

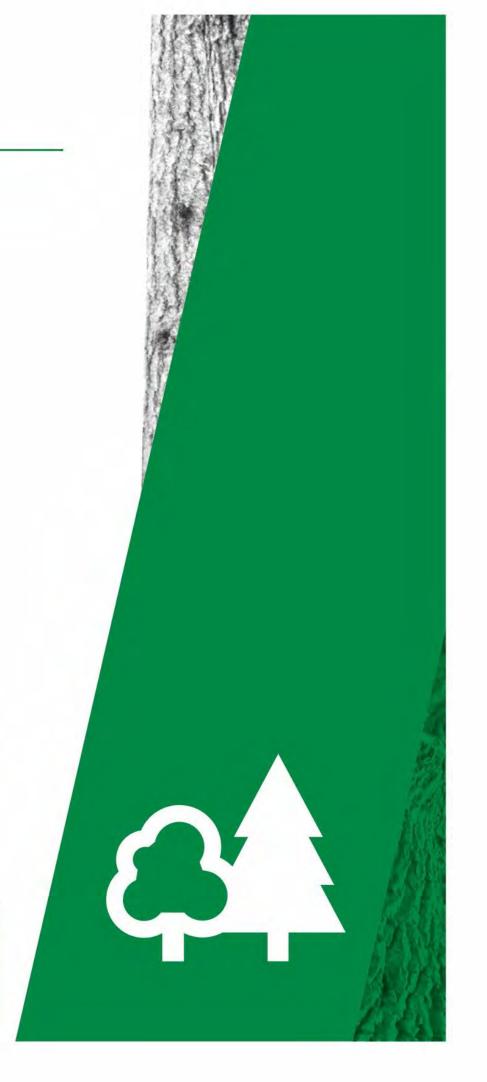
Broughton Moor Forest Design Plan 2020

North England Forest District



Forestry England forests and woodlands have been certified in accordance with the UK Woodland Assurance Standard (UKWAS)





Planning and District Context

The Strategic Plan for the **Nation's Forests** outlines the delivery of forest policy at a national level. At a regional level there are six Forest Districts covering the country that directly oversee the implementation of policy actions in local public forest estate woodlands. Forestry England is the organisation responsible for managing the English public forest estate.

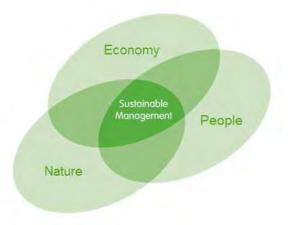
North England Forest District (NEFD) is the management unit that manages the Nation's Forests in Northern England. This is an extensive area encompassing 9 county or unitary authority areas from the Scottish border to Durham and Lancashire.



Our task is to realise the potential of each of the forests in our care for sustainable business opportunities, wildlife and nature conservation, and the enjoyment and well-being of local people and visitors. Each of our forests supports the economy through local jobs, sustainable timber production and the provision of recreation and tourism opportunities. All are funded by revenue from timber sales and recreation provision.

The woodlands of the district are currently arranged in 59 management areas, and their management is covered by individual ten year Forest Plans that identify local issues and the broad silvicultural management of the woods. Forest Plans are reviewed every five years.

These plans and their associated forest operations ensure that produce from the woodlands is endorsed by the Forest Stewardship Council® (FSC®) and the Programme for the Endorsement of Forest Certification (PEFC) as being produced from woodlands under good management that meet the requirements of the UK Woodland Assurance Standard (UKWAS) and the UK Forest Standard (UKFS). Individual Forest Plans aim to deliver a range of public benefits with achievable objectives that deliver the three drivers of sustainable land management outlined in the North England Forest District Strategy.



These key drivers are supported by the following Forest District Policy;

- we will optimise the financial return from timber production compatible with achievement of other forest district objectives while complying with the UK Forestry Standard and meeting the requirements of the UK Woodland Assurance Standard;
- we will provide public access to all our forests and woodlands where there are no legal or safety restrictions. We will encourage and permit a wide range of recreational activities from walking and quiet enjoyment to more specialised activities;
- we will ensure that rare and threatened habitats are protected and managed to maintain or enhance their conservation value;

Broughton Moor Forest Design Plan

This is the fourth revision of the Broughton Moor Forest Plan which was last revised in 2010. There are no significant changes to the previous plan, however it has been brought up to date in terms of work achieved over the last 10 years and ongoing implementation of the management objectives. The impacts and threats associated with emerging pests and diseases, particularly *Phytophthora Ramorum*, and the need to make our forests more resilient in the future has prompted changes to species composition in the restocking plan and the early felling of larch crops.

Part 1 Background Information

Introduction

Broughton Moor occupies an area of 333 ha to the south west of Coniston. It lies in the Lickle Valley which is situated between the Duddon Valley and Coniston Water, and is wholly within the Lake District National Park and its associated World Heritage Site. The entirety of the block is owned freehold and was acquired between 1939-1957.

This mainly coniferous forest was first planted in the 1940s and has been substantially restructured within the last plan review after a catastrophic storm in 2005 which caused many of the older stands to blow over. As such the age distribution of the forest is relatively young when compared to other Forestry England sites in the district. Accordingly focus for this revision is on the successful establishment of recently planted sites. Species changes in this plan reflect the current risk to, and infection of, larch from *Phytophthora Ramorum*, and the continuation of improvements made in the previous revision.

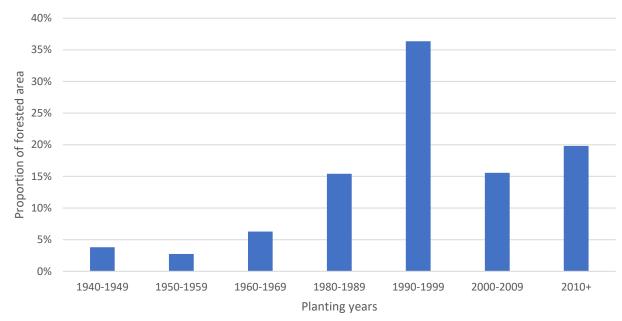
Current woodland composition

Of the 333ha of land that Broughton Moor occupies, 218ha is woodland, of this wooded area 90% has tree cover, while 10% is felled, either awaiting restocking or stocked through natural regeneration. 11ha of Broughton Moor is classed as unplantable.

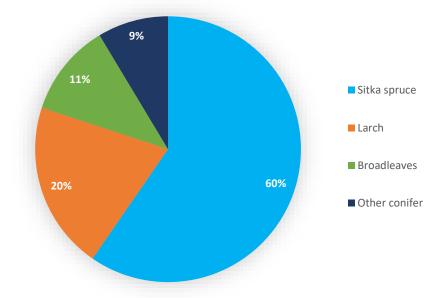
Coniferous tree species dominate Broughton Moor, with Sitka spruce making up over half of the wooded area. Larch has provided useful variety in the landscape, although outbreaks of *Phytophthora Ramorum* from 2018 onward have created challenges in maintaining both landscape and economic objectives from larch in the future for Broughton Moor.

The species composition reflects **Broughton Moor's** position as a productive forest, with over 50% of conifer crops having a yield class of over 14, with yields of over 20 possible on the best sites. Most of the lower yield classes are found within the mixed broadleaf crops. Average yield class across the whole forest is 7. The average wind hazard class is 3, which is medium, although there are significant areas of high risk to the north of the forest. As such Broughton Moor is relatively vulnerable to high wind events, as borne out in previous storms such as that of 2005. Because of this clearfell coupes are the preferred management method for most of the forest, with fewer options available for low intensity silvicultural systems.

Age Distribution of Broughton Moor



Broughton Moor Current Species



Designated areas

Broughton Moor is situated wholly within the Lake District National Park and the English Lake District World Heritage Site, which was inscribed as a cultural landscape in 2017. The National Park and World Heritage Site provide the opportunity to demonstrate, at a practical level, how activities such as forestry, which have been prominent in shaping the landscape we see today, can create greater public benefit through sustainable land management delivering for people, the landscape, nature and the economy. For example, this can be achieved through conserving and enhancing the landscape, scenic beauty, and cultural heritage of the Lake District, whilst also providing wider ecosystem services to support communities' social and economic wellbeing in a sustainable way.

Broughton Moor is located within the Coniston section of the WHS nomination document, and the forest can be seen to contribute to the agropastoral landscape of the area, with the area noted in the nomination for woodland industries in a working landscape. The nomination document acknowledges commercial forestry plantations as part of the valley landscape. Broughton Moor also helps contribute to the discovery and appreciation of a rich cultural landscape through opportunities for quiet enjoyment.

There are no Sites of Special Scientific Interest or other statutory environmental designations within Broughton Moor.

Environment and conservation

The habitat varies from coniferous woodland, broadleaf woodland, moorland, boggy riparian zones, and rocky crags. The wide variety of habitats is reflected in the birds that can be found in the forest, such as siskins, bull finches, merlins and buzzards, as well as mammals such as badger, and insects. Red squirrels are present in Broughton Moor and sightings are reported to Red Squirrels Northern England. While most of the forest is currently quite young, the increased areas of Low Impact Silvicultural Systems management presented in this plan will be of benefit to this species in years to come.

Two main watercourses flow through Broughton Moor, the River Lickle and Appletreeworth Beck. They bring benefits to the forest through the provision of important riparian habitats and enhanced levels of biodiversity. The watercourses of Broughton Moor are part of Duddon Catchment, which is subject to the South Cumbria Rivers Trust (SCRT) Duddon Catchment Management Plan. This plan identifies forestry operations as a potential source for low pH water quality events. Forest and water guidelines will be followed to preserve and enhance these natural watercourses during operations, and this forest plan looks to expand the areas of native broadleaf planting adjacent to them. In addition, the use of Low Impact Silvicultural systems along the Appletreeworth Beck aims to allow for slow change in this area.

All watercourses in the forest are to benefit from the creation of 10m riparian buffers of mixed broadleaf species, managed under LISS principles. These riparian corridors are being created with the intention of improving connectivity across the forest and increasing the variety of habitat found.

Lagg bank was cleared prior to the last plan revision to be converted into open heather moorland, which has provided valuable diversity to the habitat found within the forest. In recent years spruce regeneration has developed and requires intervention for removal in the plan period. The wider forest also has large areas of open space or those with scattered tree cover composing a transitional habitat between open ground and forest, providing a greater range of habitats.

The privately owned Spring Wood to the south west of the forest is an Ancient & Semi-Natural Woodland, and Broughton Moor contributes an extension of this habitat through two areas of mixed native broadleaves adjacent which are managed under a group shelterwood system.

Landscape and topography

Broughton Moor is located within the 'Broughton and Torver' Landscape Character Area (LDNPA 2008). The areas distinctive characteristics include the large areas of coniferous plantation at Broughton Moor. Other characteristics of this distinctive area, which Broughton Moor contributes, include the open areas of the forest which resonate with the description of higher ground featuring 'large areas of bracken with some small trees providing a contrast to the semi-improved grassland'.

The guidelines for managing landscape change in the LCA of relevance to Broughton Moor refer to the practical points of protecting the water corridors from point source and diffuse pollution, which this forest design plan contributes to through the addition of broadleaf riparian zones.

Broughton Moor can be seen from relatively few through routes in the area, and despite passing close by, views from the A593 are extremely limited. External views from the minor road from Broughton Mills on the southern boundary of the forest are largely two-dimensional owing to the road hugging the boundary of the forest. The wood is bounded by a mixture of farmed land, small parcels of privately owned woodland and open fell. To the immediate north east lies the Broughton Moor Quarry owned by Burlington Stone and is one of the few actively worked quarries in the Lake District.

A patchwork of open and afforested areas has enhanced the internal landscape, with some areas of mature conifers providing much needed age diversity to the visitor. While the age distribution within the forest is weighted towards younger stands, the provision of new areas of Low Impact Silvicultural Systems (LISS) will work towards increasing this diversity in the future.

Heritage

Broughton Moor contains one scheduled ancient monument, The Hawk, which is the site of a prehistoric enclosed settlement consisting of at least 5 hut circles and some internal walls and animal pens. Work over the period of the last design plan to keep the site clear of bracken and regeneration have been successful and this objective will continue to ensure the site is maintained in good condition.

There are also several undesignated archaeological features including the remains of Appletreeworth Farm and associated lime kilns and quarries. These non-scheduled historic features present within the area controlled by this plan will be routinely protected during operations and opportunities taken to enhance as appropriate. A variety of heritage features are present in the wider landscape and vicinity of the forest on neighbouring land including potash pits and a Norse sheiling, as well as the historically significant bridge over the River Lickle.

Communities and recreation

Broughton Moor is primarily used for quiet and informal recreational purposes. A particular use of the forest is for walking by members of the local community, as well as visitors to the area. While there are no formal Forestry England trails in the woodland, three footpaths and a bridleway cross the forest, which are utilised by both casual day trippers and long distance fell walkers who pass through and are maintained by the Lake District National Park Authority. In 2008 a footbridge bridge over the Appletreeworth beck was constructed to replace a previous wooden bridge which was washed away during storms. The new bridge was built in memory of Lady Angela Rooker.

In addition, the entire forest is dedicated under The Countryside and Rights of Way Act 2000 as open access, which enables extensive use of the forest by walkers. Permissions have been issued over the period of the last forest plan for orienteering events, management training and for one weekend a year, rallying.

There are modest car parks along the south eastern boundary and at the entrance by The Hawk, and modern and extensive facilities are available for the public throughout the year at nearby Grizedale.

Pests and diseases

Red deer have become more prevalent since the previous plan revision and have created difficulties in establishing restock sites in the past. Roe deer are also present throughout and the population is monitored to ensure that deer numbers do not compromise other objectives of management, particularly the promotion of natural regeneration.

Deer are culled by Forestry England wildlife staff, and to aid their efforts this plan has a renewed focus on the creation of deer glades from which safe wildlife management can be undertaken. In addition, the use of fences during restock operations should be considered where necessary to aid the establishment of new planting.

While the relatively isolated position of Broughton Moor reduces potential for intrusions, grey squirrels are also present in the forest and have the potential to cause damage to mature trees and displace native red squirrels. Sightings are reported to Red Squirrels Northern England (RSNE). Previously grey squirrel control was practised by a local RSNE group, and we will continue to provide opportunities for engagement with groups for squirrel management into the future.

Larch is under threat from the disease *Phytophthora Ramorum* and following several smaller outbreaks in the preceding years Broughton Moor has seen a large increase in infection during 2019. These outbreaks are subject to a process of swift response work following the issuing of Statutory Plant Health Notices by the Forestry Commission. These notices enforce the felling of infected trees to reduce the spread of the disease within the forest and to neighbouring woodland. The majority of larch areas in Broughton Moor have been placed into felling coupes in the next two felling periods to facilitate their felling in a structured manner.

Consequently, there will be no future restocking of larch and there will need to be ongoing vigilance from staff in thinned areas of continuous cover where larch occurs as natural regeneration. Larch is an important species in the landscape in terms of providing seasonal changes in colour and texture across the forest. As part of our strategy to deal with the impact of the disease, Forestry England is actively seeking the use of alternative species which provide a positive outcome in terms of increasing opportunity for diversification and improved future resilience.

Access and roading

There is a designated timber transport route for haulage entering and leaving the forest at the east gate via a narrow lane to Broughton in Furness, from where the route joins the main 'A' road network. Internally forest operations are adequately served by a network of forest roads and tracks and there are no significant roading requirements.

Part 2 Analysis and Concept

The factors outlined in Part 1 present various opportunities and constraints. These are summarised below:

Factor	Opportunities	Issues
Management type	Expansion of Low Impact Silvicultural Systems (LISS) to include some previous clearfell coupes. Smaller clearfell coupes in areas of high windthrow risk.	Owing to high windthrow hazard, as borne out in the 2005 storm, LISS is not appropriate for large areas of the forest and instead needs to be targeted.
Biodiversity and heritage	Protection of features including veteran/feature trees, deadwood, or ground flora during operations to benefit biodiversity.	Age class of Broughton Moor is not particularly diverse and currently there are minimal older stands to explore these opportunities in.
	Maintaining current condition of the Hawk Settlement heritage site.	Potential for bracken encroachment onto the Hawk.
	Lagg Bank heathland enhances biodiversity and provides habitat to numerous species	Lagg Bank heathland has scattered spruce regeneration which requires intervention to keep the area open.
Access/Roading	Good internal network of roads with all current operations areas served well.	
Pests and disease	Potential for planting of new species to replace larch threatened by <i>P. Ramorum</i> .	Increasing numbers of deer present in the forest have limited success of natural regeneration and restock sites.
		P. Ramorum infection in existing larch crops.
Future Species	Retention of current productive conifer species, transition away from larch species through proactive thinning regime and underplanting, or clear felling where plant health notices are issued.	Larch is not viable in the long term due to disease risk. Majority of forest is a young conifer crop and restructuring for increased diversity is a few periods away.

Landscape	LISS management in larch crops	Clearfells associated with <i>P. Ramorum</i>		
, i	provide gradual change with	health notices have potential to case		
	limited landscape impact.			
	I illinted fandscape illipact.	large short term landscape impacts.		
	Coupe edge to be adjusted at	Coupe edge at north eastern side of		
	clearfell and restock.	forest still inappropriate and detract		
		from the landscape.		
Current species	Retention of conifer species	Presence of larch which is at risk from		
'	generally growing well which will	P. Ramorum will need regular		
	provide a sustainable yield	monitoring.		
	throughout plan period.			
Public access	Location within Lake District	Continued use for illegal motorbike		
	National Park and proximity to	riding and illegal mountain bike trail		
	other Forestry England Sites.	building.		

Appraisal of Opportunities and Constraints

- 1. Present *Phytophthora Ramorum* infection which will require many of the larch areas to be felled under Statutory Plant Health Notices. While potentially having a large short term impact, this provides opportunity to restructure the forest with alternative species over the period of the plan to increase diversity and introduce LISS management in more areas, including the opportunity for greater areas of mixed broadleaf woodland.
- 2. Deer encroachment and the establishment of red deer populations in the woodland threaten future restock and underplanting exercises. Control of the deer is an important part of future forest management and sufficient open space to allow for effective control is essential, however some sites may still need to be fenced to ensure successful restock.
- 3. Lagg bank was cleared of trees several years ago with the intention of aiding the restoration of a heather moorland, recent regeneration of spruce on this area needs to be kept under control. Opportunity to work with volunteers who have previously worked on the Restoring Hardknott Forest project to intervene and remove this regeneration during the plan period. During the plan period, levels of broadleaf natural regeneration should be monitored, with the potential for this area to be considered transitional open woodland to be reviewed at the next plan revision.

Part 3 Objectives and Proposals

The following objectives have been identified based on Forestry England National Policy and NEFD Strategic Plan

Forest District Strategic Goal	How Forest Plan delivers
ECONOMIC	Harvesting plan provides a sustainable yield of timber into the future.
<u>Wood Production</u> - 'we will optimise the financial return from	Expansion of the LISS area to the east of the forest along the Appletree Worth
timber production compatible with the achievement of other district objectives whilst complying with the UK Forestry Standard and	Beck will allow for increased diversity in the stand while also improving the timber quality of the final crop.
meeting the requirements of the UK Woodland Assurance Standard'	Clearfell sites of productive conifer to be restocked with similar species mixes.
NATURE, HERITAGE and LANDSCAPE	Age class of Broughton Moor is weighted towards the second rotation crops of the
'we will continue to diversify the age class structure of our even-aged woodlands and increase the value of all our woodlands and	last 30 years. Continue to retain stands of older crop where physically possible
forest for wildlife'	to help increase structural diversity in the forest to provide landscape and environmental benefits.
'we will ensure that rare and threatened habitats are protected and managed to maintain or enhance their conservation value'	Expansion of the LISS area will allow for increased light and resulting improvements to diversity via thinning.
	Historic features will be routinely identified and protected during our planning and implementation of forest operations.
PEOPLE	Increased landscape diversity through new species planting will improve the
'we will utilise the land and resources at our disposal to assist communities close to our	visual appeal of the forest for visitors.
forests to enhance their environments and hence their quality of life' 'we will provide public access to all our	Encourage existing low-key recreational use in Broughton Moor suited for
forests and woodlands where there are no legal or safety restrictions'	walking, cycling or horse riding utilising the existing infrastructure.

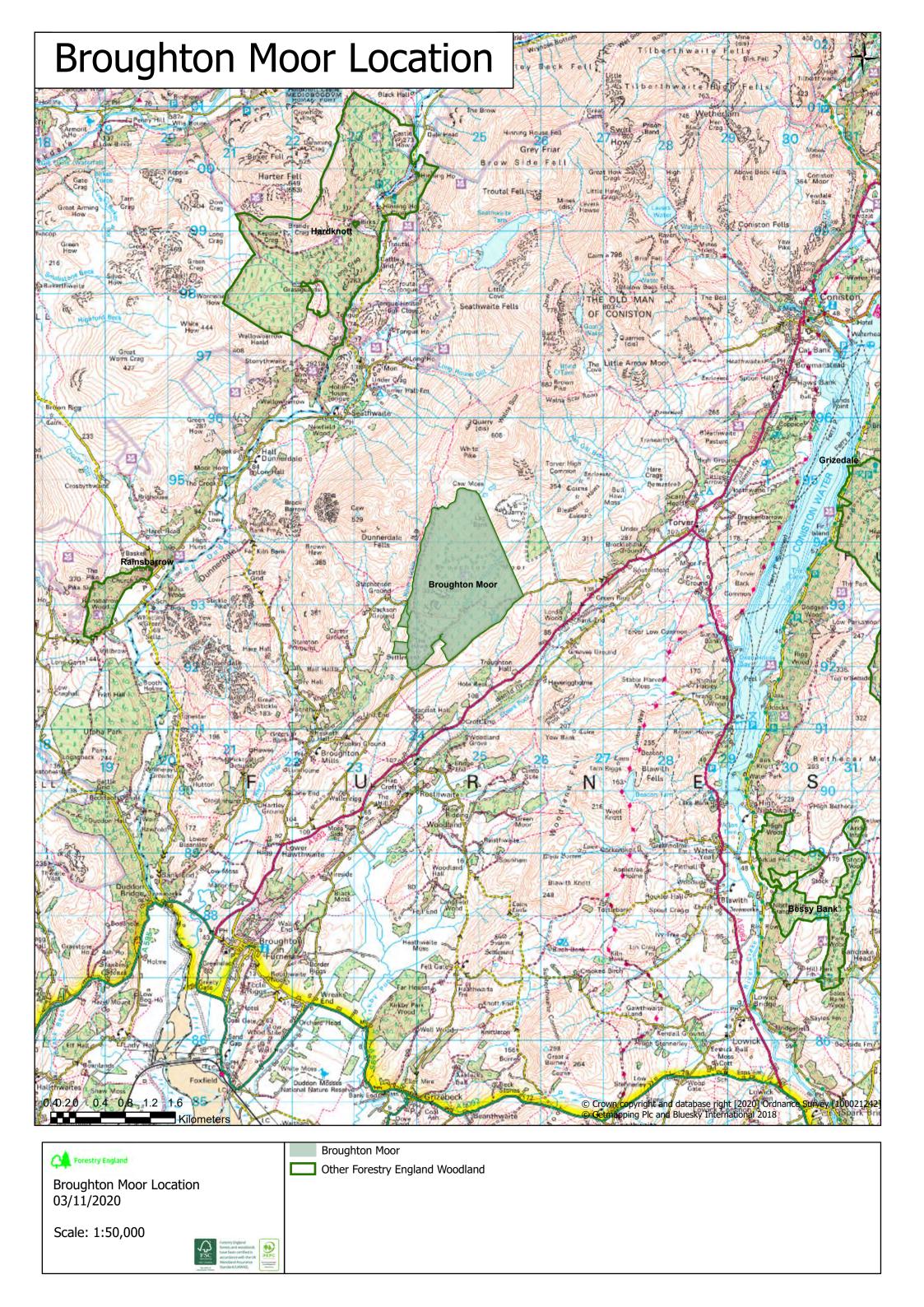
Part 4 Monitoring plan

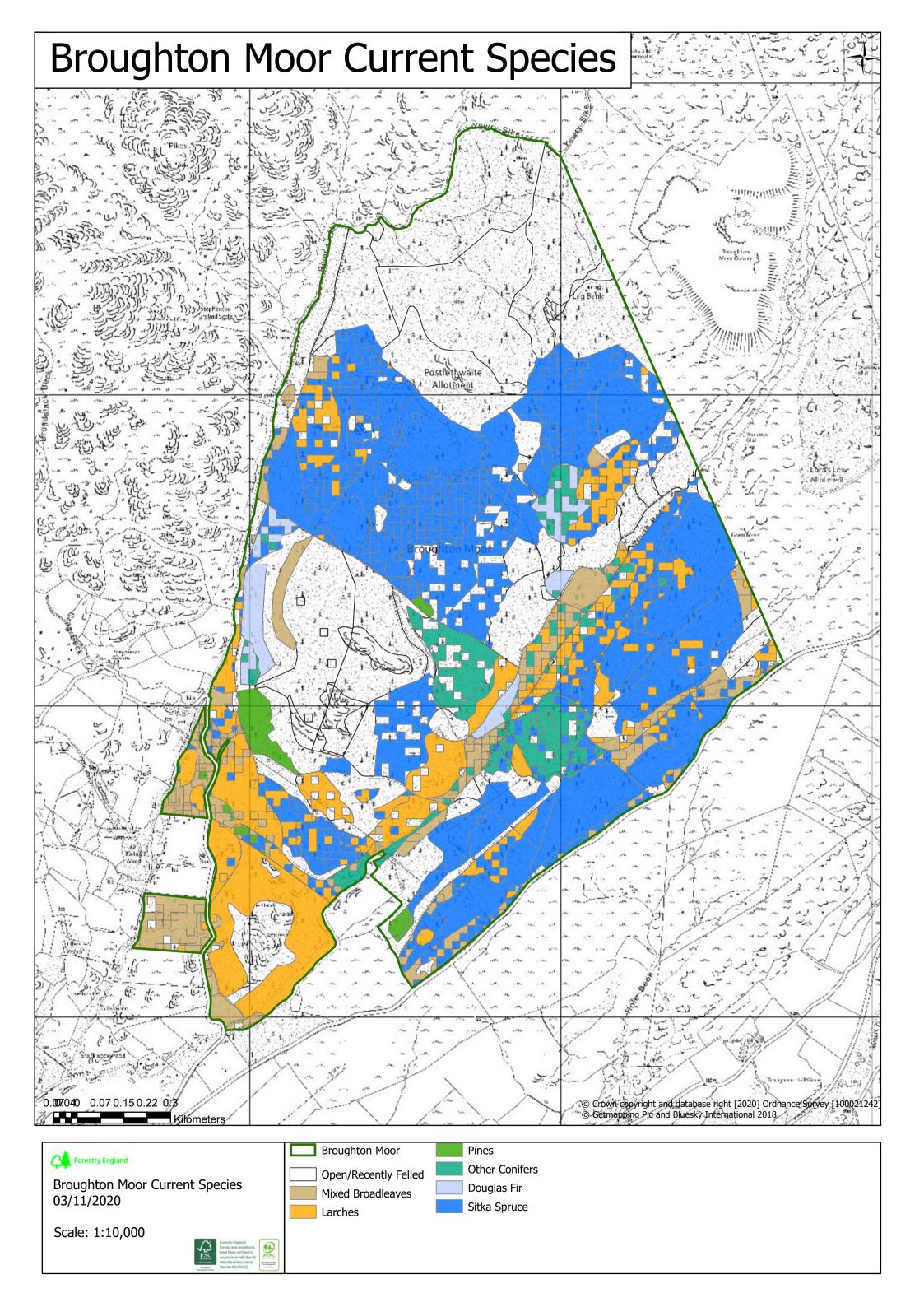
The objectives identified in section 3 will be monitored in the following ways;

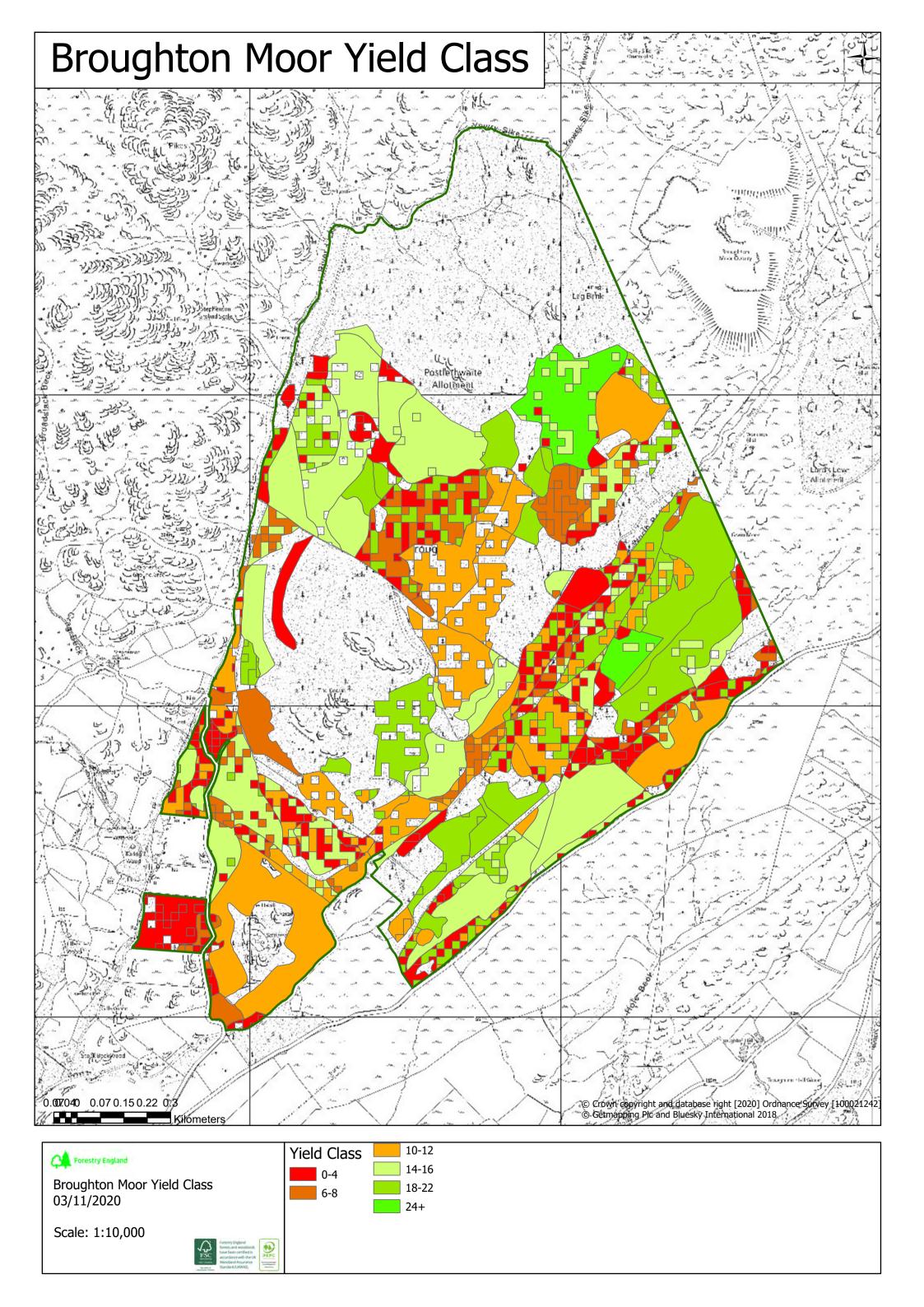
Objective	Criteria for success	Assessment
ECONOMIC		
Wood production	Marketable parcels of timber on offer to the market. Maintain timber harvesting access and infrastructure	Contract and sales records
Sustainable economic regeneration	Successful restock sites and underplanting operations with minimised pest damage	Five year Forest Plan review
NATURE, HERITAGE and LANDSCAPE		
Reversion of Lagg bank to open moorland	Clearance of natural regeneration of spruce on Lagg bank during the plan period. Regeneration of broadleaf species on Lagg bank during the plan period.	Five year Forest Plan review
Condition of historic features	period.	Operational constraints and five year review
	Protect and enhance features including The Hawk Scheduled Ancient Monument through following SAM management plans and good operational practice	
Retain older stands where possible		Five year Forest Plan review
under LISS management to increase diversity	Greater areas of LISS management and increase age distribution in the forest	
PEOPLE		
Visual enhancement to visitors.	Expansion of the LISS areas to increase diversity, diversity in planting to replace lost larch areas	Five year Forest Plan review

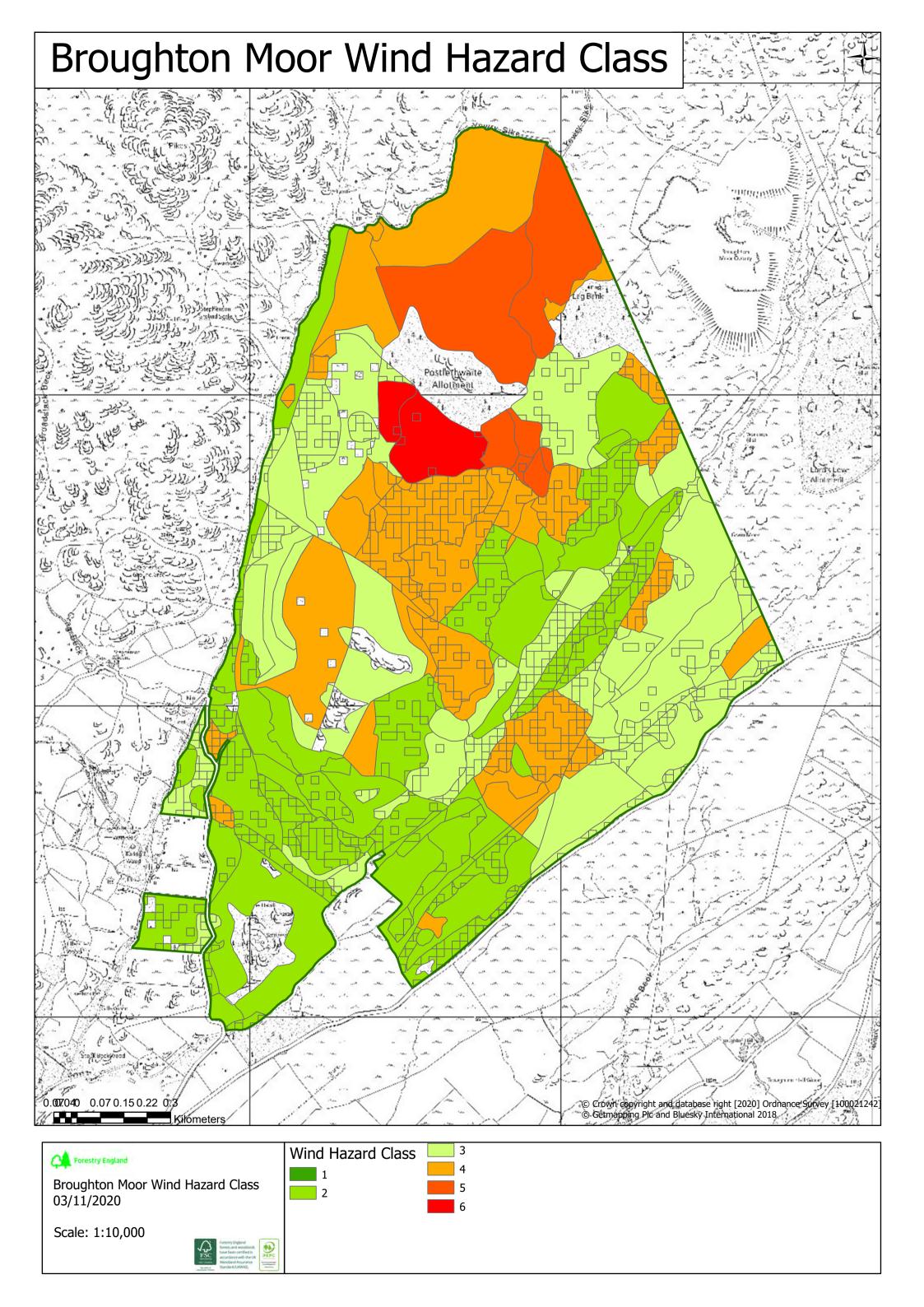
Part 5 Forest Plan Maps for Broughton Moor

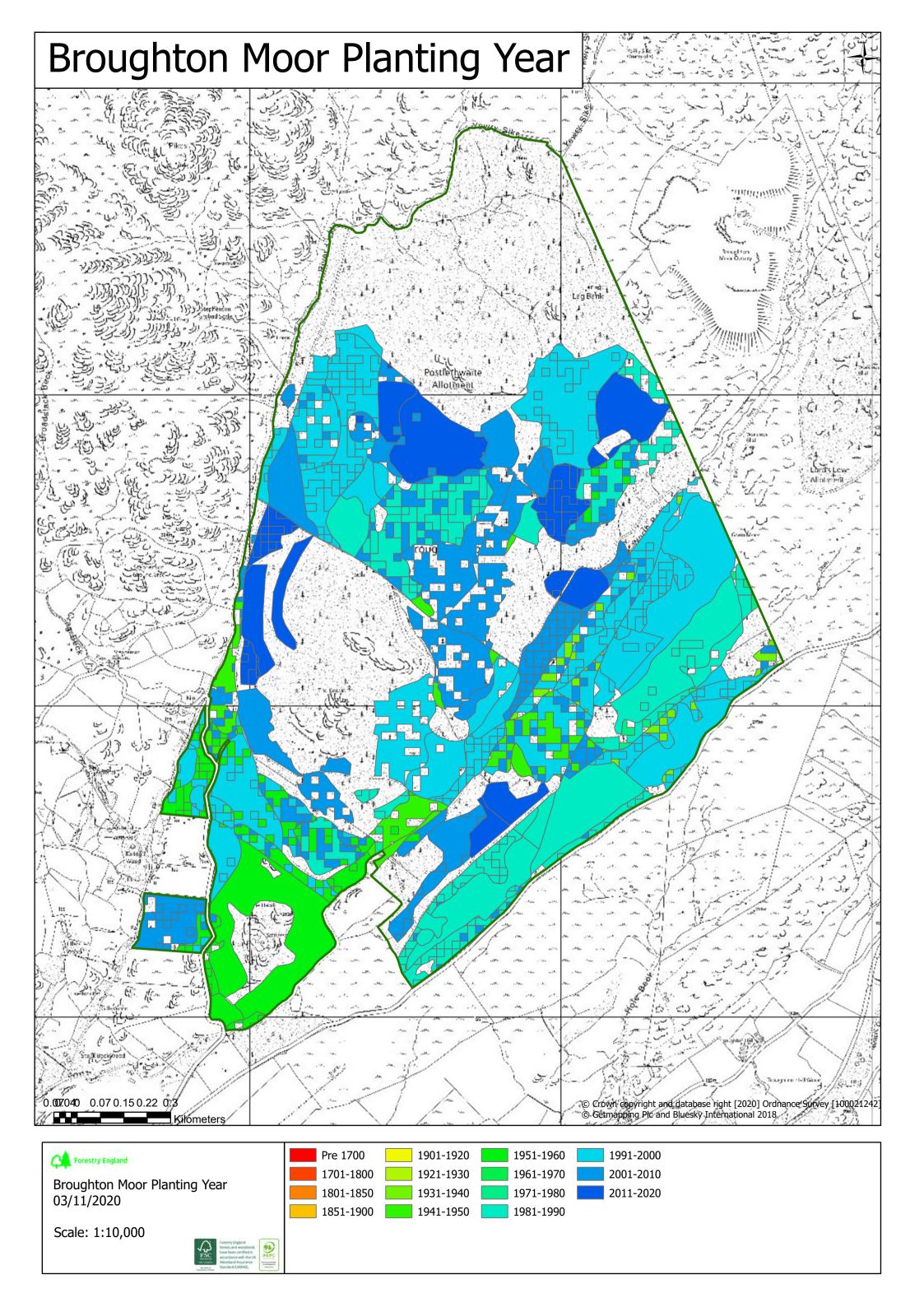
- Location 1:50,000 scale showing location in context of other woodland in the local area.
- Current Species species composition in 2020.
- Yield Class representing the productivity of the current species.
- Wind Hazard Class indicating the windiness of the sites.
- <u>Planting Year</u> representing the age class distribution of the woodlands.
- <u>Conservation and Heritage</u> statutory and non-statutory conservation and heritage features.
- Access and recreation formal public rights of way, FC access and local services.
- <u>Design Concept</u> broad management prescriptions and zoning of the woodlands.
- <u>Operations Proposals</u> showing felling proposals and areas managed under Low Impact Silvicultural Systems or Continuous Cover Forestry.
- <u>Future Species</u> representing the 20-year vision for future species composition.

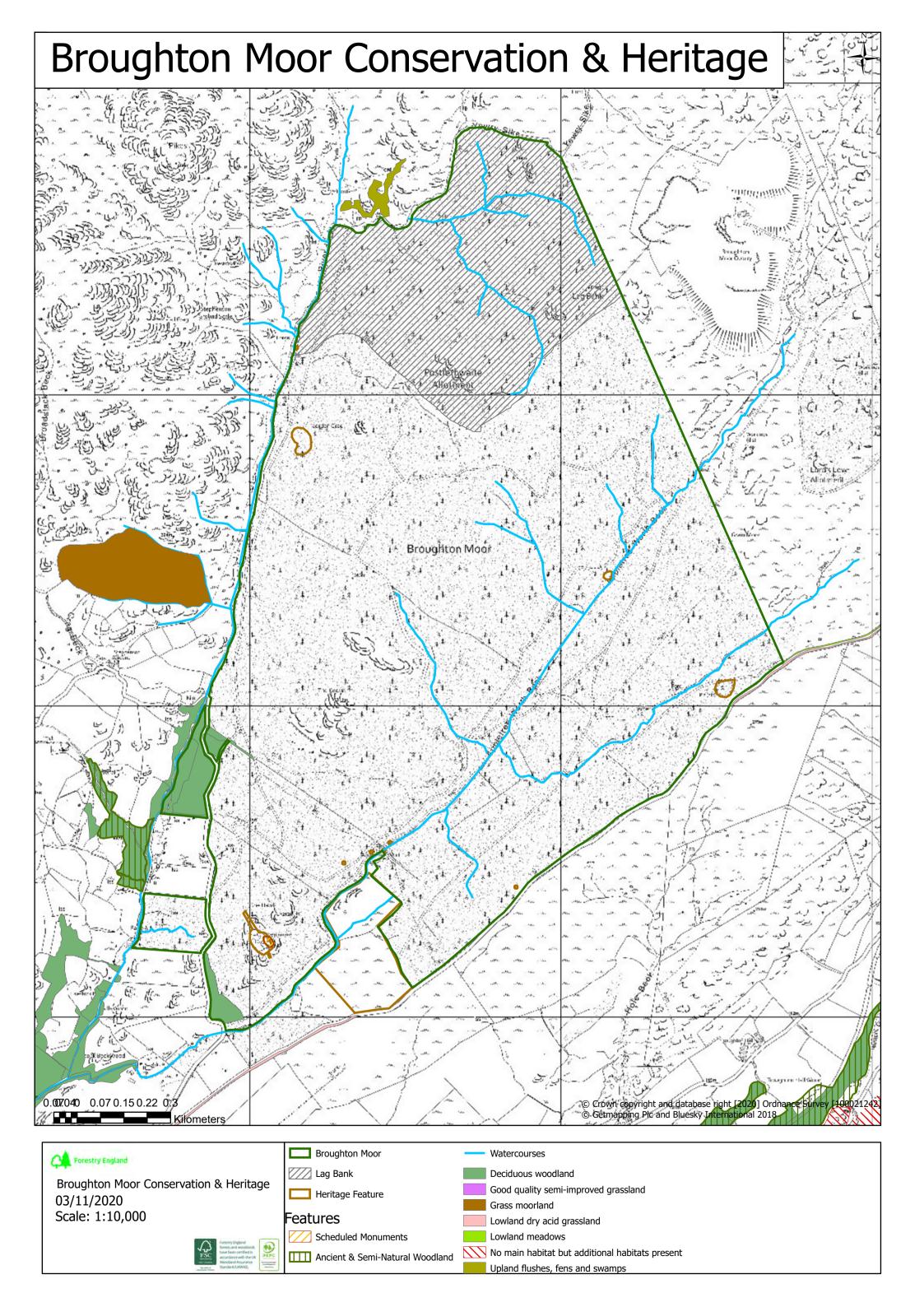


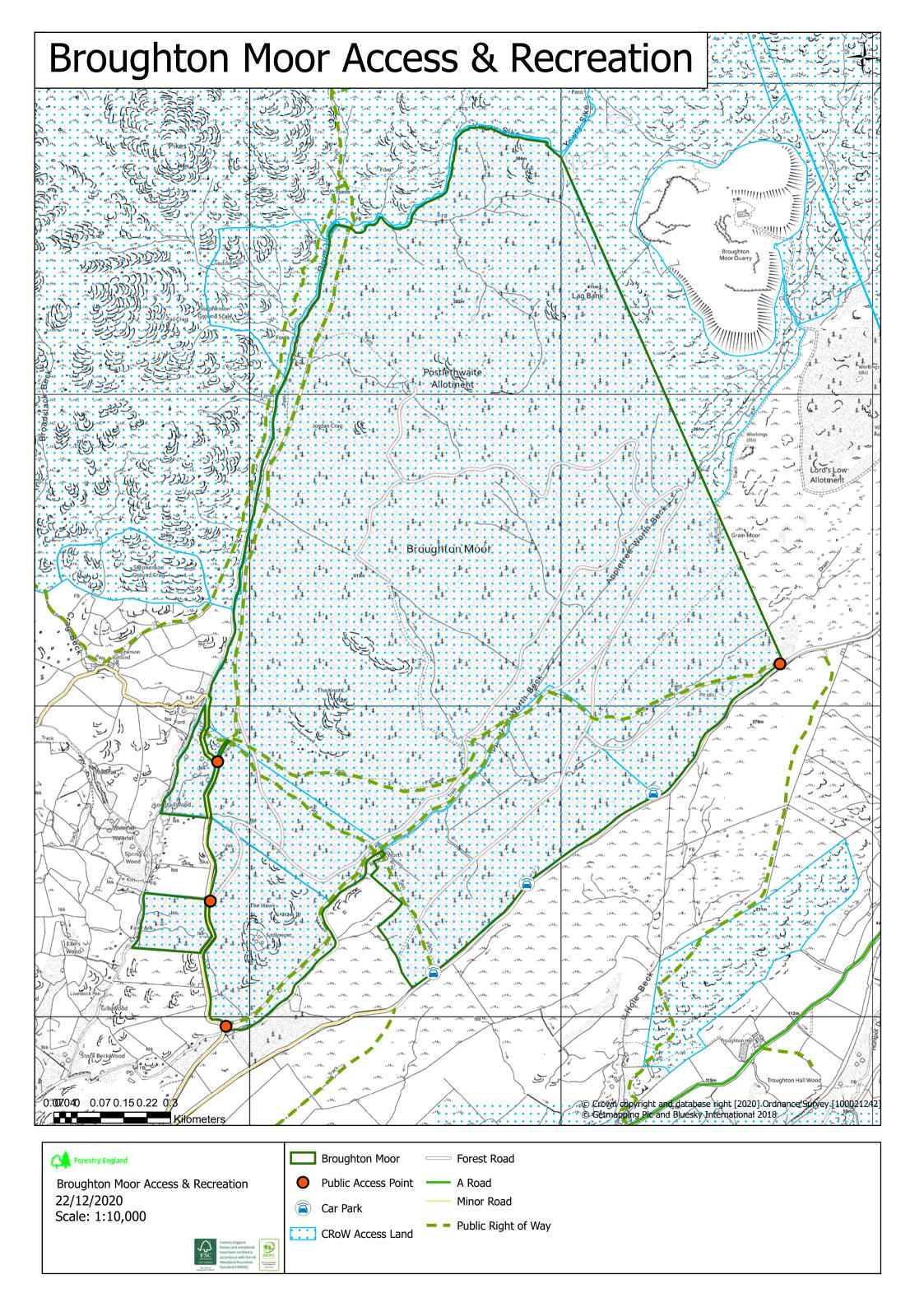


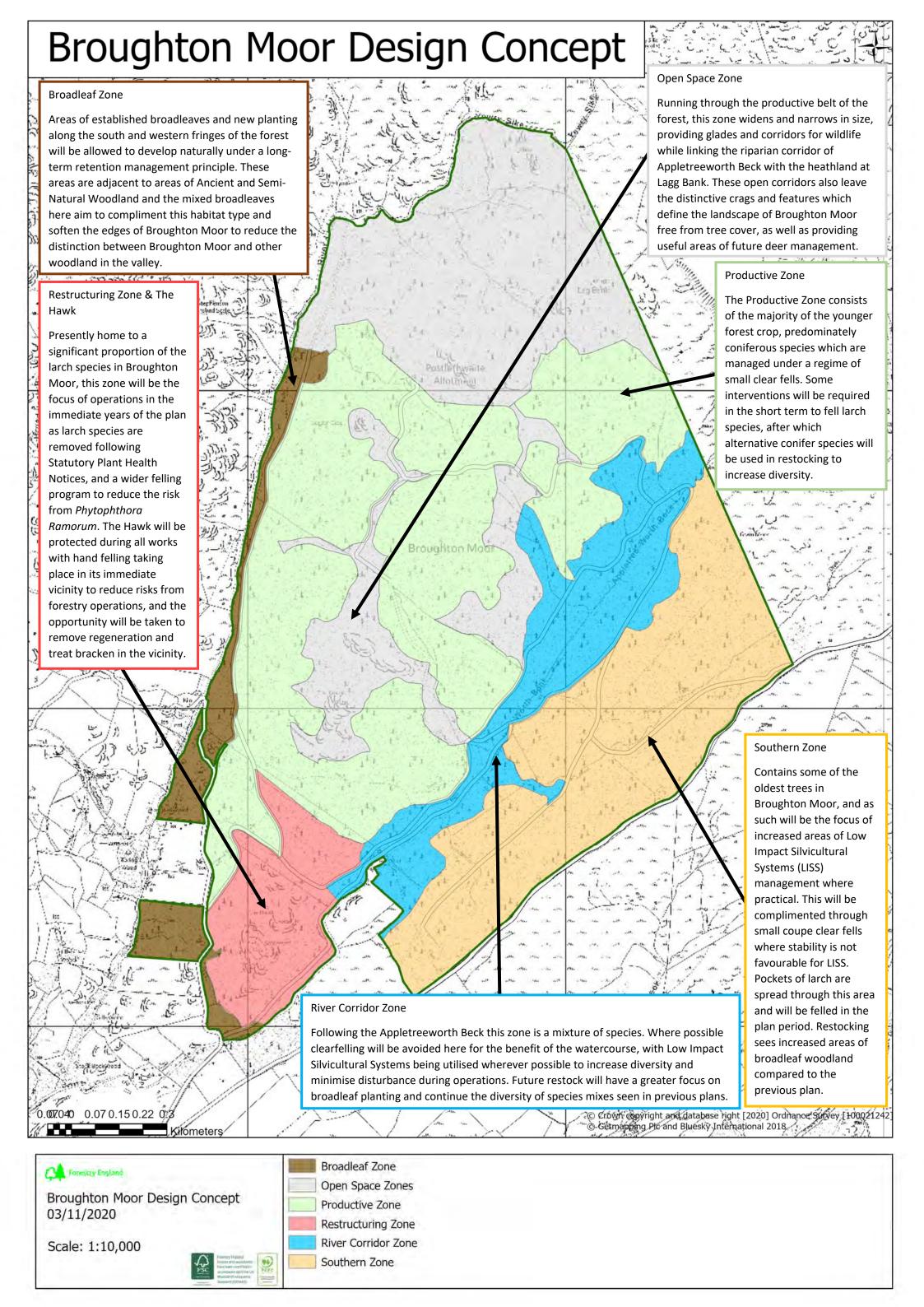


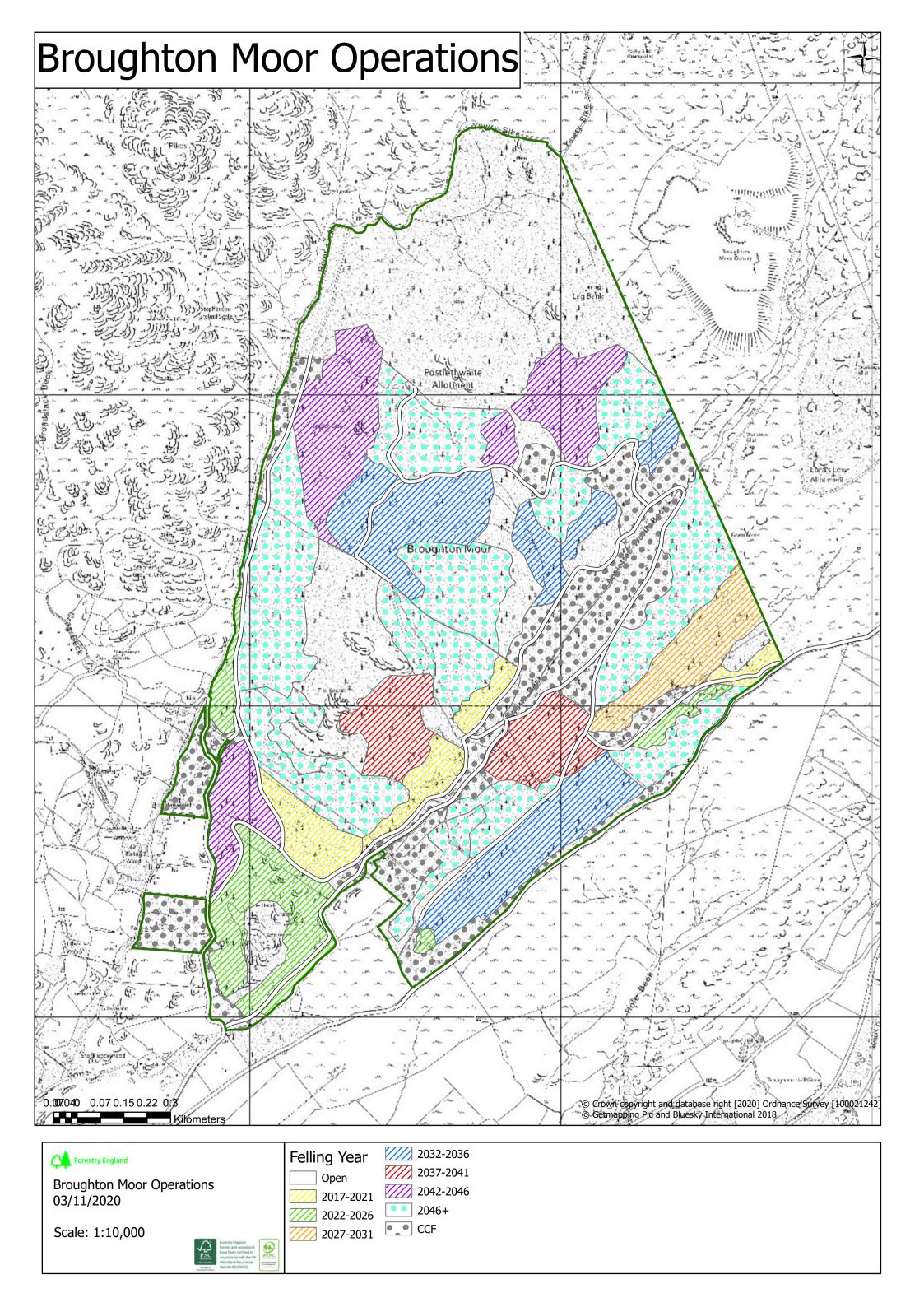


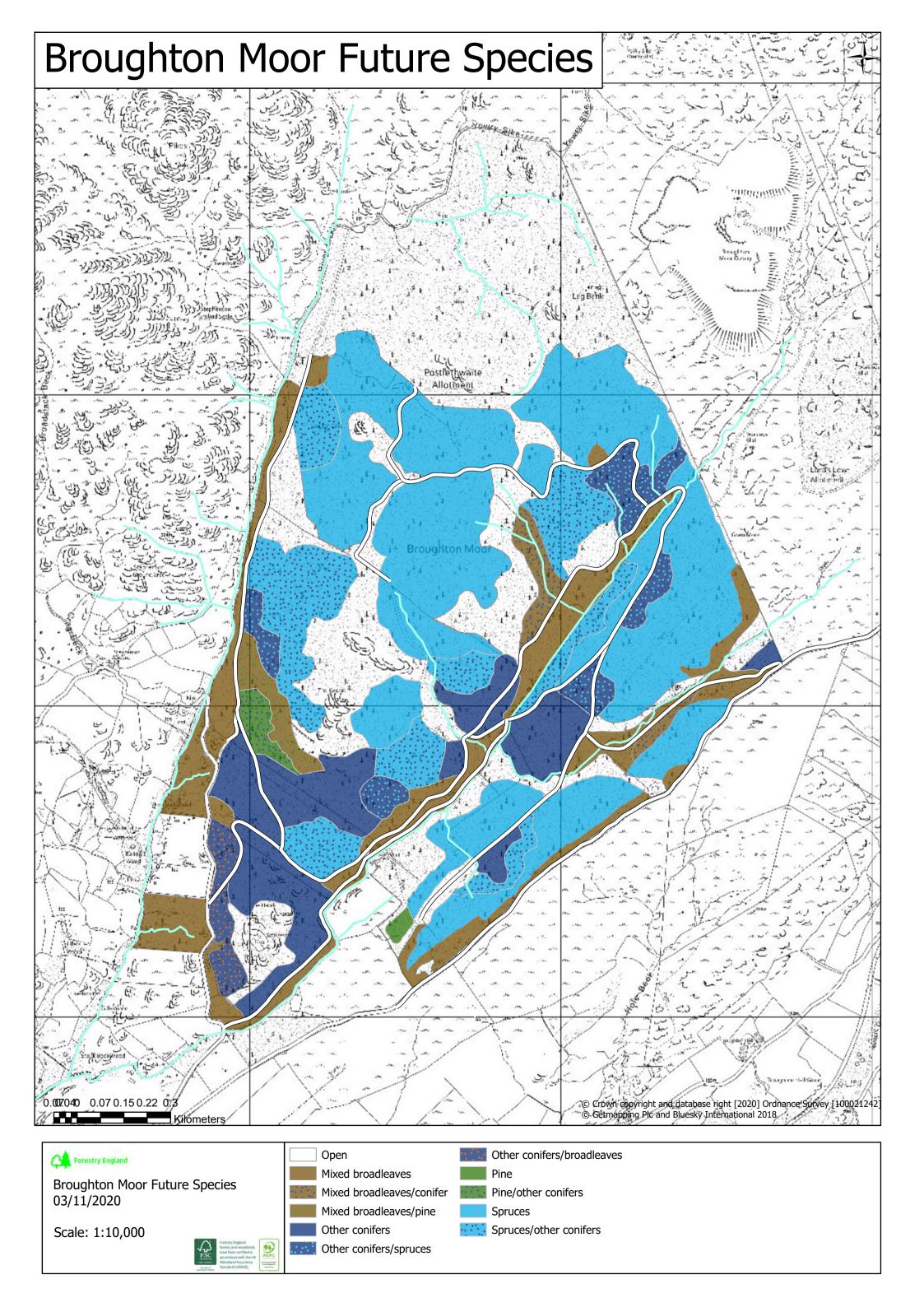












Part 6 Forest Plan Outcomes

Restructuring

Broughton Moor will undergo a significant species change during the plan period as larch which has been infected by *Phytophthora Ramorum* is felled. The impact of this felling will be large with many areas clearfelled significantly earlier than planned. While unavoidable and necessary for plant health, it cannot be denied that this felling will have a short-term negative effect on the diversity and appearance of the forest. The opportunity to create new mixed stands of alternative conifer species will improve the forest in the period after this felling takes place. This plan provides opportunities to increase the areas managed under Low Impact Silvicultural Systems to the long term benefit of the forest, through increased age, species and structural diversity.

Controlling deer populations is an important aim to support the restructuring of the forest and secure the future of restock sites, and this plan aims to make this control easier through the allocation of additional open space within the forest for deer management.

Timber production

The harvesting of timber remains a key element to the management of Broughton Moor as a productive forest. In the short term the felling of larch crops will compose the majority of the timber harvested in Broughton Moor, and in the longer term the continued thinning and small coupe clearfell regimes will provide a sustainable yield of timber into the future. We are forecast to harvest a volume of approximately 41,000m³ over the 10-year period of this forest design plan.

The restock proposals in this plan are estimated to produce approximately 2000m³ of timber per year, this productive capacity is calculated using the average yield class of the forest across the species identified in this plan. The difference between the annual production of 2000m³ per year compared to the harvesting forecast of 4100m³ is due to the need to prematurely fell larch crops. Harvesting is planned to drop away to sustainable levels after this felling is completed.

Natural capital

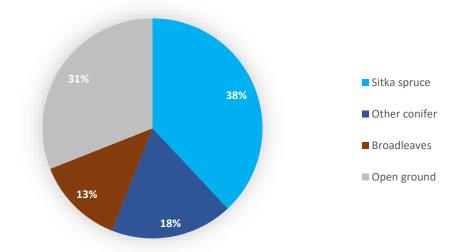
Timber represents only one of the products of a successfully managed forest. Natural Capital refers to the stock of all natural assets upon which the economy and society is built. Natural capital produces value for people in the form of 'goods' such as timber or minerals and 'services' such as climate regulation and air purification. To realise the benefits of some natural assets, humans need to intervene (e.g. harvesting timber) but in other instances natural capital produces value through natural processes (e.g. trees reducing flooding). The Broughton Moor forest plan delivers ecosystem services and other non-market benefits included in biodiversity, climate change mitigation, water, people and landscape including

public health and well-being, productivity through increased carbon sequestration, species diversification and climate change resilience, landscape enhancement and increased native woodland and priority habitats.

Future species

The future species indicated below represents how the composition could be in 20 years' time based on the restock proposals contained in this plan.

Broughton Moor Future Species



UKWAS compliance table

	Forest Plan Area (ha)	Forest Plan Percentage	Forest District Area (ha)	Forest District Percentage
Total area	333	100.0%	85888	100%
Total wooded area	229	68.8%	58069	67.61%
Area of conservation value*	50	15.0%	11322	13.18%
Long-term Retentions and Low Impact				
Silvicultural Systems	40	12.0%	10449	12.17%
Open space	104	31.2%	27819	32.39%
Natural Reserves	10	3.0%	873	1.02%

^{*}Area of conservation value is the sum of designated areas including Ancient Woodland, Long-Term Retentions, Low Impact

Silvicultural Systems, and areas of Natural Reserve.

The United Kingdom Forest Standard (UKFS)

The UKFS is the reference standard for sustainable forest management in the UK. The UKFS is supported by a series of guidelines which outline the context for forestry in the UK, defines standards and requirements and provides a basis for regulation and monitoring. These include General Forestry Practice, Forests and Biodiversity; Climate Change, Historic Environment, Landscape, People, Soil and Water.

The Broughton Moor Forest Plan is able to demonstrate that relevant aspects of sustainable forest management have been considered and the stated objectives in Part 3 show how sustainable forest management will be achieved. The plan provides a clear means to communicate the proposals and to engage with interested parties and serves as an agreed statement of intent against which implementation can be checked and monitored.

In addition to conforming to general sustainable forest management principles UKFS is demonstrated in the following key areas:

Productivity Productive potential is optimised through the delivery of the clearfell

and thinning programme, ecosystem services and other non-market benefits included in biodiversity, climate change mitigation, water,

people and landscape.

Structure Long term future species composition; 13% native species and a 31% open

ground meets UKWAS and UKFS requirements. Long term structure will improve through expansion and linking of permanent broadleaved and

open habitats.

Silvicultural Low Impact Silvicultural Systems (LISS) principles will be adopted with

long term retention (LTR) of areas of broadleaved woodland as these develop. This will improve species and age class diversity over time.

Biodiversity Ecological connectivity achieved by extending and linking areas of native

broadleaved woodland and open space will be enhanced ensuring that the area is managed with conservation and biodiversity as a major

objective.

Climate change Increase of LISS areas will minimise soil disturbance. Natural

regeneration where possible and species diversification will benefit

forest resilience.

Landscape The planning process refers to the Local Landscape Character Assessment

to inform the appropriate woodland management and design.

Historic Historic features are recognised and their safeguard will be incorporated

into operational management.

People The Forest Plan is consulted with individuals, the local community and

organisations with an interest in the management of the area.

Water

Quality will be protected through adherence to Forest and Water guidelines as a minimum during any harvesting and forest management operations.

Longer term management proposals

The proposals in this plan continue to build on the success of previous plans to support the management of Broughton Moor, and future management will continue to evaluate the opportunity for increasing areas of LISS as crops age into the future, as well as diversifying the range of species within the forest for increased resilience, while continuing to provide timber to markets in the region. Public access and low-key recreational use will remain a major objective for Broughton Moor. It is noted during this revision that Lagg Bank could be suitable for future wet woodland or open transitional woodland habitat through the favouring of broadleaf regeneration in this area and is something to be explored as this habitat develops.