly Society - Wider Countryside Butterfly Survey
Biological Records Centre - Database for the Atlas of Freshwater Fishes	Botanical Society of Britain and Ireland - Project 2010 (2)	British Lichen Society - BLS Lichen Database: Scotland 1700-2016
Biological Records Centre - Dixidae (Diptera) records from Britain and Ireland to 1988	Botanical Society of Britain and Ireland - Rare Plants (vc79 & 80)	British Lichen Society (VC82-84)
Biological Records Centre - iRecord App (iRecord)	Botanical Society of Britain and Ireland - Shaws Lochs Survey	British Phycological Society - Seaweed data for Great Britain and Ireland
Biological Records Centre - iRecord beetles (iRecord)	Botanical Society of Britain and Ireland - Watsonia Records	British Trust for Ornithology - Birds (BTO+partners) 2021 - 2023
Biological Records Centre - iRecord general data	Botanical Society of Britain and Ireland (vc78)	British Trust for Ornithology - Birds (BTO/ JNCC/ RSPB partnership) (OGL)
Biological Records Centre - iRecord Intertidal (iRecord)	Botanical Society of Britain and Ireland (vc79)	British Trust for Ornithology - Birds (BTO/ JNCC/ RSPB partnership) [OGL] 2020 onwards
Biological Records Centre - iRecord Multi-site records (iRecord)	Botanical Society of Britain and Ireland (vc80)	British Trust for Ornithology - Birds (BTO+partners) 2016 - 2019
Biological Records Centre - Millipede (Diplopoda) records (VC78-84 and 86-99)	Botanical Society of Britain and Ireland (vc81) 1970 - 1986	British Trust for Ornithology - Non avian taxa (BTO/JNCC/RSPB partnership) (OGL)
Biological Records Centre - Mosquito Recording Scheme	Botanical Society of Britain and Ireland (vc81) 2000 -	British Trust for Ornithology - Non-avian taxa (BTO+partners)
Biological Records Centre - Muscidae (Diptera) records from Britain and Ireland to 1985	Botanical Society of Britain and Ireland (vc82)	BTO - Southern Scotland Bat Survey
Biological Records Centre - Opiliones (Harvestman) Dataset	Botanical Society of Britain and Ireland (vc83)	Buglife (Scotland) Invertebrate records
Biological Records Centre - Orthoptera and related species from Britain + Ireland -2007 (CC-BY)	Botanical Society of Scotland - Botany of the Lothians Project	Buglife Scottish Oil Beetle Survey
Biological Records Centre - Ticks (Ixodidea) distribution for the British Isles	Botanical Society of Scotland Urban Flora project - Urban Flora of Scotland (iRecord)	Butterflies and Moths - Buckham Surveys
Biological Records Centre Data	Botanical Society of Scotland Urban Flora project (iRecord)	Butterfly Conservation - Borders Butterflies (1995 - 2002)
	Breeding Wigeon Survey	Butterfly Conservation - Borders Butterflies (2000 - 2006)

Butterfly Conservation - Falkirk Butterflies	Forestry Commission Scotland - Glentress Moth Records	Lothian Wildlife Information Centre - Magpie Survey (public)
Butterfly Conservation - Lothians Butterflies	Froglife - Scottish Dragon Finder data	Lothian Wildlife Information Centre - Mammal Survey (public)
Butterfly Conservation - Millennium Atlas of Butterflies in Britain and Ireland Data	Fungus Group of South East Scotland recording	Lothian Wildlife Information Centre - Orange Tip Survey (public)
Butterfly Conservation - Scottish Borders Butterflies	Garden Bioblitz (iRecord)	Lothian Wildlife Information Centre - Site Biodiversity Surveys (2000-2009)
Butterfly Conservation - South-West Scotland Butterflies	Glasgow Museums - Miscellaneous records 2000+	Lothian Wildlife Information Centre - Wetland Plant Survey (public)
Butterfly Conservation National Moth Recording Scheme (vc78)	Golder Associates	Lothian Wildlife Information Centre Data Collations - Firth of Forth Cetaceans
Butterfly Conservation National Moth Recording Scheme (vc79)	Hares of the Lammermuirs Project	Lothian Wildlife Information Centre surveys (Invertebrates - general)
Butterfly Conservation National Moth Recording Scheme (vc80)	Highland Biological Recording Group (HBRG) - Badger Dataset	Lothian Wildlife Information Centre surveys (Non-invertebrate - general)
Butterfly Conservation National Moth Recording Scheme (vc81)	Highland Biological Recording Group (HBRG) - Fungus, Lichen & Lower Plants Dataset	Marine Biological Association - 2005 - Ongoing UK MarLIN Shore Thing timed search results (OGL)
Butterfly Conservation National Moth Recording Scheme (vc82)	Highland Biological Recording Group (HBRG) - Insects Dataset	Marine Biological Association - DASSH Data Archive Centre expert sightings records
Butterfly Conservation National Moth Recording Scheme (vc83)	Highland Biological Recording Group (HBRG) - Other Invertebrates Dataset	Marine Biological Association - DASSH Data Archive Centre volunteer survey data
BWARS Advanced Single Species Surveys (iRecord)	Highland Biological Recording Group (HBRG) - P.F. Entwhistle Insects Dataset	Marine Biological Association - DASSH Data Archive Centre Volunteer Sightings Records
BWARS Single Species Surveys (iRecord)	Highland Biological Recording Group (HBRG) - Vertebrates (not Badger) Dataset	Marine Biological Association - Marine Sightings Network (iRecord)
Cameron Ecology	Historic Scotland Rangers - General Bird Records	Merlindale Nature
Central Scotland Forest Trust - Non-native species data in the Clyde catchment	Historic Scotland Rangers - General Records	National Barkfly Recording Scheme - Saville, R.E. records
CIEEM online recording for consultancies (iRecord)	Institute of Freshwater Ecology - Tweed SSSI	National Barkfly Recording Scheme - Scottish Borders records
City of Edinburgh Council - Natural Heritage Service Data	International Otter Survival Fund - Public sightings	National Plant Monitoring Scheme (iRecord)
Consultants Portal (iRecord)	iSpot (iRecord)	National Recording Scheme - Amphibians & Reptiles
Cuddy Bioblitz	JNCC - Marine Nature Conservation Review (MNCR) and associated benthic marine data	National Recording Scheme - Bryophytes (DC)
David Dodds Associates Ltd	JNCC - Scotland Otter Survey Database	National Recording Scheme - Bryophytes (DL)
David Dodds Associates Ltd - data collations	John Muir Trust records	National Recording Scheme - Earthworms
David Dodds Associates Ltd (outwith TWIC)	Literature sources - 20th C.	National Recording Scheme - Lothian Butterflies
Dragonfly Recording Network (DRN)	Lothian Amphibian and Reptile Group Survey	National Recording Scheme - Spiders
Dragonfly imports - iRecord	Lothian and Borders Mammal Group recording	National Trust for Scotland - Grey Mare's Tail Records
East Lothian Council - Biodiversity Surveys	Lothian Bat Group - iRecord Bats Lothians Bat Group bat recording	National Trust for Scotland - Sensitive Species Records
East Lothian Council Ranger Service records	Lothian Bat Group - iRecord general data-Lothians Bat Group Lockdown Bat Survey	National Trust for Scotland - Species Records
East Lothian Council Ranger Service records (birds)	Lothian Wildlife Information Centre - Amphibian Survey (public)	National Trust for Scotland - St Abbs NNR
Ecological Consultants - Environmental reports	Lothian Wildlife Information Centre - Common Blue Butterfly Survey (public)	National Trust for Scotland - St. Abbs & Eyemouth VMR
Edinburgh Natural History Society - Field Trips	Lothian Wildlife Information Centre - Garden Survey (fungi)	National Trust for Scotland - St. Abbs & Eyemouth VMR Diver Exit Forms
Edinburgh Natural History Society - Harestanes Survey (2001)	Lothian Wildlife Information Centre - Garden Survey (public)	Natural Resources Wales - Welsh Invertebrate Database (WID)
Edinburgh University Institute - Tweed Vegetation	Lothian Wildlife Information Centre - General Records (1900-1989)	Nature Conservancy Council - Aquatic coleoptera of Borders Mosses
Elite Ecology	Lothian Wildlife Information Centre - General Records (1990-1999)	Nature Conservancy Council - Cleuch Vegetation Survey
Ephemeroptera Recording Scheme (iRecord)	Lothian Wildlife Information Centre - General Records (2000-2009)	Nature Conservancy Council - Ettrick wigeon survey
European Ladybirds - European Ladybirds Survey (iRecord)	Lothian Wildlife Information Centre - General Records (known recorders) (2000-09)	
Farming and Wildlife Advisory Group (FWAG) - Barn Owl survey	Lothian Wildlife Information Centre - I-Spy 100 (public)	
Forestry Commission Scotland - Borders Records		

Nature Conservancy Council - Moorfoot Hills Vegetation Survey	RSPB - 1921 Onwards Swift Screaming Parties, UK (CCO)	Scottish Natural Heritage - Borders Odonata (Pre-1990)
Nature Conservancy Council - Tweedsmuir Bryophyte Survey	RSPB - 1921-2014 Swift Inventory of Nest Sites in the UK	Scottish Natural Heritage - Bryophytes of the Langholm - Newcastleton Hills
Nature Conservancy Council - Vegetation of Langholm-Newcastleton Hills	RSPB - 1921-2014 Swift Inventory of Screaming Parties in the UK	Scottish Natural Heritage - File Records
Nature Conservancy Council - Whiteadder and Blackadder invertebrates	RSPB - Black Grouse	Scottish Natural Heritage - Fungi of Scotland
Nature Conservancy Council - Woodland Survey	SBBRC - General Borders Records up to 1969	Scottish Natural Heritage - Grassland Survey
Nature Locator - Plant Tracker (iRecord)	SBBRC - General Borders Records 1970 - 1979	Scottish Natural Heritage - Habitat Assessment Surveys
NatureScot - Site Condition Monitoring-lamprey species in 5 river SACs in Scotland (OGL)	SBBRC - General Borders Records 1980 - 1989	Scottish Natural Heritage - Invertebrate Fauna of Exposed Riverine Sediments in the Tweed Catchment
NatureScot - SNH Great crested newt records (OGL)	SBBRC - General Borders Records 1990 - 1999	Scottish Natural Heritage - Invertebrates of the Langholm-Newcastleton Hills SSSI
NatureScot (SNH) - Compilation of 12 Article 17 terrestrial mammal species in Scotland (OGL)	SBBRC - General Borders Records 2000 - 2009	Scottish Natural Heritage - Lamprey Survey
NatureScot (SNH) - Records of otters from Site Condition Monitoring in Scotland 2011-2012 (OGL)	SBBRC - General Borders Records entered 2002 - 2007	Scottish Natural Heritage - Lusby Grassland Survey
NatureScot (SNH) - Species data for Scottish waters derived from benthic surveys 1993- 2014 (OGL)	SBBRC - General Records up to 2000	Scottish Natural Heritage - Marine Species of the Berwickshire Coast
NatureScot (SNH)- Expansion zone survey of pine marten distribution in Scotland, 2012-2013 (OGL)	SBBRC - Harestanes Butterfly Transect	Scottish Natural Heritage - Notable Vascular Plants
NatureSpot (iRecord)	SBBRC - Harestanes Freshwater Life	Scottish Natural Heritage - Rare and Restricted Vascular Plants
Non-Native Species Secretariat NNSS (iRecord)	SBBRC - Harestanes Fungi	Scottish Natural Heritage - River Corridor Survey
North Highland Bat Network (NHBN) Surveys	SBBRC - Macrolepidoptera 1950-2000	Scottish Natural Heritage - River Corridor Survey - Ettrick Water
Northumberland Bat Group records	SBBRC Borders Backyard Biodiversity	Scottish Natural Heritage - River Corridor Survey - Yarrow Water
Orthoptera Recording Scheme - Orthoptera Recording (iRecord)	SBBRC Recorders Group Surveys	Scottish Natural Heritage - Sand Dune Survey
Paxton House Recording Nature Project	SBBRC Wildlife Recording Card	Scottish Natural Heritage - Selkirk Hill Monitor
Pentland Rangers - Fungi Surveys	Scarce Montane Plant Species, Grey Mares Tail	Scottish Natural Heritage - Site Condition Monitoring (Bryophytes)
Pentland Rangers - General Public Records	Scottish Badgers - Dead Badgers	Scottish Natural Heritage - Site Condition Monitoring (Invertebrates)
Pentland Rangers - Ranger Ad-hoc records/sightings	Scottish Borders Council - Environmental Impact Assessments	Scottish Natural Heritage - Site Condition Monitoring (Lichens)
People's Trust for Endangered Species - Big Hedgehog Map	Scottish Borders Council - Hare Survey (public)	Scottish Natural Heritage - Site Condition Monitoring (Vegetation Communities)
People's Trust for Endangered Species - Hedgehog Hibernation Survey records	Scottish Borders Council - Lindean Loch Bird Counts	Scottish Natural Heritage - Site Condition Monitoring (Water Beetles)
People's Trust for Endangered Species - Hedgehog records 05-06 Hogwatch & Rural Landowner Survey	Scottish Borders Council - Otter Survey (public)	Scottish Natural Heritage - Site Surveys
People's Trust for Endangered Species - Living with Mammals Survey	Scottish Borders Council - Wilton Lodge Park records	Scottish Natural Heritage - Standing Waters Database Scotland (OGL)
Plantlife Wildflowers Count (iRecord)	Scottish Entomologists	Scottish Natural Heritage - Tweed Files
Porcupine Marine Natural History Society- Marine flora & fauna records from the North-east Atlantic	Scottish Entomologists' Gathering 1991	Scottish Natural Heritage - Tweed Macrophytes 1997
Pseudoscorpion Recording Scheme of the UK - Lothian records	Scottish Natural Heritage - 1997 Loch Inventory: South East Scotland	Scottish Ornithologists' Club - Borders Bird Report 2000
Quadrat Scotland - Borders Wetlands Survey	Scottish Natural Heritage - Action Plans for Lower Plants	Scottish Ornithologists' Club - Borders Bird Report 2000-2001-revised
RBGE - Dawyck Species	Scottish Natural Heritage - Ale Water Habitat Survey	Scottish Ornithologists' Club - Borders Bird Report 2001-02
RBGE BioBlitz - Dawyck Botanic Garden	Scottish Natural Heritage - Allium paradoxum	Scottish Ornithologists' Club - Borders Bird Report 2003-04
Red Squirrels in South of Scotland - Borders Squirrels	Scottish Natural Heritage - Badger Setts	Scottish Ornithologists' Club - Borders Bird Report 2005-06
Red Squirrels Northern England	Scottish Natural Heritage - Bat Casework Records 1970 - 2007 (OGL)	Scottish Ornithologists' Club - Borders Bird Report 2009
RSPB - 1921 Onwards Occupied Swift Nests, UK (2015-) (CCO)	Scottish Natural Heritage - Bat Roost Records	Scottish Ornithologists' Club - Borders records (2010-2019)
	Scottish Natural Heritage - Berwickshire and North Northumberland Coast cSAC	
	Scottish Natural Heritage - Berwickshire Seabird Survey	
	Scottish Natural Heritage - Blackadder River Corridor Survey	
	Scottish Natural Heritage - Borders Aspen locations	
	Scottish Natural Heritage - Borders Grassland and Mires	

Scottish Ornithologists' Club - Lothians Tetrad Bird Atlas 2007-13 (winter records)	Scottish Wildlife Trust - Volunteer Monitoring & Survey Records	The Wildlife Information Centre - Hedgehog Survey
Scottish Ornithologists' Club - Lothians Tetrad Bird Atlas 2008-13 (breeding records)	Scottish Wildlife Trust Reserve Data - Casual Records	The Wildlife Information Centre - Identification Workshops
Scottish Ornithologists' Club - SE Scotland Breeding Bird Atlas	Scottish Wildlife Trust Reserves Invertebrate Survey 2004	The Wildlife Information Centre - LBS Network Strategic Habitat Survey
Scottish Ornithologists' Club - SE Scotland Tetrad Atlas 1988-1994 non-sensitive breeding spp. CC-BY	Seasearch - Marine Surveys in Scotland	The Wildlife Information Centre - Record a Raptor Survey
Scottish Water - Great Crested Newt records	SEPA - River macroinvertebrate data for 2005 and 2006 (OGL)	The Wildlife Information Centre - Recording Excursions (2010-)
Scottish Wildlife Trust - A Survey of the Vegetation of Hare & Dunhogg Moss Wildlife Reserve 2005	SEPA - Scottish river macro-invertebrates from 2007 collected by SEPA (OGL)	The Wildlife Information Centre - Scottish Borders Brown Hare Survey
Scottish Wildlife Trust - Borders Site Surveys	SEPA - Selected Scottish freshwater fish records from 2008-2011 (OGL)	The Wildlife Information Centre - Site Surveys (2010-)
Scottish Wildlife Trust - Butterfly Quest of the Lothians (public)	SEPA invertebrates	Trichoptera Recording Scheme - Caddisfly (Trichoptera) records from Britain and Ireland to 2012
Scottish Wildlife Trust - Gordon Moss Invertebrates	SEPA Tweed Invertebrate Samples	Tweed Forum - American skunk cabbage controlled in 2022 as part of the Tweed Invasives Project
Scottish Wildlife Trust - Linn Dean Vegetation Survey 2007	Southern Uplands Partnership Records	Tweed Forum - Giant hogweed controlled in 2022 as part of the Tweed Invasives Project (CC-BY)
Scottish Wildlife Trust - Lothian Habitat Survey	Specialist studies - Invertebrates	Tweed Forum - Japanese knotweed controlled in 2022 as part of the Tweed Invasives Project (CC-BY)
Scottish Wildlife Trust - Lothian Site Surveys (2000-)	St. Abbs and Eyemouth Voluntary Marine Reserve - Bioblitz records	Tweed Foundation - Electrofishing records
Scottish Wildlife Trust - Miscellaneous Records	Stacey family records	Tweed Foundation - River Survey
Scottish Wildlife Trust - NVC Site Survey of Whitlaw Wood 2003	Sussex Biodiversity Record Centre - Francis Rose Notebook Project	Tweed Foundation - Signal Crayfish
Scottish Wildlife Trust - NVC Site Survey- Bemersyde Moss 2003	The British Association for Shooting and Conservation - UK casual records from BASC members- 1980-	TWIC General Recorders
Scottish Wildlife Trust - Pease Dean Vegetation Survey	The Macrolepidoptera of Berwickshire; VC. 81.	TWIC West Lothian Council - Local Biodiversity Site Surveys
Scottish Wildlife Trust - Reserve Data	The Mammal Society - Mammal Atlas (iRecord)	TWIC/ British Arachnological Society - Scottish Spider Search
Scottish Wildlife Trust - Staff casual records	The Mammal Society - Mammal Mapper (iRecord)	UK Ladybird Survey - Incidental ladybird (iRecord)
Scottish Wildlife Trust - Staff Monitoring & Survey Records	The Mammal Society - Mammal Tracker (iRecord)	UK Ladybird Survey (iRecord Ladybirds)
Scottish Wildlife Trust - The Scottish Squirrel Database (March 2015 -) CC-BY	The Mammal Society - National Badger Survey	University of Amsterdam - Sublittoral hard-substratum communities off St Abbs
Scottish Wildlife Trust - The Scottish Squirrel Database (pre- March 2015) CC-BY	The Mountain Plants of the Moffat Hills	Vincent Wildlife Trust - National Otter Survey
Scottish Wildlife Trust - Vegetation Survey of Gordon Moss, Scottish Borders, 2005	The Wildlife Information Centre - Badger and Leopard Slug Survey	Vincent Wildlife Trust - Pine Marten Survey
Scottish Wildlife Trust - Vegetation Survey of Pease Dean Wildlife Reserve 2004	The Wildlife Information Centre - BioBlitz Events	Water of Leith Conservation Trust recording
Scottish Wildlife Trust - Vegetation Survey of Whitlaw Wood Wildlife Reserve, Hawick, 2009	The Wildlife Information Centre - General Records (2010-)	West Lothian Council - Phase 1 survey
	The Wildlife Information Centre - General Records (known recorders) 2010-)	Wildfowl and Wetland Trust - Lothian and Borders Geese
	The Wildlife Information Centre - General Records for NBN upload (2015-)	Wooplaw Community Woodland Records
	The Wildlife Information Centre - General Records for NBN upload (known recorders, 2015-)	