

Decision support framework for peatland protection, the establishment of new woodland and re-establishment of existing woodland on peatland in England July 2023

Purpose

This guidance has been developed by the Forestry Commission (FC), Forest Research (FR), Natural England (NE) and Environment Agency (EA) to provide an agreed evidence-based decision support framework to guide both landowners and regulators. This provides greater certainty and consistency, and quicker decision making for all involved, while ensuring due regard is given to existing and potential biodiversity value, future site conditions in a changing climate, water and archaeological interests.

The guidance has been produced to support the joint ambitions for increasing woodland creation and peat restoration, ensuring effective alignment in their operational delivery and helping to avoid possible tension between achievement of Government ambitions for woodland creation and those for nature’s recovery and net zero. This decision support framework sets out how the United Kingdom Forestry Standard¹ (UKFS) will be implemented in England for trees and peatland.

This framework has been reviewed in 2023 and supports the implementation of the England Trees Action Plan, England Peat Action Plan, UK Forestry Standard and the Environmental Improvement Plan. It will shape the development of Local Nature Recovery Strategies and enable nature recovery.

¹ <https://www.gov.uk/government/publications/the-uk-forestry-standard>

Introduction

The government’s 25 Year Environment Plan² (25YEP) and developing approach to species recovery includes specific high-level commitments in England to bring about nature’s recovery, restoring our protected sites to favourable condition, creating and restoring an additional 500,000 ha of wildlife-rich habitat, protecting and restoring peatlands, and expanding woodland cover. The 25YEP set out our vision for a quarter-of-a-century of action to help the natural world regain and retain good health. The Environment Improvement Plan³ represents the first review of the 25YEP and it reinforces the intent of the 25YEP: where the 25 YEP sets out the framework and vision, this document sets out the plan to deliver. Legally binding targets⁴ to protect our environment, clean up our air and rivers and boost nature were legislated in January 2023 following extensive consultation as part of the government’s commitment to leave the environment in a better state for future generations.

The measures include a target to deliver our net zero ambitions and boost nature recovery by increasing tree canopy and woodland cover to 16.5% of total land area in England by 2050. These increases in tree and woodland cover, equivalent to an additional 250,000 ha, are sought not only to enhance nature but also to increase domestic timber supply, so enabling increased substitution for materials with higher embodied carbon. They also include an ambition to restore (or have under restoration) 280,000 ha of peatland by 2050. The peat restoration targets contribute to Defra’s share of the Land Use Pathway in the growth plan to Net Zero. Sustainable management of the peat resource within England’s peatlands is essential for Net Zero and Nature recovery delivery.

The Climate Change Committee advised that 50% of upland and 25% of lowland peat should be restored to reduce the current emissions from peat, some of which are from peat that is under forestry.

Woodland expansion and peatland protection and restoration are three of the most important, large-scale changes in land use needed to restore nature, sequester and store carbon, and can provide many other environmental benefits including flood risk management and water quality improvement. To avoid the potential for conflict and perverse outcomes, it is essential that these activities are carried out in an integrated and complementary way. Woodland expansion must be well-sited and designed to avoid adversely affecting important semi-natural habitats, including peatlands, other land where it affects the hydrology of peatlands and peat soils and priority species.

² <https://www.gov.uk/government/publications/25-year-environment-plan>

³ <https://www.gov.uk/government/publications/environmental-improvement-plan>

⁴ <https://www.gov.uk/government/news/new-legally-binding-environment-targets-set-out>

Fully functioning peatland and woodland habitats rich in wildlife will make an important contribution to the Government’s commitments to protect and recover nature. These habitats will contribute to the Nature Recovery Network: a bigger, better quality and increasingly connected network of places that are richer in wildlife. The Nature Recovery Network⁵ is supported in law by a combination of measures set out in the Environment Act⁶: including spatial mapping and planning tools called Local Nature Recovery Strategies (LNRS)⁷; and duties and incentives, such as Biodiversity Net Gain, which will drive change on the ground. Peatland protection and restoration will also support targets in the Environment Act to halt the decline in species populations by 2030 and then increase populations by at least 10% to exceed current levels by 2042.

The England Peat Action Plan⁸ and the England Trees Action Plan⁹ are linked and, together with wider plans and strategies for nature, set out Government’s approach to tackling both climate change and biodiversity loss. We want forest cover to expand in areas where it will not damage peatland.

The UK Forestry Standard, Environmental Impact Assessment (Forestry) Regulations¹⁰ and Open Habitat Policy¹¹ provide a well-established framework within which we consider woodland creation and the restoration of open habitat from woodland at a national strategic level.

LNRSs will help identify opportunities at a site level for funding both woodland creation and peat restoration. Within LNRS Partnerships, stakeholders will work together to consider the realistic prospects for effective restoration of wider peatland hydrological units and help prioritise funding to achieve restoration.

In addition, National Park and AONB Management Plans will establish shared priorities and articulate the vision and goals for an ecologically appropriate and climate resilient approach to woodland creation and peat restoration, as well as work with land managers, communities and partnerships to co-design and deliver the action required. This guidance sets out this approach and is in step with the principles set out in the UK Forestry Standard.

⁵ <https://www.gov.uk/government/publications/nature-recovery-network/nature-recovery-network>

⁶ <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

⁷ <https://www.gov.uk/government/news/five-local-authorities-announced-to-trailblaze-englands-nature-recovery-pilots>

⁸ <https://www.gov.uk/government/publications/england-peat-action-plan>

⁹ <https://www.gov.uk/government/publications/england-trees-action-plan-2021-to-2024>

¹⁰ <https://www.gov.uk/guidance/environmental-impact-assessments-for-woodland-overview>

¹¹ <https://www.gov.uk/guidance/get-consent-to-convert-woodland-to-open-habitats>

Scope of guidance

This guidance applies to new proposals for tree felling or woodland creation on peatland in England that require Forestry Commission scrutiny and approval under felling licences, current grant scheme rules and / or Environmental Impact Regulations for forestry.

Land managers who have already received a project approval or felling licence from the Forestry Commission but works remain to be completed, should consider implementing the project or felling licence in accordance with this and other recently updated guidance on soil cultivation in order to remain compliant with the UK Forestry Standard. The guidance will not be applied retrospectively to projects or felling licences which have already been implemented.

In total there are approximately 1,420,000 hectares of peat in England¹². Analysis¹³ by the Forestry Commission and Natural England, based on the 2012 National Forest Inventory, showed that in England 51,447 ha of woodland is on deep peat (peat soils more than 40 cm in depth) out of a total mapped deep peat area of 678,000 ha; 60% of the woodland on deep peat is conifer plantation, with the remainder broadleaf woodland. 42% of woodland on deep peat was within the Public Forest Estate and 18 % was on Sites of Special Scientific Interest (SSSIs) designated for either priority habitat or species interest.

Definition of peat in scope of this guidance

Carbon-rich soils that have developed under wetlands of which there are three main peat-forming types in England:

- blanket bog – large areas of peat found largely in uplands, the surface of which is fed primarily by precipitation.
- raised bog – localised domes of deep peat (usually deeper than true blanket bog) in uplands and lowlands, the surface of which is fed primarily by precipitation.
- fens – found in uplands and lowlands, fed by groundwater and surface water, as well as precipitation.

Peat formed under blanket bog makes up 52% of England’s peatland area, 42% is derived from lowland fens, and 5% from raised bogs. Spatial mapping of peatland is generally more accurate on deeper peat (more than 40 cm depth), which accounts for 678,000 ha, but shallow peat (more than 10 cm but less than 40 cm) can also support high biodiversity and provide a suite of ecosystem

¹² <http://publications.naturalengland.org.uk/publication/30021>

¹³ <https://www.forestresearch.gov.uk/tools-and-resources/fthr/peatland-restoration/>

services, including significant carbon stores. Shallow peats are mostly mapped as organo-mineral soil types: peaty podzols, peaty iron pans or peaty gleys. They can occur in similar situations to deeper peats on plateaus and sloping ground.

Although such soils have shallower organic layers, they are carbon rich and may support priority habitats including wet woodland, heath and semi-natural wet grassland. They can also occur adjacent to deep peat, forming part of the same hydrological unit, or be found as more dispersed peaty deposits as a result of localised groundwater outflows or small topographic hollows in otherwise mineral soils. In such instances they may support the only wetland habitat within otherwise dry landscapes.

Wasted peats are peatland areas, typically under improved grassland or agricultural cropping, that were originally up to several metres thick but are now much thinner¹⁴. In England peat that has become thinner than 40 cm is classed as wasted. However, in many cases they will still retain an upper layer of peat soil and may therefore produce CO2 emissions, when planted or otherwise disturbed, approaching those from deeper drained peatlands. With the reversal of drainage it is quite possible to re-establish peat forming habitats as the underlying geology and topography that allowed peatland to develop will still be present.

UK Forestry Standard definition

Currently the UK Forestry Standard excludes planting on deep peat soils (more than 50 cm peat depth) and on sites that would compromise the hydrology of adjacent bog or wetland habitats. The UKFS also requires that soil disturbance through cultivation and associated drainage should be minimised to reduce carbon loss from soils, while still achieving successful establishment. Revised guidance¹⁵ for applicants in England to encourage better practice has recently been published.

Nature for Climate Peatland Grant Scheme Criteria

In order to be eligible for Nature for Climate Peatland Grant Scheme funding in England, the area of peatland included in a project must have a predominantly minimum peat depth of 30 cm. For the purposes of the project peat soils are considered as those with a soil organic matter content of at least 30%. Where shallower peat or peaty soils are intrinsic to the restoration of the peat mass, for example as part of the same hydrological unit, these may be considered as a component of the project.

¹⁴ <https://www.ceh.ac.uk/news-and-media/news/scientists-investigate-greenhouse-gas-emissions-degraded-peatlands>

¹⁵ <https://www.gov.uk/government/publications/guidance-on-cultivation-and-ukfs-compliance-for-application-in-england-operations-note-53/guidance-on-cultivation-and-ukfs-compliance-for-application-in-england-operations-note-53>

Definition of woodland in scope of this guidance

A minimum area of 0.5 ha under stands of growing trees greater than 20 m in width, with a canopy cover of at least 20% or having the potential to achieve this. The definition relates to land use, rather than land cover, so newly established woodland, integral open space and felled areas within existing woodland that are awaiting restocking are included as woodland¹⁶.

Decision support frameworks

The decision frameworks, based on current evidence, outlined in Figure 1 and Figure 5 should be used to ensure that woodland establishment or woodland re-establishment only occurs on peat where there are clearly justified biodiversity and carbon benefits and where no risk is posed to the long-term integrity of the surrounding peatland and its long-term carbon store.

It is important that consideration is given to the effect (both negative and positive) that woodland establishment, woodland restocking or woodland removal has not only on biodiversity and carbon¹⁷, but also on water, archaeology and the archive of palaeo-environmental evidence contained in peat. To ensure sound decision making it is vital that desk-based assessments are confirmed by field survey including, at an early stage, establishing whether a proposal is worth pursuing.

¹⁶ <https://www.forestresearch.gov.uk/tools-and-resources/national-forest-inventory/about-the-nfi/>

¹⁷ For the purposes of this decision-making framework and for non-broadleaved species, Sitka spruce yield class should be used as the measure of site productivity to determine whether it is appropriate to replant on the basis of carbon balance and site productivity.

Peatland protection and the establishment of new woodland

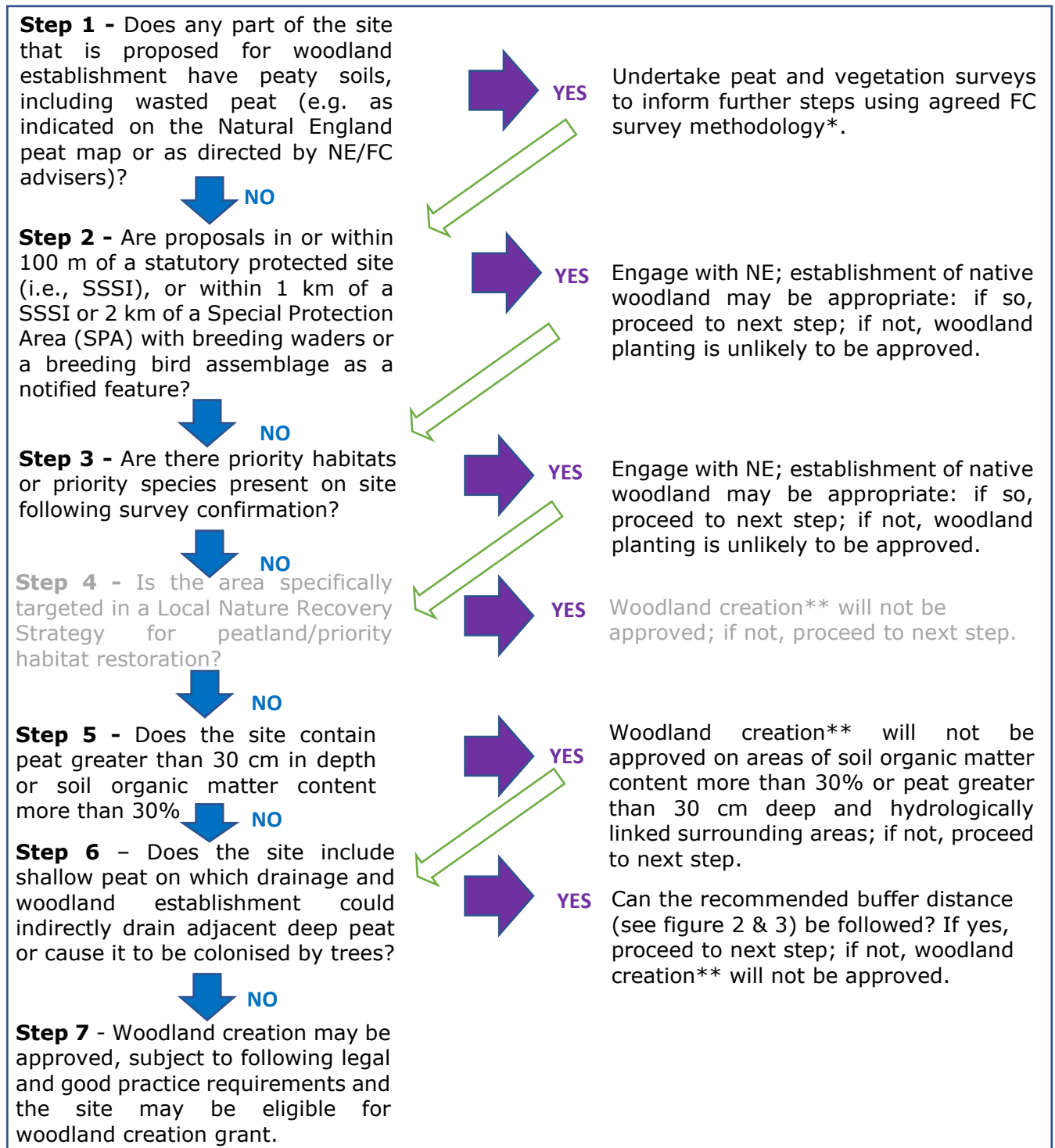


Figure 1. Decision support framework for peatland protection and the establishment of new woodland

* [Natural environment survey and assessment instructions V2.1](#). Updated November 2022

**Low density woodland may be appropriate in agreement with the Forestry Commission

Step 1 – Does any part of the site that is proposed for woodland establishment have peaty soils? If yes, a vegetation and peat survey¹⁸ will be required.

A report from the FC's Land Information Search (LIS) will tell you whether this framework applies to the site; the report draws on the Natural England peat map and includes wasted peat. However, currently available peat and priority habitat maps are not sufficiently detailed to indicate all relevant areas and, in some cases, may indicate peat where there are mineral soils. If an area is deemed to be relevant but is not identified on the LIS, this will be confirmed by the Forestry Commission following discussion with Natural England and you will be asked to follow this framework.

For lowland fen peat, the Forestry Commission will verify whether a soil survey or peat survey is required or not. The requirement for a vegetation survey will not apply if the current land use is temporary grassland or arable cropping. For wasted peat key considerations are the organic content of the soil and whether woodland establishment will affect land nearby with peatland that has potential for restoration.

Survey will not be required if it is demonstrated that soil organic content is consistently less than 30%¹⁹ unless there is a risk that woodland establishment will compromise the hydrology of adjacent peatland and where restoration should be considered as part of a scheme for the wider peatland site.

Step 2 – Are proposals in or within 100 m of a statutory protected site (i.e., SSSI), or within 1 km of a SSSI, or 2 km of a Special Protection Area (SPA) with breeding waders or a breeding bird assemblage as a notified feature?

Woodland creation on peat is inappropriate on statutory protected conservation sites (i.e., Sites of Special Scientific Interest, National Nature Reserves, Special Protection Areas, Special Areas of Conservation and Ramsar Sites) because the designation is intended to protect their natural features and habitats.

The only exceptions to this would be where restoring or expanding bog or carr woodland, riparian or ancient woodland is encouraged by Natural England. The

¹⁸ The peat and vegetation survey specifications are provided at: <https://www.gov.uk/government/publications/natural-environment-survey-and-assessment-instructions>

¹⁹ Where it is unclear whether the soil is peat, soil organic content can be confirmed by a Loss on Ignition test carried out by a soil analysis laboratory.

other terrestrial designations (SAC, SPA, and NNR) are underpinned by SSSI designation so the SSSI layer covers them all.

A buffer distance of 100 m around protected sites of either ground left open or established with tree species that are less likely to self-seed will usually prevent any significant tree establishment in the SSSI from seed from the area where new woodland is being established^{20,21,22}.

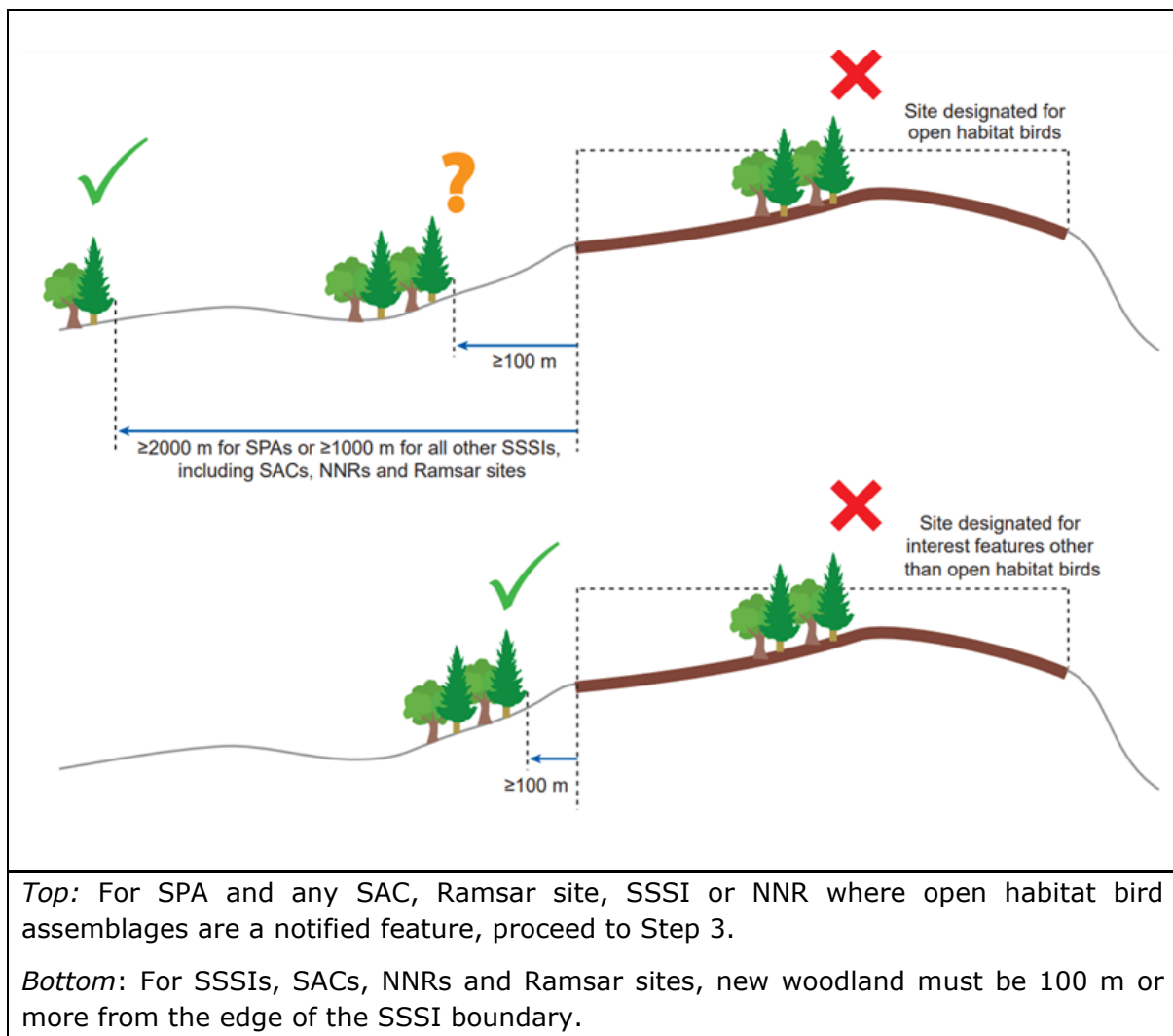


Figure 2. Buffer distance for new woodland in relation to designated sites – note consultation with NE on site specific issues may result in different buffer distances being recommended, for example, a 200 m buffer distance specifically for Sitka spruce.

²⁰ [Forestry Commission Information Note FCIN54](#)

²¹ Manzano, D. (2012) Assessing conifer regeneration on peatlands adjacent to Strathmore Forest. Unpublished report. Forestry Commission Scotland Highlands and Islands Conservancy.

²² [Forestry Commission Bulletin 120](#)

This buffer between new woodland and designated conservation sites is illustrated in Figure 2. Note consultation with NE on site specific issues may result in different buffer distances being recommended. For example, recent research findings²³ from study sites from Norway support the adoption of a 200 m buffer distance specifically for Sitka spruce. For designated sites with open habitat bird species or assemblages as a notified feature, and Natural England recommends that establishment of native woodland is appropriate, proceed to step 3.

Step 3 – Are there any priority habitats or species present on site following survey confirmation?

England’s priority habitats are defined by the Natural Environment and Rural Communities Act (2006) and listed in Natural England’s List of Habitats of Principal Importance, last updated in 2010. These are the habitat types of greatest importance for conserving and restoring England’s biodiversity. Priority habitats and valued non-priority habitats (i.e., those which are more semi-natural that may occur on peat), are listed in Table 1. Apart from wet woodland, these are normally open habitats and it is inappropriate to establish new woodland on peat supporting these habitats or adjacent to such sites where this is likely to adversely impact them.

Location	Priority or valued non-priority habitat type
Lowland	Lowland fen Lowland raised bog Lowland heathland Reedbed Wet woodland Purple moor grass and rush pasture Lowland meadows Lowland calcareous grassland Lowland dry acid grassland Good quality semi-improved grassland
Upland	Blanket bog 'Lowland' raised bogs in Upland situations Purple moor grass and rush pasture Upland flush, fen and swamp Upland heathland Upland hay meadows Wet woodland Grass moorland Fragmented heath

Table 1 – Priority and non-priority valued habitat types that may contain peat.

²³ Nygaard & Øyen, (2016) Spread of the Introduced Sitka Spruce (*Picea sitchensis*) in Coastal Norway. January 2017 Forests 8(1):24

Three additional habitat types that may be present on peaty soils, which have not yet been added to the priority habitats list, are valuable for conserving and restoring biodiversity and, as such, are generally inappropriate for conifer planting:

- good quality (ecological) semi-improved grassland
- grass moorland
- fragmented heath

Although priority habitat maps and maps of these three valued non-priority habitats are available on the Magic²⁴ website, the scale and accuracy of these is not sufficient to guarantee their presence or absence from a particular site so applications for new woodland in areas with peaty soils must have a priority habitat survey of the site undertaken by a professional surveyor²⁵ following a survey brief²⁶ provided by the Forestry Commission as evidence for this criterion. This will help establish both existing interest and their scope for habitat restoration in line with the ambition to recover nature. In some circumstances it may be appropriate to establish low density scrub and trees to enhance structural variation and niche diversity. In all cases, surveys will be subject to verification by Forestry Commission Area Ecologists.

For priority species, surveys will have identified important species and the use of habitats at the site. Species should be listed according to their national status e.g., IUCN, S41. An assessment of the impact of woodland creation must be undertaken. Advice should always be sought from the Forestry Commission before considering undertaking any bird or other species surveys.

Note: breeding bird surveys may, for example, need to consider surrounding land up to 2 km from the site footprint (see figure 2), depending on the suitability of habitat for ground nesting birds, particularly breeding waders and/or proximity of designated sites.

Step 4 – Has the landscape been specifically targeted for peatland habitat restoration in a Local Nature Recovery Strategy?

Note. This step will become applicable once the Local Nature Recovery Strategies are published. Until then, proceed to Step 5.

²⁴ <https://magic.defra.gov.uk/MagicMap.aspx>

²⁵ The survey must be carried out by suitably qualified, experienced, and professional contractors. They must have demonstrable experience of the survey and assessment work described in the specifications. They should be a professional grade member of a relevant professional body with an appropriate code of conduct and disciplinary inquiry procedure (e.g., CIEEM).

²⁶ <https://www.gov.uk/government/publications/natural-environment-survey-and-assessment-instructions>

The Nature Recovery Network is a major long-term commitment in the Government's 25 Year Environment Plan to enable nature's recovery alongside a range of other benefits, including carbon capture, flood management, improvements to water quality and opportunities for recreation. The Nature Recovery Network brings together new funding, new laws and new partners for the first time, making nature and its recovery a collaboration to which every single person, business and organisation can contribute.

The nature recovery network will be implemented through:

- I. supporting strong national and local partnerships to take coordinated action for nature. Defra has established a National Delivery Partnership, led by Natural England, to initiate, coordinate and advise action.
- II. developing new spatial planning tools, Local Nature Recovery Strategies (LNRS), to ensure habitat is established in the best place for wildlife and the wider environment.
- III. integrating the Network with new funding streams and land management duties to incentivise change on the ground.

Peatland restoration is one example of the local action that delivers carbon storage that the National NRN Partnership could support. LNRSs will also support delivery of mandatory Biodiversity Net Gain and, in complying with the strengthened biodiversity duty, all public authorities must have regard to relevant LNRSs in the exercise of their functions. They will underpin the Nature Recovery Network, alongside work to develop partnerships and to integrate nature into incentives, ensuring that finance is available to fund the management of land post-restoration. Each strategy will, for the area that it covers: agree priorities for nature's recovery; map the most valuable existing habitat for nature; and map specific proposals for creating or improving habitat for nature and wider environmental goals including woodland creation and peat restoration. LNRSs will help identify opportunities at a landscape-level and, eventually, site level for restoration moving beyond simple metrics such as peat depth, to a position where stakeholders are working together to consider the prospects for much wider restoration of peatland functional units²⁷.

Step 5 – Does the site contain peat (or soil with organic matter content more than 30%) greater than 30 cm in depth?

Soil with a peat layer of 30 cm or thicker falls into the category 'deep peat' for the purposes of this guidance. The 30 cm threshold is adopted to protect valuable peatland habitats that occur on peat shallower than the thresholds of 40 cm and 45 cm used to define deep peat for soil mapping in the Soil Survey of England and

²⁷ 'Functional unit' is used to mean the area of contiguous deep peat (>30 cm thick) and any contiguous shallow peat the management of which could lower the water table in the deep peat.

Wales and the Forestry Commission soil classification, respectively, while a shallower threshold would be too restrictive on woodland creation. Even if the peat does not currently support a priority habitat type, it is likely to have the right combination of climate, landform, soil substratum and ecohydrology for supporting this habitat in future, a valuable potential which could be compromised by woodland establishment.

As well as its ability to support rare and threatened biodiversity a further reason to avoid establishing woodland on peat is that drainage and other forms of disturbance aerate some of the peat, encouraging oxidation of organic matter, releasing stored carbon into the atmosphere, and as dissolved organic carbon into water courses. Losses of carbon can partly or wholly counteract the carbon sequestration benefits of woodland establishment, constraining GHG emission reductions. Avoiding drainage and drying of peat also protects preserved archaeological remains, such as wooden artefacts and safeguards the time series of palaeo-ecological evidence held in the intact peat profile.

Woodland establishment will not normally be approved on lowland/wasted peat if soil organic content is consistently more than 30%. If wasted peat is adjacent to and affecting the hydrology of other peatland sites, restoration should be considered as part of a scheme for the wider peatland site. Where lowland deep (or shallow/wasted) peat is currently being drained and subject to arable or intensive grazing as a land use, the establishment of wet woodland as native woodland habitat, or productive woodland under wetland conditions (most likely short rotation coppice as a paludicultural²⁸ crop) may be appropriate where the water table is raised to protect the peat. Agreement would be required from Forestry Commission and Natural England.

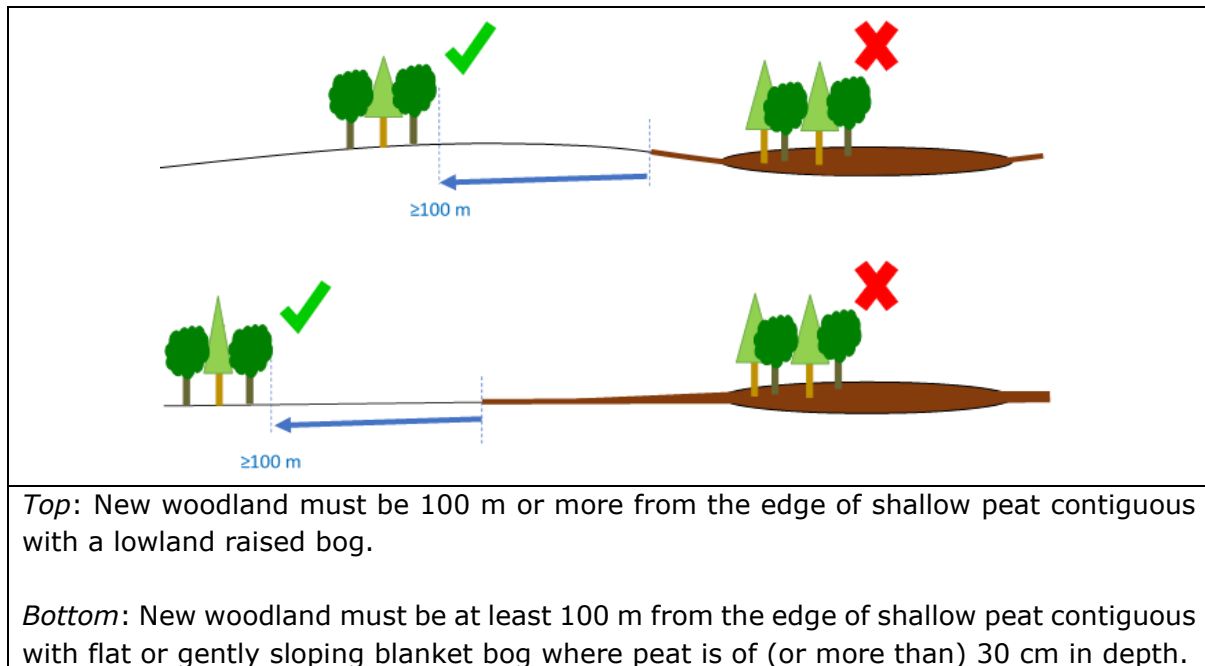
Step 6 – Does the site include shallow peat on which drainage and woodland establishment could indirectly drain adjacent deep peat or input slopes where new woodland could affect the supply and quality of water reaching adjacent peatland or, in either case, cause it to be colonised by trees?

Where shallow peat and organo-mineral soil is being considered for woodland establishment, peat bodies containing peat of 30 cm or more must be avoided in planting or other forestry operations. Drainage of relatively flat peatland lowers the soil water table beside the drain and this effect can extend some distance from

²⁸ Paludiculture, or farming on rewetted peat, is a system of agriculture for the profitable production of wetland crops under conditions that support the competitive advantage of these crops. In the context of lowland peat soils it is most usually achieved through raising of the water table to achieve wetland conditions.

the drain, perhaps up to 40 m either side during the first rotation of trees and, possibly, further in subsequent rotations²⁹.

It is important to avoid lowering the water table in deep peat outside the area being considered for woodland establishment because this will increase aeration and decomposition of the peat, releasing stored carbon as CO₂ and in drainage water. Figure 3 shows buffer distances that need to be maintained on flat or gently sloping ground (<1°) between new woodland and areas of raised and blanket bog to avoid the extended drainage effect drying the deep peat.



Top: New woodland must be 100 m or more from the edge of shallow peat contiguous with a lowland raised bog.

Bottom: New woodland must be at least 100 m from the edge of shallow peat contiguous with flat or gently sloping blanket bog where peat is of (or more than) 30 cm in depth.

Figure 3. Buffer distances for afforestation near raised and blanket bogs on flat or gently sloping terrain (<1°)

Note: In the blanket bog situation, buffers can be measured from where a significant change in slope can be demonstrated within 100 m of the peat body, instead of from the edge of all contiguous shallow peat, subject to local agreement.

Through interception and evaporation of rainwater, some types of forest reduce the amount of water draining off the land. On sloping ground, drainage alters the pattern of water movement and may divert water away that would previously have moved downslope as seepage and overland flow. If this happens, land downslope suffers a reduced water supply, which could lower the soil water level and alter the ecology. Figure 4 below shows situations where new woodland could affect the supply and quality of water reaching peatlands. Native broadleaf woodland established by natural colonisation or planting without drainage or water-diverting

²⁹ Changes to blanket bog adjoining forest plots at Bad a' Cheo, Rumster Forest, Caithness

forms of cultivation³⁰ is acceptable in these situations because its water use is comparable to that of open ground vegetation.

Note: Where narrow peat lenses are associated solely with watercourses and not a wider distribution of peaty soils, the buffer distances given in this guide will generally not apply; in such cases the minimum buffer widths from woodland edge to watercourse/body or abstraction point, as set out in UKFS³¹, should apply from the peatland edge, subject to local agreement.

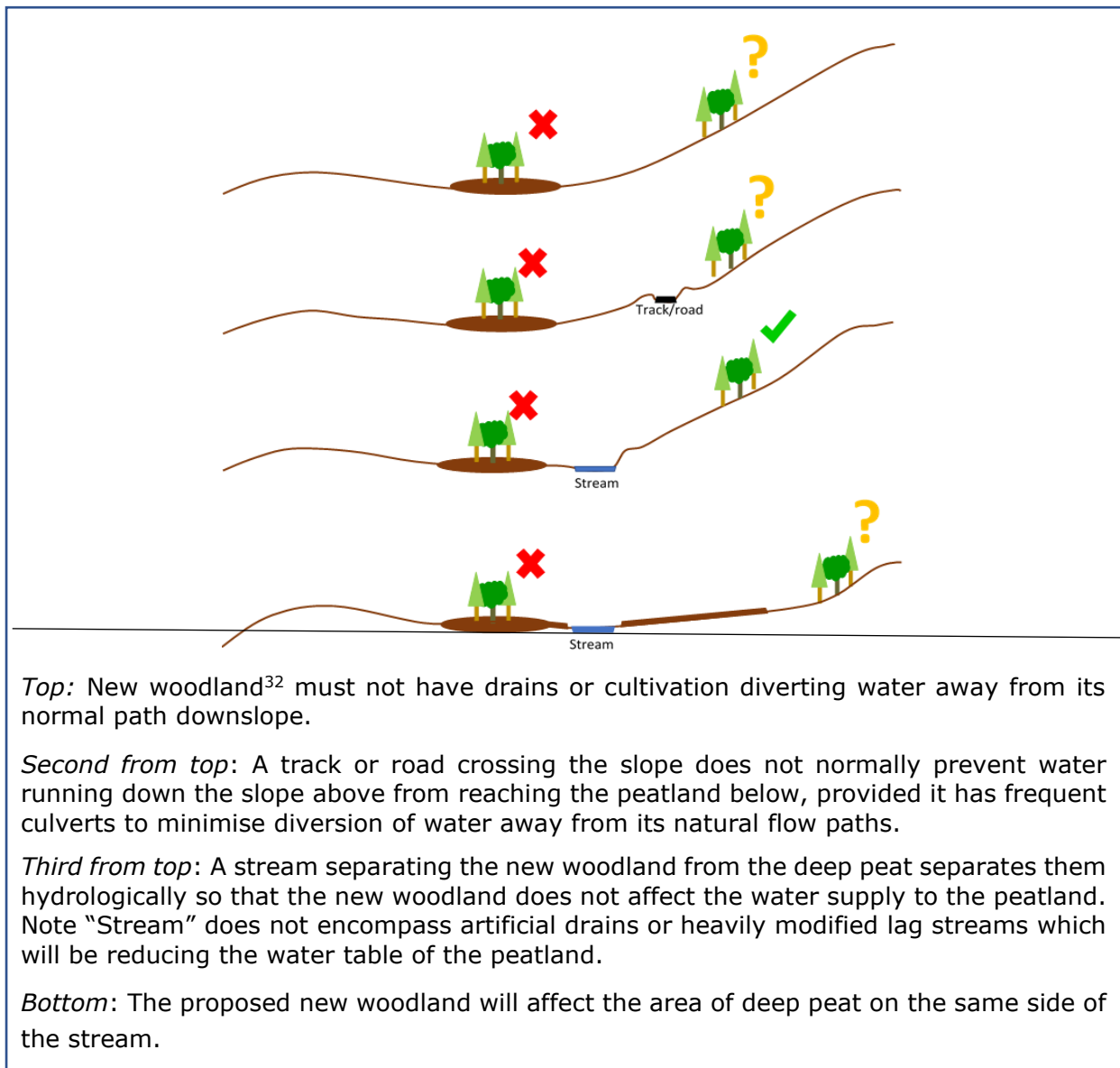


Figure 4. New woodlands on input slopes

³⁰ Screening and mounding (but not trench-mounding) are acceptable.

³¹ UKFS Table 6.7.2 page 170.

³² Excluding wet woodland.

Step 7 – If the answer to all the preceding steps (1-6) is no, woodland creation may be approved and eligible for woodland creation grant subject to following UKFS legal requirements/good practice and meeting grant scheme requirements.

The sustainability of woodland creation is strongly linked to the way new forests are planned, designed and managed. Woodland establishment that does not follow good practice is likely to be unsustainable and should not go ahead.

Operational plans must demonstrate that due diligence has been taken in identifying the soils within the woodland creation site and how the proposed cultivation can be justified to be “the least intensive and most appropriate cultivation method to successfully establish the proposed woodland”; this is a requirement to receive approval to create new woodland and receive incentives from the Forestry Commission.

Further guidance can be found in FC Operations Note 053³³ which notes that ‘*given the distribution of soils, habitats and site types in England, it is unlikely that traditional “mouldboard” type forestry ploughing will be considered as an appropriate method of cultivation and therefore will not be supported by woodland creation grant*’.

³³ <https://www.gov.uk/government/publications/guidance-on-cultivation-and-ukfs-compliance-for-application-in-england-operations-note-53>

Peatland restoration, protection and the re-establishment of woodland

The decision to replant or naturally regenerate existing woodland after felling on peat should be carefully considered, taking into account the balance of benefits for biodiversity, carbon sequestration, timber supply and other ecosystem services. The framework in Figure 5 is to guide decisions on whether it is appropriate to replant or regenerate such sites where peat depth is more than 30cm. The following sections explain each of the decision criteria.

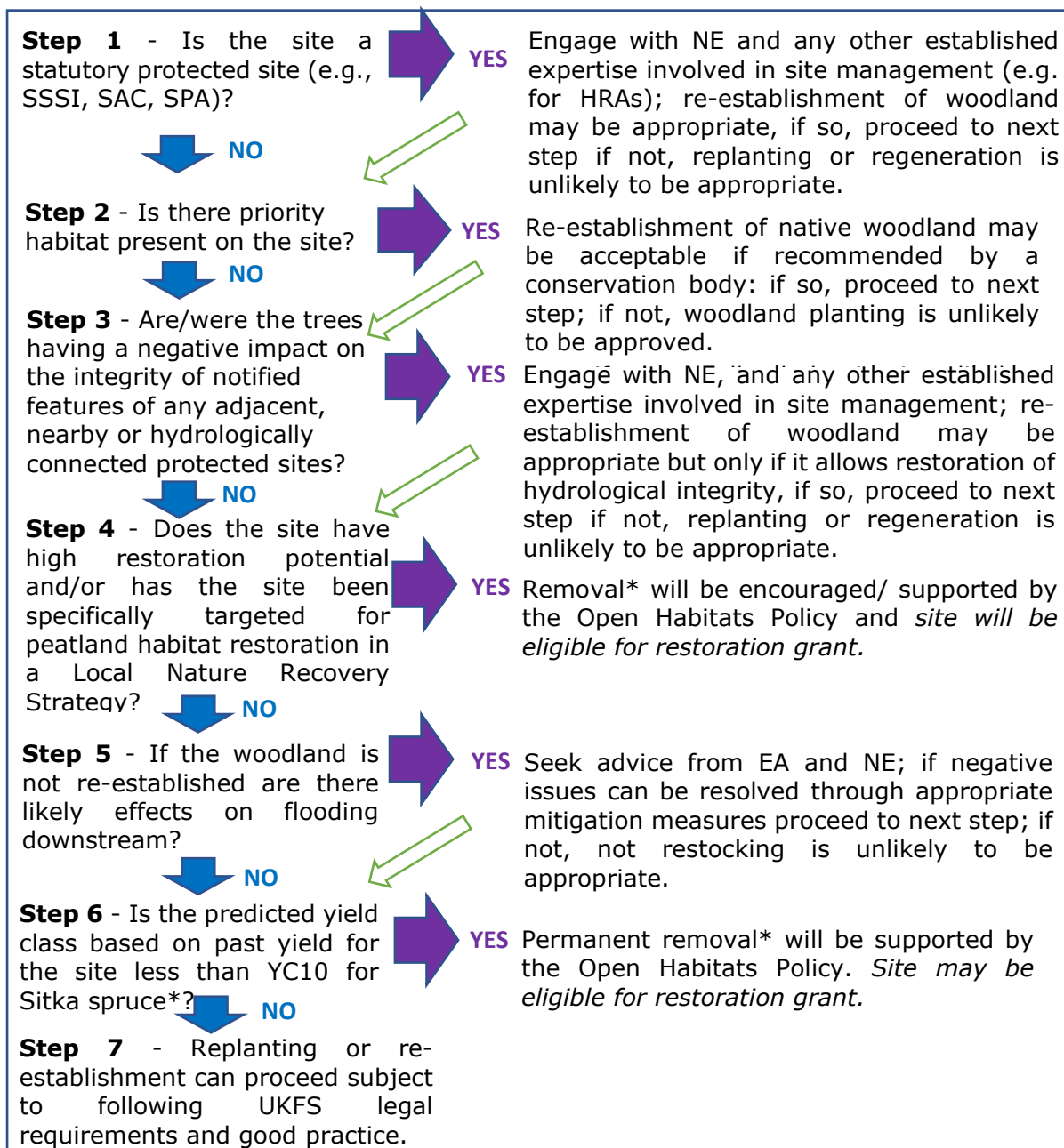


Figure 5. Decision support framework for peatland restoration, protection and the re-establishment of woodland

* Or conversion to low density native woodland in agreement with Forestry Commission

Step 1 - Is the site a statutory protected site (e.g., SSSI, SAC, SPA)?

Woodlands affected by this criterion may already be adversely impacting on the natural habitats and features of the protected site. Removing the trees provides an opportunity to remove such impacts, recover nature and reduce further drying out of peat thereby reducing carbon loss to air and water. Where the Forestry Commission, acting on the advice received from Natural England, identifies that not replanting woodlands improves the designated site's condition, we will support/encourage permanent woodland removal in line with the current Open Habitats Policy (2010) ³⁴.

Where compatible with the restoration of the eco-hydrological integrity of the peat and where trees are not having a detrimental impact on the notified site features, it may be appropriate in certain situations to encourage replacement of the existing current woodland with native wet woodland and scrub communities, for example through allowing natural colonisation. In some instances, this may not only protect but also enhance the conservation condition status of the designated site.

Step 2 - Is there priority habitat present on the site?

On sites where pre-planting priority habitat (see figure 6) on peatland has survived and trees have failed to establish or tree growth has been poor (less than yield class 10 for conifer), there will be a presumption against replanting trees. To avoid damage to surviving peatland priority habitat you may be advised to leave poorly grown trees in situ, rather than remove them. It will often be necessary to take steps to re-establish peatland hydrology by blocking drains and grips even if priority habitat has survived or if poorly growing trees are left in situ.



Figure 6. Surviving blanket bog vegetation under a stand of poorly grown trees

³⁴ <https://www.gov.uk/government/publications/when-to-convert-woods-and-forests-to-open-habitat-in-england-march-2010>

In some circumstances where hydrological integrity has been restored it may be appropriate to establish low density scrub and trees to enhance structural variation and niche diversity.

Step 3 - Are/were the trees having a negative impact on the integrity of notified features³⁵ of any adjacent, nearby or hydrologically connected protected sites?

Where re-establishment of woodland is being considered adjacent to or close to a protected site or is in the catchment of a protected freshwater site, adverse impacts on habitat and species interest must be avoided. Drainage and the presence of woodland on relatively flat peatland lowers the soil water table beside the drain and this effect can extend some distance from the drain, perhaps up to 40 m either side during the first forestry rotation and possibly further in subsequent rotations³⁶. Engage with Natural England, and any other established expertise involved in site management (e.g., for HRAs) for further advice.

It is important to avoid any lowering of the water table in peat as this will have impacts on the condition of the protected site and the overall integrity of the peat body in which the protected site sits. A peat survey to identify contiguous areas of peat where these impacts could occur, will be required to help the Forestry Commission and Natural England assess whether replanting will have a significant impact on the hydrological integrity of the notified features of a protected site.

There can also be water quality issues associated with woodland, such as acidification of freshwaters as well as significant increases in sedimentation arising from forestry operations. Further guidance can be found in UKFS Requirements and Guidelines on Forests and Water. The downstream sensitivity of protected water bodies and wetlands and potential for a decline in water quality will need to be carefully considered. Peat soils are particularly liable to leach phosphate from brash following large scale felling operations; this can pose a risk to sensitive water bodies. Felling itself can lead to short-term water acidification and increased sedimentation and needs to be managed by undertaking a 'Site Impact Assessment.' Where issues are identified, advice should be sought from Environment Agency and, if a protected site may be affected, Natural England.

The colonisation of trees onto adjacent peatland protected sites is known to pose a significant threat to the condition and integrity of peatland and other open habitat interests. Removal of self-seeded conifers is expensive and is likely to have

³⁵ Excludes breeding waders which are covered by separate guidance, see <https://www.gov.uk/government/publications/guidance-for-afforestation-proposed-on-or-near-nationally-important-upland-breeding-wader-areas>

³⁶ [Changes to blanket bog adjoining forest plots at Bad a' Cheo, Rumster Forest, Caithness](#)

to be repeated as long as sources of seed exist. Sometimes it is possible to reduce the likelihood of tree establishment by maintaining the site in a wet condition, but such establishment will often remain an issue on naturally drier parts of peatlands. Where there is evidence of colonisation into adjacent protected sites, opportunities should be taken to reduce tree seed dispersal by the use of open ground buffers, removal of mature seed-bearing trees or planting native tree species that are less likely to self-seed. A buffer distance of 100 m of open ground around protected sites (see figure 2) may be sufficient but wider or narrower buffers should be applied where there is evidence of a particular risk or not, of self-seeding onto protected sites. Seek Natural England's advice.

Step 4 – Does the site have high restoration potential and/or has the site been specifically targeted for peatland habitat restoration in a Local Nature Recovery Strategy?

Advice about restoration potential should be sought from the Forestry Commission.

A site would be expected to have high restoration potential if any of the following apply:

- it is close to and / or hydrologically connected to an area of unplanted deep peat
- is a rare peatland type e.g., raised bog, intermediate bog, calcareous fen, valley mire, transitional mire or *Molinia* meadow
- the site is in a wet state as evidenced by water standing in drains and plough furrows for most of the year
- species assemblages characteristic of peatland priority habitats occur beneath the tree canopy.

Where sites do not demonstrate the above characteristics, and are of lower potential for restoration, they could still be considered for restoration.

Local Nature Recovery Strategies, once they are published, will establish priorities and map proposals for specific actions to drive nature's recovery and provide wider environmental benefits and are managed by local authorities. In the interim a mapping tool³⁷ produced by Forest Research is available for woodland owners and managers to use to view maps indicating suitability of wooded peatlands for restoration. It combines five factors affecting their suitability (slope, peaty soil class, peatland habitat status, interpreted forest type, estimated yield class of woodland) and shows a map of the overall suitability score as well as maps of the individual factors.

³⁷ [Forest to Bog tool \(forestshinytest.org.uk\)](https://forestshinytest.org.uk)

Where woodland areas are identified³⁸ as having high restoration potential and are considered priority areas for peatland restoration, Forestry Commission will not enforce the requirement for replanting under a felling licence or forest plan. The location of the site in a specifically targeted area for peatland restoration in a LNRS (once they are in place) is also likely to indicate the potential availability of funding to support nature recovery and the future success of the site as priority open habitat.

Step 5 – If the woodland is not re-established are there likely effects on flooding downstream?

The potential effects on flood risk arising from the permanent removal of woodland cover must be considered, taking account of changes in the pattern of settlement and land use in the catchment since woodland cover was established, the potential for peatland restoration to offer a long term stable hydrological regime and the potential for compensatory mitigation of any enhanced flood risk.

Restoration of peatland habitats may not reduce the downstream flood risk as much as established woodland can³⁹ but may provide a more stable long-term pattern of flood risk. Where the scale of conifer removal suggests there may be a short-term increase in flood risk, natural flood management actions in the catchment may be needed to mitigate this additional risk. These issues will be taken into account in consideration of felling licence applications. Advice from the Environment Agency and Natural England, if a protected site may be affected, may be required.

Step 6 – Is the present yield class for the site less than YC10 for Sitka spruce?

For the purposes of this decision-making framework we need to understand the balance between carbon emissions from forested peat and the carbon uptake in the trees and its long-term retention in wood products. Sitka spruce yield class should be used as the measure of site conditions for tree growth in the uplands to determine whether it is appropriate to replant a site on the basis of carbon balance; however, if replanting is considered appropriate and takes place, it is acceptable for a wider range of species that are of lower productivity than YC10 Sitka spruce to be planted to maintain UKFS-compliance and increase forest resilience.

³⁸ http://forestshinytest.org.uk/Peatmap_May22/

³⁹ Allott, T. et al. (2018) [Peatland Catchments and Natural Flood Management. Report to the IUCN UK Peatland Programme's Commission of Inquiry on Peatlands Update](#)

Yield class: Over a forestry cycle, from when the trees start growing to when they are felled, forests on peat soil need to achieve a productivity of at least Yield Class 10 to avoid net loss of carbon from the site, assuming there is no additional drainage or fertilizer application and minimal cultivation at the time of re-establishment. YC 10 gives a minimal level of net carbon sequestration c.1 tonne CO₂e per hectare per year. Carbon sequestration, in isolation, is not a reason to justify replanting at YC10 or above; current evidence is simply indicating that trees achieving YC10 or more are unlikely to be a net source of CO₂ emissions.

Yield class is used in this decision-making framework as a proxy for the net carbon balance of a stand of trees over its rotation and may be amended as new evidence of emission rates from afforested and rewetted peat is published. There is also the potential longer-term issue of nutrient sustainability of repeated harvesting cycles on peatland. Yield class is likely to be partially dependent on the level of drainage of the peat established when the crop was planted with the most modified peats being the most productive.

To predict future yield class, the yield class achieved over the previous rotation by the forest being felled should be used as an initial guide, unless there is clear evidence that a better prediction is available. For example, this may include robust predictive models (e.g., Ecological Site Classification) of future yield. However if, as is likely, site amelioration by the use of fertilizer, herbicide, drainage and cultivation will be less than for the previous rotation, adjustment should be made to allow for this.

Where yield class does not meet the YC10 threshold, peatland habitat restoration is encouraged, and the site may be eligible for a peatland restoration grant. This is recognised by the Government's policy on when to convert forests to open habitats in England which sets out that compensatory planting is not required following the removal of low yielding forestry on peat.

Restoration considerations: Techniques for rewetting and restoring afforested peatland to re-establish healthy peatland vegetation and to protect the peat carbon store have developed over the past 25 years with some major advances made in the past five years. In many cases rewetting brings back key peat forming vegetation within 5 to 10 years.

Some sites are easier than others to rewet; in general, flat sites are easier than slopes. The degree of peat degradation also affects the ease of restoration; sites where the peat has dried out and cracked or where peat pipes have developed need stronger interventions to restore the faster degrading carbon store within the peat, than those where it remains largely intact.

There are few sites that are unrestorable but the more difficult the site the more interventionist the restoration solution.

Step 7 – If the answer to all the preceding steps (1-6) is no, replanting or re-establishment can proceed subject to following the legal requirements and good practice in UKFS.

The sustainability of woodland management and carbon in soils and peat is strongly linked to the way forests are planned, designed and managed. Replanting that does not follow good practice is unlikely to be sustainable and appropriate. In particular, it is important that any restocking activity should not encompass additional drainage activity, including maintenance of existing drains, as this will result in further drying out of peatlands and loss of carbon.