

Priority open habitats and woodland creation

A field guide (2020)



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forestry.gov.uk/england-woodlandcreation



1 Purpose

This booklet accompanies the Forestry Commission operations note 043: "Principles for afforestation on or near priority habitats" (published in February 2018) to clarify the principles to be adopted when considering woodland creation on or near priority habitats (as defined by Section 41 of the NERC Act 2006). In addition to providing an overview of those priority open habitats most likely to need consideration during the planning and assessment of woodland creation proposals, the document also provides an insight into assessing their condition and addresses the associated surveys that may be required to establish a sites current habitat status and condition.



2 Background

4/5

There are approximately 1.1 million hectares (ha) of non-woodland priority habitats in England encompassing a wide variety of habitat types from coastal saltmarsh and wildflower rich grasslands to montane heath and blanket bogs. Whilst historic losses and habitat fragmentation have rendered such habitats a scarce resource they form a critical component of our resilient landscapes and habitat networks, collectively supporting over 1000 species recognised as conservation priorities. Maintenance and restoration to good condition of such habitats is a key policy priority and is central to nature's recovery.

Being able to identify these habitats is critical to ensuring their protection, in part because our knowledge of their location and extent is imprecise and varies with habitat type and region.

According to the sensitivity mapping carried out to inform the Environmental Impact Assessment (EIA) threshold changes in 2017 around two million hectares of land in England has been identified as 'low risk' i.e. the land does not contain any recorded priority habitats or other nationally sensitive features such as prime agricultural land. The sensitivity mapping extends to the whole of England; woodland creation proposed in the low risk component of the mapping is likely to require less supporting evidence and be able to follow a simpler regulatory path. That said, it is important to recognise that non-woodland priority habitat may still be present within this 'low risk' area due to the incompleteness of national priority habitat inventories and exclusion of certain habitats e.g. wood pasture and parkland.

Areas containing priority habitats are identified as 'high sensitivity' to woodland creation and so are excluded from the mapped area for low risk. Whilst woodland creation may be possible in these high sensitivity areas, proposals must consider fully the sensitivities of the site in determining suitability and in the woodland design.

The EIA process¹ will assess the woodland creation proposals to ensure they do not create damaging or irreversible impacts on the wider environment. The principles that follow summarise and provide guidance as to how this can be achieved.

¹ <https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/>



3 The principles underpinning woodland creation on or near priority open habitats²



a. All proposals must meet the requirements of the UK Forestry Standard (UKFS) and also comply with the various regulatory requirements relating to forestry generally.

b. There is a general presumption against woodland creation on non-wooded Section 41 (S41) priority habitats (see Figure 1) because of the ecological importance of the non-wooded habitat.

c. Applicants may consider making changes to existing priority habitats, which may include allowing broadleaves and mixed woodland to succeed on poor quality/lower value sites. Whether this is appropriate will be dependent on site-specific characteristics and the status of the habitats in question, see principle d.

d. Project proposers should engage with Natural England (the government's statutory nature conservation body) when considering proposals which may make changes to areas of existing non-woodland priority habitats; such changes would be regarded as a potential loss of or damage to that habitat.

When assessing a proposal, Natural England will need to formally give advice to the Forestry Commission on the impact of loss of any habitat included on the S41 Priority Habitat Inventory. For example, there may be sites where the extent of a priority habitat has been incorrectly mapped, or where the condition of priority habitat has degraded to such an extent that the ecological features present are no longer consistent with the definition of the mapped priority habitat. In such cases, Natural England may remove all or a proportion of the site from the Priority Habitat Inventory.

e. Where woodland creation is appropriate on a site, the planting design should address existing biodiversity interest of a site by using a hierarchy of (a) avoiding loss (using the positioning of open space

and boundaries), (b) mitigating impacts (through species choice, tree spacing etc.), and (c) compensating for unavoidable loss.

f. Any woodland creation on priority habitat should adhere to the definition of native woodland given in the practice guide '*Managing ancient and native woodland in England*', i.e. be predominantly native broadleaves (including productive), but can include a proportion (20% max) of non-native species. Additional naturalised broadleaved species can be included as part of the native component to improve the future resilience of the new woodland (up to 20%).

g. Woodland creation should, as a minimum, result in no net loss of biodiversity. Where public funds have been provided, it is reasonable for the delivery body to require a net gain as a result of woodland creation.

h. The standard metric for assessing net gain or loss of habitat is currently a simple area measurement (hectares). From an EIA perspective, in order to assess the potential biodiversity impact on a site it is important to understand quantity and condition status of the habitat, with the key issue being the need for the project proposer to provide adequate information to allow a reasonable decision to be made.

² <https://www.gov.uk/government/publications/principles-for-afforestation-on-or-near-priority-habitats-operations-note-43>

NB: some woodland creation proposals may still not be appropriate for other non-ecological reasons e.g. the presence of existing heritage features or of designed or protected landscapes, which would be adversely impacted by new woodland.

NB: Please note that lowland wood-pasture and parkland and traditional orchards have affinities with both woodland and open habitats. The general presumption against woodland creation applies to these habitats also.



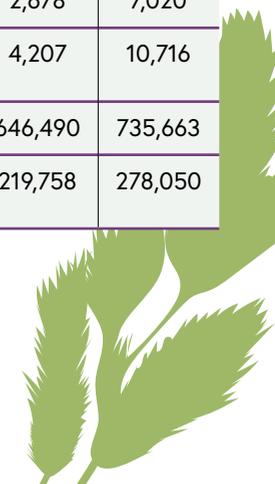
Extent of priority habitats in England

Habitat group	Priority habitat	Priority habitat within SSSI (ha)	Priority habitat outside of SSSI (ha)	Total priority habitat area (ha)
Coastal	Coastal sand dunes	8,652	1,931	10,584
Coastal	Coastal vegetated shingle	3,697	426	4,124
Coastal	Maritime cliff and slope	7,619	3,842	11,461
Coastal	Mudflats	71,684	6,294	77,978
Coastal	Saline lagoons	1,171	194	1,355
Coastal	Saltmarsh	23,564	695	24,489
Grassland	Lowland calcareous grassland	41,016	24,551	65,567
Grassland	Lowland dry acid grassland	7,960	7,493	15,453
Grassland	Lowland meadows	13,406	22,722	36,129
Grassland	Purple moor grass and rush pastures	2,951	6,377	9,326
Grassland	Upland calcareous grassland	6,958	3,396	10,353
Grassland	Upland hay meadow	840	2,685	3,525

Figure 1: Extent of priority habitats in England (2015)

Habitat group	Priority habitat	Priority habitat within SSSI (ha)	Priority habitat outside of SSSI (ha)	Total priority habitat area (ha)
Heathland	Lowland heathland	45,847	10,972	56,819
Heathland	Mountain heaths and willow scrub	5,151	1,065	6,216
Heathland	Upland heathland	159,959	76,965	236,924
Inland rock	Limestone pavement	2,481	447	2,928
Orchards	Traditional orchard	50	15,552	15,601
Wetland	Blanket bog	187,240	93,050	280,290
Wetland	Coastal and floodplain grazing marsh	30,858	187,324	218,182
Wetland	Lowland fens	13,277	9,046	22,323
Wetland	Lowland raised bog	7,734	1,956	9,690
Wetland	Reedbeds	4,142	2,678	7,020
Wetland	Upland flushes, fens and swamps	6,510	4,207	10,716
Woodland	Deciduous woodland	89,163	646,490	735,663
Woodland	Wood-pasture and parkland ³	58,292	219,758	278,050

³ <http://publications.naturalengland.org.uk/publication/4864081829822464>



4a Broad habitat type: Grassland

Priority habitat: Lowland calcareous grassland

Description

Lowland calcareous grasslands are developed on shallow lime-rich soils generally overlying limestone rocks, including chalk. They are typically managed as components of pastoral or mixed farming systems, supporting sheep, cattle or sometimes horses; a few examples are cut for hay.

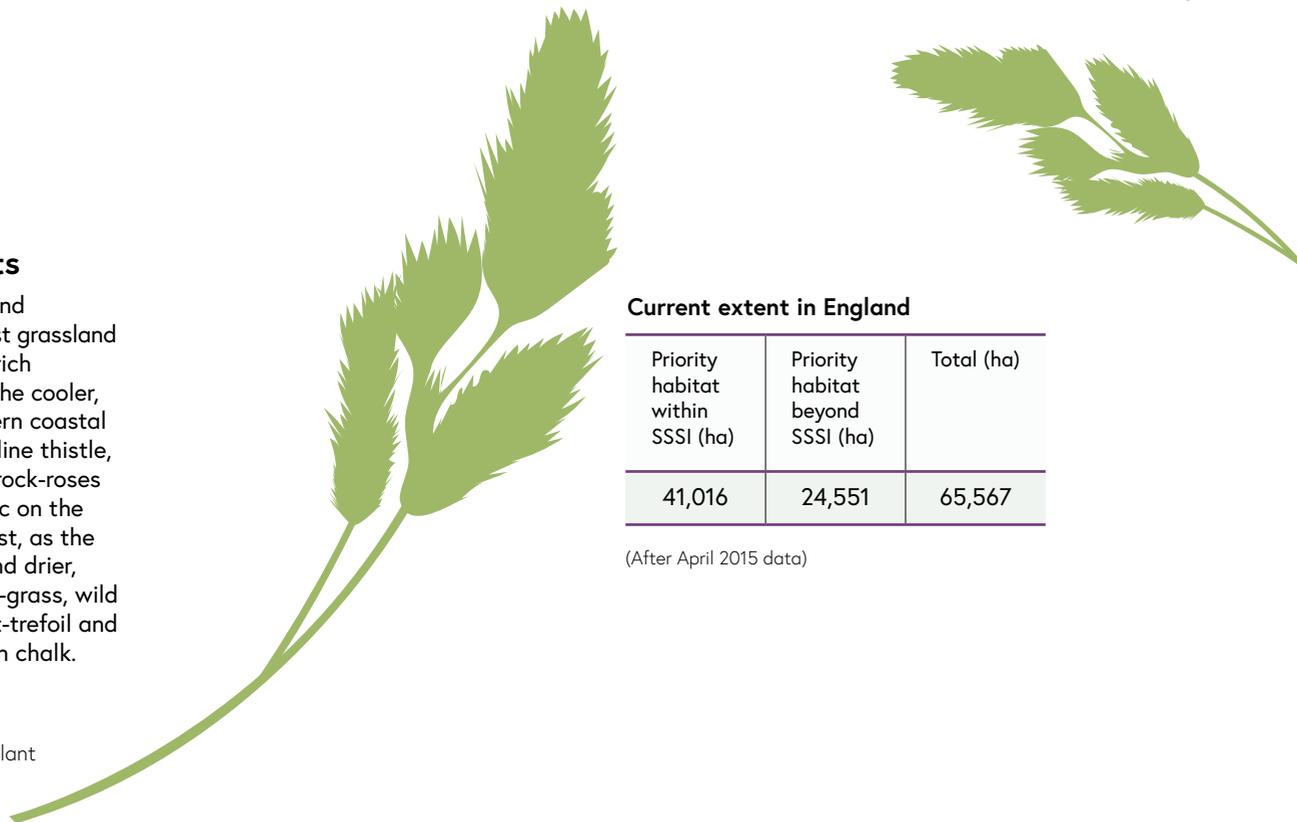
Characteristic plants

Lowland calcareous grassland comprises some of the oldest grassland and supports an incredibly rich botanical assemblage. On the cooler, moister southern and western coastal fringes, species such as carline thistle, yellow-wort, black medick, rock-roses and squills are characteristic on the hard limestones. Further east, as the climate becomes warmer and drier, quaking grass, meadow oat-grass, wild thyme, dropwort, bird's-foot-trefoil and salad burnet are common on chalk.

Figure 2: A habitat that has developed in response to longstanding low intensity grazing (Photo: Natural England)



Figure 3: Cowslip – A flagship plant of calcareous grasslands (Photo: Natural England)



Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
41,016	24,551	65,567

(After April 2015 data)

NVC communities

- CG1 Sheep's fescue – Carline thistle grassland
- CG2 Sheep's fescue – Meadow oat-grass grassland
- CG3 Erect brome grassland
- CG4 Tor-grass grassland
- CG5 Erect brome – Tor-grass grassland
- CG6 Meadow oat-grass grassland
- CG7 Sheep's fescue – Mouse-ear hawkweed – Thyme grassland
- CG8 Blue moor-grass – Small scabious grassland
- CG9 Blue moor-grass – Limestone bedstraw grassland
- CG10 Sheep's fescue – Common bent – Wild thyme grassland

4a Broad habitat type: Grassland



Priority habitat: Lowland dry acid grassland

Description

Lowland acid grassland typically occurs on nutrient poor, generally free draining soils with pH ranging from 4 to 5.5 overlying acid rocks or superficial deposits such as sands and gravels. It includes both enclosed and unenclosed acid grassland throughout the UK lowlands (normally below 300m). It includes all acid grassland managed in functional enclosures. The habitat commonly exists as part of a mosaic with lowland heathland.

Figure 4: Dry acid grassland can occur in expansive habitat patches but often occurs as part of a habitat mosaic in association with lowland heathland (Photo: Natural England)



Characteristic plants

Characteristic plants include sheep's fescue, wavy hair-grass, heath-grass, tormentil, heath bedstraw and sheep's sorrel. The habitat is typically species-poor but localised patches can be more diverse and include species such as harebell, common bird's-foot-trefoil, betony, mouse-ear hawkweed and sheep's-bit.

Figure 5: The distinctive yellow flowers of tormentil are a characteristic feature of lowland dry acid grassland (Photo: Jay Doyle)



Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
7,960	7,493	15,453

(After April 2015 data)

NVC communities

- U1 Sheep's fescue – Common bent – Sheep's sorrel grassland
- U2 Wavy hair-grass grassland
- U3 Bristle bent grassland
- U4 Sheep's fescue – Common bent – Heath bedstraw grassland



4a Broad habitat type: Grassland

Priority habitat: Lowland meadow

Description

Flower-rich grasslands that depend upon traditional cutting and/or grazing to maintain their species diversity and prevent scrub colonisation. Also found on some roadside verges, churchyards and other public land. Unimproved grasslands can be distinguished from agriculturally improved grasslands by their abundance and variety of flowers. Another feature of unimproved grassland is that generally no single grass species is consistently dominant in the sward in contrast to improved swards. Improved grasslands are characteristically bright green, whereas unimproved grassland is generally more subdued in colour. The grassland is not restricted to grassland cut for hay but also takes into account unimproved neutral pastures where livestock grazing is the main management influence.



Characteristic plants

Characteristic species include wood crane's-bill, pignut, great burnet, lady's mantles, common knapweed, hawkbits, ox-eye daisy, meadow vetchling, yellow rattle and orchids. Flood pastures and flushed areas may also include species such as marsh marigold, globeflower, water avens and birds-eye primrose.

Figure 6, below left: A Lowland meadow exhibiting its herb-rich sward now reduced by some 97% in extent across the UK (Photo: Natural England)

Figure 7: Common knapweed comprises a key indicator of the Lowland meadow habitat (Photo: Forestry Commission)



Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
13,406	22,722	36,129

(After April 2015 data)

NVC communities

MG5	Crested dog's tail – Common knapweed grassland
MG4	Meadow foxtail – Great burnet floodplain meadow
MG8	Crested dog's tail – Marsh marigold flood-pasture



4a Broad habitat type: Grassland

Priority habitat: Purple moor grass and rush pastures

Description

Purple moor grass and rush pastures occur on poorly drained, usually acidic soils in lowland areas of high rainfall. Their vegetation, which has a distinct character, consists of various species-rich types of fen meadow and rush pasture. Purple moor grass, and rushes, especially sharp-flowered rush, are usually abundant. Just as the best examples of lowland heath contain a wide range of plant communities, so the same is true for this habitat: the characteristic plant communities often occur in a mosaic with one another, together with patches of wet heath, dry grassland, swamp and scrub.

Figure 8: The Culm grasslands of Devon, a form of purple moor grass and rush pasture (Photo: Devon Wildlife Trust)



Characteristic plants

Key plant species associated with purple moor grass and rush pastures include: wavy St. John's-wort, whorled caraway, meadow thistle, marsh hawk's beard, greater butterfly orchid and lesser butterfly orchid.

Figure 9: Ragged robin and sharp-flowered rush are typical plants of purple moor grass and rush pastures (Photo: Devon Wildlife Trust)



Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
2,951	6,377	9,328

(After April 2015 data)

NVC communities

The best examples of purple moor grass and rush pastures contain a wide range of plant communities which occur in a mosaic with one another, together within patches of wet heath, dry grassland, swamp and scrub. The main NVC habitat types include as follows:

- M23 Soft rush – Sharp-flowered rush – Marsh bedstraw rush pasture
- M25 Purple moor grass – Tormentil mire
- M26 Purple moor grass – Marsh hawk's-beard mire
- MG10 Yorkshire fog – Soft rush rush-pasture
- M22 Blunt-flowered rush – Marsh thistle fen-meadow
- M24 Purple moor-grass – Meadow thistle fen-meadow



4a Broad habitat type: Grassland

Priority habitat: Upland acid grassland/grass moorland (non-priority)

Description

Upland acid grassland is made up of grass-dominated swards (both short and tussocky) found on acid rocks, sands and gravels in the upland landscape. Tends to be less valuable for wildlife and is shaped by longstanding livestock grazing. Upland waders tend to occur only as a sparse assemblage.

Figure 10, below left: Upland acid grassland (Photo: Natural England)

Figure 11, below right: Mat grass – often dominates the sward in heavily razed upland acid grasslands (Photo: Graham Steven)

Characteristic plants

Steeper, well-drained slopes and thinner soils support a springy turf of close-cropped sheep's fescue and bent grasses, woven with soft branched mosses and stippled with the tiny flowers of tormentil and heath bedstraw. On more peaty soils (including degraded bog) tough mat grass can predominate, while deeper peat supports a distinctive sward of heath rush and common hair-cap moss in a community unique to Britain and Ireland. Particularly acid and boggy hillsides in the western uplands support vast areas of tussocky purple moor grass. Rushes often form a part of upland acid grassland, marking out flushes and damp hollows, but are more predominant in rush pasture. The vegetation type is dictated by soil type, drainage and grazing pressure.

Current extent in England

Not currently known but widespread and abundant across the uplands of England

NVC communities

Widespread	
U2	Wavy hair-grass grassland
U3	Bristle bent grassland
U4	Sheep's fescue – Common bent-heath bedstraw grassland
U5	Mat-grass – Heath bedstraw grassland
U6	Heath rush – Sheep's fescue grassland
More localised	
U1	Sheep's fescue – Common bent – Sheep's sorrel grassland
U7	Mat-grass – Stiff sedge grass heath
U10	Stiff sedge – Woolly fringe moss heath
U13	Tufted hair-grass – Heath bedstraw grassland



4a Broad habitat type: Grassland



Priority habitat: Upland calcareous grassland

Description

Calcareous grasslands are found in shallow, well-drained soils derived from a variety of lime or base-rich rock types. The grassland is maintained by light levels of stock grazing to prevent coarse grasses and scrub from becoming established. Upland calcareous grasslands are defined as occurring in an upland setting (above the level of agricultural enclosure). Upland calcareous grasslands typically occur as components of habitat mosaics, which are generally managed as rough grazing land for domestic livestock.

Figure 12: Upland calcareous grassland in County Durham (Photo: Natural England)



Characteristic plants

Characteristic plants include wild thyme, limestone bedstraw, salad burnet, bird's-foot trefoil, rock-rose, fairy flax, quaking grass, crested hair-grass. Calcareous grassland can support a number of rare and uncommon species, including Teesdale violet, fly orchid, spiked speedwell, hoary rock-rose, spring gentian and alpine forget-me-not.

Figure 13: Wild thyme is a key wildflower of upland calcareous grasslands (Photo: Natural England)



Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
6,958	3,395	10,353

(After April 2015 data)

NVC communities

- CG9 Blue moor-grass grassland
- CG10, CG11 & CG12 Sheep's fescue – Common bent swards
- CG13 & CG14 Mountain avens communities



4a Broad habitat type: Grassland

Priority habitat: Upland hay meadow

Description

Upland hay meadows occur in upland valleys in the north of England with some outliers in Scotland. The main concentrations are in the northern pennines of North Yorkshire, Durham and east Cumbria but there are scattered locations in west Cumbria, Lancashire, Northumberland, Perthshire and as far north as Aberdeenshire. The most important centres are Teesdale, Lunedale, Weardale and Baldersdale in Durham, Swaledale and Wharfedale in North Yorkshire and around Tebay, Orton and Ravenstonedale in Cumbria. Upland hay meadows are confined to areas where non-intensive hay-meadow management is undertaken in association with brown earth soils on level to moderately sloping sites between 200m-400m in elevation.

Characteristic plants

No single grass species is consistently dominant and the most striking feature of the vegetation is generally the variety and abundance of flowering plants, including wood crane's-bill, pignut, great burnet and lady's mantle.

Figure 14, below left: An upland hay meadow characterised by the NVC community MG3 (Photo: Natural England)

Figure 15, below: Wood crane's bill comprises a characteristic plant of unimproved upland hay meadows (Photo: Natural England)



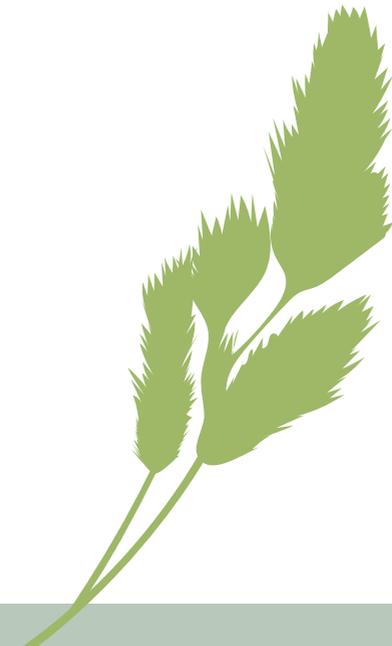
Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
840	2,685	3,525

(After April 2015 data)

NVC communities

MG3 Sweet vernal grass – Wood Crane's-bill grassland



4a Broad habitat type: Grassland



Grassland conservation issues

- Agricultural improvement/intensification by use of fertilisers (including intensive winter stock feeding that leads to soil enrichment), herbicides and other pesticides, re-seeding or ploughing for improved pasture and/or arable crops
- Overgrazing (sometimes associated with supplementary feeding as per above) can cause localised sward damage, due to trampling and long-term nutrient enrichment. The heavy grazing typical of upland acid grasslands leads to a dominance of mat grass and heath rush with heathland plants being eliminated
- Cessation/reduction of grazing on agriculturally marginal land and a cessation of traditional cutting regimes for hay and/or rushes
- Invasion by non-native invasive plants
- Compaction and soil disturbance from both recreational pressure and/or utilities infrastructure installation/maintenance disrupting the semi-natural sward/potentially introducing invasive non-native plants
- Loss to development including mineral and rock extraction, landfill, road building, housing and retail/light industrial parks
- Purple moor grass and rush pastures are affected by drainage (leading to the direct loss of habitat) as well as a cessation/reduction of traditional burning
- Atmospheric pollution and climate change, the impacts of which aren't fully understood

NB: Opportunities exist to restore both woodland and upland open habitats (most notably upland heathland) on the upland acid grassland resource



Grassland indicators of poor condition

- Low species-richness: increased intensity of grazing, changes in livestock type and elevated levels of fertiliser input and/or re-seeding leading to reduced biodiversity value (indicated by loss of characteristic grasses and herbs). In purple moor grass and rush pasture a cessation of grazing will result in a loss of plant diversity and overgrazing can lead to the loss of characteristic herbs as rushes become more prevalent
NB: Acid grassland can be naturally species poor
- Openness: development of rank grass/bracken invasion in response to undergrazing/a cessation of grazing with the subsequent development of scrub (including wet scrub on damper grassland) followed by long-term transition to woodland
- Sward height in acid grassland: indicates grazing pressure i.e. too low and it can revert to dwarf shrub heath, too high and the acid-loving herbs can be lost
- Presence of invasive non-native plant species e.g. Cotoneaster and buddleia on lowland calcareous grassland
- Sward disturbance: overgrazing can lead to compaction and erosion (also linked to heavy recreational pressures). Linear disturbance to the characteristic grassland vegetation indicating historic soil disturbance arising from infrastructure installation/maintenance
- Evidence of drainage i.e. loss of rushes and other plants associated with the damp conditions of purple moor grass and rush pastures



4b Broad habitat type: Heathland

Priority habitat: Lowland heathland (wet and dry)

Description

Lowland heathland is characterised by the presence of plants such as heather, dwarf gorses, and cross-leaved heath and is generally found below 300 metres in altitude. Areas of good quality heathland should consist of an ericaceous layer of varying heights and structures, some areas of scattered trees and scrub, areas of bare ground, gorse, wet heaths, bogs and open water. Lowland heathland can develop on drift soils and weathered flint beds over calcareous soils (limestone or chalk heath). Lowland heathland is a dynamic habitat that undergoes significant changes in different successional stages, from bare ground (e.g. after burning or tree clearing) and grassy stages, to mature, dense heath. These different

stages often co-occur on the same site. To distinguish between lowland heathland and genuine acid grassland, less than 25% dwarf shrub cover should be assessed as grassland, over 25% as heathland.

Characteristic plants

Lowland heath is characterised by the presence of ericaceous vegetation with dry heath being dominated by ling and wet heath supporting a higher proportion of cross-leaved heath.

Figure 16, below left: Lowland heathland is much reduced in extent following agricultural intensification, woodland creation, development and succession to secondary woodland (Photo: Natural England)

Figure 17a, below: Heather (or ling) (Photo: Forestry Commission/Isobel Cameron)



Figure 17b, above: Cross-leaved heath occurs in both dry and wet lowland heathland but Ling is favoured by the drier conditions as opposed to cross-leaved heath which is a key component of wet heathland (Photo: Natural England)

Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
45,847	10,972	56,819

(After April 2015 data)

NVC communities

- M15 Deergrass – Cross-leaved heath wet heath
- M16 Cross-leaved heath – Compact bog moss wet heath
- H1 Ling – Sheep's fescue heath
- H2 Ling – Dwarf gorse heath
- H3 Dwarf gorse – Bristle bent heath
- H4 Western gorse – Bristle bent heath
- H5 Cornish heath – Black sedge heath
- H6 Cornish heath – European gorse heath
- H8 Ling – Western gorse heath
- H9 Ling – Wavy hair-grass heath
- H10 Bell heather heath
- H11 Ling – Sand sedge heath
- H12 Ling – Bilberry heath
- H16 Ling – Bearberry heath

4b Broad habitat type: Heathland

Priority habitat: Upland heathland (dry and wet)

Description

Upland heathland vegetation occurs widely on mineral soils and thin peats (<0.5m deep) throughout the uplands and moorlands of the UK. It is characterised by the presence of dwarf shrubs at a cover of at least 25%. Blanket bog may also contain substantial amounts of dwarf shrubs, but is distinguished from heathland by its occurrence on deep peat (>0.5m). Upland heathland is defined as lying below the alpine or montane zone (at about 600-750m) and usually above the upper edge of enclosed agricultural land (generally at around 250-400m). Blanket bog and other mires, grassland, bracken, scrub, trees and woodland, freshwater and rock habitats frequently form intimate mosaics with heathland vegetation in upland situations. High quality heaths are generally structurally diverse, containing stands of vegetation with heather at different stages of growth. Upland heath in 'favourable condition' also usually includes areas of mature heather.



Figure 18: Upland heathland is characterised by the presence of dwarf shrubs at a cover of at least 25% (Photo credit: Natural England)

Characteristic plants

Upland heathland in 'favourable condition' is typically dominated by a range of dwarf shrubs such as heather, bilberry, crowberry, bell heather and in the south and south west western gorse. In northern areas juniper is occasionally seen above a heath understorey. Wet heath is most commonly found in the wetter north and west and in 'favourable condition' should be dominated by mixtures of cross-leaved heath, deer grass, heather and purple moor grass, over an understorey of mosses often including carpets of sphagnum mosses.



Figure 19a: Cross-leaved heath occurs in both dry and wet upland heathland but Ling is favoured by the drier conditions as opposed to Cross-leaved heath which is a key component of wet heathland (Photo: Natural England)



Figure 19b: Heather (or Ling) (Photo: Forestry Commission/ Isobel Cameron)

Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
159,959	76,965	236,924

(After April 2015 data)

4b Broad habitat type: Heathland

NVC communities

Encompasses a range of NVC habitat types including as follows:

Restricted to southern Britain	
H4	Western gorse – Bristle bent heath
H8	Ling – Western gorse heath
More widespread in the east	
H12	Ling – Bilberry heath
Characteristic in the western margins	
H10	Ling – Bell heather heath
H21	Ling – Bilberry – Red bog-moss heath
M15	Deergrass – Cross-leaved heath wet heath
Generally widespread in the uplands	
H18	Bilberry – Wavy hair-grass heath
More localised distribution	
H9	Ling – Wavy hair-grass heath
H16	Ling – Bearberry heath
M16	Cross-leaved heath – Compact bog moss wet heath

NB: The distribution of these communities is influenced by climate, altitude, aspect, slope, maritime influences and management practices including grazing and burning.

Heathland conservation issues

In the past heathland was lost primarily to agriculture, forestry, mineral extraction and development. Uncontrolled burning has also been a particular threat to bryophyte and lichen-rich heathland. The main factors affecting both lowland and upland heathland habitat at present are:

- Overgrazing by livestock incompatible with the maintenance of dwarf-shrub cover (heather being particularly sensitive)
- Agricultural improvement including conversion to more intensive forms of agriculture, particularly pasture improvement and the drainage of wet heath
- Encroachment of trees and scrub and the simplification of vegetation structure due to a lack of conservation management such as light grazing and controlled burning and cutting
- Nutrient enrichment, particularly deposition of nitrogen compounds emitted from intensive livestock farming, or from other sources such as atmospheric deposition

Heathland indicators of poor condition

- Scrub and bracken invasion can indicate poor habitat condition
- Ratio of dwarf shrub to grass cover: reduction in dwarf shrub vegetation and the presence of a closely cropped sward and is indicative of overgrazing (if overgrazed or burned too frequently, grasses become dominant and the heathy character is lost)
- Drainage: the presence of drainage infrastructure impacting on the abundance and distribution of characteristic wet heath ground flora e.g. Cross-leaved heath and sphagnum mosses



4c Broad habitat type: Wetland

Priority habitat: Blanket bog

Description

Bogs are acid peatlands supporting specialised flora and fauna, fed predominantly by rain water (as opposed to fens, which receive their nutrients via groundwater). They require water-logging for peat formation and this peat acts as a carbon sink. Bogs may have a similar vegetation cover to heathland but they are distinguished by their deeper peat layer (more than 0.5 metres).

Blanket bogs are mantles of peat formed in the uplands over gently undulating hills, on plateaux and in hollows. Bogs require permanently waterlogged conditions for peat to form and accumulate from dead plant material that only partially decomposes.

Decomposition is unable to fully take place because the anaerobic conditions prevent the action of micro-organisms. Blanket bog is a globally restricted peatland habitat confined to cool, wet, typically oceanic climates but in the UK it comprises one of the most extensive semi-natural habitats ranging from Devon in the south to Shetland in the north. Peat depth can be very variable, with an average of 0.5-3m being fairly typical but depths in excess of 5m are not unusual. Whilst a great deal of the blanket bog resource in the UK occurs in a degraded condition it is still considered to be a priority habitat.



Figure 20: Blanket bog in the Yorkshire Dales (Photo: Jay Doyle)



Characteristic plants

Bog vegetation is characterised by sphagnum bog mosses, cotton-grasses, cross-leaved heath and heather. Sundews, bog rosemary, bilberry and cranberry are also common.



Figure 21: Cotton grass is a distinctive plant of blanket bogs (Photo: Natural England)

Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
187,240	93,050	280,290

(After April 2015 data)

NVC communities

M1	Feathery bog moss bog pool community
M2	Sphagnum bog pool community
M3	Common cotton-grass bog pool community
M15	Deergrass – Cross-leaved heath wet heath
M17	Deergrass – Hare's tail cotton-grass blanket mire
M18	Cross-leaved heath – Papillose peatmoss raised and blanket mire
M19	Ling – Hare's tail cotton-grass blanket mire
M20	Hare's tail cotton-grass blanket and raised mire
M25	Purple moor grass – Tormentil mire

NB: other communities such as flush, fen and swamp types also form an integral part of the blanket bog landscape.

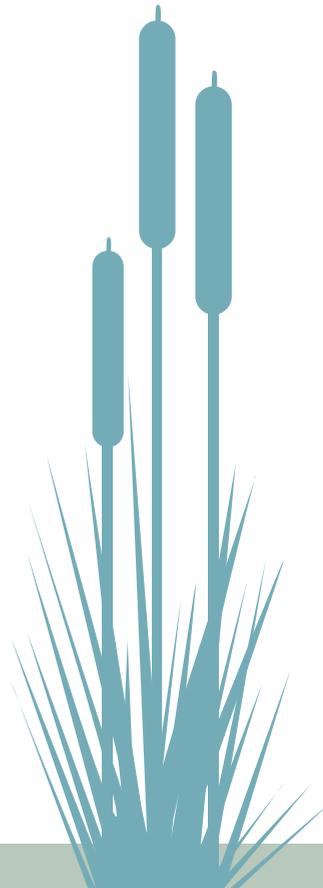
4c Broad habitat type: Wetland

Priority habitat: Coastal and floodplain grazing marsh

Description

Grazing marsh is defined as periodically inundated pasture, or meadow with ditches that maintain the water levels, containing standing brackish or fresh water. The ditches are especially rich in plants and invertebrates. Almost all areas are grazed and some are cut for hay or silage. Sites may contain seasonal water-filled hollows and permanent ponds with emergent swamp communities, but not extensive areas of tall fen species like reeds; although they may abut with fen and reed swamp communities.

Figure 22: Grazing marsh, a low-lying grassland subject to the dual influence of inundation and grazing (Photo: Natural England)



Characteristic plants

The seasonal inundation characteristic of grazing marsh gives the vegetation a distinctive composition, with species such as creeping bent, marsh foxtail, marsh marigold and silverweed. Most of these grasslands are moderately species-poor and only a small proportion of the habitat is deemed to be species-rich in England. Ditches are an important component in the grazing marsh ecosystem; often forming the field boundaries in this flat landscape. These can support a variety of marginal and aquatic plant species, including greater reedmace, reed canary-grass, water plantain, broad-leaved pondweed and sedges.



Figure 23: Marsh marigold, a characteristic plant of grazing marsh (Photo: Natural England)

Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
30,858	187,324	218,182

(After April 2015 data)

NVC communities

A wide variety of neutral grassland, aquatic and swamp NVC communities are associated with this habitat type.

4c Broad habitat type: Wetland

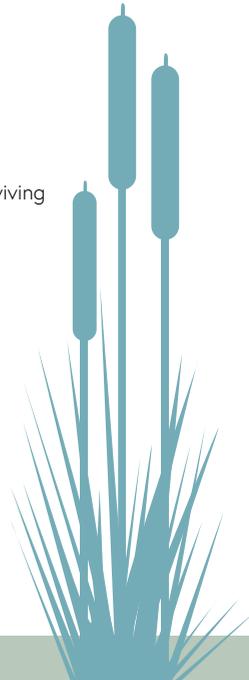
Priority habitat: Lowland fens

Description

The UK hosts a large proportion of the surviving fen resource in Europe, though its extent has declined dramatically in the past century. Fens are peatlands that receive water and nutrients from the soil, rock and ground water as well as from rainfall: they are minerotrophic. Two types of fen can broadly be distinguished: topogenous and soligenous. **Topogenous fens** are those where water movements in the peat or soil are generally vertical. They include basin fens and floodplain fen. **Soligenous fens**, where water movements are predominantly lateral, include mires associated with springs, rills and flushes in the uplands, valley mires, springs and flushes in the lowlands, trackways and ladder fens in blanket bogs and laggs of raised bogs.

Fens can also be described as `poor-fens` or `rich-fens`. Poor-fens, where the water is derived from base-poor rock such as sandstones and granites occur mainly in the uplands, or are associated with lowland heaths. They are characterised by short vegetation with a high proportion of bog mosses *Sphagnum* spp. and acid water (pH of 5 or less). Rich-fens, are fed by mineral-enriched calcareous waters (pH 5 or more) and are mainly confined to the lowlands and where there are localised occurrences of base-rich rocks such as limestone in the uplands.

Figure 24: The UK is home to a large proportion of the surviving resource of fen in Europe (Photo: Natural England)



Characteristic plants

The vegetation generally comprises typical wetland species such as reeds, rushes and sedges, including either tall robust species such as great fen-sedge and common reed, or a suite of small sedges such as common sedge and yellow sedges.

Figure 25: Yellow iris, found in fens containing a more fertile peat (Photo: Natural England)



Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
13,277	9,046	22,323

(After April 2015 data)

NVC communities

A wide variety of mire (M) and swamp (S) communities

4c Broad habitat type: Wetland

Priority habitat: Lowland raised bog

Description

Lowland raised bogs are peatland ecosystems that develop primarily, but not exclusively, in lowland areas such as the head of estuaries, along river flood-plains and in topographic depressions. In such locations drainage may be impeded by a high groundwater table, or by low permeability substrata such as clays. The resultant waterlogging provides anaerobic conditions which slow down the decomposition of plant material which in turn leads to an accumulation of peat.

Continued accrual of peat elevates the bog surface above local groundwater levels to form a gently-curving dome from which the term 'raised' bog is derived. The thickness of the peat mantle varies considerably but can exceed 12 metres. Lowland raised bogs are a particular feature of cool, rather humid regions such as the northwest lowlands of England but remnants also occur in some southern and eastern localities, for example Somerset, South Yorkshire and Fenland.

Characteristic plants

These very wet conditions are ideal for acid-loving bog-mosses, cotton grasses, heather, cross-leaved heath, bog asphodel and deer-grass, species otherwise more common in the cooler, wetter uplands.



Figure 27: Bog asphodel, sulphur yellow flowers in summer give way to a deep orange as the plant fruits in the autumn (Photo: Natural England)



Figure 26: Lowland raised bog, the survival of this habitat depends upon light or moderate grazing and an absence of peat-cutting, draining, burning and woodland creation (Photo: Natural England)

Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
7,734	1,956	9,690

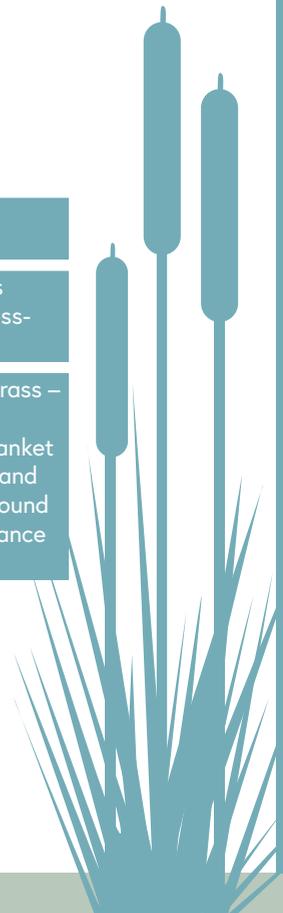
(After April 2015 data)

NVC communities

A number of plant communities defined by the National Vegetation Classification can be found on raised bogs

Plant communities that are typical of natural raised bogs include the bog pool communities M1 to M3 and M18 Cross-leaved heath – Sphagnum spp. raised and blanket mire

In addition a number of communities, including M15 Deergrass – Cross-leaved heath wet heath, M19 Ling – Hare's-tail cottongrass blanket mire, M20 Hare's-tail cottongrass blanket and raised mire, M25 Purple moor grass – Tormentil mire and W4 Downy birch – Purple moor grass woodland, can be found on raised bogs which have been subject to some disturbance such as drainage or peat-cutting



4c Broad habitat type: Wetland

Priority habitat: Reedbeds

Description

Reedbeds are wetlands dominated by stands of the common reed within which the water table is at or above ground level for most of the year. They tend to incorporate areas of open water and ditches, and small areas of wet grassland and carr woodland may be associated with them.

Figure 28 A once expansive feature of floodplains and coastal areas, reedbeds today occur in a much reduced and fragmented state. (Photo: Natural England)



Figure 29: Common reed, this stout perennial plant is the dominant species within this priority habitat (Photo: Natural England)

Characteristic plants

A habitat dominated by common reed.

Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
4,142	2,878	7,020

(After April 2015 data)

NVC communities

Comprised of a variety of NVC swamp communities

4c Broad habitat type: Wetland

Priority habitat: Upland flush, fen and swamp

Description

Upland flushes, fens and swamps are peat or mineral-based wetlands occurring in upland situations, which receive water and nutrients from surface and/or groundwater sources as well as rainfall. The soil, which may be peaty or mineral, is waterlogged with the water table close to or above the surface for most of the year. The habitat includes both soligenous mires (springs, flushes, valley fens) and topogenous mires (basin, open-water transition and flood-plain fens), as well as certain *Molinia* grasslands and rush pastures.

These habitats come under the broad heading of **fen**. The defining feature of these wetlands, and what distinguishes them from bogs, is that they receive most of their nutrients and water from groundwater and surface runoff rather than from direct rainfall. Those in which water movement is mainly vertical due

to impeded drainage include basin mires and floodplain fens (reedbeds and swamps), whilst those where water movement is mainly horizontal in the form of surface water flow and groundwater seepage include valley mires, flushes and springs. **Swamps** have a water table which is at or above ground level for most of the year. They are found around the margins of ponds, lakes and slow-moving sections of rivers and can extend over the entire surface of shallower water bodies. **Basin mires or fens** are formed in ill-drained hollows. **Valley mires or fens** are generally found in linear depressions, usually with a central stream. **Springs and flushes** occur where there are upwellings of groundwater and where there is water movement over or through the soil surface.

Characteristic plants

Swamps: A variety of plants can form swamps, including reed canary-grass, branched bur-reed, water horsetail, common spike-rush, common reed, sedges, reedmaces and club-rushes. Similar vegetation can also be found where there is only seasonal inundation of the vegetation and is often, confusingly, termed fen. Tall herb fen occurs in similar seasonally inundated situations and may be dominated by some of these species, or by Meadowsweet. Tall herb fen tends to also have species such as yellow flag, wild angelica and purple loosestrife.

Basin mires or fens: A variety of wetland vegetation can be present, including various types of swamp, tall herb fen, and sedge and Sphagnum bog-moss dominated vegetation.

Valley mires or fens: They are usually characterised by bog-mosses, cross-leaved heath, bog asphodel and sedges, though rushes may also be abundant.

Springs and flushes: Acid flushes are generally species-poor and are characterised by bog-mosses, small sedges and common cotton grass. Base-rich flushes (usually high pH) are more diverse and are characterised by a range of mosses and liverworts together with small sedges, bird's-eye primrose, butterwort and autumn hawkbit.

Springs are generally dominated by mosses and liverworts, with starry saxifrage, blinks and opposite-leaved golden saxifrage prominent in acid examples and lesser clubmoss and autumn hawkbit in base-rich springs.



Figure 30: An acid flush supporting abundant sedges and mosses (Photo credit: Jay Doyle)



Figure 31: Butterwort – an insectivorous plant with a scattered distribution across NW England (Photo: Dave Mitchell/Natural England)

4c Broad habitat type: Wetland

Priority habitat: Upland flush, fen and swamp

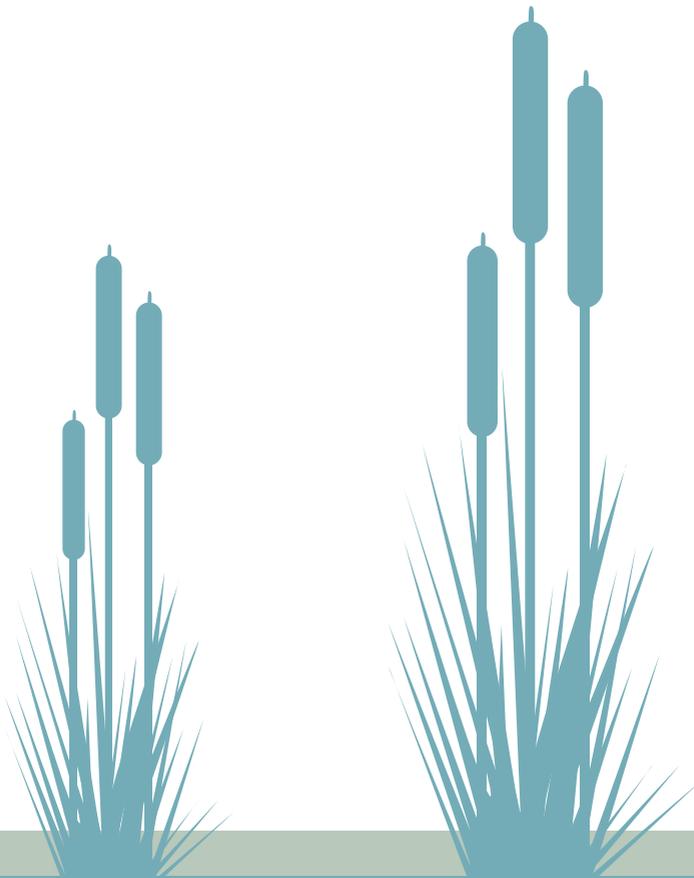
Current extent in England

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
6,510	4,207	10,716

(After April 2015 data)

NVC communities

M4	Bottle sedge – Sphagnum mire
M5	Bottle sedge – Sphagnum mire
M6	Star sedge – Sphagnum mire
M7	White sedge – Sphagnum mire
M8	Bottle sedge – Sphagnum mire
M9	Bottle sedge – Brown moss mire
M10	Dioecious sedge – Butterwort mire
M11	Common yellow sedge – Yellow saxifrage mire
M12:	Russet sedge mire
M23a	Sharp-flowered rush – Common marsh bedstraw mire
M25c	Purple moor grass – Tormentil mire, angelica sub community
M27	Meadowsweet – Angelica mire
M28	Yellow-flag – Meadowsweet mire
M29	Marsh St John's-wort – Bog pondweed soak away
M31	Alpine silverwort – Feathery bog-moss spring
M32	Fountain apple-moss – Starry saxifrage spring
M33	Pohlia wahlenbergii var glacialis spring
M34	Common yellow-sedge – Iceland pursalane flush
M37	Curled hook-moss – Red fescue spring
M38	Curled hook-moss – Common sedge spring
S9	Bottle sedge swamp
S10	Water horsetail swamp
S11	Bladder sedge swamp
S19	Common spike-rush swamp
S27	Bottle sedge – Marsh cinquefoil tall herb fen



4c Broad habitat type: Wetland

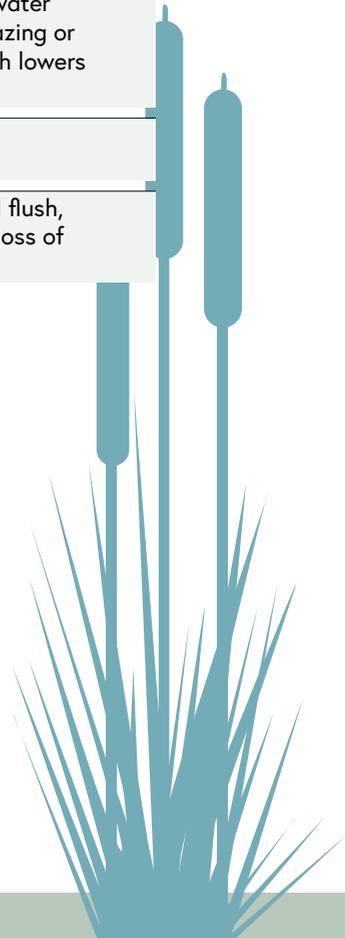
Wetland conservation issues

- The combined effects of drainage, agricultural conversion and intensification, direct loss to development and neglect have led to a catastrophic reduction in the extent of wetland habitats in both lowland and upland landscapes. Climate change and its associated extreme weather and sea-level rise will intensify the pressures placed on the wetland resource
- Drainage is perhaps the key issue affecting all wetland habitats, be that in-situ drainage or on adjoining land along with water abstraction, which lowers the local water table. Undergrazing or a cessation of grazing along with water abstraction which lowers the local water table
- Undergrazing or a cessation of grazing can lead to scrub encroachment
- Overgrazing is a particular issue for blanket bogs, upland flush, fen and swamp and grazing marsh where it leads to the loss of characteristic wetland plants

Wetland indicators of poor condition

- Presence of drainage infrastructure (both in-situ and ex-situ) and knock-on effects including a loss/reduction in characteristic plants. In reedbeds this will be evident by the contraction of common reed. In blanket bogs cotton grass and sphagnum mosses will give way to heather under drier conditions (and burning will increase grass cover)
- Overgrazing may lead to the exclusion of characteristic plants in wetland habitats such as grazing marsh and upland flush, fen and swamp
- Change in vegetation composition with characteristic plants occurring in reduced abundance/being absent from site, particularly evident in upland flush, fen and swamp and lowland fen
- Occurrence of bare peat on blanket bogs: bare peat usually signifies erosion due to past damage through air pollution, burning and/or overgrazing
- Scrub intrusion indicating a cessation of traditional management and/or drainage leading to drying
- Degraded lowland raised bogs tend to be dominated by hare's-tail cotton grass and purple moor grass and lack the characteristic sphagnum mosses

NB: Ongoing anthropogenic climate change will worsen the impacts of human modification to England's wetland resource and in some instances compromise the natural functioning of intact habitat patches (in large part via summer desiccation and the potential for peat burning under increased summer drought conditions). The restoration and expansion of the best examples of our wetland habitat is critical to future proofing the resource. New woodland creation schemes need to carefully consider the effects of planting proposals on the long-term viability of all priority wetland habitats.



4d Broad habitat type: Woodland

Priority habitat: Wood-pasture and parkland

Description

Wood-pasture and parkland are mosaic habitats valued for their trees, especially veteran and ancient trees, and the plants and animals that they support. Grazing animals are fundamental to the existence of this habitat. Specialised and varied habitats within wood-pasture and parkland provide a home for a wide range of species, many of which occur only in these habitats, particularly insects, lichens and fungi which depend on dead and decaying wood. Individual trees, some of which may be of great size and age, are key elements of the habitat and many sites are also important historic landscapes. Key features of wood-pasture and parkland include as follows:

- Ancient/veteran trees, which are special in their own right as some of the oldest living organisms in the UK
- The presence of grazing animals – animal dung contributes to invertebrate and fungal diversity and grazing controls tree and shrub regeneration, maintaining a semi-open habitat
- The presence of microhabitats including large diameter (relative to the species) hollowing trees, other decaying wood, rot holes, ageing bark and fallen but regenerating trees, which support a wide range of specialised invertebrates, lichen and fungi
- Nectar sources for invertebrates
- Open grassland or heathland ground vegetation
- Continuity in terms of very long-lived individual trees and ongoing management

NB: Traditional orchards are also deemed to be a priority habitat and, though not covered in detail within this booklet, they share many commonalities with wood-pasture and parkland given their scattered tree and grassland resource. They also warrant careful consideration within woodland creation proposals.



Figure 32: An ancient habitat type with a biodiversity legacy that extends back to the post-glacial wildwood (Photo credit: Natural England)

Characteristic plants

The current range of tree species may be the result of manipulation by past management, for example to favour species which provided animal fodder or longer lived tree species (notably oak) for timber. Other typical tree species in addition to oak include beech, alder, birch, hazel and sweet chestnut with Scots pine typical in parts of Scotland. Woody scrub is a particularly important element with species such as hawthorn and blackthorn contributing nectar sources for invertebrates and protection for regenerating trees.



Figure 33: Hawthorn is a key component of the understorey in wood-pasture and parkland and an important source of nectar and fruits (Photo: Natural England)

4d Broad habitat type: Woodland

Current extent in England⁴

Priority habitat within SSSI (ha)	Priority habitat beyond SSSI (ha)	Total (ha)
58,292	219,758	278,050

(After 2017 data)

⁴ <http://publications.naturalengland.org.uk/publication/4864081829822464>

NVC communities

A wide variety of woodland, grassland and heathland NVC communities are associated with wood-pasture and parkland in England

Wood-pasture and parkland conservation issues

- Gap in knowledge concerning extent and condition of habitat leading to ongoing neglect and loss
- Parklands and wood-pastures can suffer from a lack of younger generations of trees, which produces a skewed age structure
- Isolation and fragmentation of the few remaining parklands/wood-pasture sites in the landscape

Inappropriate management:

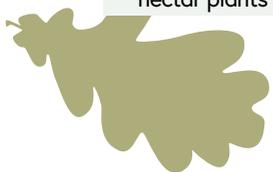
- Undergrazing can lead to loss of habitat structure through bracken and scrub invasion
- Overgrazing may result in bark browsing, soil compaction and loss of nectar plants

Inappropriate management (continued):

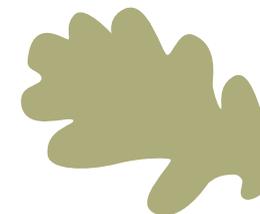
- Pasture improvement through reseeding, deep ploughing, fertiliser and other chemical treatments, leads variously to tree root damage, loss of nectar-bearing plants, and damage to the soil and epiphytes
- The removal of veteran trees and dead wood for reasons of safety or tidiness where sites have high amenity use, or for forest hygiene can be a significant issue
- Neglect, and loss of expertise of traditional tree management techniques (e.g. pollarding) can also lead to trees collapsing or being felled for safety reasons
- In parklands in particular there can be problems with damage to trees and roots from soil compaction and erosion caused by trampling by livestock, people and car parking, and vandalism

Wood-pasture and parkland indicators of poor condition

- Significant gaps in structure i.e. lack of replacement generations
- Bracken and scrub invasion in response to lack of/cessation of grazing
- Bark stripping, soil compaction and loss of nectar plants in response to overgrazing
- Poor tree health in response to tree root damage and lack of nectar-bearing plants brought about by pasture improvement/conversion to improved grassland or arable
- Occurrences of gaps in tree cover and evidence of removal in response to safety and or tidiness concerns
- Advanced collapse of veteran trees in response to lack of positive management
- Soil compaction and erosion in response to livestock and human trampling and car parking
- Vandalism e.g. cutting or burning of veteran trees



5 Surveys



This section covers the various surveys that may be required when assessing woodland creation in respect of vegetation type, peat and breeding birds

5.1 Vegetation survey techniques for priority habitats

Phase 1 Habitat Classification and field survey techniques

The screening and scoping stages of the EIA process for woodland creation proposals will gather and analyse the information that is available and identify whether further surveys are required. This information will be used to assess woodland creation proposals to ensure they do not create damaging or irreversible impacts on the wider environment.

Phase 1 provides a standardised system to record semi-natural vegetation and other wildlife habitats. It comprises an approach designed to cover large areas of the countryside relatively rapidly providing a basic assessment of habitat type and its potential importance for nature conservation. Each habitat type/feature is identified by way of a brief description of its defining features and is subsequently allocated a specific name, an alpha-numeric code and a unique mapping colour. Phase 1 habitat types are defined as follows:

Phase 1 classification comprises ten (A-J) broad level categories:

A	Woodland and scrub
B	Grassland and marsh
C	Tall herb and fen
D	Heathland
E	Mire
F	Swamp, marginal and inundation
G	Open water
H	Coastland
I	Exposure and waste
J	Miscellaneous

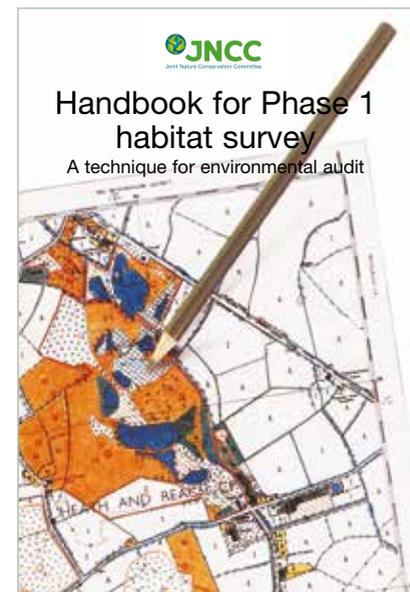


Figure 34: The Phase 1 habitat survey handbook (after Joint Nature Conservation Committee (JNCC))

Amongst the 10 categories 155 specific habitat types are recognised, each with its own name, alpha-numeric code, description and mapping colour. Phase 1 surveys prove useful for largescale woodland creation proposals to help focus the more in depth phase 2 surveys discussed later. On its own phase 1 will not provide an assessment of the quality of a priority habitat i.e. a phase 1 survey does not collect sufficient detail to assess against county/regional (Local Wildlife Site) or national (SSSI) selection criteria.

Phase 2 Botanical Survey and the National Vegetation Classification

A phase 2 Botanical Survey yields a more complete plant list for a vegetation type or unit, including rare or other notable species. The DAFOR scale is applied to the survey to denote the abundance of plant species as follows:

D (DOMINANT)
A (BUNDANT)
F (FREQUENT)
O (OCCASIONAL)
R (RARE)

Phase 2 survey uses the National Vegetation Classification (NVC) system developed by the Joint Nature Conservation Committee (JNCC) to identify and map vegetation using defined plant community types. It is most often





commissioned to assist monitoring or inform management of protected sites such as Sites of Special Scientific Interest (SSSIs) or nature reserves. It can also be required as part of Ecological Impact Assessments (EclAs) or large developments or where development impacts important, diverse or complex habitats. A phase 2 habitat survey is required in order to assess the condition/quality of priority habitat to help inform whether woodland creation proposals are appropriate or not.

The National Vegetation Classification (NVC)

The NVC was published in a series of volumes from 1991 to 2000 and provides a 'common language' for the character and value of British vegetation to be understood. It is accepted as a core standard by:

- nature conservation and countryside organisations;
- forestry, agriculture and water agencies;
- local government;
- non-government organisations; and
- industry and academia.

It can be used to inform monitoring (but not as a monitoring tool in itself). It serves as the basis for developing management options for sites or landscapes and as a framework for restoration and design guidelines. The NVC survey is accepted as the 'gold-standard' for describing vegetation within the UK. Surveys should be undertaken within an April to October survey window in order for an accurate assessment of the sites vegetation status to be made.



5.2 Peat depth survey requirements

The UK Forestry Standard (2017) provides clear instruction to avoid planting new forests on soils supporting deep peat and to consider the impact of planting proposals on adjacent bog and other wetland habitats:

"Avoid establishing new forests on soils with peat exceeding 50cm in depth and on sites that would compromise the hydrology of adjacent bog or wetland habitats." (UKFS, 2017).

Where peat is likely to occur in either an upland or lowland setting a peat survey will be required to identify the areas of deeper peat and areas that would compromise the hydrology of adjacent bog or wetland habitats. These areas should be excluded from the proposed woodland creation with appropriate buffering.

Record peat depths (using an appropriate peat probe) together with the peatland condition category on a 100m x 100m grid marked on a map before the survey starts. For recording peat condition use the simple 4-category Birnie, Taylor and Smyth classification (as per references):

- Near-natural – Sphagnum moss dominates the ground layer vegetation;
- Modified – Sphagnum mosses rare or absent due to past fire, grazing/trampling or scrub encroachment;
- Drained – within 30m of a drain or revegetated hagg/gulley erosion;
- Actively eroding – within an area of active erosion with lots of bare peat.

NB: The Veteran Tree Initiative Specialist Survey Methodology should be used to complement the above vegetation surveys in order to record ancient and veteran trees and their associated wood-pasture and parkland habitat.



1. Information about the surveyed area

Information to include when reporting on the peat depth survey result:

- Site name;
- Grant reference;
- Contractor details;
- Date(s) of survey (e.g. 10/02/2017 to 11/02/2017);
- Total number of points surveyed;
- General weather conditions at time of survey.

2. Data output

For each peat depth sampling point provide the following information in an Excel table or as a GIS shape file format:

- Grid reference (in British National Grid) or 6-8 figure eastings and northings, in British National Grid (if you would prefer to record latitude and longitude in WGS84 in decimal degrees, please do so but make this clear on the form);
- Date of sampling (day/month/year) Please also include time of sampling when using electronic recording system;
- Sample point identification reference;
- Sample point peat depth (in cm);
- Sample point peatland condition category;
- Comment or observation (if appropriate);
- Maps of areas surveyed and peat depth and condition maps can also be produced;
- Please include appropriate copyright to take into account the backdrop used. Any additional information collected during the peat survey is also welcome.



5.3 Requirements for a breeding birds survey

The main requirement is a breeding bird survey to record birds breeding during March to August. Breeding bird surveys are best conducted in suitable habitat with a methodology based on the British Trust for Ornithology (BTO) Breeding Bird Survey (BBS). A site should be visited on a minimum of three occasions, usually in April, to map habitat and determine survey transects and revisited in May and June to undertake bird counts along pre-determined transects. Each visit should avoid persistent rain, strong winds and fog. The survey must follow the field methodology as set out on the BTO website.⁵

- A map (1:5000 scale or similar) should be produced for each survey visit showing the location of birds observed, using standard BTO species and activity codes
NB: BTO activity codes are important to help separate probable or confirmed breeding birds from non-breeding birds.
- Following the last visit a 'combined map' should be produced identifying individual bird territories, allowing an estimate of the density and distribution of the breeding bird species within the site
- A short report summarising findings should be produced
- Population estimates will need to be presented for all species and an evaluation of the importance of the site for breeding birds provided
- Appendices should include survey maps for each survey visit alongside the territory map
- Incidental records of other notable flora and fauna species could also be usefully presented
- Stakeholders/consultees may flag other birds of significance that will nest outside the main breeding season, if so then visits would need to be scheduled/timed accordingly
- It is important to combine records to identify territories using a consistent and repeatable approach. More detailed guidance on this is available in Gilbert et al. 1998 Bird Monitoring Methods.

NB: The survey needs to be adapted to site level (in terms of setting out survey transects) rather than for a 1km square.

The Forestry Commission and Natural England have prepared a joint guidance note "*Guidance for afforestation proposed on or near nationally important upland breeding wader areas*".⁶ This guidance was produced to help ensure that proposals for woodland creation identify and avoid important breeding wader sites i.e. those sites that are capable of supporting breeding waders and where breeding waders are present.

⁵ <https://www.bto.org/our-science/projects/bbs>

⁶ <https://www.gov.uk/guidance/how-to-benefit-species-and-habitats-biodiversity-in-your-woodland>



"Carefully planned and designed woodland creation projects can help restore forest habitat networks whilst protecting priority open habitats and their wildlife, serving to enhance landscape character."



6 Area and administration offices



Area and administration offices

You can contact your local Woodland Officer via the area offices below:

Yorkshire and North East

Foss House, Kings Pool
1-2 Peasholme Green
York, YO1 7PX

Telephone: 0300 067 4900
yne@forestrycommission.gov.uk

South East and London

Bucks Horn Oak
Farnham
Surrey, GU10 4LS

Telephone: 0300 067 4420
southeast.fce@forestrycommission.gov.uk

North West and West Midlands

Ghyll Mount, Gillan Way
Penrith 40 Business Park
Penrith
Cumbria, CA11 9BP

Telephone: 0300 067 4190
nwwm@forestrycommission.gov.uk

South West

Bullers Hill
Kennford
Exeter, EX6 7XR

Telephone: 0300 067 4960
southwest.fce@forestrycommission.gov.uk

East and East Midlands

Santon Downham
Brandon
Suffolk, IP27 0TJ

Telephone: 0300 067 4574
eandem@forestrycommission.gov.uk

National Office

Forestry Commission
620 Bristol Business Park
Bristol, BS16 1EJ

Telephone: 0300 067 4000
nationalenquiries@forestrycommission.gov.uk

Admin offices

You can contact your local admin office:

Admin Hub, Exeter

Bullers Hill
Kennford
Exeter, EX6 7XR

Telephone: 0300 067 4960
adminhub.bullershill@forestrycommission.gov.uk

Admin Hub, Bucks Horn Oak

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Farnham
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