Definition of Favourable Conservation Status for Blanket bog

Defining Favourable Conservation Status Project

Alistair Crowle, Iain Diack, David Glaves, David Key and Richard Lindsay

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Executive summary

This document sets out Natural England's view on favourable conservation status for Blanket bog in England.

Favourable conservation status is the minimum threshold at which we can be confident that the habitat, and its associated species, are thriving in England and are expected to continue to thrive sustainably in the future.

This definition has been produced following the Natural England approach to defining favourable conservation status described in the guidance document Defining Favourable Conservation Status in England.

Section 1 of this document describes the habitat covered by this definition and its ecosystem context.

Section 2 specifies the units used to describe the three favourable conservation status parameters. These are:

- Natural range and distribution (where the habitat occurs).
- Extent (how much habitat there is).
- The structure and function attributes (habitat quality).

Section 3 outlines the evidence considered when developing the definition. This definition is based on the best available evidence on the ecology of Blanket bog**.** The evidence covers the current situation, historical changes and possible future changes.

Section 4 sets out the conclusions on the favourable values, that is the value for each of the three parameters when the habitat has achieved favourable conservation status.

This document does not include any action planning, or describe actions, to achieve or maintain favourable conservation status. These will be presented separately, for example within strategy documents.

Summary Favourable Conservation Status

Favourable conservation status in England is defined here as:

- The maintenance of the natural range and distribution, and current area of blanket bog;
- 95% of its area to meet the structure and function attributes including for species (described in Section 6.3) to be in favourable condition; and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and

- only be subject to management interventions where they are necessary to restore functional hydrology or reintroduce key species.

Much of England's 321,000 ha of blanket bog has been extensively modified through historic atmospheric deposition of nutrients and pollutants since the industrial revolution, and more recent and ongoing land management practices, particularly within the last 150 years. Despite these modifying processes, the natural geographic range and distribution of blanket bog in England has not changed significantly, although there are natural and anthropogenically driven differences in the vegetation composition between upland areas. This geographic variation is maintained within the current range. Nevertheless, there have been considerable reductions in the extent of blanket bog within all the upland areas it occurs in and particularly in some, for example, the North York Moors. This reflects agricultural land claim and afforestation, and extraction of peat for fuel since at least medieval times.

In order to achieve favourable conservation status, it is essential that the appropriate structures, processes and species are present to enable the establishment of healthy structure and function of blanket bog. At a site scale, there should be structural elements and micro-landscape patterns characteristic of a bog surface capable of accumulating peat within that climate region.

Table 1 Confidence levels for favourable values

Favourable conservation status parameter	**Favourable value**	**Confidence in the favourable value**
Range and distribution	The current range and distribution across the following upland areas: the Lake District, the Pennines (includes North, South, West, Yorkshire Dales and Peak District), Northumberland (including the Cheviot Hills and the Border Mires), the North York Moors, the Bowland Fells, Black Mountains, Exmoor and Dartmoor is maintained.	**High**
Extent	321,000 ha.	**Moderate**
Structure and function	95% of area in favourable condition. All species are Least Concern.	**High**

The nature of this definition has a particular significance for peatlands, and in particular for peat bogs, because it will be noted that both extent of habitat, together with habitat structure and function, are listed *before* any mention of species. Peat bogs are often regarded as species-poor habitats, and indeed it is true that the central parts of some raised bogs may support no more than ten or 15 higher plants and bryophytes (Rodwell 1991). The condition of, and ecosystem services provided by, a peat bog are determined far more by the structures and functions of the peat bog surface than by the particular species complement creating those structures and functions.

At the time of publication of this definition, based on a comparison of the favourable values with the current values, blanket bog in England is not in favourable conservation status. Note that this conclusion is based solely on the information presented within this document and is not a formal assessment of status nor is it based on focussed and/or comprehensive monitoring of status.

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About the Defining Favourable Conservation Status project

Natural England's Defining Favourable Conservation Status (DFCS) project is defining the minimum threshold at which habitats and species in England can be considered to be thriving. Our Favourable Conservation Status (FCS) definitions are based on ecological evidence and the expertise of specialists.

Through setting our ambition and aspiration for species and habitats, our definitions will inform decision making and actions to achieve and sustain thriving wildlife.

Our FCS definitions will be embedded into delivery of the 25 Year Environment Plan, through the Nature Recovery Network, biodiversity net gain and environmental land management schemes (ELMS).

Conservation bodies will use them to inform their work, including management planning for the land they own. Businesses will have a clear understanding of how their work impacts nature recovery and how they can help contribute to achieving thriving nature.

By considering the evidence for FCS, decisions will be more confident and strategic, with an understanding of their contribution to, or impact on, the national ambition.

1 Habitat definition and ecosystem context

1.1 Habitat definition

Annex I type H7130 Blanket bogs in England are extensive peatlands that have formed in upland areas where climate is characterised by regular inputs of precipitation (rain, snow, hill-fog, mist or dew) and low levels of evapotranspiration, allowing peat to develop not only in wet hollows but over large expanses of flat, sloping and undulating ground.

Favourable condition requires that there is a functioning surface layer consisting of vegetation capable of creating fresh peat material while also providing the appropriate hydrological control mechanisms – this functional layer being termed the 'acrotelm'. This acrotelm layer should completely cover the non-living peat mass beneath (the 'catotelm'), protecting it from day-to-day weather conditions and maintaining it in a permanently waterlogged state.

There is a hierarchy of self-regulating structural levels that is used to describe blanket bogs (Lindsay 1995). Within the acrotelm layer there should be micro-structures (hummocks, ridges, hollows, pools) which further act to control water movement across the surface and which provide the necessary self-regulatory capacity to adjust to changes in water inputs and outputs. The micro-landscape patterns formed by these micro-structures should provide the site as a whole with the capacity both to regulate water flow but also to provide the capacity to self-regulate the distribution and nature of such patterns in response to changes in circumstance. It should be noted that tussocks and erosion features – both generally being features of degraded/damaged bog - do not provide capacity for self-regulatory responsiveness.

The extent of habitat is also important, both within a local area and across regions. This is because within the local area there is a requirement for the self-regulatory processes to be capable of functioning to the natural edge of the peat body, otherwise a condition of instability is established. Extent across regions is important because this provides the capacity for the habitat as a whole to display the necessary range of micro-structures and micro-landscapes which then provide the range of niches required by the full range of natural blanket bog biodiversity.

It is the case, even up to landscape scale, that a number of associated habitats and communities, such as springs, flushes, minerotrophic mires and heath, contribute very substantially to the overall biodiversity of the blanket bog landscape, yet the contribution of these important features often goes overlooked. The greater mineral-richness of these features provides many more opportunities for a wide range of species to penetrate far into the otherwise hostile environment of the blanket bog landscape. They act as zones of water collection or emergence within such mire-complexes and as such, these features are also important as hydrological boundaries between different self-regulating units.

Therefore, damage to these boundary features can have significant effects on the hydrology of adjacent ombrotrophic bog units. Such features may be encountered more regularly in the milder, wetter and geologically and topographically more complex north and west, but they are an important feature of all blanket bog systems. These areas may generally have benefited from less intensive land use and exposure to atmospheric deposition, that are major drivers of degradation in blanket bog but have often been used as the most efficient means of providing a main drainage channel for land-claim, afforestation or other development work. Consequently, their restoration forms a critical part of the overall blanket bog recovery.

Peat forms wherever waterlogging prevents complete decomposition of dead plant matter. As such, any accumulation of such waterlogged material can be classed as ‘peat’. Peat bog habitat, on the other hand, is influenced by the depth of such material, inasmuch as a thickness of 0.3 m or more is recognised as a critical threshold for many plant species. Where the peat is less than 0.3 m, many species can still obtain solutes from the sub-soil whereas once the peat is deeper than 0.3 m the majority of plant roots are restricted to the peat layer, which contains relatively few solutes and is generally highly acidic, making conditions increasingly intolerable to all but the typical species of blanket bog. Areas of shallower peat will often thus also support blanket bog vegetation and should also be regarded as blanket bog and an integral part of the hydrological unit of the peat mass or body.

Natural England has adopted 0.3 m peat depth for defining blanket bog, although this has yet to be fully adopted in practice in part due to peat depth mapping issues which are being addressed through ongoing work on an England Peat Map. The use of peat depth for defining blanket bog is discussed in Annex 1. It is re-emphasised here that blanket bog may occur on peats shallower than 0.3 m, especially upon the periphery of blanket bog masses. This may be in part due to topographical variation, but it could also reflect historic land use.

‘Active’ blanket bog is defined as supporting a significant area of vegetation that is normally peat-forming. Characteristic species include the important peat-forming species, such as bog-mosses *Sphagnum* species, cottongrasses *Eriophorum* species and purple moor-grass *Molinia caerulea* in certain circumstances. Heather *Calluna vulgaris* and other ericaceous species are usually present, particularly on hummocks. Thus sites, particularly those at higher altitude, characterised by extensive erosion features, may still be classed as ‘active’ if they otherwise support extensive areas of typical bog vegetation, and especially if the erosion gullies show signs of recolonisation.

In situations where ombrotrophic blanket bog meets a watercourse or where a minerotrophic water source meets the edge or occurs within the blanket bog, H7140 Transition mire and quaking bog can occur. This habitat is often characterised by an intimate mixture of acid and alkaline loving plants, sometimes forming on a quaking surface over water or very wet peat. This tends to be a feature of the least damaged blanket mires, along with H7150 Depressions on peat, and supports some of the most threatened mire species.

The most abundant blanket bog NVC types are:

- M17 *Scirpus cespitosus* [now *Trichophorum germanicum*] – *Eriophorum vaginatum* blanket mire
- M18 *Erica tetralix* – *Sphagnum papillosum* raised and blanket mire
- M19 *Calluna vulgaris* – *Eriophorum vaginatum* blanket mire
- M20 *Eriophorum vaginatum* blanket and raised mire
- M25 *Molinia caerulea* – *Potentilla erecta* mire.

M15 *Scirpus cespitosus* [*Trichophorum germanicum*] – *Erica tetralix* wet heath and M16 *Erica tetralix* – *Sphagnum compactum* wet heath may also occur on blanket peat, not only as natural components of the blanket mire mosaic on shallower or more rapidly-draining peat, for example on steeper slopes, but also as degraded forms of bog vegetation on artificially drained or otherwise damaged deeper peat.

Stands on shallower peats (<0.3 m) are generally referable to Annex I type H4010 Northern Atlantic wet heaths with *Erica tetralix*. Hollows within blanket bog may contain bog-pool vegetation of the M1 *Sphagnum auriculatum*, M2 *Sphagnum cuspidatum/recurvum* or M3 *Eriophorum angustifolium* communities, and there may be H3160 Natural dystrophic lakes and ponds. H7150 Depressions on peat substrates of the *Rhynchosporion* occur locally around the margins of bog pools. Most of these communities sit in the EUNIS D1.2 blanket bog classification.

The habitat generally exists as extensive peat masses within which areas of other vegetation types occur including springs, flushes, fens and occasionally intermediate or even raised bog, along with transitions to heath. These are included as functional components of the peatland system as a whole. By and large, English blanket bog is heavily modified such that the characteristic microtopography is reduced or absent and this is reflected in the dominance of certain vegetation communities such as M19 and M20. In some areas characteristic blanket bog vegetation has become dominated or replaced by single or a few species, in particular heather *Calluna vulgaris* (typically H9 *Calluna vulgaris* – *Deschampsia flexuosa* heath and H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath) or purple moor-grass *Molinia caerulea* (M25). These areas are still regarded as blanket bog, albeit it in degraded condition.

Cross-leaved heath *Erica tetralix*, cottongrasses *Eriophorum* species (especially *E. vaginatum*), deergrass *Trichophorum germanicum,* heather *Calluna vulgaris* and bog-mosses such as *Sphagnum papillosum*, *S. tenellum* and *S. capillifolium* are characteristic of blanket bog throughout its UK range. Other species are more characteristic of, or are more abundant in, certain geographical areas. For example, the higher, drier eastern bogs typically support a higher proportion of hare's-tail cottongrass *Eriophorum vaginatum* and bilberry *Vaccinium myrtillus* than those bogs further west. Similarly, purple moor-grass *Molinia caerulea* and bog-myrtle *Myrica gale* are much more widespread and typical on western bogs. The distribution of some of the rarer bog-mosses, for example *S. austinii* and *S. fuscum*, does not appear to be associated with geography but instead reflects the locations of the least damaged sites.

The species complement *is* important in the sense that different species have different growth forms and so *Sphagnum pulchrum* or *S. tenellum* only form low-growing mats whereas *S. capillifolium* or *S. fuscum* will generally create large hummocks. These small-scale micro-structures ('nanotopes') combine together to form micro-landscapes of surface pattern ('microtopes') which indicate the condition and determine the likely long-term functioning of the system within that particular part of the site.

The arrangement of differing micro-landscape patterns across a site then indicate the condition and determine the likely long-term functioning of the peatland unit as a whole (the 'mesotope'). Where peatland units join to form peatland complexes, which is one of the characteristic features of the blanket mire landscape precisely because the peat cloaks extensive tracts of the landscape in a continuous mantle, individual mesotope units (defined on the basis of their individual hydromorphologies – such as saddle mire, watershed mire or spring mire) combine together into functionally interlinked peatland complexes termed 'macrotopes'. If required, an extensive landscape of macrotopes can be regarded and treated as a 'supertope', as might be the case for Exmoor, North Dartmoor, or the Dark Peak.

Peat bog habitat condition is thus first and foremost determined by the extent to which these structural and functional systems are in place and are operating naturally. The absolute nature of the individual species that go towards creating this self-regulating system are of less importance from this perspective than are the presence of the necessary self-regulating structures, though the species complement is obviously of equal significance when considered in terms of biodiversity. That said, even here there is self-regulatory inter-dependence. For example, without *any* of the characteristic *Sphagnum* species it is impossible to create the necessary micro-structures of hummock, low ridge, hollow or pool, while the use of hummocks by breeding wader species helps to fertilize these particular structures and encourage their growth. However, the waders will not breed there unless there are also sufficient wet hollows to provide an adequate food source. A bog consisting solely of hummocks or dominated only by cotton-grass tussocks is unlikely to attract breeding dunlin or support any populations of the great sundew *Drosera anglica* or the bog raft spider *Dolomedes fimbriatus*.

While the *core* areas of its natural range in England can be regarded as stable, it has undoubtedly been the case that the margins of this habitat have been very substantially eroded by peat extraction, agricultural land claim and afforestation.

Source: Modified from JNCC: JNCC Blanket bogs; Lindsay 1995.

1.2 Habitat status

Blanket bog has a requirement for a very specific climatic range in order to develop, characterised by oceanic conditions. This results in blanket bog having a very restricted global distribution. Britain and Ireland are regarded as the 'type' regions for blanket bog holding around 13% of the total world area. Blanket bog is listed:

- as a habitat of Principal Importance in England under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006; and
- under Annex I of the Habitats Directive, with active blanket bog a priority habitat.

Blanket bog has been assessed as Near Threatened in the European Red List of Habitats, while some of the component habitats of blanket mire ecosystems are identified as being at higher risk.

The five (South Pennine Moors was classified in two phases) upland Special Protection Areas (SPAs) in England have a large component of the habitat made up by blanket bog with the following breeding species making up the reasons for classification – hen harrier, peregrine falcon, merlin, short-eared owl and golden plover. Additional qualifying breeding bird species are acknowledged to occur within the existing SPAs.

Sources: Lindsay and others 1988; Stroud and others 2001.

1.3 Ecosystem context

Blanket bog, by definition, occurs as a landscape-scale feature and is part of the wider mosaic of habitats in the uplands of England, often forming the dominant land cover over large areas. Whilst geology, landform and hydrology are key drivers of upland habitats (especially blanket bog), altitude, aspect and soil also influence the development of other habitats, all of which can be further shaped by anthropogenic activity. Some of these habitats are globally rare and are particularly well represented in the UK.

Rather than individual stands of vegetation, the habitat exists as extensive tracts of peat-dominated landscapes within which the individual peatland units form interconnected complexes (macrotopes) while also displaying a complex assemblage of surface patterns (many of which may consist of a very simple pattern or even consist of a single dominating structural element) within which areas of other vegetation types including minerotrophic, especially soligenous, elements (including spring, flush, acidic and basic fen), pools, and transitions to wet heath and non-peatland vegetation (particularly dry heath) are included as functional components of the system as a whole. Areas of deeper peat that may have originally developed as individual raised bogs often occur within the blanket peat/mire complex but cannot readily be distinguished from other areas of deep peat which may have formed across gently sloping watershed plateaux. Areas of very deep peat are most likely to display the most complex surface patterns and often support a range of species characteristic of wetter bogs. In situations where the conditions are conducive to the growth of raised bogs out of their original confines, leading to the fusing of adjacent peat bodies but not an entire covering of the landscape, a form of peatland known as ‘intermediate mire’ develops - that is, ‘intermediate’ between raised and blanket bog. It may, however, be more accurate to recognise that these systems comprise both types of mire rather than being intermediate between them, and, in supporting morphological features and species of both types, are therefore of particularly high conservation value. This form of mire is relatively limited in distribution, largely along the England/Scotland border, and presents various definitional challenges.

The minerotrophic element of blanket mire ecosystems is associated with inputs of water from groundwater outflow or surface run-off from surrounding mineral ground. This gives rise to a wide variety of wetland types, depending on hydrochemistry, topography and other variables. Some of these habitats are of high conservation concern in their own right, including Annex I type H7140 Transition mires and quaking bogs, which occur in particularly wet situations where a quaking surface may develop over of a body of water, and in places where base-rich water merges with the more acidic water draining from the ombrotrophic bog. These wetlands are important in both sustaining the overall hydrological integrity of the entire bog system and also in providing niches for a much wider range of plant and animal species than can survive in the very acidic and low nutrient conditions of the bog. They form a fundamental part of the whole blanket bog ecosystem.

Undamaged blanket bogs show a complex pattern of variation related to climatic factors, particularly illustrated by the variety of patterning of the bog surface in different parts of the UK. Such climatic factors and subsequent degree of patterning also influence the floristic composition of bog vegetation. Many of the bogs in the Hebrides and Northern Ireland have affinities to types in western Ireland and thus exhibit more oceanic aspects of the range of variation, while those sites towards the eastern limit of blanket bog formation show more continental affinities. However, over much of the resource, and particularly in England, the vegetation in bog ecosystems is so damaged by human activities that much of this element of bog diversity is no longer present.

Annex 1 habitats that are associated with blanket bog as part of the upland habitat mosaic in England are listed as follows:

- H4010 Northern Atlantic wet heaths with *Erica tetralix*
- H4030 European dry heaths
- H4060 Alpine and Boreal heaths
- H4080 Sub-Arctic *Salix* spp. scrub
- H6150 Siliceous alpine and boreal grasslands
- H6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)
- H6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
- H7110 Active raised bogs
- H7120 Degraded raised bogs still capable of natural regeneration
- H7140 Transition mires and quaking bogs
- H7150 Depressions on peat substrates of the *Rhynchosporion*

- H7220 Petrifying springs with tufa formation (*Cratoneurion*)
- H7230 Alkaline fens
- H8110 Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*)
- H8120 Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*)
- H8210 Calcareous rocky slopes with chasmophytic vegetation
- H8220 Siliceous rocky slopes with chasmophytic vegetation
- H19A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles.

Sources: Lindsay 1995; JNCC: Common Standards Monitoring Guidance for Upland habitats.

2 Units and attributes

2.1 Natural range and distribution

Geographic areas:

Because blanket bog occurs at a landscape scale, distribution is defined in terms of blocks of land in the uplands. These areas can be individually defined using a combination of altitude, peat soil mapping and vegetation data (subsequently incorporated within the Natural England Priority Habitat Inventory).

2.2 Extent

Hectares.

2.3 Structure and function attributes

Structure and function attributes for H7130 Blanket bog are defined in the Special Areas of Conservation (SAC) feature frameworks that underpin Supplementary Advice to Conservation Objectives. These attributes have been developed to be relevant at the scale of an entire SAC, taking into account the wider landscape-scale requirements for site functionality. These attributes are also applicable to locations of blanket bog outside protected sites (each location) and national metrics for favourable structure and function are specified.

Structure attributes

- Extensive development of natural micro-structures and micro-landscapes formed by a surface layer capable of peat formation.
- Extensive vegetation cover with species typically associated with peat formation.
- Absence of bare peat, whether in micro-erosion networks, gullies or flats or other erosion features.
- Limited presence of tussock growth forms.
- Vegetation composition.

Structure attributes reflect the type of vegetation present. Healthy blanket bog has a hummock/hollow microtopography that develops through the differing ability of individual plant species to tolerate immersion in water when the water-table is close to or at the surface of the peat. Damaged blanket bog will often have areas of bare peat, with a low-lying surface vegetation, that is the result of dominance by one plant species, for example heather, that occurs in conjunction with the drying of the upper peat layers.

Function attributes

- Hydrology
- Soils/peat
- Air quality
- Management.

These attributes can be described as physical factors that dictate if a blanket bog is able to act as a bog (see Lindsay 2010 and for what follows). In order for blanket bog to function, it requires water levels in the peat to be permanently at a level which maintains the peat of the catotelm in a permanently waterlogged state. Artificial drainage, for example, dries surface peat and lowers the bog water table into the catotelm. It also changes the composition of microtope micro-landscape features and micro-landscape elements, often by altering vegetation composition, consisting of loss of *Sphagnum* species and acrotelm function. This in turn leads to more rapid water loss, drying of peat causing oxidation and the loss of substrate and carbon as well as subsidence of the peat surface through compaction caused by water loss and actual loss of peat material either through erosion or oxidation to the atmosphere. Atmospheric deposition of pollutants including, historically, sulphur dioxide, and more recently nitrogen compounds, can have a severe impact upon the natural vegetation of blanket bog. Impacts include loss of typical bog species, particularly lower plants, through direct toxicity, as well as through a fertilising effect which alters the balance of the typically very low-nutrient bog environment by favouring the growth of certain species over those bog 'specialist' species that are unable to respond to higher nutrient conditions. Management of blanket bog can negatively affect the function of the habitat by introducing drainage, loss of the feature through construction of infrastructure, for example tracks, and damage to vegetation through heavy grazing, burning and vehicle use.

Sources: Lindsay 2010; Lindsay and others 2014; Finlayson and others 2017; Joosten and others 2017.

3 Evidence

All blocks of evidence are assigned one of three confidence levels (High, Moderate, Low), based on the quality of the evidence, its applicability and the level of agreement.

The matrix in Figure 1 is used to assess the confidence level assigned to blocks of evidence. White = High confidence; Light blue = Moderate confidence and Dark blue = Low confidence.

Limited evidence Strong agreement	Medium evidence Strong agreement	Robust evidence Strong agreement
Limited evidence Medium agreement	Medium evidence Medium agreement	Robust evidence Medium agreement
Limited evidence Weak agreement	Medium evidence Weak agreement	Robust evidence Weak agreement

Figure 1 Matrix used to assign confidence to blocks of evidence (after IPCC 2010).

Quality of evidence is defined as follows:

Robust evidence is that which has been reported in peer-reviewed literature, or other reputable literature, from well-designed experiments, surveys or inventories that shows signs of being applicable generally.

Medium evidence is that reported from well-designed experiments, surveys or inventories but from only one or a small number of sites, with uncertainty over its more general applicability, or is correlational or circumstantial evidence.

Limited evidence includes ‘expert opinion’, based on knowledge of ecological factors that plausibly suggest an effect, but there is no circumstantial or direct evidence available.

Agreement is defined as follows:

Strong agreement is consensus across the literature and amongst those with expertise on the habitat or species.

Medium agreement is common consensus across the literature and amongst experts but there are some differing papers or reports and/or some differences of opinion.

Weak agreement is little consensus across the literature and amongst experts and, possibly, many different findings and/or opinions.

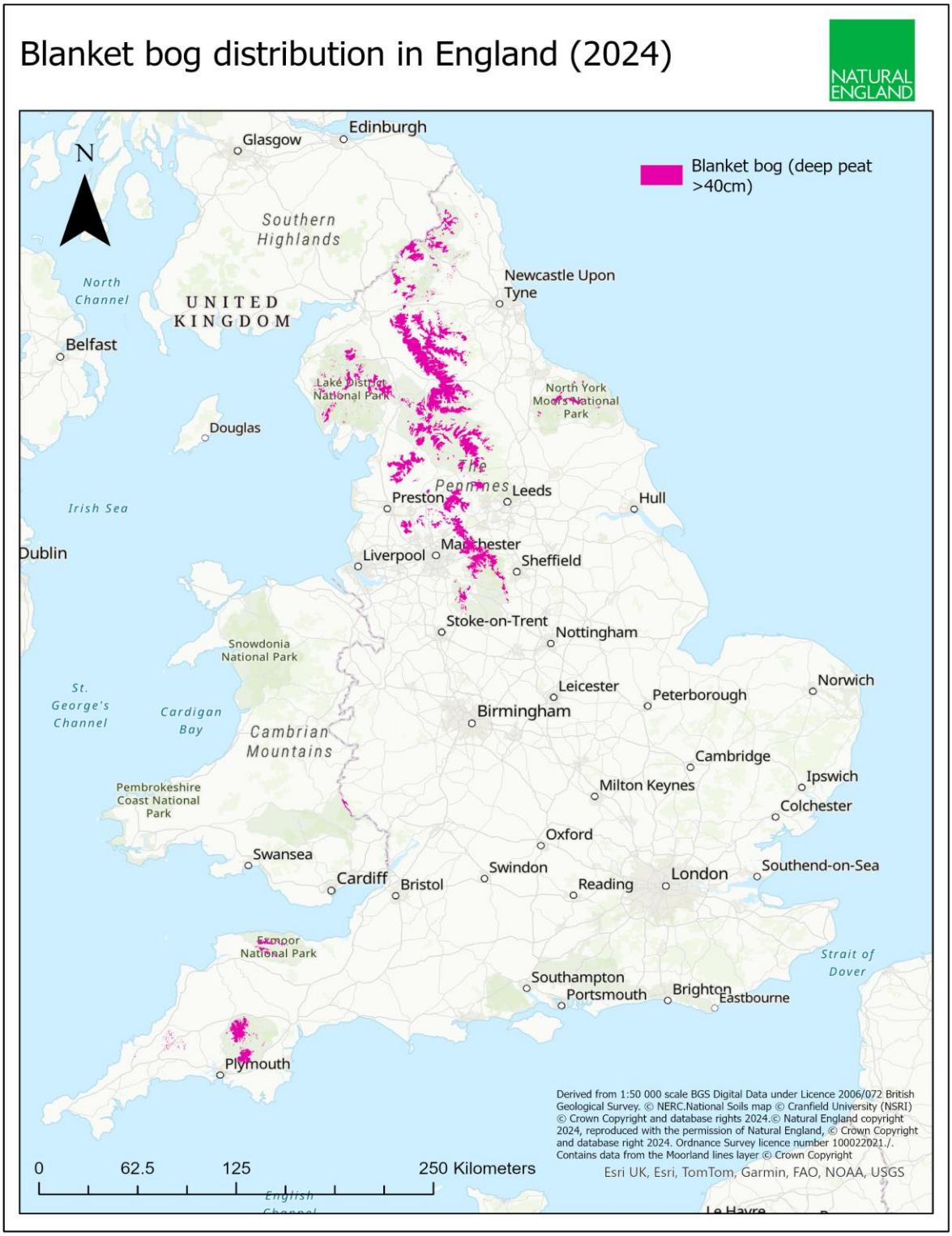
3.1 Current situation

Natural range and distribution

Blanket bog is found within the following upland areas:

- the Lake District
- the Pennines (including North, South, West, Yorkshire Dales and Peak District)
- Northumberland (including the Cheviot Hills and the Border Mires)
- the North York Moors
- the Bowland Fells
- the Black Mountains
- Exmoor, and
- Dartmoor.

On Bodmin Moor, M17-related vegetation occurs in locally in topogenous (valley mire) rather than ombrogenous situations (for example, Wilson & Wheeler 2016). Though other areas of deep peat in Cornwall shown on Map 1 are within the Moorland Line, they are in the Disadvantaged Area, rather than the Severely Disadvantaged Area which is normally used to define the uplands. They are unlikely to relate to blanket bog.



Map 1 Blanket bog distribution in England: Deep peat within the Moorland Line (2024).
Source: Natural England. 2024a. England peat status and Moorland Line datasets.

Confidence

High

Extent

The area mapped as blanket peat in the England's Peatlands report (Natural England 2010) is circa 350,000 ha. However, there are various estimates of extent reflecting incomplete mapping, inaccuracies (in part due to widespread transitions to fen, wet and dry heath and some grasslands) and different data sources ranging from vegetation and habitat mapping to soils maps and combinations of them.

The area of blanket bog in England has been estimated as the area of deep peat within the Moorland Line (this excludes areas of forestry), based on current peat maps where deep peat is defined as 0.4m depth (Map 1). This is approximately 320,914 ha. The Moorland Line has been used to define the area of upland peat, as deep peat outside the Moorland Line is potentially another habitat. The revised definition of blanket bog of greater than 0.3 m peat depth adopted in the habitat definition (3.1) will likely increase the area figure for the habitat. A definitive peatland map for England is currently in production which will provide an opportunity to address this issue.

Confidence

Moderate

Patch size and connectivity

Blanket bog is a landscape-scale feature and will occur wherever the hydrological conditions are right for its formation in the uplands. Patch size is of minimal importance for this habitat compared to others.

Confidence

High

Quality of habitat patches

By and large, English blanket bog is heavily modified such that the characteristic microtopography is reduced or absent and this is reflected in the dominance of certain vegetation communities such as M19 and M20. For historic reasons, some areas have seen the characteristic blanket bog vegetation replaced by single dominant species, in particular heather *Calluna vulgaris* or purple moor-grass *Molinia caerulea*. These areas are still regarded as blanket bog, albeit in modified or degraded condition.

Currently, 11% of blanket bog is considered to be in favourable condition within SSSIs (source: Natural England 2025 Site Search).

The major structure or function requirement that is not met for blanket bog is hydrology. Artificial drainage and burning (both management and wildfire) have negative effects upon the hydrology of blanket peat.

The physical structure and soils attributes are adversely affected by management, particularly burning, and wildfire. Vegetation composition and structure may also be adversely affected by grazing and burning management. The effects of air pollution are pervasive. Rowe and others (2021) found that on designated sites (SACs, SPAs and SSSIs) in England almost all the area of bog exceeded acidity critical loads and the whole area exceeded nutrient nitrogen critical loads. This includes all types of bog, but predominantly blanket bog.

Sources: Rodwell and others 1991; Averis and others 2004; Glaves and others 2013; Martin and others 2013; Brown and others 2014; Noble and others 2018; Natural England data.

Confidence

High

Threatened species

Birds of Conservation Concern red list: dunlin, black grouse, hen harrier, curlew, merlin and ring ouzel.

Birds of Conservation Concern amber list: short-eared owl and meadow pipit.

England vascular plant red list: great sundew *Drosera anglica* (Endangered), bog sedge *Carex limosa* (Endangered), common cottongrass *Eriophorum angustifolium* (Vulnerable) and cross-leaved heath *Erica tetralix* (Near Threatened).

Priority species (from NERR024) that are known to occur on blanket bog are listed below. Some of them, for example, curlew and black grouse are subject to bespoke recovery projects.

- *Numenius arquata arquata* curlew
- *Tetrao tetrix britannicus* black grouse
- *Vipera berus* adder
- *Zootoca vivipara* common lizard
- *Coenonympha tullia* large heath
- *Notioscopus sarcinatus* a money spider
- *Semljicola caliginosus* a money spider
- *Aplodon wormskjoldii* carrion moss
- *Splachnum vasculosum* rugged collar-moss.

The following species are currently restricted in their distribution and abundance and would be expected to increase when all area of blanket bog achieves favourable conservation status: *Sphagnum* species.

The following vegetation types are currently less common or widely distributed than would be expected when all areas achieved favourable conservation status: M1, M2, M17 and M18.

Sources: Pearsall 1941; Chapman 1964; Chambers and others 1999; Webb and others 2010; Stroh and others 2014; Eaton and others 2015; Wheeler and others 2020.

Confidence

High

3.2 Historical variation in the above parameters

The range and distribution of blanket bog habitat in England has remained largely stable. There have, however, been recorded losses in area due to small scale development (for example, track construction, wind-farm development, grouse butt construction and peat cutting), agricultural improvement and afforestation. The largest single loss of area of blanket bog is likely to have occurred with the establishment of Kielder Forest and afforestation more widely in the Border Mires, which led to comprehensive drainage of entire peatland landscapes and afforestation of approximately 25,000 ha of blanket and intermediate bog.

Whilst the underlying peat bodies of most areas remain, there have been substantial losses especially on some of the fringes as a result of agricultural land claim and afforestation, and extraction of peat for fuel since at least medieval times. In some places at the southern extent of the range, such as in the Peak District, Bowland Fells and Welsh borders, some areas of peat have been completely lost.

Historic wildfires, atmospheric deposition, rotational burning, drainage and livestock grazing have all impacted upon the quality and, to a certain degree, the quantity of the habitat. However, in recent years there has been some amelioration in the effects of atmospheric deposition. Whereas the area affected by exceedance of acidity and nutrient nitrogen critical loads has changed little since the period 1995-1997, the magnitude of the exceedance has declined. The magnitude of acidity critical loads has declined by 60% and nutrient nitrogen exceedance by a third (Rowe and others 2021).

From World War II until circa 2006, many areas were subject to extensive gripping (drainage channels) in addition to rotational burning of vegetation and, in some places, high stocking densities. Few areas were unaffected by these impacts.

Natural range and distribution

The current range (as opposed to extent) is considered to represent the favourable range of the habitat in covering the geographic variation in the habitat within England. However, there are some upland areas particularly on the fringes of the natural range, such as the Shropshire Hills, that are known to have once held blanket bog and where land use has almost entirely removed the habitat (Woods 1993). In this area and elsewhere on the

Welsh borders, notably the Black Mountains, the natural range of blanket bog extends into Wales.

Extent

The extent of blanket bog has declined, although it is not possible to put a figure on the size of the decline. Current mapping of areas of peat indicate that the loss is considerable. The completion of the currently ongoing England Peat Map Project should provide a clearer picture of the size of the loss of blanket bog.

Quality of habitat patches

Pollen and carbon analysis, as well as old botanical records, show that the current vegetation found across most of English blanket bog is atypical of that found over the course of the development of the peat body, with increases in *Calluna vulgaris* and *Molinia caerulea* being especially pronounced in the last 200 years. Prior to this, declines in some species and the distribution of *Sphagnum* species have also been recorded. The exact reasons for these declines are not fully understood, but historic atmospheric deposition resulting from increased human populations and activity near bogs is likely a significant factor, possibly acting alongside changes in climate.

In addition, intensification in land management practices throughout the 20th century led to a significant decline in habitat quality, in terms of both species' losses and mire function, the two being inextricably linked. Pearsall (1941) describes widespread loss of M18 wet mire type vegetation across the Stainmore Mosses in Co. Durham to *Calluna* and/or *Eriophorum vaginatum* dominated vegetation as a result of burning for grouse moor establishment and drainage/grazing. Chapman & Rose (1991) and Adamson (pers. comm. 2019) also report the loss of large areas of *Erica-Sphagnum* (M18) bog to vegetation of drier conditions following extensive drainage and afforestation of an 'intermediate' mire and its catchment in Northumberland.

Sources: Pearsall 1941; Tallis 1964; Chapman & Rose 1991; Graham 1993; Robinson and others 1998; Ardron 1999; Chambers and others 1999; Ratcliffe 2002; Anderson and others 2014; McClymont and others 2014; Gillingham and others 2016; Heinemeyer and others 2020.

Confidence

High

3.3 The future for the habitat and its conservation

Whilst air pollution appears to be declining, acidity and nutrient nitrogen critical loads for blanket bog are exceeded almost everywhere. Nevertheless, recovery in habitat quality is measurable at some sites, in particular where hydrological restoration measures have been put in place and damaging activities have ceased. *Sphagnum* reintroduction projects so far do not seem to be showing signs of adverse effects of deposition, that is to say, at

the present time, atmospheric deposition does not appear to be a limiting factor in the reintroduction of some *Sphagnum* species (Benson and others 2021).

Land management practices including grazing and burning continue as widespread effects on condition of blanket bog. There have also been significant areas affected by wildfire.

Douglas and others (2015) estimated that there was circa 278 km^2 of deep peat in England that demonstrated signs of being rotationally burned. Thacker and others (2015) identified that more than 33 km^2 of new burns on upland deep peat took place annually in England at the time (out of circa 84 km^2 in total including upland heath). Both sets of authors stressed that the data are likely to be an under-recording of the true extent of burning. The total area burned is considerably larger than the area affected annually by wildfire in the uplands in England (mean circa 12 km^2 ha per year over the same period, 2009– 2017, Glaves and others 2020).

Large areas of the English uplands, including areas of blanket bog, are subject to livestock grazing. There are fewer grazing animals now than before headage payment subsidies ended in 2005. Future trends in livestock numbers are uncertain but grazing management is not required to maintain blanket bog, so further reduction or cessation of grazing is not a threat to this habitat.

Added to these areas should be those that are or have been subject to other damaging practices such as drainage for which there is currently little accurate spatial data, either in terms of what restoration has taken place or what remains outstanding. However, considerable efforts have been made to block drainage channels in the last 15 years with much work still ongoing.

A large area of blanket bog in northern Cumbria and Northumberland is subject to afforestation that commenced after World War II. Whilst the centres of the best known mires remained unplanted, they occurred as islands within the forest and were exposed to damage through drainage aimed at promoting and managing the planting or extraction of timber and self-seeding by the adjacent trees. The management issues around these sites are well understood and subject to ongoing discussion. Climate change models suggest potential loss of blanket bog solely in response to climatic factors. However, the botanical data from the peat archive indicates changes in bryophyte composition in response to past climate shifts with different species coming to the fore depending upon the climate at the time. This suggests that a scenario of maintenance of the habitat is a reasonable expectation, albeit with changes in species composition. Restoration will improve the resilience of the habitat to climate change, though unrestored, severely degraded sites on the edge of the rainfall envelope may not be recoverable in the future.

There are potential impacts on the habitat from increased nitrogen deposition in particular upon bryophyte quality and quantity as well as potentially shifting conditions to those that favour graminoids.

Natural range and distribution

Maintenance of the current range will ensure maintenance of the habitat in the future, including the variation that is associated with different geographic areas.

Extent

The current area is sufficient to maintain the associated biological diversity and variation in the habitat and protect against catastrophic events but is probably a poor representation of the natural ecosystem diversity of the habitat, as can be seen within even very recent parts of the peat archive (for example Chambers and others 1999, 2006). In terms of carbon storage, water quality and reduction of flood risk, there is significant opportunity to restore former areas of blanket bog to a hydrologically and ecologically functioning state, particularly around the fringes of the current surviving areas. Areas shown in pink on Map 1 represent areas on deep peat that are identified as blanket bog. Areas which are currently mapped as heath or grass habitats on the Priority Habitats Inventory (PHI) or are not identified as a Priority Habitat, represent areas of modified blanket bog on deep peat (Natural England. 2024b). These are opportunity areas for the restoration of functioning blanket bog. For the purpose of this definition, peat depth was selected as a representation of blanket bog due to the potentially misleading classification of habitats based on vegetation in PHI.

Quality of habitat patches

Where peat formation is restored, through reinstatement of near surface water levels, and in the absence of activities that damage the acrotelm, the expectation (from the peat archive) is that blanket bog will move onto a trajectory that over time will lead to recovery. Sites which are more degraded may need additional intervention to assist with this recovery.

This means that for favourable conservation status all blanket bog habitat (100%) should have active peat formation to halt further degradation. This means a minimum standard condition for all areas is:

- The peat substrate should consist of both active acrotelm and catotelm (the body of compressed peat below the acrotelm that slows down water movement and forms a mound of saturated peat) layers.
- Natural hydrological processes are operating across all components of the mire landscape in the absence of anthropogenic modification, providing consistently near-surface water levels (fluctuating within acrotelm, whilst catotelm is permanently waterlogged).
- Vegetation cover should be made up of typical blanket bog species.

Areas that meet these requirements are expected to gradually improve over time and eventually achieve favourable condition, where there is no land management or only management to restore functional hydrology and reintroduce key species.

The restoration of blanket bog through appropriate management would lead to conditions that would favour the natural expansion of the current distribution of fauna and flora that are currently restricted.

Sources: Tallis 1964; Clymo 1984; Martin and others 2013.

Confidence

Moderate

3.4 Constraints to expansion or restoration

Blanket bog generally occurs away from areas of urban-related development, for example, industrial parks, motorways etc. However, this habitat can be affected by developments in the form of wind turbines, vehicle tracks, huts or grouse butts that can all contribute to its degradation.

There are reports from north-west Scotland of blanket bog formation taking place in areas where the peat had been previously removed as the result of crofting activity (R. Lindsay, pers. comm.). This has not been recorded within England so that currently the view of Natural England is that re-creation of blanket bog, where it has been completely destroyed, seems unlikely. Restoration of degraded areas of bog, however, is taking place across much of the resource. Establishing the correct hydrological regimes is the key factor. There is increasing work on the type of vegetation and environmental requirements of vegetation in relation to re-establishing peat-forming processes. Natural England Evidence Review (NEER003) *Restoration of degraded blanket bog* (Shepherd and others 2013) states that:

> “This topic review has found no examples of unrestorable bogs, where conditions for growth and recovery of bog species are either not prohibitive or amenable to management.”
>
> “There is no evidence in this review to suggest any areas of peat are completely unrestorable.”

The consensus is that the peat archive indicates that blanket bog has the capability for healing itself and adapting to a changing climate provided that the environmental and physical conditions are intact. Until shown otherwise, Natural England’s approach is that all blanket bog is regarded as being capable of restoration to an active status. This is a climax habitat and should not require active management once it is in favourable or recovering condition.

Sources: Clymo 1984; Grace and others 2013; Shepherd and others 2013; Douglas and others 2015.

Confidence

High

4 Conclusions

4.1 Favourable range and distribution

The favourable range and distribution is the current range and distribution of the habitat.

Condition monitoring (incorporating additional technology, for example, remote sensing and aerial imagery) should be used to ensure no loss of extent of the habitat and that the appropriate extent and composition of vegetation is found within sites.

4.2 Favourable extent

The favourable area is the current area of deep peat within the Moorland Line including semi-natural vegetation in one of the recognised mire NVC communities on deep peat or degraded forms including heath-like vegetation, that is 321,000 ha.

4.3 Favourable structure and function attributes

All attributes are applicable to designated and non-designated sites as this is a habitat that requires complete hydrological integrity to be present in order for it to function properly.

Structure attributes

Table 2 Structure attributes

Structure attributes	**England**	**Landscape**	**Protected sites (71%)** **Outside Protected sites (29%)**
Bare ground	No bare ground across the habitat extent.	No bare ground visible from aerial photos or when viewed from a distance.	No bare ground.
Vegetation structure	95% of area in target condition.	One vegetation type, for example *Calluna vulgaris*, should not dominate the vegetation community.	Dwarf-shrub shoots, especially early-stage growth, should not show signs of excessive grazing. No signs of trampling by animals.

Structure attributes	England	Landscape	Protected sites (71%) Outside Protected sites (29%)
		Intact transitional areas with valley mires, wet heaths, flushes and springs.	No signs of damage caused by vehicles. Bog surface should exhibit discernible patterning at the local scale, characteristic structural variation or micro-topography with niches to accommodate both aquatic and terrestrial *Sphagnum* species.
Vegetation composition	Development of the full range of vegetation types, characteristic of an intact hydrological regime across the mire.	Blanket bog vegetation contributes to a diverse vegetation mosaic at the mesotope level.	Characteristic vegetation community composition having key indicator species*. *Sphagnum* should be frequent (not just *S. fallax*) and cover should be high. Three key indicator species* should make up at least 50% of the vegetation cover. *Eriophorum vaginatum*, Ericaceous species or *Trichophorum* should not individually exceed 75% cover. Low cover of undesirable species, scattered trees or shrubs.

Function attributes

Table 3 Function attributes

Function attributes	England	Landscape	Protected Sites (71%) Outside protected sites (29%)
Hydrology	Functioning natural hydrological regimes.	Naturally high water table. Natural drainage patterns. Natural transitions between different water sources.	No artificial drainage.
Soils/peat	Undisturbed, hydrologically intact with active carbon sequestration and peat accumulation.	No peat erosion as a result of anthropogenic activities. Presence of characteristic properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungi:bacteria ratio.	No signs of poaching by animals. No signs of peat damage caused by vehicles. Presence of characteristic properties of the underlying soil types, including structure, bulk density, total carbon, pH, soil nutrient status and fungi:bacteria ratio. Natural hydrological processes providing consistently near-surface water levels (each location).
Air quality	Concentrations and deposition of air pollutants to at or below the habitat-relevant Critical Load or Level values	Regional emissions not contributing to atmospheric deposition.	No signs of nutrient enrichment (for example, singular species dominance).

Function attributes	England	Landscape	Protected Sites (71%) Outside protected sites (29%)
	(each location unless evidence improves).		
Management	There are appropriate resources to ensure sites receive the management they require to achieve or maintain favourable condition. There is evidence to support the management options.	Fully functioning blanket bog is a climax habitat that does not require management intervention. Until the site is fully functioning, management interventions may be needed to fix outstanding drainage issues, inappropriate grazing levels or burning.	Management is in place to achieve or maintain target condition in the long term. Inappropriate management such as rotational burning, drainage or unsustainable levels of grazing have been removed.

***Key indicator species:** *Andromeda polifolia, Arctostaphylos uva-ursi., Betula nana, Carex bigelowii, Calluna vulgaris, Cornus suecica, Drosera species, Erica species, Empetrum nigrum, Eriophorum angustifolium, E. vaginatum, Menyanthes trifoliata, Myrica gale, Narthecium ossifragum, non-crustose lichens, Pleurocarpous mosses, Racomitrium lanuginosum, Rubus chaemaemorus, Rhynchospora alba, Sphagnum species, Trichophorum germanicum* and *Vaccinium species.*

Quality of habitat patches

At least 95% of the favourable area of the habitat meets the structure and function requirements as described above.

Threatened species

All species partially or wholly dependent on this habitat should be Least Concern, when assessed using IUCN criteria (or considered to be Least Concern if not formally assessed), as regards to this habitat.

Condition is monitored using Common Standards Monitoring (CSM, JNCC 2009) but not routinely outside of SSSIs (though there have been periodic sample surveys) and it does

not cover all of the above attributes particularly those relating to function. Not all of these attributes need to be actively monitored at each location (for example, fungi:bacteria ratio; air pollution) and some attributes may be measured through remote sensing in the future (for example, scrub or tree cover). Blanket Bog is generally classed as in 'favourable condition' locally if more than 90% of the area is achieving the targets set out in site relevant Favourable Condition Tables (based on CSM tailored to the site). The following describes favourable structure and function at a national level:

- Natural development of climax bog vegetation should continue (or have the potential) to accumulate peat in the absence of damaging activities with management interventions only occurring where they are necessary to restore functional hydrology or reintroduce key species.

- The acrotelm should be hydrologically intact and functioning naturally ensuring that the integrity of the peat is secured and the vegetation composition is able to adapt to natural climatic and physical processes.

- Optimum area and distribution of appropriate mire vegetation is key with peat forming species such as *Sphagnum* and *Eriophorum*.

- Optimum distribution and abundance of characteristic fauna.

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Appendices

Annex 1. Blanket bog and peat definitions

Alistair Crowle and David Glaves

Introduction

Peat is a material that has accumulated in situ and consists of at least 30% (dry mass) of dead organic material (Joosten and others 2017). A peatland is an area with a naturally accumulated peat layer at the surface and a mire is a peatland with vegetation that forms peat (Joosten and others 2017). Blanket bog is both an (ombrogenous) type of mire and a peatland. Very often, these terms are used interchangeably but, on occasion, they can have a specific meaning.

The use of peat depth to define blanket bog

Definitions of peatlands have been based on soil and geological descriptions or inferred from information on vegetation description and hydrological processes (JNCC 2011). The mapping of the distribution and extent of blanket bog presented in Map 1 (in the Natural England Blanket bog FCS definition) is based on the England peat status dataset (Natural England 2024a), within the Moorland Line with the soil mapping based on 40 cm depth of peat. This will be updated as more accurate maps become available.

There are differences between the depth of peat used to define ‘deep peat’ in the various country Soil Survey classifications. In England and Wales, it is greater than 40 cm, in Scotland greater than 50 cm (“peat soil” and greater than 100 cm “deep peat”) and in Northern Ireland greater than 50 cm (JNCC 2011). Nevertheless, as an unintended consequence, 50 cm became widely adopted across the UK as one of the criteria used to define blanket bog habitat, for example, in ‘Phase 1’ habitat survey (NCC 1990), Common Standards Monitoring guidance for upland habitats (JNCC 2004 and what follows) and in the Higher Level Stewardship Farm Environment Plan (Rural Development Service 2005 and what follows). The UK BAP Habitat Action Plan (HAP) for blanket bog (UK Biodiversity Group 1999, JNCC 2008) noted that:

> “Peat depth is also very variable, with an average of 0.5 - 3 m being fairly typical but depths in excess of 5 m not unusual. There is no agreed minimum depth of peat which can support blanket bog vegetation. It includes the EC Habitats Directive priority habitat 'active' blanket bog, the definition of active being given as 'still supporting a significant area of vegetation that is normally peat forming.”

The largest area of blanket bog in Britain is found within Scotland and the production of the UK BAP Blanket Bog Habitat Action Plan was led by the then Scottish Natural Heritage (Richard Lindsay pers. comm.). Soil mapping in Scotland was historically focused upon looking for suitable forestry sites but after World War II, the emphasis moved from forestry to agricultural use (A. Lilly, pers. comm.). Peat mapping recorded soil depths as less than

50 cm, 50–100 cm and greater than 100 cm (A. Lilly pers. comm., JNCC 2011). It has been suggested that this split was based upon the different vegetation communities that were found on peatland either side of this depth (A. Lilly pers. comm.). In the same period, Planning Authorities often used 50 cm as the depth of peat to be left for restoration of lowland peatland sites following extraction of peat for horticultural purposes (Lindsay & Clough 2016).

In England and Wales, the Soil Survey used 40 cm depth as part of the definition of deep peat soil. It is believed that this survey was also originally conceived to map soils for agricultural potential (A. Colclough pers. comm.) with the definition of peat soils being based upon an O horizon (top layer) requirement of 40 cm organic matter or 30 cm where it occurs over bedrock or extremely stony material (Avery 1973, A. Colclough pers. comm. 2021). Hannam and others (2021) note, however, that "since the earliest decades of the 20th Century, soil classification has always been based on fundamental soil properties for example soil texture, structure, organic matter content, colour and Calcium Carbonate content. The classification was developed to be applied in general purpose surveys of both cultivated and uncultivated land. The link with agriculture and other uses of soil has always been very strong but, at the primary classification level, the productivity/use of the soil in agricultural terms is not the predominant classification issue." Despite the existence of the Soil Survey of England and Wales, the 50 cm depth to identify blanket bog remained in common usage in England until the production of the Blanket Bog Restoration Strategy (Natural England 2015) and Blanket Bog Land Management Guidance (Uplands Management Group 2017), which used a peat depth of 40 cm. This change was made in part in recognition of the fact that the Soil Survey provided the only national map of deep peat available for England at the time.

It appears clear that the use of 40 cm and 50 cm to define blanket bog is a soil classification definition based upon soil mapping protocols rather than an ecological definition. Joosten and others (2017) report that internationally, different countries variously define peatlands using depths of 20, 25, 30, 40, 45, 50, 60 or 70 cm of peat. In addition, in the UK, 10 cm (to 40 cm) is used to define shallow peats in soil mapping (JNCC 2011). However, a commonly used depth for the definition of peatland is 30 cm (for example, Kivinen & Pakarinen1981). Joosten and others (2017*)* point out that the roots of most peatland plants are found within the top 30 cm. This being the case, it is axiomatic that most of the vegetation on blanket bog must obtain its required nutrients via precipitation rather than from any underlying mineral soils. It is worth noting that Joosten and others (2017) and Joosten & Clarke (2002) treat the terms "mires" and "peatlands" similarly.

In 2020, Natural England's Science Advisory Committee supported a proposal made by Natural England upland/peatland specialists that the definition of blanket bog should use a peat depth of 30 cm based upon ecological factors rather than the 40 or 50 cm depths that were derived from soil mapping classifications. The proposal was consistent with the definition of peatlands adopted in the UK Peatland Strategy (IUCN 2018): "A wetland soil composed largely of semi-decomposed organic matter deposited in-situ, having a

minimum organic content of 30% and a thickness greater than 30 cm", which was based on Finlayson & Milton (2016).

The proposed move to a 30 cm peat depth definition for blanket bog aims to adopt an ecological definition which is more consistent with wider use in Europe and other countries beyond. Peatlands are wetland habitats that require water to function, so in determining the extent of blanket bog, it is important to consider whole blanket peat masses in terms of hydrologically connected units. Within these units, there may be areas of peat that are shallower than 30 cm which can be due to a range of factors such as underlying geology/landform or past land use.

It is uncertain what difference a move to 30 cm will make in terms of the mapped area of blanket bog in England given in this report (based in part on 40 cm peat depth from soil mapping), though it will inevitably increase the area (and result in corresponding declines in the area of heath, especially wet heath, and potentially other habitats) but the England Peat Map Project currently underway should be able to answer to this question in due course.

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