

Red List of Ecosystem assessment series

Produced by JNCC and NatureScot, supported by Natural Resources Wales, Natural England, and Northern Ireland Environment Agency.

This resource is one in a series/number of Ecosystem Red List assessments developed to accompany the UK Biodiversity Indicator '[Red List of Ecosystems](#)'. The assessments are available at: <https://jncc.gov.uk/resources/7b922dfc-708b-4c8c-9e6a-e2040447fb39>.

Resilient ecosystems are crucial for preventing biodiversity loss and species extinction. Maintaining healthy ecosystems safeguards the essential services they provide, which are fundamental to human well-being and a thriving economy. However, pressures and threats such as deforestation, overfishing, or climate change, can disturb the balance of ecosystems and threaten their health and functioning. Assessing the level of threat facing ecosystems is important in helping us understand the current status of the environment, and on a practical level, assessments can be used to help prioritise conservation funding decisions and where to take conservation management action on the ground.

The 'Red List of Ecosystems' (RLE) is a global assessment approach set out by the International Union on Conservation of Nature (IUCN). The approach includes consideration of a series of criteria, including change in geographic distribution through time; whether the ecosystem distribution is geographically restricted; evidence for any environmental degradation; and disruption to biotic processes or interactions. We have not carried out the quantitative analyses of the probability of ecosystem collapse necessary to assess criterion E as we do not have the data needed to carry out such analyses consistently. The IUCN methodology is widely used as a robust approach to assessing the status of ecosystems. Further details of the criteria used in these assessments are available on the [IUCN portal](#).

This assessment series sets out the RLE assessment conclusions for ecosystems found in the UK, alongside the details of how the assessment was made, including for each IUCN component criterion. The assessments have been peer-reviewed, and source data is referenced. Once complete, the series will cover the full range of natural and seminatural habitats that occur in the UK, throughout marine, terrestrial and freshwater environments.

Assessments are conducted according to the [Global Ecosystem Typology Level 3](#) (Ecosystem Functional Groups). This enables the assessments to feed into the Kunming-Montreal [Global Biodiversity Framework](#) (GBF) headline indicator A.1 Red List of Ecosystems. This indicator, which has been incorporated into the UK Biodiversity Indicator suite, is designed to measure progress against [Goal A](#) ('Protect and restore') and [Target 1](#) ('Plan and manage all areas to reduce biodiversity loss') of the GBF.

Any gridded maps are derived from public sector information licensed under the Open Government Licence v3.0. Coastline boundary is derived from the Oil and Gas Authority's and Lloyds Register SNS Regional Geological Maps (Open Source).

TF1.6 Boreal, temperate and montane peat bogs

1. Key facts

Ecosystem description: Peat bogs in the boreal-subarctic and temperate areas of the world account for up to 40% of the world's soil carbon. They are landscape sponges, with highly specialised plant life including shrubs, sedges and mosses equipped to grow in acidic, nutrient-poor, low-oxygen, waterlogged soils. Sphagnum moss and other peat-forming plants are foundational to these ecosystems. Insects are the dominant animal group, along with amphibians, reptiles, rodents and a few visiting birds

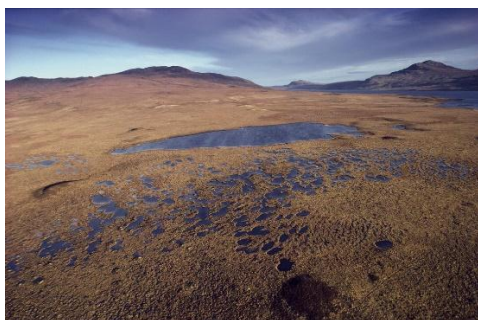


Image credit: Flow Country World Heritage Site, Caithness and Sutherland ©Steve Moore/NatureScot

Overall assessment conclusion: Endangered (EN) based on criterion D1.

Date assessment published: 02.12.2025

Assessor: Karen Rentoul

Reviewer: Ed Mountford; David O'Brien

Corresponding habitat classifications:

The following habitats were considered in the production of this assessment:

EUNIS codes: [D1.1](#) Raised bogs, [D1.2](#) Blanket bogs, [D2.3](#) Transition mires and quaking bogs, [G1.5](#) Broadleaved swamp woodland on acid peat

UK BAP Priority Habitats: Blanket bog, Lowland raised bog, Wet woodland (only a small part)

Habitats Directive Annex I habitats: [H7110](#) Active raised bogs, [H7120](#) Degraded raised bogs still capable of natural regeneration, [H7130](#) Blanket bogs, [H7150](#) Depressions on peat substrates of the Rhynchosporion, [H91D0](#) Bog woodland

2. Assessment against IUCN criteria

Criterion A: Reduction in geographic distribution

Criterion A considers reduction in geographic distribution over ANY of the defined time periods for criteria A1, A2a, A2b or A3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#)

Peatlands or peat bogs are found in only a few parts of the world with cool, wet and usually oceanic climates and cover 3% of the world's land area. In the UK peatlands cover around 10% of the land – 23,274 km² (JNCC, 2025a,b,c; Mountford et al., 2025), which includes over 10% of the world's blanket bog habitat (Bain *et al.*, 2011). They are widely distributed across north and west of the UK, extending from Devon in the south to Shetland in the north. There are notable concentrations in several areas, including the Highlands and Islands, and

Central Belt in Scotland, the Solway region on the England/Scotland border, north-west England, north Wales and Northern Ireland (JNCC, 2025a,b,c).

Much of the extent of peatland is blanket bog, one of Scotland's most common semi-natural habitats covering some 18,000 km². This is due to Scotland's position on the edge of the Atlantic Ocean resulting in high levels of precipitation, and rocks, soils and landforms that stop rainwater from draining away quickly resulting in waterlogged conditions which allow for the formation of peat soils (NatureScot 2023). Blanket bogs in Scotland are most commonly found in the Northern Highlands, Western Isles and Northern Isles, and range from coastal to montane regions. Lowland raised bogs are mainly located in the north-east, central belt and southern Scotland.

Historical losses of the UK peatlands have been substantial. This includes some of the finest UK peatland ecosystems, which have been severely damaged by the expansion of commercial plantation forestry throughout the 20th century, including the Flow Country of Caithness and Sutherland, the Border Mires of Cumbria and Northumberland (Ratcliffe, 2002), and the mires of the Scottish Southern Uplands (Ratcliffe, 2007). Approximately 18% of UK peatlands are under forestry (Evans et al., 2017). Despite small net reductions in the extent of forestry on peat in England and Wales from 1990 to 2013, in Scotland and Northern Ireland (despite large forest-to-bog restoration projects) there were net increases, leading to an overall increase in UK peat under forestry of 24,000 ha during this period (Artz et al. 2019). A further estimate of 40% has been modified or destroyed by drainage and conversion to agriculture (Littlewood et al., 2010). Of the remaining blanket bog, less than 20% is in a natural or near-natural condition, with about a quarter having been severely eroded or affected by past peat cutting (Littlewood et al., 2010).

It is likely that further small-scale losses will arise through renewable developments, mainly wind farms, pumped storage hydro with associated solar arrays and battery energy storage systems (JNCC 2019a,b). In addition, losses may arise as a result of projected changes in climate, which by 2061-2080 could potentially cause a substantial decline in the area of land suitable for peatland habitats (Ritson et al., 2025).

Assessment: A3 Vulnerable (VU) – Since 1750 around 60% of the UK's peatlands have been lost, primarily through drainage for agriculture intensification or afforestation with non-native coniferous trees (Littlewood et al., 2010; Evans et al., 2017). This loss and degradation of peatlands is continuing with land use, deer pressure, invasion by forestry trees (Sitka spruce and Lodgepole pine), development, extraction and climate change, resulting in erosion, modification or destruction (Bain et al., 2011; NatureScot, 2015).

Criterion B: Restricted geographic distribution

Criterion B considers restricted geographic distribution indicated by ANY of the time periods for criteria B1, B2 or B3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#).

In the UK peatlands cover a wide range and around 10% of the land – an extent of 23,274 km² (JNCC, 2025a,b,c; Mountford et al., 2025).

Assessment: Least Concern (LC) Despite historic losses, this ecosystem still covers a large area with the range surface area (which is c.114,000 km² for blanket bogs alone, JNCC, 2019a) exceeding the Vulnerable threshold for restricted distribution.

Criterion C: Environmental degradation

Criterion C considers environmental degradation over ANY of the time periods for criteria C1, C2a, C2b or C3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#).

Atmospheric pollution (most probably SO₂ and its solution products) have severely affected upland vegetation across the southern Pennines of England, notably destroying the cover of *Sphagnum* and *Racomitrium* on blanket bogs in the 19th and 20th centuries; although concentrations of SO₂ have decreased, N deposition has increased approximately fourfold during the past century (Lee et al., 1988). Ombrotrophic bogs that rely on atmospheric inputs for nutrients and are highly sensitive to increases in N deposition, the main effects of which on bog habitats in the UK (as reported by the UK Air Pollution Information System 2025) include: declines in the moss understorey in response to an increase in the vascular plant over-storey; reductions in the cover of *Sphagnum*; absence of characteristic species; changes in species composition, proportions and abundance; and expansion of [nitrophilous](#) (nitrogen-loving) species e.g. grasses, at the expense of lower plants.

Peatlands are wetland habitat as such are sensitive to changes in hydrology. During the mid-twentieth century, open ditches were cut across much of the UK peatland landscape, which has resulted in widespread degradation by altering runoff regimes, increasing oxidation of organic matter, changing C, N and P cycling, and increasing metal and suspended sediment concentrations in streams relative to intact peatlands (Ramchunder et al., 2009).

Many UK upland peatlands have been subject to burning for land management purposes, particularly grouse moor management, with the practice increasing over the 20th and early 21st century. This has impacted upland peatland habitats in various ways (Noble et al., 2025), including generally moving the vegetation of blanket bog away from its characteristic composition; impacting faunal communities; removing a large proportion of aboveground carbon stock via combustion, followed by gradual re-accumulation over several decades; increasing the export of dissolved and particulate organic carbon increase after burning; and influencing various aspects of water chemistry and flow. Wildfires, arson and poorly managed or 'hot' burns are of particular concern, as these can have severe damaging consequences for peatland ecology, hydrology and soil processes.

Climate change can have detrimental impacts on these habitats through repeated drought (forecast to increase in frequency and duration: Kirkpatrick Baird et al., 2023), wildfires and flooding, which can change the species and functions of the habitat. In addition, ombrotrophic mires are sensitive to nitrogen deposition which we are seeing increasing across the UK. As a result of projected changes in climate, the area of land suitable for peatland could potentially decline substantially by 2061-2080 with only western Scotland retaining substantial areas suitable for peat (Ritson et al., 2025).

In addition to these factors there is pressure on peat bogs from renewable development: mainly wind farms, pump storage hydro with associated solar arrays and battery energy storage systems (JNCC, 2019a,b; JNCC, 2025a,b,c).

Assessment: C2a and C2b Vulnerable (VU) – with climate change, drainage and nitrogen deposition affecting different locations up to 80% of bogs could be affected with a severity of 50%. This is based on the current rate of change, which may vary depending on future conditions. Competing land uses also adds to the degradation of this ecosystem.

Criterion D. Disruption of biotic processes or interactions

Criterion D considers Disruption of biotic processes or interactions over ANY of the time periods for criteria D1, D2a, D2b or D3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#)

Peat bogs in the UK have also been impacted by over-grazing by deer and sheep, tree and scrub encroachment from non-native tree species used in forestry and rhododendron (JNCC, 2019a,b). Over-grazing and trampling by both sheep and deer change the composition of the bog vegetation and its structure, damages sensitive plants, and can cause more rapid surface water flow; it also generally increases erosion, eventually leading to bare peat and gullies (Bain et al., 2011). Encroachment by trees/large shrubs, leads to the replacement of bog vegetation and can also cause peat drying and degradation. Colonisation by non-native conifers, particularly Sitka spruce, through seed 'rain' beyond the planted area, remains a problem in many sites (NatureScot, 2025).

As a result of over-grazing, encroachment by trees/large shrubs and the effects of atmospheric pollution, drainage and burning (see above), most of the peatland bog vegetation in the UK has been assessed as being in unfavourable condition (JNCC, 2019a,b).

Assessment: D1 Endangered (EN) – the pressures listed above have a large impact on the habitat and its function. If the current processes continue there will be a continued decline in the condition

Conservation measures in place

There is a sizeable effort across the UK to carry out restoration of peat bogs (e.g. NatureScot, 2015; Field et al., 2024). In Scotland there is also work being carried out to increase the sustainable management of wild deer populations and decrease their impact on semi-natural habitats. Regional approaches include the North Pennines National Landscape and the Flow Country in Caithness and Sutherland which has attained World Heritage Site status in 2024.

Government funding is available for restoration in England through the Nature for Climate Peatland Grant Scheme, in Wales through the National Peatland Action Programme, the Department of Agriculture, Environment and Rural Affairs' Environment Fund in Northern Ireland and peatland ACTION in Scotland.

Sites across the UK have been designated for the protection of peat bogs under the Ramsar Convention on Wetlands and as Special Areas of Conservation (SACs), Sites of Special Scientific Interest (SSSIs) (England, Scotland, Wales), and Areas of Special Scientific Interest (ASSIs) (Northern Ireland).

Overall assessment conclusion

Boreal, temperate and montane peat bogs in the UK are assessed as being Endangered (EN) based on criterion D1.

3. Literature references

Artz, R., Evans, C., Crosher, I., Hancock, M., Scott-Campbell, M., Pilkington, M., Jones, P., Chandler, D., McBride, A., Ross, K. and Weyl, R., (2019). The state of UK Peatlands: An update. *IUCN UK Peatland Programme's Commission of Inquiry on Peatlands*.

Bain, C.G., Bonn, A., Stoneman, R., Chapman, S., Coupar, A., Evans, M., Gearey, B., Howat, M., Joosten, H., Keenleyside, C., Labadz, J., Lindsay, R., Littlewood, N., Lunt, P., Miller, C.J., Moxey, A., Orr, H., Reed, M., Smith, P., Swales, V., Thompson, D.B.A., Thompson, P.S., Van de Noort, R., Wilson, J.D. & Worrall, F., (2011). *IUCN UK Commission of Inquiry on Peatlands*. IUCN UK Peatland Programme, Edinburgh.

Evans, C., Artz, R., Moxley, J., Smyth, M.A., Taylor, E., Archer, E., Burden, A., Williamson, J., Donnelly, D., Thomson, A. and Buys, G., (2017). *Implementation of an emissions inventory for UK peatlands*. Centre for Ecology and Hydrology.

Field, G., Thornton-Lee, R., Rayment, M. and Bassford, M., (2024). Nature for Climate Peatland Grant Scheme Process Evaluation - Interim Evaluation - Final Report. NECR546. Natural England.

JNCC (2019a) article 17 reporting for blanket bog. Available at: <https://jncc.gov.uk/jncc-assets/Art17/H7130-UK-Habitats-Directive-Art17-2019.pdf>

JNCC (2019b) Article 17 reporting for lowland raised bog. Available at: <https://jncc.gov.uk/jncc-assets/Art17/H7110-UK-Habitats-Directive-Art17-2019.pdf>

JNCC (2025a) 7110 Active raised bogs. Available at: <https://sac.jncc.gov.uk/habitat/H7110/>

JNCC (2025b) 7120 Degraded raised bogs still capable of natural regeneration. Available at: <https://sac.jncc.gov.uk/habitat/H7120/>

JNCC (2025c) 7130 Blanket bogs. Available at: <https://sac.jncc.gov.uk/habitat/H7130/>

Kirkpatrick Baird, F., Spray, D., Hall, J. and Stubbs Partridge, J., (2023). Projected increases in extreme drought frequency and duration by 2040 affect specialist habitats and species in Scotland. *Ecological Solutions and Evidence*, 4(3), p.e12256.

Lindsay, R., Birnir, R., Clough, J. (2014). IUCN UK Committee Peatland Programme, Briefing note number 1. IUCN. Available at: <https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2019-07/1%20Definitions%20final%20-%205th%20November%202014.pdf>

Littlewood, N., Anderson, P., Artz, R., Bragg, O., Lunt, P. & Marrs, R. (2010). *Peatland Biodiversity*. Report to IUCN UK Peatland Programme. Edinburgh.

Mountford, E., Baulch, V. & Hill, E. (2025). Technical Documentation for the UK Biodiversity Indicator on the Extent of Natural Ecosystems: 2025 version. *JNCC Report 809*. JNCC, Peterborough, ISSN 0963-8091. <https://jncc.gov.uk/resources/ee44fbd1-81de-4c5b-8210-83a24e799555>.

NatureScot (2015). Scotland's National Peatland Plan: Working for our future. Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/carbon-management/restoring-scotlands-peatlands>

NatureScot (2023). *Blanket Bog*. Available at: - <https://www.nature.scot/landscapes-and-habitats/habitat-types/mountains-heaths-and-bogs/blanket-bog>

NatureScot (2025). *Interface of non-native woodlands and peatland areas*. Available at: <https://snh.maps.arcgis.com/home/item.html?id=9da2f9c71cac4b2e8aed17283ca3b836>

Noble, A., Glaves, D.J., Leppitt, P., Crowle, A., Key, D. and Rodgers, A., (2025). *An evidence review update on the effects of managed burning on upland peatland biodiversity, carbon and water*. Natural England Evidence Review, NEER155. Natural England.

Ramchunder, S.J., Brown, L.E. and Holden, J. (2009). Environmental effects of drainage, drain-blocking and prescribed vegetation burning in UK upland peatlands. *Progress in Physical Geography* 33(1), p. 49-79.

Ratcliffe, D.A. (2002). *Lakeland*. Collins, London.

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

Ritson, J. P., Lees, K. J., Hill, J., Gallego-Sala, A., & Bebber, D. P. (2025). Climate change impacts on blanket peatland in Great Britain. *Journal of Applied Ecology*, 62, 701–714.

UK Air Pollution Information System (2025). *Nitrogen deposition: Bogs*. Available at: <https://www.apis.ac.uk/nitrogen-deposition-bogs>