Broxa
Forest Plan
FP 18
2025

Yorkshire Forest District

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

Forestry England - Property

Forest District:	Yorkshire
Woodland or property name:	Broxa
Nearest town, village or locality:	Scarborough
OS Grid reference:	SE 964 944
Local Authority district/unitary Authority:	North York Moors National Park

Areas for approval

	Conifer	Broadleaf
Felling	78.55	4.27
Lower Impact Silvicultural Systems regeneration felling	69.22	1.4
Restocking	122.57	30.87

1. I apply for Forest Plan approval for the property described above and in the enclosed Forest Design Plan.

2. I confirm that the pre-consultation, carried out and documented in the Consultation Record attached, incorporated those stakeholders which FS agreed must be included. Where it has not been possible to resolve specific issues associated with the Plan to the satisfaction of consultees, this is highlighted in the Consultation Record.

3. I confirm that the proposals contained in this Plan comply with the UK Forestry Standard.

4. I undertake to obtain all permissions necessary for the implementation of the approved Plan.

Signed ..... Signed .....

Forest Management Director Area Field Manager

District - Yorkshire Area - Yorkshire and North East

Date.....

Date of Approval..... Date approval ends.....

Figure 1 – Map showing the location of Broxa forest in the context of large neighbouring forest blocks, within the North York Moors National Park.

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Summary

This Forest Plan sets the strategic management direction of Broxa forest for the period until 2035. It builds upon previous plans and understands the forests context and composition such as landscape, heritage, ecology, structure, tree species and habitats present.

Opportunities and constraints are identified which inform management objectives. A range of appropriate objectives are identified covering how the plan will contribute to the themes of Wildlife, People, Climate and Economy, including further detail on implementation, with a monitoring plan provided within the appendices.

The plan explains how Forestry England will continue to sustainably harvest timber using a range of silvicultural systems and builds forest resilience through diversification of species and forest structure. Climate is considered along with approaches to resilience and mitigation. The plan's approach to Plantation on Ancient Woodland (PAWS) is provided as well as detail on how forest management will benefit wildlife.

A variety of maps and appendices are provided to support understanding.

General Principles

All operations within the forest will be carried out in accordance with the following standards;

- U.K. Woodland Assurance Standard
- U.K Forestry Standard 5th edition (published 2023)

All of our forests and woodlands are certified to the Forest Stewardship Council®(FSC®) licence code FSC-C123214 and the Programme for the Endorsement of Forest Certification (PEFC) licence code PEFC/16-40-1001 standards. We will maintain the land within our stewardship certified against the UK Woodland Assurance Standard, as independently assessed by annual independent surveillance audits.

Operational Planning - Before any major forest operations are undertaken, an Operational Site Assessment (OSA) is completed. The OSA details the proposed work outlining all known environmental, social and operational considerations, becoming an important reference document during the planning phase, at the pre commencement meeting before works begin and for supervisory visits during the operation. The OSA is retained along with other related documents. Forestry England staff will monitor all work through regular site visits ensuring that guidelines and contract conditions are adhered to.

We will protect and where appropriate, enhance all known sites of archaeological and ecological importance including areas of ASNW and PAWS, managing designated sites, such as scheduled monuments in accordance with statutory requirements, as per agreed management plans.

We apply local and national policy and best practice guidance to the management of riparian corridors, improving and enhancing the habitat network and benefiting protected species. Developing species and structural diversity will benefit habitats for priority woodland bird species throughout the woodland (Appendix 1 – Priority species).

Forest Resilience - We will continue to improve forest resilience to plant health, biosecurity and climate change threats through species and structural diversification.

Forest Development Types - During the lifetime of this plan, we will look to introduce the concept of Forest Development Types (FDTs)[8]. *"A Forest Development Type is a long-term vision of how the species composition and structure of a forest stand is intended to develop. The concept encourages the greater use of mixed-species stands and a wider variety of stand structure than previously deployed in British forests".*

Lower Impact Silvicultural Systems (LISS) - All plans consider LISS in windfirm conifer plantations, based on methodologies in available guidence[11]. LISS with associated scale felling will contribute towards a varied and intimate internal and external forest landscape, with simple and complex stand structures creating a diverse visitor experience, whilst contributing toward structural diversity. Where existing coupes are not identified for LISS management, we may consider managing these on an extended rotation basis to be thinned and monitored for future consideration for conversion to LISS. See Appendix 2 – LISS Justification.

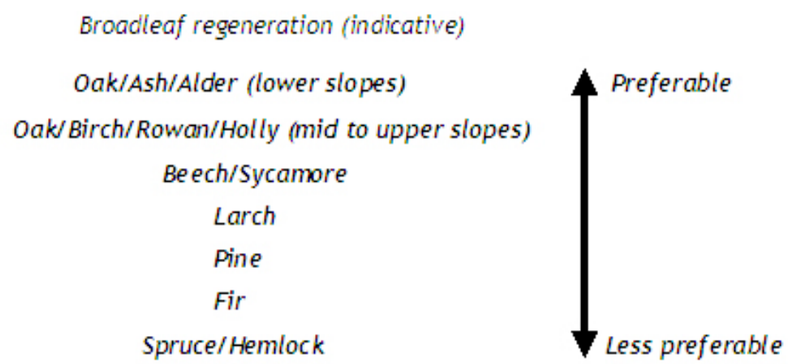
Using the FC Forest Research Agency, Ecological Site Classification system (ESC), a range of conifer species are considered 'optimum' to 'unsuitable' for LISS where timber production is considered as an objective.

Wildlife Management - Successful establishment of restocking sites through planting and/or natural regeneration requires effective control of crop damaging mammals. Although deer are present within the forest and surrounding farmland, good levels of natural regeneration indicate that browsing pressure is low. Damage levels will be monitored and managed[9].

Routine maintenance operations (e.g. fencing, ride mowing, survey work etc.) follow local policy[10].

Wildfire - Regarding wildfire, we will follow guidance as set out in 'FC Practice Guide – Building wildfire resilience into forest management planning'. This will be applied proportionately dependant on a particular forest or woodland.

Natural Regeneration - Natural regeneration in PAWS is assessed and the risks to the plan considered. Where dense shade or invasive species (i.e. Western hemlock) threatens the native woodland community, it will be removed as part of routine felling or thinning operations.



Native Woodland - Threats to our native woodlands can be immediate and absolute (e.g. loss to infrastructure or development) or slower and subtler (e.g. shading from conifer species or invasive species such as Rhododendron). There are also more widespread environmental changes, such as diffuse pollution and climate change, which may threaten in the long term.

Major threats to native woodland are:

- Climate change and fragmentation
- Excessive browsing and grazing by deer, livestock and grey squirrels
- Inadequate or inappropriate management
- Invasive and non-native plant species
- Diffuse pollution
- Pests and diseases
- Inappropriate recreational use
- Development and boundary incursions

We will continue to apply local and national policy and best practice guidance for the management and development of our existing and new native woodlands.

Open space - There are no plans to create new areas of permanent open heathland, however this plan will continue the management and development of exisitng heathland; Within woods we will continue the development and management of open space habitat such as roadside verges, neutral grassland and acid mires where appropriate and in line with Forestry England's Open Habitat Policy. Maintaining a mixed resource of temporary and permanent open space with diverse flora will provide habitat for priority species.

Woodland Habitat condition - Over the lifetime of the plan where maintaining semi-naturalness is important, such as Ancient Woodland Sites, we will monitor and record levels of change through the Sub-Compartment Database and the resulting Semi Natural Class scores (Table 1; See also Section 1.2, Table 2). Across these sites we will maintain stands at SN Class 1 and gradually manage other sites towards this target composition.

Class 1	**Semi-Natural Woodland**
Includes native coppice woodland and high forest or site-native plantation with a relatively high percentage of native self-sown or coppice understorey.	
Class 2	**Reasserting Semi-Natural Woodland**
Plantation or ex-plantation with 50-80% site-native species. Includes coppice regeneration and/or strong natural regeneration amongst planted trees.	
Class 3	**Plantation**
Plantation with 20-50% site-native trees under established plantation stands	
Class 4	**Plantation**
Plantation with less than 20% site-native species. Includes all non-native broadleaves and beech planted outside its natural range in England.	

Table 1 – Semi- Natural Class descriptions

Haulage - We will continue discussions with the relevant Highways Authority to agree haulage routes and discuss annual tonnages. All timber traffic will be managed in line with the Road Haulage of Round Timber Code of Practice, Fifth Edition (2020), which aims to improve the safety and environmental standards of the timber haulage industry.

Broxa Forest Plan

730 Hectares (Ha)

Period of Plan: 2025 - 2035

1.0 Describing the site

Broxa is located within the southeast of the North York Moors National Park, a designated landscape and is within 10 kilometres of Scarborough.

Mostly situated on a former moorland plateau, it has areas that are deeply incised to the south by Whisper Dales and High Dales Becks. It is bounded to the west by the River Derwent, which separates Broxa from the neighbouring forest block of Langdale.

Although predominantly a freehold property, 103.33ha at Suffield Moor and Noddle End is leasehold.

Views are varied as the woodland sits on a gently sloping plateau between the Limestone Hills to the South and the Limestone Dales to the North. Near views are experienced from vehicles travelling along the fast moving Reasty Road and by walkers, cyclists and horse riders using numerous rights of way along with forest roads and rides. Longer views of the North facing scarp slope are prominent from nearby council roads to the north.

The plateau is dominated by larch and pine species, ranging from the early 1940's afforestation to present day restocking, where felling continues to increase structural diversity. Scarp slope and gill woodlands are comprised of mixed conifer and broadleaf species, creating a more intimate structure.

Broxa is host to a number of important Forest Research experiment sites.

1.1 Geology and Soils (FP Map 01)

Lower Calcareous Grit is the predominant geology over most of the plateau. As the land falls away to the River Derwent and its tributaries, related Oolitic rocks form bands round the grit: Oxford Clay, then Kellaway Rock and finally Cornbrash shale beds. There is little or no drift geology. Broxa forest is home to a locally rare area of Pleistocence Ice Wedges known as Dimbleby's Ice Polygons.

Soils follow similar patterns to the geology, predominated by iron pan soils over grit on the plateau, brown earths and humic-iron podsols on the mid slopes and surface-water gleys on the lower slopes. On steeper ground there are associated physical limitations to machine working.

1.2 Tree Species (FP Map 02)

Larch and Pine are the dominant species groups at 22% and 23% respectively, comprised primarily of Japanese larch and Scots pine, with Hybrid larch, Corsican and Lodgepole pine as lesser components. Spruce accounts for 8%, Fir 3% and other conifer species at 5%.

Broadleaves account for 21% of woodland cover, dominated by birch and beech, with ash, oak, sycamore and alder also present. No one species dominates any soil type.

Species Composition*	2025	
	Ha	%
Mixed Broadleaf	156.3	21.4
Pine	165.4	22.7
Larch	158.7	21.7
Fir	20.4	2.8
Spruce	60.9	8.3
Other Conifer	35.3	4.8

*Table 2 - Species composition by main species.*including as a component in mix with other species.*

Semi-Natural Class	Area (Ha)
1	71.1
2	37.4
3	89.6
4	501.9
No Trees	30.0
Total	**730**

Table 3 - Areas of Semi Natural Classifications (see General Principles) across Broxa.

1.3 Wind Hazard

Wind Hazard Class ranges from 1 to 3, indicating that the wood is relatively windfirm, however on exposed scarp tops as with on gleyed soils, tree stability is less certain. Alternative management options such as Lower Impact Silvicultural Systems (LISS) and extending the rotation age of productive conifer crops are therefore restricted to stable areas.

1.4 Landscape (Photographic montage)

Broxa is situated in the 'Langdale Forest' landscape character area in the south-east of the North York Moors National Park, on gradually rising former upland moor. The elevation ranges from circa 80m to 220m from Lang Dale valley bottom to the forest plateau.

1.5 People and Community (FP Map 04)

Broxa is very well used by both local people and visiting tourists for walking, horse riding and cycling and it lies close to the population centre of Scarborough. Reasty Top car park provides a popular starting point for a large network of public rights of way and informal paths and tracks.

The leasehold status across 103.33ha (14%) means that not all of Broxa is dedicated as open access under CROW legislation.

1.6 Natural Heritage (FP Map 04)

Broxa comprises predominantly secondary rotation plantation conifer with almost 25% designated as Ancient Woodland, located in the deeply incised valleys of Lang Dale, High Dales, Whisper Dales and Bready Gill; of this, >70% is classed as conifer Plantation on Ancient Woodland Sites (PAWS). Broxa provides an important contribution to the districts PAWS restoration aims.

Native woodland types range from Alder, lowland mixed broad-leaved woodland and Lowland oak-birch woodlands. The quality of associated semi-natural ground flora is variable and influenced by the existing over-storey of conifer, mixed conifer/broadleaf and broadleaf stands.

Wet and dry heathland habitat supports populations of Green hairstreak butterfly. Historically there are white-clawed crayfish on the River Derwent and it remains an important potential habitat for this species in addition to king fisher and otter.

The forest supports a range of national and regionally important species across different habitat types including Schedule 1 birds of prey, Nightjar, Northern wood ant and ground flora such as Common and Intermediate wintergreen and Lesser twayblade (see Appendix 1).

Broxa Forest is also the site of Pleistocene Ice Wedges that are of regional and national significance, creating distinctive polygonal patterns in the vegetation.

1.7 Cultural Heritage (FP Map 04)

Broxa forest contains a rich and regionally important resource of historic features with 28 scheduled monuments, several of which are significant at a landscape scale, and 220 unscheduled features, including Barns Cliff House and its associated banks and walls.
Historic features include Prehistoric linear boundaries, Iron and Bronze Age tumuli, medieval quarries and 18th century boundary stone markers.

2.0 Describing the Project

2.1 Project Brief

Forestry England's purpose is to secure and grow the social, economic and natural capital value of the nation's forests. Different forests will deliver against our purpose in different ways depending on site conditions, constraints, and opportunities.

Throughout this plan period we will continue to sustainably harvest timber using appropriate silvicultural systems such as clear-felling, thinning and LISS, maintaining or increasing timber productivity and forest resilience through diversification of species and forest structure, whilst improving the forests contribution to the local landscape.

Forest Plans provide a holistic and long-term approach to planning and forest design. Forest plans will refer to other documentation, such as SSSI management plans, where appropriate.

2.2 Opportunities & Constraints

Opportunities

- Except for areas of Natural Reserve (Breaday Gill, Swires Gill, Stoney Gill, High Dales, Barns Cliff), Ancient Woodland (as per Natural Reserve plus Ash Haggs Gill, Pits Wood) and open ground, the remainder is predominantly conifer as a sustainable timber resource.

- Potential for further PAWS restoration in the Barns Cliff valley areas should appropriate additional funding be available.

- With 90% of the plantable area supporting productive high forest, Broxa remains an important block for its contribution to the district's timber producing capacity.

Constraints

- Areas of invasive rhododendron and some areas of natural regeneration of Western Hemlock in PAWS.

- Areas of very poor nutrient status across Broxa forest.

- Areas of steep ground and access issues, presenting challenges for thinning operations.

- The advance of Phytophthora ramorum (*P. ramorum*) on Larch may present a significant negative impact should further infections occur. This is particularly important due to the high visual impact of larch across Broxa. Alternative species such as Oriental Spruce, Macedonian Pine and Scots Pine have been utilised in replacement.

- Dothistroma septosporum (DNB) and Dendroctonus micans (*D.micans)* could have a significant impact should significant infection rates occur. DNB impacts pine stands, accounting for 22.6% (a reduction from 24% in 2017) of all planted species and 37.4% of planted conifer. Regarding *D.micans*, working with Forest Research, Rhizophagus Grandis has been released over recent years across neighbouring blocks.

- Projected climate change scenarios and forest pest and diseases are likely to challenge future tree species choice, particularly on the plateau where the nutrient and water regimes are low.

2.3 Objectives and Implementation

	Objectives	Implementation
Wildlife	Protect and, where appropriate, enhance all known sites of ecological importance: • Improve the resilience of the forest and natural environment to pests, diseases and wildfires, and realise the potential of this forest for nature and wildlife, with a particular focus on diversification of species and structure. • Increase the proportion of native broadleaf cover, particularly across areas of Plantation on Ancient Woodland Sites (PAWS), riparian zones and along steep-sided scarp slopes. • Work towards improving semi-natural scores across PAWS by at least one score by 2044. • Maintain the ecological value of the forest, including through the continuation of PAWS restoration through felling and thinning programmes. • Reduce the area of clearfell by managing stands through LISS regeneration felling.	• Increase and improve the deadwood resource[1] • Areas of high ecological value across which deadwood resources could be encouraged include Ancient Woodland, riparian zones, Long Term Retention sites and areas of broadleaf woodland. • Restore PAWS in line with guidance [2,3,4,5] • Follow guidance to implement adaptation actions including the acceptance of naturalised species and assisted migration[6] • Increase the diversity of tree species and age structure to maintain and improve favourable conditions for target species and identified habitats. • Utilise natural regeneration and enrichment planting, particularly across areas of PAWS (and targeting the retention of high-value conifer crops). Consideration must be given to the importance of appropriate nightjar habitat. • All work sites are surveyed prior to any operations being carried out, both to audit the accuracy of information already held on record and to identify opportunities to further improve the ecological value of the woodlands.
People	• Maintain the woodlands contribution to the landscape character NYMNPA Langdale Forest landscape character area. On a scale of low/medium/high, landscape sensitivity is medium. • Improve landscape impact through the use of appropriate silvicultural systems. • Maintain the cultural and heritage value of Broxa forest. Protect and, where appropriate, enhance all known sites of archaeological importance.	• Design of clearfell coupes and LISS shelterwood areas to ensure that their scale and shape are in-keeping with the scale of the forest and the surrounding landscape. The resulting diversity in structure enhances both external and internal views of the forests. • Appropriate scale felling will continue the process of restructuring, continuing away from even-aged, single species stands to a more mixed conifer/broadleaf woodland, linking with other associated habitats. • All heritage features will receive the level of care appropriate to their relative importance during the planning and execution of forest operations. Operational planning will identify appropriate measures for protection of heritage features before work begins, and, where possible, opportunities to enhance the condition of heritage feature at Broxa will be taken during routine forest operations through liaison with Historic England and the North York Moors National Park Authority.
Climate	• Continue the reduction of larch as a component within mixed stands, consider strip and group felling in pure stands and increase rhododendron control, especially within or adjacent to larch crops.	• *Rhododendron ponticum* is recorded across several sites in the forest. A programme of vegetation management will be carried out over the duration of this plan where this is likely to impact on high value conservation sites. • Appropriate scale felling including LISS will continue the process of restructuring, continuing away from even-aged, single species stands to a more mixed conifer/broadleaf woodland, creating increased species and structural diversity

		• Consider the selection of Ecological Site Classification Tool (ESC) supported alternative tree species contributing towards greater species diversity and climate change resilience. We will follow guidance and research to implement adaptation such as accepting naturalised species and assisted migration[6,12] • Consideration and further development of use of Forest Development Types (FDT) will continue throughout the lifetime of this plan. A long list of site appropriate FDTs is available in Appendix 6.
Economy	• Maximise and maintain a sustainable supply of timber from a forest that has both structural and species diversity, utilising a range of site-appropriate conifer and broadleaf species.	• Timber will be sustainably harvested through LISS, clearfelling and thinning interventions. • Manage relative proportions of productive mixed conifer and broadleaf. Looking for opportunities to retain areas of existing conifer and extending rotations where appropriate. Where appropriate we will develop broadleaf stands to increase their contribution to timber production. • Operations will be planned and controlled to ensure due regard for all other management objectives. • ESC supported tree species will aims to maintain or increase timber productivity.

Table 4 – Broxa Forest Plan objectives and implementation table. Note: A monitoring plan is provided in Appendix 4 detailing how objectives will be measured.

3.0 Methodology – Forest Operations

The design concept map (FP Map 08) details the key factors to be addressed through this Forest Plan. Other Forest Plan maps show the operational plan - Proposed Felling (FP Map 05), Proposed Management Coupes (FP Map 06), and Future Habitat and Restock (FP Map 07) that shows the distribution of restocking.

3.1 Felling

Felling	Area - hectares	% of total area (excl. SSSI)	Projected volume (m^3)
Clearfell 2025 – 2028	50.11	6.86	18409
Clearfell 2028 – 2035	32.71	4.48	8008
Net Area to be managed under LISS	70.62	9.67	28248

Table 5 - Breakdown of felling areas within the plan period (FP Map O5).

3.2 Lower Impact Silvicultural Systems (LISS)

Through this plan a large proportion of Broxa will be managed utilising LISS through Strip, Group and Irregular Shelterwood silvicultural systems. During the plan period, it is proposed that areas of LISS where crops are over 25 years old will receive a silvicultural intervention (thinning/regeneration felling, removing no more than 30% of the stems within any single compartment at one time over the plan period); as a result, the associated area will be regenerated through a combination of restocking and natural regeneration.

3.3 Restocking

Conifer

Areas of felling carried out through management by LISS and clear felling will be established through a combination of restocking, using diverse productive conifer species, diversifying age structure to provide a sustainable timber resource, whilst mindful of the projected climate change impacts. A range of ESC informed timber producing conifer species as set out in Appendix 2 and Appendix 3 'Species by soil type' will help inform restocking options.

Additionally, areas of LISS and clearfelling will be managed to encourage natural regeneration of conifer and broadleaf species, although it is accepted that replanting will be required to maintain and further diversify species.

Reference to Predominantly Mixed Conifer on the Future Habitat and Species Map (FP Map 07) describes where a range of species will be planted/regenerated, where conifer species have a target composition of at least 80% of the component mix. Appropriate levels of suitable broadleaf species via natural regeneration may be accepted. The OSA provides specific data on soils and other factors, informing the correct choice of species, on a site specific basis. All sites will achieve at least 2500 stems per hectare through planting, natural regeneration, or a combination of both.

Broadleaf

There are >120ha of Ancient Woodland within Broxa with a semi-natural score of 1 - 4 (See General Principles – Habitat Conditions). Where Conifer PAWS are either clear felled or managed through LISS regeneration felling, regeneration will be carried out through a combination of natural regeneration and planting site-native species where required.

We will accept 'naturalised' species such as beech and sycamore and the principles of assisted migration where these can enhance resilience to the impacts of climate change.

Reference to Predominantly Mixed Broadleaf on the Future Habitat & Species Map will be used to describe those areas where a range of species will be planted and/or regenerated, where broadleaf species have a target composition of at least 60% of the component mix. Appropriate levels of suitable conifer natural regeneration may be accepted and up to 20% conifer planting may be undertaken to increase woodland resilience.

Targeted enrichment planting will be considered across sites that fail to develop sufficient natural regeneration of broadleaf species.

Most sites will achieve at least 1100 broadleaf stems per hectare through natural regeneration, planting or a combination of both. Where quality timber production is an appropriate objective, higher stocking densities may be utilised.

Habitat type (based on principle species planted)	Area - hectares			% of total area		
	2025	2035	2055	2025	2035	2055
Broadleaved; mixed/yew woodlands	201.4	207.4	230.7	27.6	28.4	31.6
Coniferous woodlands	486.3	459.5	430	66.6	62.9	58.9
Acid grass land, upland heathland, upland birch woods, upland mixed ashwoods, upland oakwood	42.3	63.1	69.3	5.8	8.6	9.5

Table 6 – Expected changes to the distribution of habitat type 2025-2055.

4.0 Monitoring

A detailed monitoring plan is provided in Appendix 4. This plan outlines how we will monitor delivery against the Forest Plan objectives, operational implementation, and forest certification.

4.1 Forest Plan Monitoring

All forest plans are formally reviewed at year 5 ('mid-term review') and year 10, where the plan is assessed against its objectives. This plan will be formally reviewed in 2029 with the opportunity to share information where requested. This period may be shortened if circumstances change significantly or if parts of the plan prove detrimental to the overall aims and objectives.

Where an amendment to the Forest Plan is required, the Forestry Commission Practice Delivery Note 01 – Tolerance Table will be applied as set out in Appendix 5.

4.2 UKWAS Compliance Table

We will maintain the land within our stewardship certified against the UK Woodland Assurance Standard, as independently assessed by annual independent surveillance audits.

	Forest Plan Area (ha)	Forest Plan Percentage	Forest District Area (ha)	Forest District Percentage
Total Area	730	100	21045	100
Total Wooded area	698.8	95.7	18585	88
Natural Reserves - Plantation (1%)	22.5	3.6	294	1.8
Natural Reserves - Semi-natural (5%)	8.5	11.9	102	5
Long-term Retentions and Low Impact Silvicultural Systems (>1%)	430.7	59	10636	50.5
Area of conservation Value (15%) including designations; SSSI, PAWS, ASNW, NR, LTR, LISS	430.7	59	10636	50.5
Planned Open/Other	15.9	2.2	3114	15

Table 7 – UKWAS Compliance Table

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5. Plantations on Ancient Woodland Sites (PAWS) Restoration – PPG 70 Policy Document
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11. FC Information Note 40 – 'Transforming Even-aged Conifer Stands to Continuous Cover Management'
12. Wessely, Johannes & Essl, Franz & Fiedler, Konrad & Gattringer, Andreas & Hülber, Bernhard & Ignateva, Olesia & Moser, Dietmar & Rammer, Werner & Dullinger, Stefan & Seidl, Rupert. (2024). A climate-induced tree species bottleneck for forest management in Europe. Nature Ecology & Evolution. 8. 1-9. 10.1038/s41559-024-02406-8.

Appendix 1 – Priority species

Bird Species [1]	**Forest location**	**Habitat enhancement**
Woodcock, dunnock	Developed shrub layer	Continue selective thinning and regeneration felling as part of LISS management, this will allow the development of shrub layer structure and increased structural and species diversity. Create and maintain successional woodland (birch and oak)/scrub habitat and standing deadwood.
Tree pipit Willow warbler Spotted flycatcher Willow tit Marsh tit Redstart Song Thrush Yellow hammer Turtle Dove	Woodland edge, ride, glade	Continue selective thinning and regeneration felling as part of LISS management, this will create increased structural and species diversity. Expand road and ride margins to extend herb and invertebrate rich roadside verges, increase habitat connectivity and edge habitat. Create and maintain successional woodland (birch and oak)/scrub habitat and standing deadwood.
Nightjar	Open habitat/ wooded heath	Maintain a mosaic of open structure woodland with areas of open habitat/ clearfell with wide rides for feeding habitat.
Crossbill Firecrest	Mature conifer woodland	Continue thinning conifer stands to develop canopy and subsequent seed production across a range of conifer species.
Mammals[2]	**Forest location**	**Habitat enhancement**
Otter	River Derwent	Removal of conifer as part of PAWS restoration
Reptile [2]	**Forest location**	**Habitat enhancement**
Adder Common Lizard	Heathland/verges	Maintain the known sites in suitable condition through vegetation management. Plan operations to minimise damage to known hibernacula sites. Maintain a mosaic of open structure woodland/wooded heath, wide rides and forest road verges.
Invertebrate[3]	**Forest location**	**Habitat enhancement**
Northern Hairy Wood ant		Increase connectivity of suitable habitats by maintaining a mosaic of open structure woodland, wide rides and forest road verges.
Lepidoptera[2]	**Forest location**	**Habitat enhancement**
Silver washed fritillary	Broad leaved woodland with wide rides and glades or conifer with broadleaved understorey	Continue selective thinning to create areas of broad leaved woodland or conifer with broadleaved understory Expand road and ride margins to extend herb and invertebrate rich roadside verges, increase habitat connectivity and edge habitat/ woodland glades.
Green Hair Streak Beautiful Snout Devon Carpet Birch Mocha	Woodland rides and clearings, heathland	Continue selective thinning and strip-shelterwood felling as part of LISS management, this will allow the development of shrub layer structure and increased structural and species diversity. Enhance rides, woodland edge habitat and clearings to encourage a habitat mosaic with more open heathy areas.
Botany[2]	**Forest location**	**Habitat enhancement**
Pyrola media & P. minor	Ground flora associated with pinewoods, although it can sometimes be in heath habitats in association with Calluna vulgaris	Continue selective thinning and regeneration felling as part of LISS management, maintain elements of pine species within the block. Maintain the known sites in suitable condition through vegetation management. Plan operations to minimise damage to known sites.
Trees of special interest	**Forest location**	**Habitat enhancement**
Cider Gum Monkey Puzzle	SE 9569 9444 SE 9572 9437	Maintain the known sites in suitable condition through vegetation management. Plan operations to minimise damage to known sites.

[1] Source – BTO Bird Atlas and Breeding Bird Survey data and surveys undertaken by the Forest bird study group.
The Breeding Bird Survey is run by the British Trust for Ornithology (BTO) and is jointly funded by the BTO, the Joint Nature Conservation Committee (JNCC) (on behalf of the statutory nature conservation bodies: Department of Agriculture, Environment and Rural Affairs - Northern Ireland, Natural England, Natural Resources Wales and Scottish Natural Heritage), and the Royal Society for the Protection of Birds (RSPB).
[2]FE Wildlife monitoring volunteers
3 Source - University of York PhD studies

Appendix 2 - LISS justification - Broxa Site Appraisal

Site Factor	Suitability Score	Comment
Wind Hazard Classification: Majority of the forest is WHC range 1 - 3	1	ESC indicates rooting depth ranges between 20 cm to 100 cm.
Soil fertility: Very Poor to Medium	1	Isolated areas of medium fertility support a wider range of species and competing vegetation.
Current species suitability: CP, LP, MCP, MAP, RAP, SP, WEP, NS, ORS, OMS, SS, DF, EL, RC, JCR, ESF, GF, NMF, PSF, LEC, WH, RSQ, LC, BI, AMA, NOM, SY, BE, RON, POK, ROK, SOK, ASP, RAN, CAR, RAR, GAR, IAR, ROW, TST, WST, HBM, WCH, SC, HOL, SRF	1, 2, 3 Suitable	Advanced natural regeneration already occurs across a range of conifer and broadleaf species, either as developing understorey where light levels are favourable or across clear fell sites. Corsican Pine and Larch or not considered dues to tree health issues.

Initial analysis indicates areas of Broxa achieve a good to moderate site ranking for transformation to LISS.

Stand Appraisal

Stand form – Overall stand form across most conifer species is good and developing but more variable across broadleaf species.

Thinning history – Regular thinning has been carried out across the majority of conifer stands where threshold basal area has been reached, providing opportunities for subsequent selective thinning to improve crown development. Currently there is good evidence that a range of conifer and broadleaf species are capable of developing through natural regeneration across sites.

The impact from P.ramorum, *D.septosporum, D.micans* and *Chalara* on larch, pine, spruce and ash species will need to be monitored as to how this might impact on future stand composition, depending on what the management objectives are for those sites.

Access – Although good infrastructure exists across most of the forest areas, there are areas where access is very challenging. Thinning and LISS management will seek to maximise stand development where safe to do so.

On the basis of the above information, we will consider transformation to LISS for the most of the block with the aim of increasing species diversity through enrichment planting using a range of species depending on site objectives.

Strip (with a width ≤1.5 x treelengths, with a length appropriate to site constraints), Irregular and Group shelterwood (up to 0.6 ha in size) systems will be applied to a range of stand types where the felling of small coupes, will contribute toward the development of a diverse woodland.

Future wildlife management issues may arise where deer browsing could impact Shelterwood systems as more palatable species are introduced. Site monitoring and adherence to the District Deer Management strategy will help inform future management.

The Forest Research ESC table below supports the range of target species considered for natural regeneration and those identified as very suitable (dark green) and suitable (light green) where enrichment planting will increase species diversity.

Ecological Site Classification Report

Eastings(m)	Northings(m)	Grid Reference	Climate Scenario	Site Class	Filter	Brash	Drainage	Fertiliser/Nurse
495345	494083	SE953940	Medium-High 2080 (A1b/3q0) AWC method	Very warm - Moderately exposed - Slightly dry	Suitable conifers only	No brash present	No drainage installed	No fertiliser

Site Description and Variables

The site has a very warm, moderately exposed and slightly dry climate. The soils are fresh moisture status and poor nutrient status. The analysis assumes that site management (e.g. CCF), the use of deep rooting species and/or soil properties will help mitigate climatic moisture deficits. The site DAMS score has been reduced due to either a) an intention to underplant species with the benefit of shelter from established trees or b) local observations of additional shelter/less exposure. Tree species recommendations in ESC do not take account of each countries regulatory approval process, so prior to including species in a forest plan advice should be sought from relevant forestry authorities.

Modifications	AT	CT	DAMS	MD	SMR	SNR
Default	2424.0	8.0	14.0	226.0	5.0(Fresh)	2.0(Poor)
Dams Modifier			-2			
Final	2424.0	8.0	12.0	226.0	5.0(Fresh)	2.0(Poor)

Species	Abbr.	Suit(Ecol)	Suit(Timber)	Yield	Limiting	AT	CT	DAMS	MD	SMR	SNR	Version
Corsican pine	CP	●	●	16	SNR	●	●	●	●	●	●	3.3(A)
Lodgepole pine	LP	●	●	11	SNR	●	●	●	●	●	●	3.1(A)
Macedonian pine	MCP	●	●	12	SNR	●	●	●	●	●	●	3.1(C)
Maritime pine	MAP	●	●	12	SNR	●	●	●	●	●	●	3.1(C)
Monterey/Radiata pine	RAP	●	●	17	SNR	●	●	●	●	●	●	3(C)
Scots pine	SP	●	●	12	SNR	●	●	●	●	●	●	3.3(A)
Weymouth pine	WEP	●	●	8	SNR	●	●	●	●	●	●	3(C)
Norway spruce	NS	●	●	13	SNR	●	●	●	●	●	●	3.3(A)
Oriental spruce	ORS	●	●	13	SNR	●	●	●	●	●	●	3(C)
Serbian spruce	OMS	●	●	11	SNR	●	●	●	●	●	●	3(B)
Sitka spruce	SS	●	●	16	MD	●	●	●	●	●	●	3.4(A)
Sitka spruce (Imp.)	Imp.SS	●	●	17	MD	●	●	●	●	●	●	3.4(A)
Douglas fir	DF	●	●	18	SNR	●	●	●	●	●	●	3.1(A)
European larch	EL	●	●	8	SNR	●	●	●	●	●	●	3(A)
Western red cedar	RC	●	●	16	SNR	●	●	●	●	●	●	3.1(A)
Japanese red cedar	JCR	●	●	16	SNR	●	●	●	●	●	●	3(B)
European silver fir	ESF	●	●	15	SNR	●	●	●	●	●	●	3(B)
Grand fir	GF	●	●	20	SNR	●	●	●	●	●	●	3(A)
Nordmann fir	NMF	●	●	14	SNR	●	●	●	●	●	●	3(C)
Pacific fir	PSF	●	●	19	AT5	●	●	●	●	●	●	3.4(C)
Leyland cypress	LEC	●	●	14	SNR	●	●	●	●	●	●	3(B)

Ecological Site Classification Report												
Western hemlock	WH	●	●	14	AT5	●	●	●	●	●	●	3(A)
Coast redwood	RSQ	●	●	17	SNR	●	●	●	●	●	●	3(B)
Lawson's cypress	LC	●	●	15	SNR	●	●	●	●	●	●	3(B)

Ecological Site Classification Report

Eastings(m)	Northings(m)	Grid Reference	Climate Scenario	Site Class	Filter	Brash	Drainage	Fertiliser/Nurse
495345	494083	SE953940	Medium-High 2080 (A1b/3q0) AWC method	Very warm - Moderately exposed - Slightly dry	Suitable broadleaves only	No brash present	No drainage installed	No fertiliser

Site Description and Variables

The site has a very warm, moderately exposed and slightly dry climate. The soils are fresh moisture status and poor nutrient status. The analysis assumes that site management (e.g. CCF), the use of deep rooting species and/or soil properties will help mitigate climatic moisture deficits. The site DAMS score has been reduced due to either a) an intention to underplant species with the benefit of shelter from established trees or b) local observations of additional shelter/less exposure. Tree species recommendations in ESC do not take account of each countries regulatory approval process, so prior to including species in a forest plan advice should be sought from relevant forestry authorities.

Modifications	AT	CT	DAMS	MD	SMR	SNR
Default	2424.0	8.0	14.0	226.0	5.0(Fresh)	2.0(Poor)
Dams Modifier			-2			
Final	2424.0	8.0	12.0	226.0	5.0(Fresh)	2.0(Poor)

Species	Abbr.	Suit(Ecol)	Suit(Timber)	Yield	Limiting	AT	CT	DAMS	MD	SMR	SNR	Version
Downy birch	PBI	●	▲	3	AT5	●	●	●	●	●	●	3.2(A)
Silver birch	SBI	●	●	7	AT5	●	●	●	●	●	●	3.2(A)
Big leaf maple	AMA	●	●	8	SNR	●	●	●	●	●	●	3.1(C)
Norway maple	NOM	●	▲	6	SNR	●	●	●	●	●	●	3(B)
Sycamore	SY	●	●	6	SNR	●	●	●	●	●	●	3.3(A)
Beech	BE	●	●	5	SNR	●	●	●	●	●	●	3.1(A)
Roble beech	RON	●	●	11	SNR	●	●	●	●	●	●	3.1(B)
Pedunculate oak	POK	●	●	5	SNR	●	●	●	●	●	●	3.1(A)
Red oak	ROK	●	●	5	SNR	●	●	●	●	●	●	3(B)
Sessile oak	SOK	●	●	6	SNR	●	●	●	●	●	●	3.2(A)
Aspen	ASP	●	▲	5	SNR	●	●	●	●	●	●	3.2(A)
Rauli beech	RAN	●	●	15	AT5	●	●	●	●	●	●	3.1(B)
Common alder	CAR	●	●	7	SNR	●	●	●	●	●	●	3.2(A)
Red alder	RAR	●	●	7	AT5	●	●	●	●	●	●	3(B)
Grey alder	GAR	●	●	7	AT5	●	●	●	●	●	●	3.1(B)
Italian alder	IAR	●	●	9	CT	●	●	●	●	●	●	3.2(B)
Shining gum	ENI	●	●	34	AT5	●	●	●	●	●	●	3(C)
Cider gum	EGU	●	●	16	AT5	●	●	●	●	●	●	3(C)
Rowan	ROW	●	●	3	SNR	●	●	●	●	●	●	3.3(A)
True service tree	TST	●	●	5	SNR	●	●	●	●	●	●	3(A)
Wild service tree	WST	●	●	6	SNR	●	●	●	●	●	●	3(A)

Ecological Site Classification Report												
Hornbeam	HBM	●	●	7	SNR	●	●	●	●	●	●	3(A)
Wild cherry	WCH	●	●	6	SNR	●	●	●	●	●	●	3(A)
Sweet chestnut	SC	●	●	8	SNR	●	●	●	●	●	●	3(A)
Holly	HOL	●	●	3	SNR	●	●	●	●	●	●	3(C)
Eucalyptus glaucescens (SRF)	SRF	●	●	14	SNR	●	●	●	●	●	●	3(C)

Appendix 3 - Restock species by soil type

Site type		Species														
Upland sites	Lowland sites	**SP**	**LP**	**MCP**	**DF**	ESF	GF	**WH**	WRC	Ley/Law C	Coast R	Giant R	**HL**	**SS**	**NS**	Oriental S
Gley						***y***		***y***	***y***	y				**Y**	**Y**	***y***
Iron pan/podzol		**Y**	***y***	***y***	**y**	***y***	***y***				***y***	***y***	**y**		y	***y***
BE/intergrade		**Y**		***y***	**Y**	***y***	***y***	***y***	***y***	y	***y***	***y***	***y***	***y***	**Y**	***y***
Calcareous				***y***		***y***			***y***	y						***y***
	Gley					***y***		***y***	***y***	y	***y***	***y***		**Y**	**Y**	***y***
	Podzol	**Y**	***y***	***y***	**y**	***y***	***y***	***y***	***y***	y		***y***	***y***		y	***y***
	BE/intergrade	**Y**		***y***	**Y**	***y***	***y***		***y***	y	***y***	***y***		***y***	**Y**	***y***

BOLD CAPITAL (Y)/BOLD INFILL COLOUR	**Cat A Major species** - currently widely used with no supply problems and should continue to play an important role
Bold, lower case italics (y), pastel infil colour	**Cat B Minor species** - Species that either currently play a minor role but have demonstrated their suitability being part of a species range to diversify our forests. Climate change may increase or reduce their use
Normal lower case (y), pastel infill colour	**Cat C Secondary species**- Species with little information on forest performance but possible choice based on Arboreta. Use on small-scale experimental basis for now but may increase if favourable results

soucre data http://www.forestry.gov.uk/fr/treespecies

Refer to cell comments for specific species notes

No planting where >0.5m peat depth

Pacific coast associated forest cover - consider in mixtures as part of management by LISS					
DF	GF	WH	Law C	Coast R	*ESF*

Appendix 4 - Broxa Forest Monitoring Plan			
Objective	**Method**	**Frequency/Timings**	**Actions**
Wildlife			
Improve the resilience of the forest and natural environment to pests, diseases and wildfires and realise the potential of this forest for nature and wildlife, with a particular focus on diversification of species and structure.	Update Forester Web GIS; subcompartment database, Conservation module.	As recordable changes occur within the forest environment. At time of Year 0 plan renewal, 5-year review, 10-year review.	Measure changes in diversity across species, age structure, conservation siting's/records and broad habitat types; conifer, broadleaf, open. Ensure positive change through increasing diversity occurs over the lifetime of the plan.
	Review sample of Operational Site Assessments.	Annually	Provide feedback where management is not compliant with recommendations.
Increase the proportion of native broadleaf cover, particularly across areas of PAWS, riparian zones and along steep-sided scarp slopes.	Update Forester Web GIS; subcompartment database; analyse semi-natural scores	As recordable changes occur within the forest environment. At time of Year 0 plan renewal, 5-year review, 10-year review.	Measure changes in diversity across species, age structure, conservation siting's/records and broad habitat types; conifer, broadleaf, open. Ensure positive change through increasing diversity occurs over the lifetime of the plan.
Maintain the ecological value of the forest.	Update Forester Web sub compartment database and conservation module.	Annually or as data becomes available. At time of Year 0 baseline, 5-year review, 10-year review.	Provide feedback where management is not compliant with recommendations.
Reduce the area of clearfell by managing stands through LISS regeneration felling, whilst being mindful of the importance of appropriate nightjar habitat. Utilising natural regeneration and enrichment planting, particularly across areas of PAWS and targeting the retention of high-value conifer crops.	Update Forester Web GIS; subcompartment database: analyse semi-natural scores	As recordable changes occur within the forest environment. At time of Year 0 plan renewal, 5-year review, 10-year review.	Measure changes in stand structure. Ensure positive change through increasing diversity occurs over the lifetime of the plan.
People			
Maintain the woodlands contribution to the landscape character NYMNPA Langdale Forest landscape character area. Clearfells will be designed so that their size and scale are in keeping with the surrounding landscape.	Fixed-point photography	Year 0 baseline, 5-year review, 10-year review.	Review visual impact of coupes within the landscape and adjust future coupe shapes if necessary.
Improve landscape impact through the use of appropriate silvicultural systems.			

Maintain the cultural and heritage value of Broxa forest. Protect and, where appropriate, enhance all known sites of archaeological importance.	Liaise with and review Historic England - At risk Register, NYMNPA shared monuments data, update Forester Web GIS Heritage module.	Annually or as data becomes available. At time of Year 0 baseline, 5-year review, 10-year review.	Provide feedback where management is not compliant with recommendations.
Climate			
Continue to improve species and structural diversity.	Update Forester Web GIS; subcompartment database	As recordable changes occur within the forest environment. At time of Year 0 plan renewal, 5-year review, 10-year review.	Measure changes in diversity across species e.g. using the Shannon Diversity Index. Ensure positive change through increasing diversity occurs over the lifetime of the plan. Measure changes in stand structure. Ensure positive change through increasing diversity occurs over the lifetime of the plan.
Continue the reduction of Larch as a component within mixed stands, consider group felling/small scale regenerative felling in pure stands.	Update Forester Web GIS; subcompartment database	As recordable changes occur within the forest environment. At time of Year 0 plan renewal, 5-year review, 10-year review.	Measure changes in diversity across species. Ensure positive change through increasing diversity occurs over the lifetime of the plan.
Economy			
All of our forests and woodlands are certified to the Forest Stewardship Council®(FSC®) licence code FSC-C123214 and the Programme for the Endorsement of Forest Certification (PEFC) licence code PEFC/16-40-1001 standards. We will maintain the land within our stewardship certified against the UK Woodland Assurance Standard.	Independent surveillance audit across the organisation.	Annually	Implement corrective actions as required.
	Independent surveillance audit across the District.	As per audit sample.	Implement corrective actions as required.
Maximise and maintain a sustainable supply of timber from a diverse range of site-appropriate conifer and broadleaf species	Update Forester Web GIS; subcompartment database, Operational Thinning Layer, Management Coupe Layer.	As recordable changes occur within the forest environment and End Of Year updates. Year 0 plan renewal, 5-year review, 10-year review.	Review long-term changes in productive capacity through the Production Forecast at the point of plan renewal and across the wider District.
Site-specific - Operational			
Clearfell coupes - ensure boundaries are accurately reproduced and within agreed tolerances as set out in Forestry Commission Practice Delivery Note 01 (FC PDN 01).	GPS unit or equivalent data recorders.	Upon completion of all harvesting activity.	If significant coupe variation, apply for appropriate ammendment to FC as required as per FC PDN 01 prior to felling. Update Forester Web for completed clearfells.

Restock & Future Habitat Coupes - Productive mixed conifer sites. Establish at least 2500 conifer stems per ha by planting and natural regeneration by year 5 since date of initial planting (allowing 2 years fallow for *hylobius*).	On-site stocking density plot surveys.	Beat-up surveys between years 1 to 4. Year 5 stocking assessment, internal guidance PPG4.	Carry out beating up where stocking density falls below prescribed number of trees/ha to achieve full stocking.
Restock & Future Habitat Coupes - Mixed broadleaf habitat. Establish at least 1100 broadleaf stems per ha through natural regeneration by year 10 since date of felling.	On-site stocking density plot surveys.	Beat-up surveys between years 1 to 4. Year 5 stocking assessment, internal guidance PPG4.	Carry out enrichment planting where stocking density falls below prescribed number of trees/ha to achieve full stocking.
LISS coupes - Productive mixed conifer sites. Establish at least 2500 conifer stems per ha by year 10 after final removal overstorey.	On-site stocking density plot surveys.	Beat-up surveys between years 1 to 4. Year 5 stocking assessment, internal guidance PPG4.	Carry out enrichment planting where stocking density falls below prescribed number of trees/ha to achieve full stocking.
Increase rhododendron control especially within or adjacent to Larch crops	On-site visual assessment and monitoring	As recordable changes occur within the forest environment.	Review activity across the forest and wider District to measure activity and to provide insight into gaps and future opportunities through volunteering.
Wildlife management - Identify problem sites where mammal damage is affecting crop establishment or degrading woodland flora.	On-site stocking density plot surveys. Damage, Impact and Activity Assessments as set out in YFD Deer Management Strategy.	To be informed from results of beat-up surveys between years 1 to 4 and year 5 stocking assessment, internal guidance PPG4.	Target deer control in line with District strategy.
Forest Plan specific			
Forest Plan mid-term review. Review the plan's aims and objectives and the progress of their implemetation.	Apply a variety of measures as described throughout this monitoring plan.	2030	Modify the plans aims and/or objectives where these are no longer compatible with National or District Policy. Significant plan changes will require consultation and formal amendment from the Forestry Commission.

Appendix 5 – Agreed Tolerance Table

	Adjustment to felling coupe boundaries	Swapping of felling coupes	Adjustment to felling operation	Clearance of standing trees associated with wind-blown areas[7]	Delayed restocking - including natural regeneration	Species choice	Tree health
Formal assessment and approval by FC area team required	>25% of the coupe area	Where changes to the felling sequence is likely to result in a significant breach[1] of the UKFS adjacency rules	From unconditional felling (thinning or low-intervention management) to conditional felling such as: • regeneration felling • strip felling[2] • clear felling and where ≥50% of standing tree volume is to be removed	Individual work area that is either: >5ha of standing trees associated with wind-blow areas or Proposals result in cumulative additional felling[8] affecting >20% of the Forest Plan area[9]	N/A – dealt with via FC Area team approval (below)	From mixed, predominantly broadleaves to predominantly conifer	Where no SPHN is issued but felling of ≥65% standing tree volume is required in response to a plant health issue
Written approval only required from FC area team[3]	Between 10-25% of the coupe area	Where changes to the felling sequence is likely to result in a minor breach[4] of the UKFS adjacency rules	From unconditional felling (thinning or low-intervention management) to conditional felling where between 30%-50% of standing tree volume is to be removed such as: • regeneration felling • strip felling or From lower intensity regeneration felling to higher intensity regeneration felling, (as defined by the felling operation hierarchy[5]) where <50% of standing tree volume is to be removed	Individual work area that meets both the criteria: 1-5ha of standing trees associated with wind-blow areas, (Where there is an <u>immediate</u> and <u>significant</u> risk to health and safety or access, felling of ≥5ha of standing trees associated with wind-blow areas) and Proposals result in cumulative additional felling[8] affecting <20% of the Forest Plan area[9]	<u>Planting</u>: Where this is ≥ 4 planting seasons from the date of felling. <u>Natural regeneration</u>: where necessary intervention to secure natural regen is not implemented within 4 full planting seasons from date of felling	Deciduous conifers to predominantly evergreen conifers	Where no SPHN is issued but felling between ≥50% and < 65% of standing tree volume is required in response to a plant health issue
No formal or written approval by FC area team <u>required</u>[6]	< 10% of the coupe area	Where changes to the felling sequence does not result in a breach of the UKFS adjacency rules	Clear felling to strip felling, shelterwood or regenerative felling systems, or thinning or From more severe regeneration felling to less severe regeneration felling as defined by the regeneration felling hierarchy[5]	<1ha of standing trees associated with wind-blow areas (Where there is an <u>immediate</u> and <u>significant</u> risk to health and safety or access, felling of 1ha-5ha of standing trees associated with wind-blow areas) and Proposals result in cumulative additional felling[8] affecting <10% of the Forest Plan area[9]	For any changes to the timing of restocking where this occurs <4 full planting seasons from the date of felling	Any other changes	Where an SPHN is issued Or Thinning / regenerative felling <50% of standing tree volume is required in response to a plant health issue

[9] For Yorkshire Forest District the "Forest Plan Area" will be utilized rather than "Forest Management Unit" when considering cumulative impact.
[1] Greater than 20% of the coupe boundary
[2] Felling strips with a width ≤ 1.5 x treelengths, with a length appropriate to site constraints.
[3] Approval letter retained for compliance inspection purposes.
[4] 20% or less of the coupe boundary
[5] Lower impact operation to higher impact operation hierarchy: thinning, selection system, uniform shelterwood, irregular shelterwood, group shelterwood, strip felling, clear felling.
[6] District must keep all **assessment and decision-making** records in respect of amendments for **audit purposes** and compliance inspections
[7] Operations remain subject to other approvals for sensitive areas (e.g. SSSI, SAM etc). Subject to agreement of this tolerance table by relevant protected landscapes.
[8] Cumulative additional felling = 5 year rolling total area of growing trees felled (excludes dead and completely windblown trees) that were not approved for felling within the relevant felling period, in the initial approved Forest Plan. This includes both FS approved amendments and felling below thresholds. The intention is to identify instances where events result in more substantial shift in management requiring increasing need for review of forest plan proposals.
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Appendix 6 - Forest Development Types - Long List

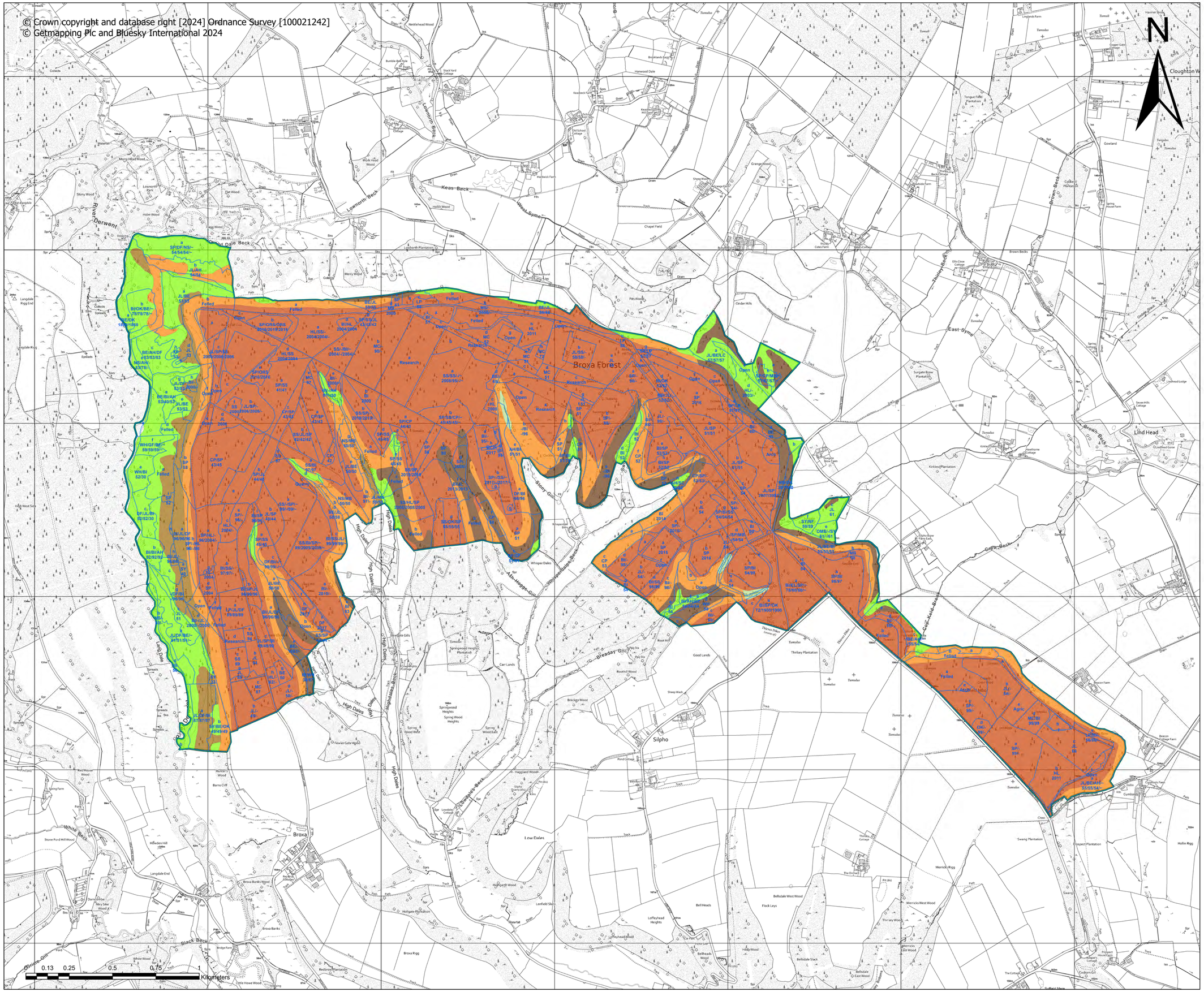
"A Forest Development Type is a long-term vision of how the species composition and structure of a forest stand is intended to develop. The concept encourages the greater use of mixed-species stands and a wider variety of stand structure than previously deployed in British forests".1

As can be seen from the table below, there are a range of FDT's suitable to Broxa.

Code	Description	Future Climate		Future Climate (AWC)		Primary Species	Primary Proportion	Secondary Species	Secondary Proportion	Even aged		Uneven aged		Flashcard
		2050	2080	2050	2080					Unthinned	Thinned	Simple	Complex	
1.1.1	Sitka spruce even aged	Unsuitable	Unsuitable	Suitable	Suitable	SS	90-100			x	x*			FDT_1_1_1_SS_V1.pdf
1.1.2	Sitka spruce uneven aged	Unsuitable	Unsuitable	Suitable	Suitable	SS	80-90					x*	x	FDT_1_1_2_SS_V1.pdf
1.1.4	Sitka spruce with light demanding conifers	Unsuitable	Unsuitable	Suitable	Suitable	SS	60-80	XCLD	20-40	x	x*	x	x	FDT_1_1_4_SS_and_XCLD_V1.pdf
1.1.5	Sitka spruce with shade tolerant conifers	Unsuitable	Unsuitable	Suitable	Suitable	SS	60-80	XCST	20-40		x	x*	x	FDT_1_1_5_SS_and_XCST_V1.pdf
1.1.6	Sitka spruce with beech	Unsuitable	Unsuitable	Suitable	Suitable	SS	70-90	BE	Oct-30		x*	x	x	FDT_1_1_6_SS_and_BE_V1.pdf
1.1.7	Sitka spruce with long lived broadleaves	Unsuitable	Unsuitable	Suitable	Suitable	SS	50-90	XBLL	Oct-50		x	x*	x	FDT_1_1_7_SS_and_XBLL_V1.pdf
1.1.8	Sitka spruce with short lived broadleaves	Unsuitable	Unsuitable	Suitable	Suitable	SS	50-90	XBSL	Oct-50	x	x*			FDT_1_1_8_SS_and_XBSL_V1.pdf
1.2.1	Norway spruce even aged	Suitable	Suitable	Suitable	Suitable	NS	90-100			x	x*			FDT_1_2_1_NS_V1.pdf
1.2.2	Norway spruce uneven aged	Suitable	Suitable	Suitable	Suitable	NS	80-90					x*	x	FDT_1_2_2_NS_V1.pdf
1.2.3	Norway spruce with Sitka spruce	Suitable	Suitable	Suitable	Suitable	NS	70-90	SS	Oct-20	x	x*	x	x	FDT_1_2_3_NS_and_SS_V1.pdf
1.2.4	Norway spruce with shade tolerant conifers	Suitable	Suitable	Suitable	Suitable	NS	60-80	XCST	20-40	x	x	x*	x	FDT_1_2_4_NS_and_XCST_V1.pdf
1.2.5	Norway spruce with beech	Suitable	Suitable	Suitable	Suitable	NS	50-70	BE	20-40		x	x	x*	FDT_1_2_5_NS_and_BE_V1.pdf
1.2.6	Norway spruce with	Suitable	Suitable	Suitable	Suitable	NS	60-80	XBLL	20-40		x	x*	x	FDT_1_2_6_NS_and_XBLL_V1.pdf

	long lived broadleaves													
1.2.7	Norway spruce with short lived broadleaves	Suitable	Suitable	Suitable	Suitable	NS	70-90	XBSL	Oct-30	x	x*			FDT_1_2_7_NS_and_XBSL_V1.pdf
2.1.1	Scots pine even aged	Suitable	Suitable	Suitable	Suitable	SP	80-100			x	x*			FDT_2_1_1_SP_V1.pdf
2.1.2	Scots pine uneven aged	Suitable	Suitable	Suitable	Suitable	SP	70-90				x	x*	x	FDT_2_1_2_SP_V1.pdf
2.1.3	Scots pine with shade tolerant conifers	Suitable	Suitable	Suitable	Suitable	SP	60-80	XCST	20-40			x*	x	FDT_2_1_3_SP_and_XCST_V1.pdf
2.1.4	Scots pine with light demanding conifers	Suitable	Suitable	Suitable	Suitable	SP	60-90	XCLD	Oct-40		x*	x		FDT_2_1_4_SP_and_XCLD_V1.pdf
2.1.5	Scots pine with sessile oak	Suitable	Suitable	Suitable	Suitable	SP	50-70	SOK	20-40				x*	FDT_2_1_5_SP_and_SOK_V1.pdf
2.1.6	Scots pine with beech	Suitable	Suitable	Suitable	Suitable	SP	60-80	BE	20-40		x	x*	x	FDT_2_1_6_SP_and_BE_V1.pdf
2.1.7	Scots pine with birch	Suitable	Suitable	Suitable	Suitable	SP	60-90	SBI	Oct-40		x	x	x*	FDT_2_1_7_SP_and_BI_V1.pdf
2.2.1	Corsican pine with shade tolerant conifers	Suitable	Suitable	Suitable	Suitable	CP	30-70	XCST	30-70			x*		FDT_2_2_1_CP_and_XCST_V1.pdf
2.2.2	Corsican pine with light demanding conifers	Suitable	Suitable	Suitable	Suitable	CP	30-70	XCLD	30-70		x*	x	x	FDT_2_2_2_CP_and_XCLD_V1.pdf
2.2.3	Corsican pine with long lived broadleaves	Suitable	Suitable	Suitable	Suitable	CP	30-70	XBLL	30-70			x*		FDT_2_2_3_CP_and_XBLL_V1.pdf
2.3.1	Lodgepole pine even aged	Suitable	Suitable	Suitable	Suitable	LP	90-100			x	x*			FDT_2_3_1_LP_V1.pdf
2.3.2	Lodgepole pine with downy birch	Suitable	Unsuitable	Suitable	Unsuitable	LP	50-70	DBI	30-50	x	x*			FDT_2_3_2_LP_and_DBI_V1.pdf
2.4.1	Larch with Scots pine	Suitable	Suitable	Suitable	Suitable	LA	60-90	SP	Oct-40		x*			FDT_2_4_1_LA_and_SP_V1.pdf
2.4.2	Larch with shade tolerant conifers	Suitable	Unsuitable	Suitable	Suitable	LA	60-80	XCST	20-40			x*	x	FDT_2_4_2_LA_and_XCST_V1.pdf

2.4.3	Larch with beech	Suitable	Unsuitable	Suitable	Suitable	LA	50-80	BE	Oct-40			x*		FDT_2_4_3_LA_and_BE_V1.pdf
2.4.4	Larch with oak	Suitable	Unsuitable	Suitable	Suitable	LA	50-70	OK	20-40				x*	FDT_2_4_4_LA_and_OK_V1.pdf
3.1.1	Douglas fir even aged	Suitable	Suitable	Suitable	Suitable	DF	90-100				x*			FDT_3_1_1_DF_V1.pdf
3.1.3	Douglas fir with shade tolerant conifers	Suitable	Suitable	Suitable	Suitable	DF	60-80	XCST	20-40		x	x*	x	FDT_3_1_3_DF_and_XCST_V1.pdf
5.2.1	sessile oak with birch	Suitable	Suitable	Suitable	Suitable	SOK	50-80	BI	20-50		x	x	x*	FDT_5_2_1_SOK_and_BI_V1.pdf
5.2.2	sessile oak with Scots pine	Suitable	Suitable	Suitable	Suitable	SOK	50-70	SP	20-40		x	x	x*	FDT_5_2_2_SOK_and_SP_V1.pdf
7.1.1	birch even aged	Suitable	Suitable	Suitable	Suitable	BI	70-100			x	x*			FDT_7_1_1_BI_V1.pdf
7.1.2	birch and short lived broadleaves	Suitable	Suitable	Suitable	Suitable	BI	50-70	XBSL	30-50	x	x*			FDT_7_1_2_BI_and_XBSL_V1.pdf
7.2.1	silver birch and Scots pine	Suitable	Suitable	Suitable	Suitable	SBI	60-90	SP	Oct-40		x	x*	x	FDT_7_2_1_SBI_and_SP_V1.pdf
7.2.2	silver birch and sessile oak	Suitable	Suitable	Suitable	Suitable	SBI	50-80	SOK	20-50			x	x*	FDT_7_2_2_SBI_and_SOK_V1.pdf
8.1.2	sweet chestnut with long lived broadleaves	Suitable	Suitable	Suitable	Suitable	SC	50-80	XBLL	20-50		x	x*	x	FDT_8_1_2_SC_and_XBLL_V1.pdf

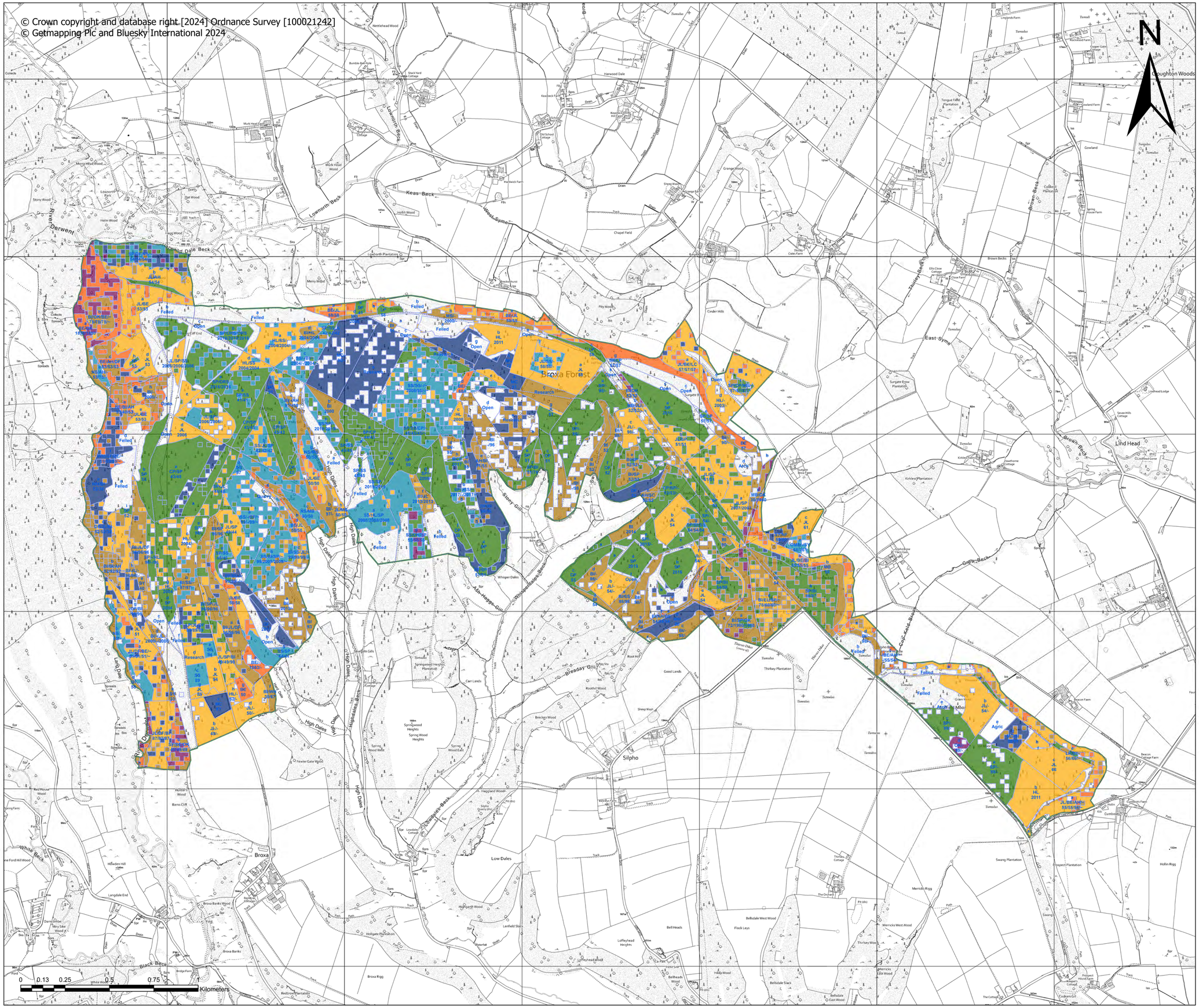


Forestry England

Broxa Forest Plan

FP Map 01 - Soils
Scale: 1:10,000
when printed @ A1
Created: May 2024

- Typical Brown Earth
- Podzolic Brown Earth
- Podzol
- Ironpan Soil
- Surface-Water Gley
- Valley Complex

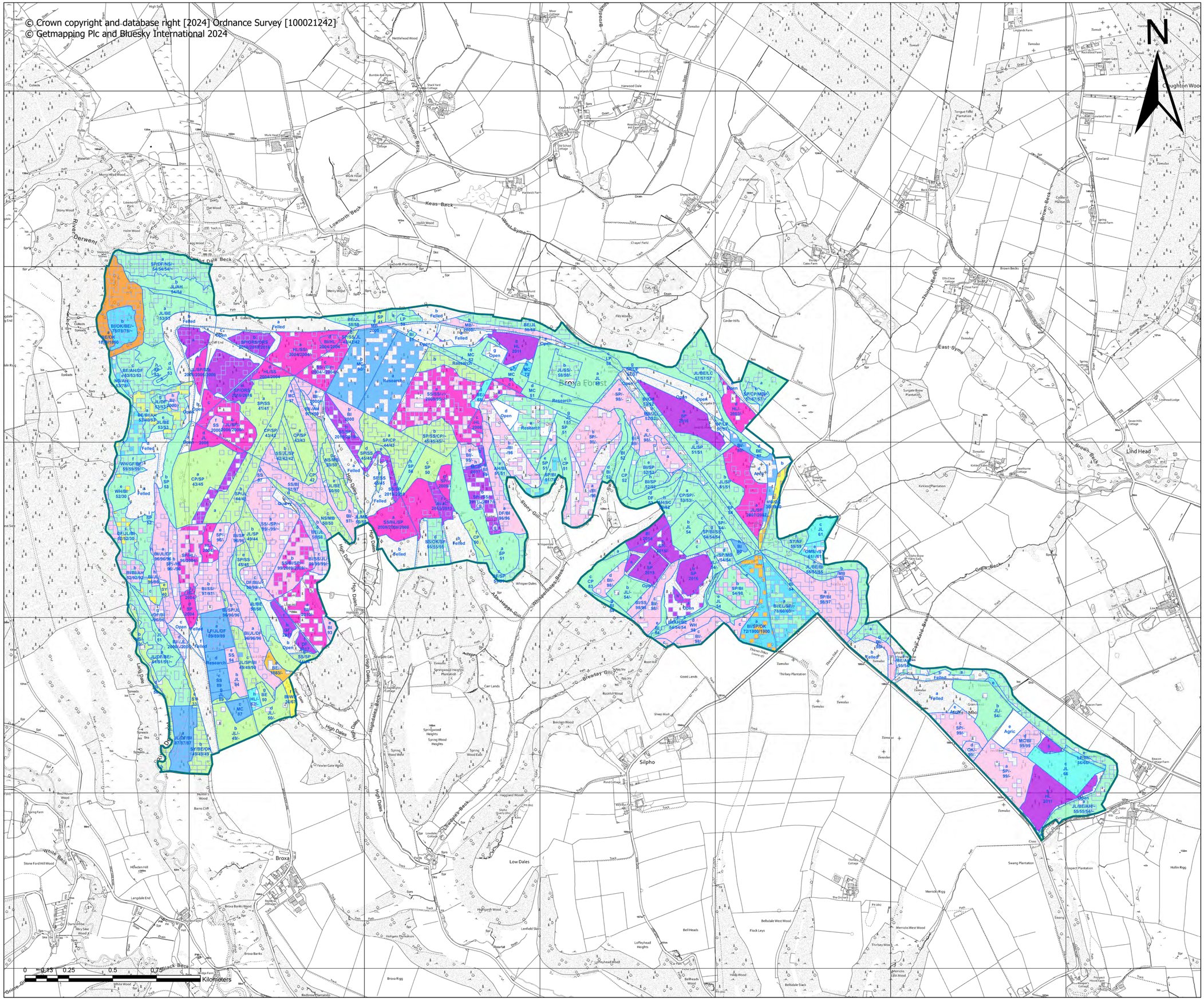


Forestry England

Broxa Forest Plan

FP Map 02 - Current Species
Scale: 1:10,000
when printed @ A1
Created: May 2024

- Beech
- Larch
- Oak
- Other Broadleaves
- Other Conifers
- Pine
- Spruce
- Open, Felled etc

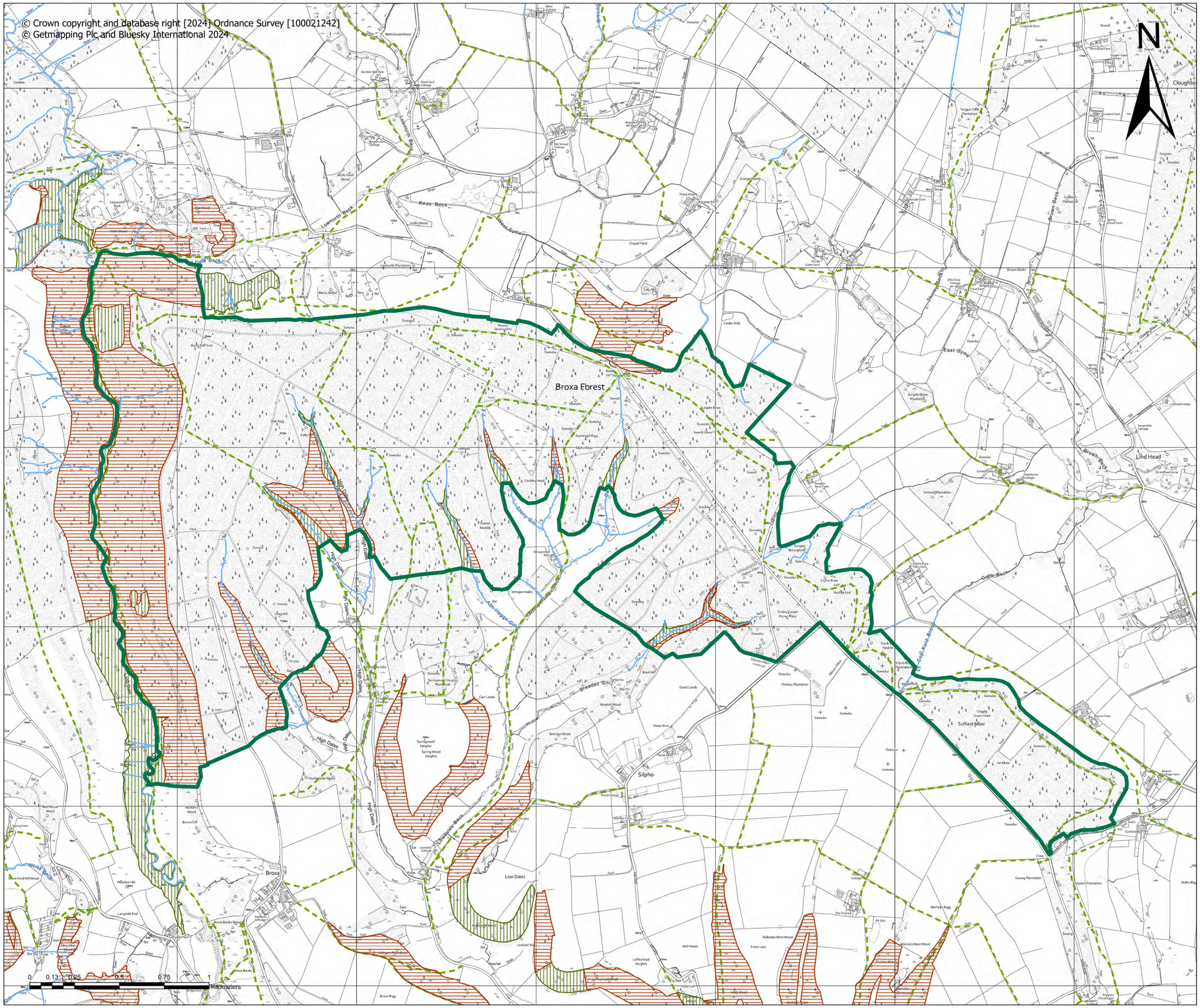


Forestry England

Broxa Forest Plan

FP Map 03 - Age Class
Scale: 1:10,000
when printed @ A1
Created: May 2024

- 1801 - 1850
- 1851 - 1900
- 1921 - 1930
- 1931 - 1940
- 1941 - 1950
- 1951 - 1960
- 1961 - 1970
- 1971 - 1980
- 1981 - 1990
- 1991 - 2000
- 2001 - 2010
- 2011 - Present



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Broxa Forest Plan

FP Map 04
Management Information

Scale: 1:10,000
when printed @ A1
Created: May 2024

- Forest Block
- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland
- Public Rights of Way
- Watercourses

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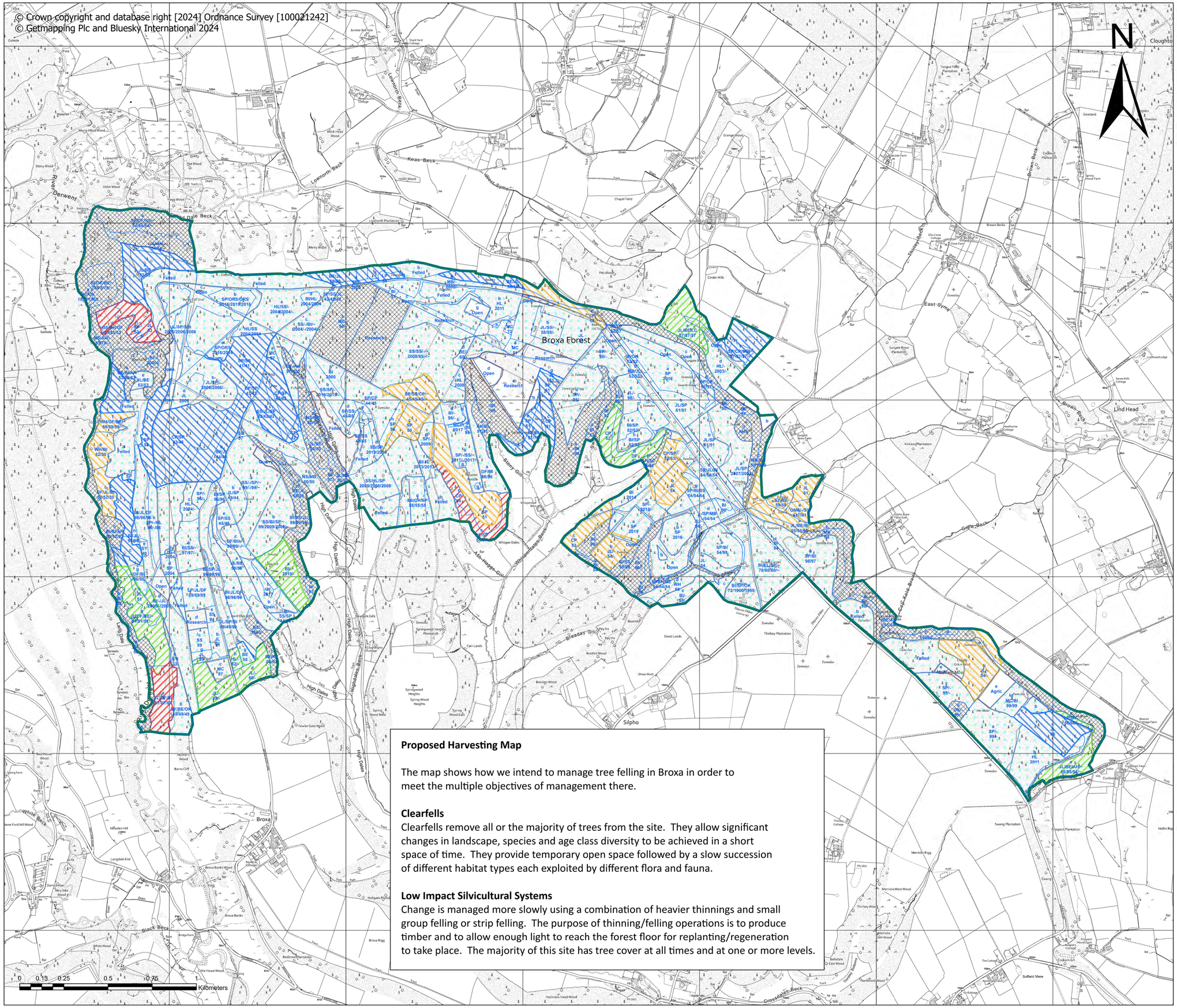

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Broxa Forest Plan

FP Map 05
Proposed Felling

Scale: 1:10,000
when printed @ A1
Created: May 2024

- 2022 - 2026
- 2027 - 2031
- 2032 - 2036
- 2037 - 2041
- Beyond 2042 or LISS
- Other / Open Land
- Long Term Retention

Proposed Harvesting Map

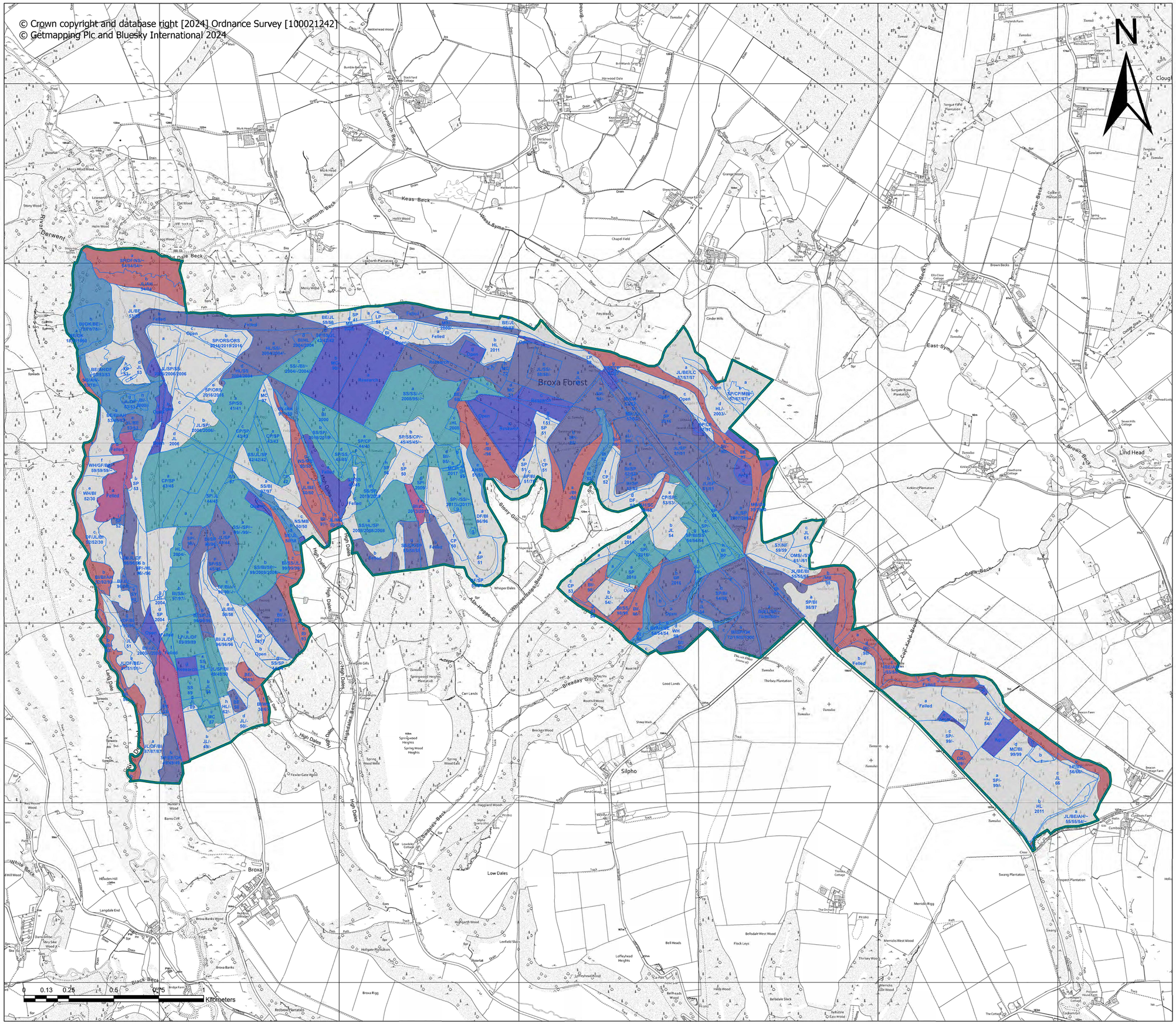
The map shows how we intend to manage tree felling in Broxa in order to meet the multiple objectives of management there.

Clearfells

Clearfells remove all or the majority of trees from the site. They allow significant changes in landscape, species and age class diversity to be achieved in a short space of time. They provide temporary open space followed by a slow succession of different habitat types each exploited by different flora and fauna.

Low Impact Silvicultural Systems

Change is managed more slowly using a combination of heavier thinnings and small group felling or strip felling. The purpose of thinning/felling operations is to produce timber and to allow enough light to reach the forest floor for replanting/regeneration to take place. The majority of this site has tree cover at all times and at one or more levels.

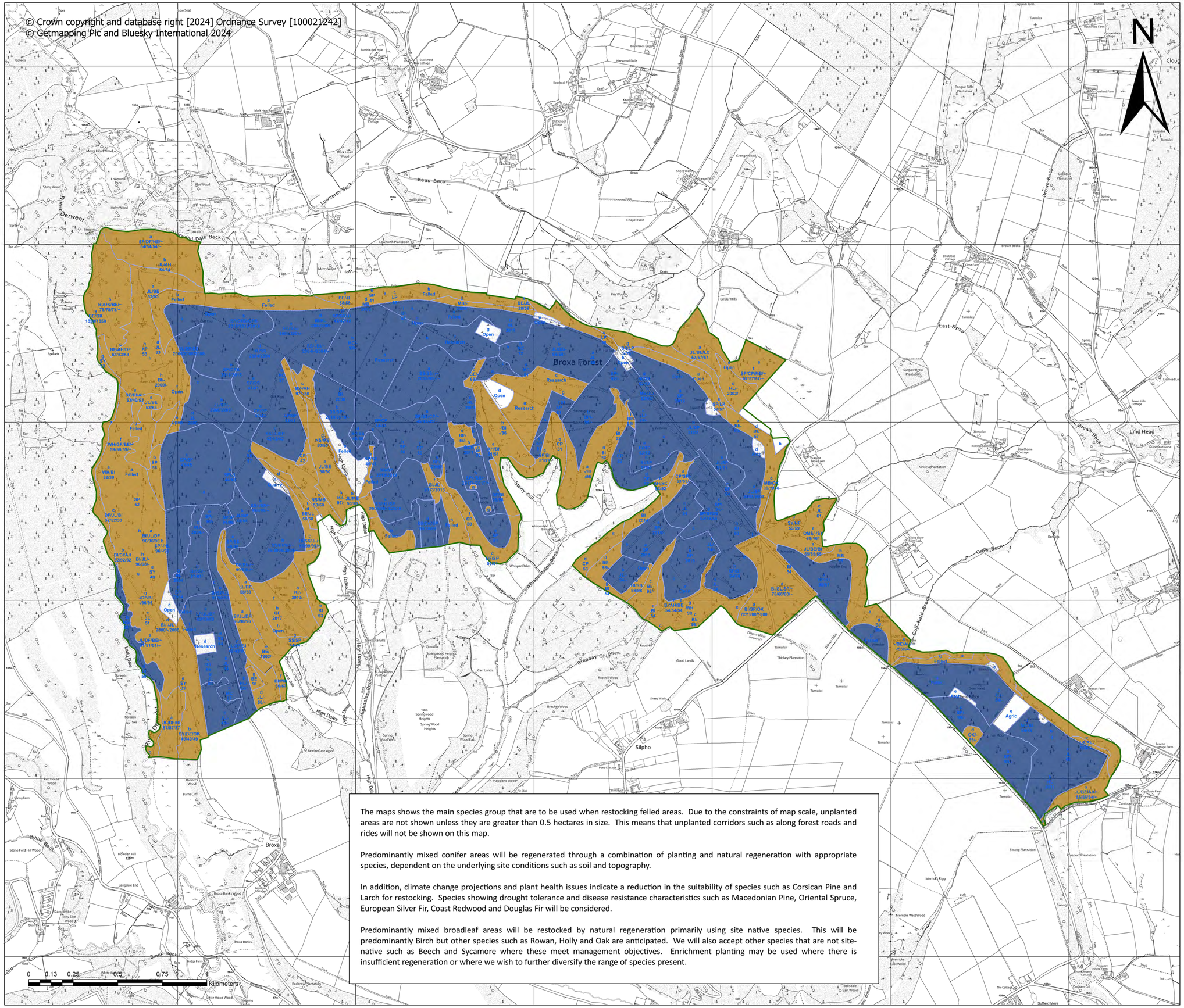


Forestry England

Broxa Forest Plan

FP Map 06 - Proposed Management Coupes
Scale: 1:10,000
when printed @ A1
Created: May 2024

- Block
- Clearfell
- Strip shelterwood
- Group shelterwood
- Irregular shelterwood (general)
- Minimum Intervention
- Natural Reserve
- Other\Open Land



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Broxa Forest Plan

FP Map 07 - Future Habitat & Restock
Scale: 1:10,000
when printed @ A1
Created: May 2024

Predominantly Mixed Broadleaf
Predominantly Mixed Conifer

The maps shows the main species group that are to be used when restocking felled areas. Due to the constraints of map scale, unplanted areas are not shown unless they are greater than 0.5 hectares in size. This means that unplanted corridors such as along forest roads and rides will not be shown on this map.

Predominantly mixed conifer areas will be regenerated through a combination of planting and natural regeneration with appropriate species, dependent on the underlying site conditions such as soil and topography.

In addition, climate change projections and plant health issues indicate a reduction in the suitability of species such as Corsican Pine and Larch for restocking. Species showing drought tolerance and disease resistance characteristics such as Macedonian Pine, Oriental Spruce, European Silver Fir, Coast Redwood and Douglas Fir will be considered.

Predominantly mixed broadleaf areas will be restocked by natural regeneration primarily using site native species. This will be predominantly Birch but other species such as Rowan, Holly and Oak are anticipated. We will also accept other species that are not site-native such as Beech and Sycamore where these meet management objectives. Enrichment planting may be used where there is insufficient regeneration or where we wish to further diversify the range of species present.

Forestry England

Title: FP Map 08 - Analysis and Concept

Date: 2 May 2024

Author: Yorkshire Planning and Environment

Scale @ A2: 1:15,000

Ancient Woodland

Sub-compartments

Sub-compartments

Blocks

Blocks

Scenario Restock Areas

Manage as predominantly mixed broadleaf

Manage as predominantly productive mixed conifer

Continue the process of visual improvement of this area within the landscape and along the prominent scarp slope.

Continue the development of broadleaf and mixed species areas.
Open areas will be accepted as these will contribute towards a diverse mosaic of habitats

Consider opportunities to imporve the visitor experience with views of the wider landscape.

Exisitng linkages, including scheduled monuments, woodland and public rights of way along the scarp slope offer views from and across the landscape.

Sustainable timber production remians a priority objective across much of Broxa forest.

A diverse range of site appropriate, productive tree species will be will be established.
Where suitable, the expansion and implimentation of Lower Intervention Silvicultural Systems (LISS) will continue to be utilsed, building upon previous and exisitng successes.

The restoration of ancient woodland remains a priority objective.

Where areas of conifer are felled, these will be restored through natural regeneration of suitable species and enrichment planting, if required.

0 0.25 0.5 1 1.5 2 2.5 km

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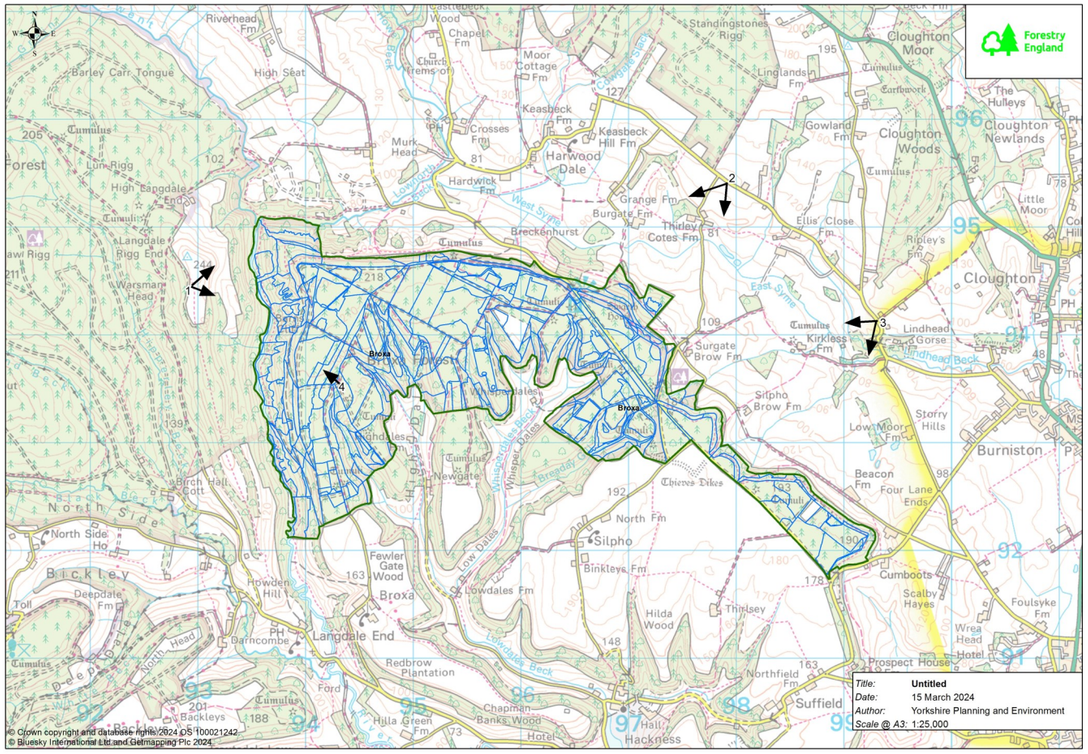
PEFC PEFC/16-40-1001 Promoting Sustainable Forest Management www.pefc.co.uk

Forest Design Plan **Broxa**



1. SE 9291 9442

This view from the adjoining Langdale forest, takes in the northern most portion of Broxa Barns Cliff, an area of primarily PAWS Ancient Woodland. Proposed felling will see further reduction of conifer elements and the regeneration of primarily native broadleaves.

2 & 3. SE 9792 9541 &SE 9929 9414

The distant forest within the local landscape context, with interventions over the previous plan period diversifying species and structure, reducing hard species boundaries and improving the landscape; this approach of softening edges and diversification will continue.

4. SE 9429 9356

This image shows how species and structural diversification is taking place as a result of planned and considered silvicultural interventions throughout Broxa Forest.