

Yorkshire Forest District

Dalby Forest Plan

FDP 07

2013

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CONTENTS

1. Background

2. Describing the Site

- 2.1 Geology and Soils
- 2.2 Tree Species
- 2.3 Wind Damage
- 2.4 Landscape
- 2.5 People and Community
- 2.6 Natural Heritage
- 2.7 Cultural Heritage

3. Describing the Project

- 3.1 Project Brief
- 3.2 Objectives
- 3.3 Constraints
- 3.4 Implementation
 - 3.4.1 Conservation
 - 3.4.2 Timber Harvesting
 - 3.4.3 Landscape
- 3.5 Plan
- 3.6 Areas
 - 3.6.1 Breakdown of felling areas within the period of the plan
 - 3.6.2 Breakdown of constituent areas
- 3.7 Methods/Forest Operations
 - 3.7.1 Planning
 - 3.7.2 Standards
 - 3.7.3 Harvesting
 - 3.7.4 Haulage
 - 3.7.5 Restocking

4. Monitoring

- 4.1 Clearfells
- 4.2 Restock
- 4.3 Continuous Cover
- 4.4 Design Plan

5. Determination of Impact Significance and Mitigation

- 5.1 Ancient and Native Woodland
- 5.2 Flora
- 5.3 Other Objectives

APPENDICES

- 1. Consultation Record**
- 2. Priority woodland bird species**
- 3. CCF Justification**
- 4. Restock species by soil type**

Dalby

3575.8 Hectares

Period of Plan: 2012 - 2021

1. Background

Dalby Forest is part of a network of Forestry Commission (FC) land in the east of the North York Moors National Park which is collectively known as the North Riding Forest Park.

The land at Dalby has a long history of human activity and intervention as described by John Rushton and Brian Walker in 'Dalby - Valley of Change'. Centuries of change saw the pre-historic primary woodland starting to be cleared by Neolithic and early Bronze Age ancestors, but more radical change occurred around the Iron Age with the introduction of farming. Cleared woodland was managed by agricultural methods through the spectrum of historic periods including industrial-scale rabbit warrening in the 17th and 18th Century.

The land was acquired by the FC in the early 1920's and shortly afterwards started establishing the forest on land that had previously been managed as rough pasture. With the exception of 19.6 ha of leasehold land at Ellers Wood and 7.8 ha at South Moor Farm, Dalby is a freehold property.

2. Describing the Site

2.1 Geology and Soils (FDP Map 01)

Middle calcareous grit (sandstone) is the predominant parent material across the higher moorland plateau and running along the spurs of the riggs. Sedimentary bedrock of the Hambleton Oolite Limestone and Yedmandale Limestone and Calcareous Sandstone series occur along the mid-slopes between the top of the riggs and the bottom of the dales. Oxford Clay Formation (mudstone) runs along the valley bottoms forming the spring line.

Soils at Dalby follow similar patterns to the geology, with a predominance of iron pan soils over the sandstone grits on the plateau, shallow calcareous soils along the tops of the riggs, where limestone-rich material can be found at the surface of a number of

locations. Brown earths and humic-iron podsols are found along the dales and valley slopes and surface-water gleys across the valley bottoms. Isolated areas of un-flushed peat bog can be found at Yondhead Rigg and Crosscliff.

2.2 Tree Species (FDP Map 02)

Sitka spruce is the dominant species accounting for 30% of the planted area, with larch and pine at 16% each. Mixed broadleaves comprised mainly of beech account for 11%, but also birch, ash, sycamore, alder and oak as lesser components.

Spruce, pine and larch tend to dominate the iron pan soils across the plateaux, whereas Douglas fir and broadleaf species occupy the brown earth and calcareous soils across the riggs, dales and valley sides.

Open space including agricultural land, felled and unplanted land currently accounts for 17% of the forest area.

2.3 Wind Damage

Windthrow hazard measurements indicate the whole of Dalby Forest is windfirm, although on exposed scarp tops as well as on badly gleyed soils tree stability is less certain.

In light of this, management options are relatively unrestricted across the majority of the property with regard to practising Continuous Cover Forestry and the potential to extend the rotation age of crops to cover a wide range of objectives.

2.4 Landscape (FDP Map 03 and 04)

Dalby is situated in the 'Dalby Forest' landscape character area¹ in the south-east of the North York Moors National Park, on gradually rising former upland moor. Elevation ranges from 60 metres in Thornton Dale valley bottom up to 248 metres on the forest plateau. There are four distinct landforms across the Dalby landscape;

- the forest plateau at an altitude of 220 metres to 248 metres,
- the riggs and dales running north-east to south-west,
- the stream valleys, notably Thornton Dale, Stain Dale, Trouts Dale and Deep Dale,
- the scarp slope that provides a natural break to Langdale Forest to the north.

¹ North York Moors National Park Landscape Character Assessment - 2003

At the start of the previous plan (2002), the forest was largely coniferous in nature, with 72% of the forest area being coniferous, 12% broadleaf cover and 16% open space. Although little has changed in terms of species composition over the last ten years with species composition and the area of open space remaining relatively static, earlier restocking between 1982 and 1996 has resulted in a peak of 20 to 40 year old crops accounting for 40% of the total planted area (see Map 03).

2.5 People and Community (FDP Map 07)

Dalby forest lies at the hub of recreational activity within the Yorkshire Forest District. Receiving more than 450 000 day visits per annum, it is a popular tourist location at all times of the year offering a range of opportunities including: walking, mountain biking, orienteering, horse riding/trekking, picnic/barbeque sites, children's play areas and a scenic forest drive. Facilities include:

Dalby Visitor Centre with shop, exhibition, restaurant with terrace, meeting room and toilets

Courtyard Complex

Bike Hire

Dalby Activity Centre

Go Ape Hire Wire Adventure Course and Segways

70 km of way marked mountain bike trails

1 technical mountain bike park

38.5 km of way marked walking trails

16 car parks

14 km forest drive

Picnic and BBQ areas

Opportunities to improve and expand recreation facilities are continually reviewed, with forthcoming attractions including Go Ape Tree Top Junior, an all-ability trail at Low Dalby and a Forest Maze near the Adderstone play area.

Except for leasehold areas, Dalby forest is dedicated as access woodland under CRoW legislation, thereby allowing unrestricted pedestrian access across the majority of the property.

Views of stakeholders and participants are sought through consultation opportunities (Appendix 1).

2.6 Natural Heritage (FDP Map 06)

Within Dalby there are four designated Sites of Special Scientific Interest;

Ellerburn Bank – notified for its calcareous grassland.
Ellers Wood & Sand Dale – notified for its alder woodland community
Seive Dale Fen – notified for its fen and mire communities
Troutsdale & Rosekirk Dale Fens – as for Sieve Dale

In addition, the following sites run contiguous with Dalby forest boundary:

Sand Dale Special Area of Conservation (SSSI/SAC) – notified for its grassland and mire communities
Nabgate – notified for its calcareous grassland
Bridestones – notified for its geology, upland heath, blanket mire, woodland and species rich bracken communities.

Although Dalby is a predominantly secondary plantation conifer forest, around 120 ha are classed as Ancient Woodland Sites of which 14 ha are ancient semi-natural woodland (ASNW) and the remainder are plantation ancient woodland sites (PAWS). Native woodland types range from W4 – Birch woodland with purple moor grass, W7- Alder/ash woodland with bottle sedge, W10/11 – Lowland/Upland mixed broadleaf woodland with bluebell and W16/17 – Upland Oak/birch woodland with bilberry.

Dalby forest is home to a wide range of international, national and regionally important species including Schedule 1 birds of prey, several species of declining woodland bird species including Nightjar (see Appendix 2), narrow-leaved marsh orchid, yellow birds-nest, Violet crown cup (fungi), small pearl bordered fritillary, Duke of Burgundy, barred green colonel soldier fly and at least five different species of bat.

The network of becks and watercourses running through the stream valleys are important for Otter and Kingfisher.

2.7 Cultural Heritage (FDP Map 07)

Dalby forest contains a rich and regionally important resource of historic features with 83 scheduled monuments, several of which are of significant importance at a landscape scale, and over 600 unscheduled monuments.

Historic features include Prehistoric linear boundaries and pit alignments, Iron and Bronze Age tumuli, medieval quarries and holloways, limestone kilns, rabbit types and 18th century boundary stone markers amongst others. Some of the more unusual features are those associated with the warrening industry previously mentioned in section 1.

3. Describing the Project

3.1 Project Brief

- increase the proportion of native broadleaf cover, particularly across areas of PAWS, areas of high conservation value, riparian zones and along steep-sided scarp slopes
- manage designated sites in accordance with statutory requirements as per agreed management plans
- consider the selection of alternative main tree species that will contribute toward a greater range of species diversity to maintain or increase timber productivity
- increase the diversity of the age structure by adjusting current felling patterns throughout the wood and enhance external and internal edges

3.2 Objectives

- Conserve veteran trees and continue the restoration of PAWS to native woodland and associated plant communities, to be measured by the sub-compartment database.
- Ensure scheduled and unscheduled ecological and historic features are maintained in target condition and improved where opportunities arise, to be measured by English Heritage, Natural England, Non Government Organisations and FC systems accordingly.
- In line with climate change projections, maintain a sustainable supply of timber from a more diverse range of site appropriate conifer and broadleaf species, to be measured by the Production Forecast and Sales Recording Package.
- Provide recreational opportunities and facilities within the forest in a way, and at a rate, that maintains their economic and social function, whilst achieving the plans' other objectives. To be measured by stakeholder consultation, surveys and internal Business Accounting systems.
- Maintain the woodlands contribution to the wooded character within the NYMNP Forest (Dalby Forest) character through the maintenance and development of structural and species diversity. To be measured by the sub-compartment database and fixed-point photography.

3.3 Constraints

- Difficult access and topography present operational challenges whilst harvesting scarp slopes, gills and valley sides

- 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

3.4 Implementation

3.4.1 Conservation

Protect and, where appropriate, enhance all known sites of archaeological and ecological importance:

Archaeological sites

All sites, regardless of their designation, will receive the same level of care during the planning and execution of forest operations. The operational planning system will ensure they are recognised and the proper measures for their protection are in place before work begins. This planning system also ensures that, where possible, opportunities to enhance the condition of archaeological and historic interest are taken during routine forest work. For Dalby this will include:

- Maintain designated sites (Scheduled Ancient Monuments) in favourable condition. Reference will be made to site-specific management plans where these identify particular management issues that need to be addressed.
- Where linear archaeological features exist in continuous cover compartments, forest operations should take special care in crossing these features to avoid damaging them. In some instances it may be appropriate to create fixed crossing points with adequate protection measures for the archaeological features.

Ecological sites

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. For Dalby this will include:

- Managing Veteran trees and PAWS as set out in – ‘Ancient Woodland on the Forestry Commission Estate in England (March 2002)’ and ‘FEE Operations Instructions No. 3 (rev.2012), Ancient Woodlands’.
- Restoring calcareous springs with spreads of tufa as set out in – ‘An Open Habitat Strategy for FC England Estate (draft October 2011)’.

- Increase the diversity of tree species and age structure that will maintain and improve favourable habitats for target species and identified habitats. This is particularly beneficial for the range of habitats and species recorded at Dalby from which a selection has already been mentioned at 2.6 - Natural Heritage.
- Increase and improve the deadwood resource as set out in – ‘Managing deadwood in forests and woodlands Practice Guide (2012)’. Areas of high ecological value across which deadwood resources could be encouraged include; riparian zones, PAWS, Natural Reserves and SSSI’s.

Minimum Intervention - Natural Reserves

Natural Reserves are sites that are predominantly woodland which have been set aside where biodiversity is the prime objective. As far as reasonably practicable this is a permanent designation and will be managed on a minimum intervention system.

Across Dalby, there are 6 distinct areas of Natural Reserve that account for 98 hectares.

Long Term Retentions

These are stable stands or clumps of trees that are important to retain for landscape or biodiversity reasons and will be retained beyond their economic rotation but still managed under an appropriate silvicultural system i.e. thinning may still be carried out.

Invasive species

Priority will be given to control and progressively remove invasive species (e.g. rhododendron, Himalayan balsam and Western hemlock) across Ancient Woodland Sites and other sites identified as being of High Conservation Value. The rate of control will be dependant on the resources available during the period of approval for the plan.

3.4.2 Timber Harvesting

We will continue to sustainably harvest timber both from clearfell and thinnings, and where appropriate develop broadleaf stands to increase their contribution to timber production. These operations will be planned and controlled to ensure due regard for all other objectives of management at Dalby.

3.4.3 Landscape

The woods at Dalby lie within the North York Moors National Park, a designated landscape.

‘Landform is typical of the Tabular Hills landscape; a gently graded plateau towards the north of the forest (at a maximum height of 240m) falls away towards the Vale of Pickering in the south. The plateau is deeply incised by river valleys with steep sides and occasional cliff lines and by shallow dry valleys mainly orientated in a north east to

south west direction. The forest extends down the edge of the north facing scarp with its irregular wavelike form, the top edge of which allows views across Langdale Forest to the north.

The northern and western edges of the character area are bounded by deeply incised watercourses including Dalby Beck, Grain Beck and Crosscliffe Beck. The eastern edge of the area is bounded by a steep sided valley of Troutdale, within the adjacent Hackness character area. The plateau itself is drained by minor becks that are steeply incised into the plateau edges and follow a winding dendritic pattern; surface drainage is largely absent on the plateau top.¹

On a scale of low/medium/high, landscape sensitivity is considered to range from medium to high depending upon site factors and visibility across the wider landscape.

Views are varied with internal views experienced from vehicles travelling along Dalby Forest Drive and by walkers, cyclists and horse riders using the numerous trails, public rights of way and forest rides.

Longer views, both internal and external can be experienced from established points that are maintained for this purpose i.e. Crosscliffe, Haygate and Jerry Noddle.

The forest plateau accounts for one third of the forest area (1212 ha) and is dominated by second rotation conifer crops (757 ha) comprised primarily of Sitka spruce (543 ha) but also larch, pine and smaller components of other conifers and broadleaf species. Future felling should retain site-appropriate species such as pines and diversify species and age structure by felling pure stands of poorly performing Sitka and phytophthora prone larch.

Although predominantly planted with second rotation crops, the dales landscape units have a broader range of species including pine, fir, spruce, larch and broadleaf species. The adoption of Continuous Cover Forestry (CCF) and smaller-scale felling responding to landform across these sites will contribute toward a more intimate landscape.

The stream valleys, riggs and Crosscliffe scarp slope landscape units have a more diverse range of species and age structure. Future felling and management through a combination of high forest-clearfell and CCF will look to increase this diversity and their contribution to the forest landscape.

¹ North York Moors National Park Landscape Character Assessment - 2003

3.5 Plan (FDP Map 09)

The design concept map shows the key factors we need to address. These are taken forward and used to form the basis of a practical plan in the fell and restock maps.

3.6 Areas (FDP Maps 10 and 11)

3.6.1 Breakdown of felling areas within the period of the plan.

A map showing the location of felling sites can be found in the A1 Forest Design Plan folder.

Felling	Area - hectares	% of total area	Projected volume (m ³)
2013 – 2016 Clearfell	103	2.9	51000
2017 – 2021 Clearfell	109	3.0	97500
2022 – 2023 Clearfell	46	1.3	44600
Continuous Cover	60	1.7	21000
Minimum Intervention	98	2.7	

(Projected volume includes felling and thinning across felling periods)

3.6.2 Breakdown of constituent areas.

A Future Habitat and Species map showing the location and detail of the constituent areas can be found in the Forest Design Plan folder.

Habitat type (based on principal species established)	Area – hectares	% age of total area
Conifer	2404	67
Broadleaf	821	23
Open space (i.e. heathland/ agriculture/recreation)	350	10

3.7 Methods / Forest Operations

3.7.1 Planning

Before any major forest operations are undertaken an “Operational Site Assessment” is completed. This document details the proposed work and outlines all known environmental, social and operational considerations. The “Operational Site Assessment” then becomes an important reference document during the planning phase, at the pre commencement meeting before scheduled works begin and for supervisory visits during the operation. The “Operational Site Assessment” is kept along with other documents relating to the operation in the main office.

For routine maintenance operations (e.g. fencing, ride mowing, survey work etc.) the Yorkshire District policy on timing of operations to minimise wildlife disturbance will be followed.

3.7.2 Standards

All operations within the forest will be carried out in accordance with the certification standard for the U.K. Woodland Assurance Scheme and according to guidance contained in the U.K Forestry Standard. Operations will also adhere to the guidance given in the Forestry Commission General Forestry Practice Guidelines (Forests and biodiversity, Forests and climate change, Forests and historic environments, Forests and landscape, Forests and people, Forests and soils, Forests and Water).

3.7.3 Harvesting

The majority of the timber is likely to be sold standing and contractors will be employed by the purchaser to carry out the work. Staff from both the timber buyer and the Forestry Commission will monitor work through regular site visits to ensure all guidelines and contract conditions are adhered to.

Clearfell V's Continuous Cover Forestry

All plans are required to consider lower impact silvicultural systems (LISS) in windfirm conifer plantations as opposed to traditional clearfell systems. This decision is based upon the methodology provided in FC Information Note 40 – ‘Transforming Even-aged Conifer Stands to Continuous Cover Management’. Where existing coupes are not identified for CCF management, we will manage on an extended rotation basis to be thinned and monitored for future consideration for conversion to CCF.

At Dalby, using the FC Forest Research Agency, Ecological Site Classification system (ESC), a range of conifer species are considered 'optimum' to 'unsuitable' for CCF where timber production is considered as an objective. We will only use species identified as 'unsuitable' where local conditions minimise site limiting factors i.e. fir species will be planted on free draining, brown earth locations to reduce the limiting factor of winter soil moisture regime (water logging); spruce on north facing, water receiving sites to reduce the limiting factor of summer soil moisture regime (drought).

Steep sided, irregularly thinned sites with poor access and difficult harvesting terrain will be clear felled with a view to retaining mature, windfirm broadleaf and conifer specimens where possible. Physical and economic constraints may require certain sites to be left and allowed to develop through to biological rotation, where no felling is carried out.

The area of forest plateau across Dalby Forest contributes toward a wider habitat network (Langdale Forest, North York Moors SSSI) that is favourable for breeding Nightjar, an iconic moorland species. Current data indicates the density of breeding pairs makes this one of the most significant concentrations across the north of England and the conversion from clearfell to CCF across large parts of the forest plateau is likely to have a negative impact on Nightjar numbers. As a consequence, clearfell systems will continue to be managed across this part of the forest, particularly where they are consistent with other objectives of the plan (development of structural and species diversity).

See Appendix 3 – CCF justification.

3.7.4 Haulage

As in our other woodland blocks 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, Fourth Edition (2012), which aims to improve the safety and environmental standards of the timber haulage industry.

3.7.5 Restocking

Conifer

The areas of clearfell in the design plan will be replanted to diversify species and age structure and to continue to provide a sustainable timber resource, whilst mindful of the projected impacts of climate change. The FC Forest Research Agency, Ecological Site Classification system (ESC) will aid species choice and selection. A range of timber

producing conifer species as set out in Appendix 4 'Species by soil type' will help inform restocking options.

Although identified as suitable by ESC, Corsican pine is no longer considered appropriate for restocking due to forest health issues and there are concerns regarding the long term sustainability of larch.

Sitka and Norway spruce is considered unsuitable by ESC at the 2080 high scenario, however it will continue to be grown across locally gleyed and brown earth soil types on water receiving sites with a north-west to north-east aspect. Across such sites it is felt that localised conditions that reduce the impact of moisture deficit values will allow the retention of these species across suitable locations.

Unless restocking conifer sites with a single species, reference to Mixed Conifer on the Future Habitat & Species Map will be used to describe those areas where a range of existing species will be planted.

As indicated at 3.7.1 Planning, the Operational Site Assessment will provide site-specific data on soils and other site factors that will help inform the correct choice of species on a site-by-site basis.

The continuous cover areas will be managed to encourage natural regeneration, although it is accepted that replanting will be required to maintain and further diversify the current range of species.

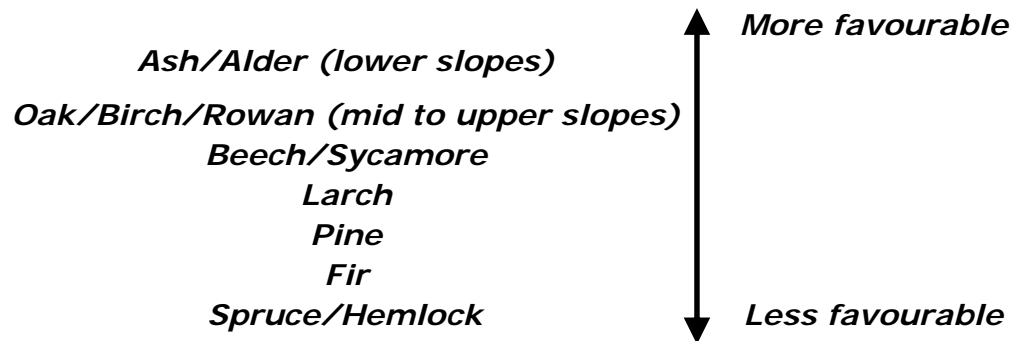
Natural regeneration across clearfell areas will be assessed in terms of species suitability and the risk it poses to the objectives of the plan are considered as to its retention or removal.

Broadleaf

The areas of PAWS at Dalby will be restored to the appropriate range of native woodland types where this is influenced by underlying soil nutrient and moisture regimes. Delayed thinning or no-thinning across some of these sites reduces the option for gradual restoration through CCF due to the increased risks of windthrow. Consequently, appropriate scale clear felling phased over a range of felling periods, and restocking by natural regeneration will secure the eventual conversion from conifer to native dominant, mixed broadleaf woodland. Other sites that are more stable will be considered to be managed as CCF.

On non-PAWS sites planned for conversion to broadleaf woodland, we will accept natural regeneration of both native and non-native species i.e. beech, sycamore.

Species regeneration on PAWS areas



Natural regeneration in PAWS woodland will be assessed and the risk it poses to the objectives of the plan considered. Where dense shade or invasive species (i.e. Western hemlock, rhododendron) threatens the native woodland community, it will be removed as soon as practicable. Where the risk is lower it will be allowed to reach a harvestable size and removed as part of a routine felling or thinning operation.

Heathland/Wooded heath

It is proposed to develop a mosaic of upland heath and native broadleaf/mixed woodland habitat through natural regeneration across conifer sites that lie adjacent to existing heathland habitats. Habitat networks will be maintained and established across parts of the forest that will enhance and maximise the movement of flora and fauna by increasing the permeability both within and outwith the forest area. The development of these sites will be beneficial for a range of species including Nightjar. We do not intend to manage these sites for future timber production.

4. Monitoring

4.1 Clearfells

All clearfell areas are managed spatially using the Sub Compartment Database to ensure the boundaries and designs are accurately reproduced on the ground. Significant variances in the areas to be felled may require a formal amendment of the plan plus the agreement of and approval by FC regional staff, as per CSM 6.

4.2 Restock

All restock areas where timber production is an objective will be planted/naturally regenerated and monitored to ensure that the number of established trees per hectare fully meets the requirements of OGB*4. This document has mandatory requirements on the monitoring of the crop in Year 5 to ensure the establishment of at least 2500 trees / ha.

4.3 Continuous Cover

Continuous cover areas will be monitored using the methods and procedures contained in OGB*7. Similar in scope to the methods employed for restock areas, where timber production is the aim we need to have at least 2000 saplings per hectare after 10 – 15 years, these should be evenly spread over 90% of the site.

4.4 Design Plan

All design plans are formally reviewed “mid term” and the plan’s aims and objectives and its success at achieving those aims and objectives will be formally reviewed in 2018. This time period can be shortened if circumstances change significantly or if parts of the plan prove detrimental to the overall aims and objectives.

*Operational Guidance Booklet

5. Determination of Impact Significance and Mitigation

5.1 Ancient and Native Woodland

Threats to our ancient and native woodlands can be immediate and absolute (e.g. loss to infrastructure or development) or slower and more subtle (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. (www.forestry.gov.uk/keepersoftime)

Major threats to ancient and native woodland are:

- *Climate change and fragmentation*
- *Excessive browsing and grazing by deer & livestock*
- *Inadequate or inappropriate management*
- *Invasive and problem species*
- *Diffuse pollution*
- *Loss*

Through this plan, we will continue to apply local and national policy and best practice guidance for the restoration of PAWS. It will help to target resources and identify where additional support is required.

5.2 Flora

Heathland is a UKBAP Priority Habitat

Within woods, concentrate on open space habitat expansion and management, developing heathland, neutral grassland and acid mires.

(G. Peterken – Native Woodland Development in the North York Moors and Howardian Hills)

This plan will continue the management and development of heathland where this will improve habitat networks within Dalby Forest. Maintaining a mixed resource of temporary and permanent open space will provide suitable habitat for Nightjar and other priority flora and fauna species within the forest area.

5.3 Other Objectives

Concentrate on developing habitat-rich riparian corridors with marshes, meadows, woodlands, trees in farmlands. These would pass through both woodland and farmland.
(G. Peterken – Native Woodland Development in the North York Moors and Howardian Hills)

We will continue to apply local and national policy and best practice guidance to the management of riparian corridors across Dalby Forest. This will improve and enhance the habitat network within the woodlands and benefit protected species. Continuing development of both species and structural diversity will benefit habitats for priority woodland bird species throughout the woodland.

Appendix 2 – Priority woodland bird species

Bird Species ¹	Forest location	Habitat enhancement
Nightjar	Forest plateau	Maintain sequential felling and restocking to ensure continuity of open areas; large coupes and open structure woodland/wooded heath.
Woodcock	Forest plateau	Restructure closed canopy woodland through thinning and sequential felling, create and maintain open structure woodland/wooded heath, ride enhancement and glade creation.
Lesser redpoll	Stream valleys – Thornton Dale, Staindale	Thinning of closed canopy stands to improve shrub layer structure, enhance rides and woodland edge, create and maintain successional woodland (birch)/scrub habitat and standing deadwood
Willow warbler	Stream valleys – Thornton Dale	
Wood warbler	Stream valleys – Thornton Dale	
Willow tit	Stream valleys – Thornton Dale	
Spotted flycatcher	Stream valleys – Thornton Dale	

¹ Source – Bird species; North Yorkshire Forest Bird Study Group and RSPB targeting maps.

Appendix 3 – CCF justification

Site Factor	Suitability Score	Comment
WHC: range 1 to 3	1	Tree stability is not a site-limiting factor
Soil fertility: Very Poor to medium	1	Isolated areas of medium fertility support a wider range of competing vegetation
Species suitability: LP SP,CP,DF,WH,WRC NS,SS	1 – Optimal 2 – Suitable 3 – Unsuitable	Corsican pine is not considered suitable due to RBNB.

With a combined score ranging from 3 to 5, initial analysis indicates significant areas of Dalby achieve a moderate to good suitability score for transformation to CCF. Further analysis of stand structure is considered to help inform whether transformation should be considered.

- Stand form – Form is average and of a reasonable quality.
- Thinning history – Variable. Thinning operations have been carried out over a relatively regular cycle across 1st rotation conifer crops, developing crowns that can act as potential seed bearing trees. Second rotation conifer stands have already started or are programmed to start thinning cycle. Mature beech stands have not been thinned for a number of cycles but should respond favourably to future thinning.
- Currently, there is evidence that SS, SP, LP, DF, WH, JL/HL, beech and ash are capable of developing as a natural regeneration resource across restock sites and existing CCF coupes.

On the basis of the above information, we will consider CCF across even-aged conifer stands using a range of conifer species (mainly LP, SP, DF, WH but also spruce where conditions allow) and beech and ash, aiming initially for a simple stand structure.

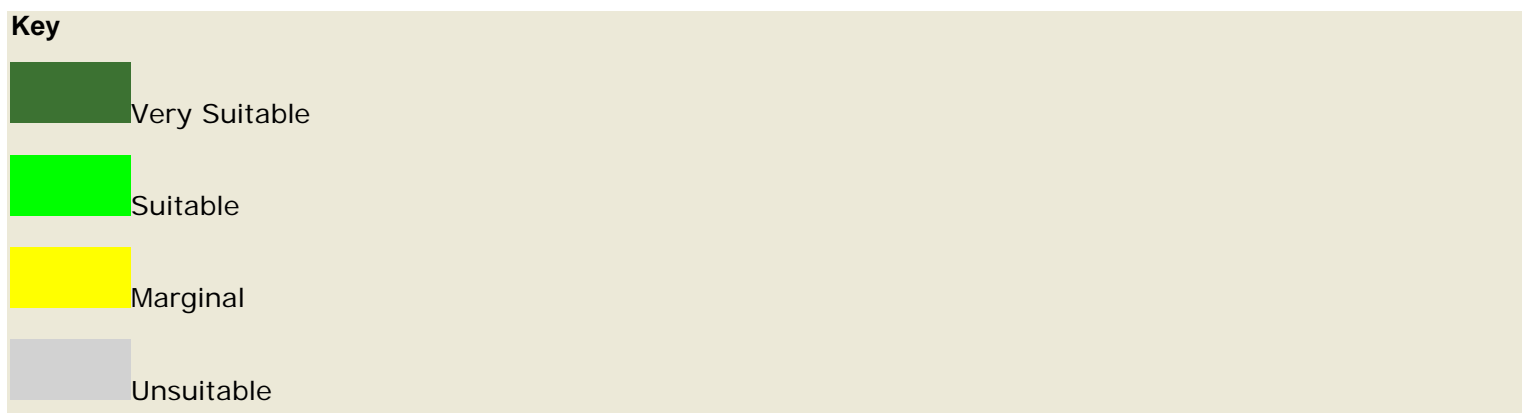
We will adopt a Group Shelterwood system through a combination of thinning, group felling (0.25 to 0.50 ha) and replanting with suitable species.

Some areas of high forest/clearfell coupes will be managed on an extended rotation basis and will be monitored for their development of natural regeneration. Where appropriate these will be considered for developing toward CCF management as set out above.

Alternative shade-bearing species considered for enrichment planting in CCF stands include:

























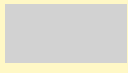













































European silver fir, Coast redwood, Western red cedar, Leyland and Lawsons cyprus.

The Forest Research Ecological Site Classification table below provides a snapshot of a typical site in Dalby which supports the range of target species considered for natural regeneration and those where enrichment planting will increase species diversity.



[Dalby, flainsey rigg SE870867] Future Climate Analysis - 5km Area Projection UKCIP02

Species	Baseline			2050 Lo			2050 Hi			2080 Lo			2080 Hi	
	Lim Factor	Suitability	Yield	Lim Factor	Suitability	Yield	Lim Factor	Suitability	Yield	Lim Factor	Suitability	Yield	Lim Factor	Suitability
Corsican pine	AT5	Very Suitable	20	SMR	Very Suitable	20	SMR	Very Suitable	20	SMR	Very Suitable	20	SMR	Very Suitable
Lodgepole pine	SNR	Very Suitable	12	SNR	Very Suitable	12	SNR	Very Suitable	12	SNR	Very Suitable	12	SNR	Very Suitable
Macedonian pine	SNR	Very Suitable	12	SNR	Very Suitable	12	SNR	Very Suitable	12	SNR	Very Suitable	12	SNR	Very Suitable
Maritime pine	SNR	Suitable	8	SNR	Suitable	10	SNR	Suitable	10	SNR	Suitable	10	SNR	Suitable
Monterey/Radiata pine	AT5	Suitable	12	AT5	Very Suitable	16	AT5	Very Suitable	18	AT5	Very Suitable	18	CT	Very Suitable
Scots pine	MD	Very Suitable	16	MD	Very Suitable	16	MD	Very Suitable	14	MD	Very Suitable	16	MD	Very Suitable
Weymouth pine	MD	Very Suitable	12	MD	Very Suitable	12	MD	Suitable	10	MD	Very Suitable	10	MD	Suitable
Norway spruce	MD	Marginal	10	MD	Marginal	10	MD	Marginal	8	MD	Marginal	8	MD	Unsuitable
Oriental spruce	DAMS	Very Suitable	20	DAMS	Very Suitable	20	DAMS	Very Suitable	20	DAMS	Very Suitable	20	DAMS	Very Suitable
Serbian spruce	DAMS	Very Suitable	20	DAMS	Very Suitable	20	DAMS	Very Suitable	20	DAMS	Very Suitable	20	AT5	Very Suitable
Sitka spruce	MD	Marginal	14	MD	Marginal	14	MD	Marginal	10	MD	Marginal	12	MD	Unsuitable
Douglas fir	DAMS	Very Suitable	22	DAMS	Very Suitable	22	DAMS	Very Suitable	22	DAMS	Very Suitable	22	MD	Suitable
Hybrid larch	MD	Suitable	14	MD	Very Suitable	14	MD	Marginal	6	MD	Suitable	8	MD	Unsuitable

Japanese larch	MD		8	MD		10	MD		6	MD		6	MD	
European larch	MD		12	MD		12	MD		8	MD		10	MD	
Western red cedar	CT		18	CT		18	CT		18	CT		18	MD	
Japanese red cedar	MD		12	MD		14	MD		6	MD		10	MD	
European silver fir	MD		14	MD		16	MD		10	MD		12	MD	
Grand fir	MD		24	MD		24	MD		18	MD		20	MD	
Noble Fir	MD		2	MD		2	MD		0	MD		0	MD	
Nordmann fir	AT5		22	AT5		22	MD		20	MD		20	MD	
Pacific fir	CT		18	CT		18	CT		18	CT		18	MD	
Leyland cypress	MD		20	MD		20	MD		18	MD		18	MD	
Western hemlock	CT		20	CT		20	CT		20	CT		20	MD	
Giant redwood	DAMS		28	DAMS		28	DAMS		28	DAMS		28	MD	
Coast redwood	CT		24	CT		26	MD		26	CT		26	MD	
Lawson's cypress	MD		20	MD		20	MD		16	MD		18	MD	

Appendix 4 - Restock species by soil type

Site type		Species													
Upland sites	Lowland sites	SP	LP	Mac P	DF	ESF	GF	WH	WRC	Ley/Law C	Coast R	Giant R	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
BE/intergrade		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
	BE/intergrade	Y		y	Y	y	y		y	y	y	y	y	Y	y

BOLD CAPITAL/INFILL	Cat A Major species - currently widely used with no supply problems and should continue to play an important role
Bold lower case italics	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	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

[source data](http://www.forestry.gov.uk/fr/treespecies) http://www.forestry.gov.uk/fr/treespecies

[source data](http://www.forestry.gov.uk/forestry/inf-d-8mad67) http://www.forestry.gov.uk/forestry/inf-d-8mad67

Refer to cell comments for specific species notes

No planting where >1m peat depth

Pacific coast associated forest cover - consider in mixtures as part of underplanting for CCF					
DF	GF	WH	Law C	Coast R	ESF







DALBY
 Forest Plan 7
 Yorkshire Forest District



View 1 from Bridestones public footpath to Crosscliff—The young, even-aged second-rotation conifer crop dominates the view when looking across from the heathland SSSI/National Trust property. Future felling and restocking should aim to create a more diverse forest edge with the natural regeneration of heathland and broadleaf and conifer trees.



View 2 from Wilton Heights across to Ellerburn and up Thornton Dale— The abrupt boundary edge between conifer forest and agricultural fields creates a stark contrast that doesn't respond to the landform. Clearfelling and allowing natural regeneration of broadleaf species will be more in-keeping with the landscape and the adjacent ancient semi-natural woodland.

View 3 from Wilton Heights up Sand Dale - The second rotation conifer crops offer a narrow range of visual diversity along the dale sides where similar aged stands of primarily spruce are established. Appropriately sized clearfell coupes will break up the even-aged structure and a wider variety of conifer species will be established on the dale sides with broadleaf species along the bottom .



View 4 from Cockmoor Hall road to Hern Head—The conifer plantations respond to the landform where they follow the contour and wrap around the upper scarp slope and onto the plateau. There is a pleasing symmetry with the mature broadleaf trees in the dale bottom and the geometric-shaped agricultural fields along the mid-slope. This is a relatively stable landscape with the woods at Hern Head designated as Natural Reserves where crops will develop through to their biological rotation.



View 5 from A169 to Lockton Lane end across to Stoneclose Rigg—View primarily enjoyed when travelling between Pickering and Whitby. The wood in the foreground is private woodland but beyond is the patchwork pattern of predominantly 1st and 2nd rotation conifer crops typical of Dalby Forest. A combination of clear fell coupes and Continuous Cover systems will improve the level of species and structural diversity.





View 6 from Haygate car park across toward Sutherbruff Rigg, Flax Dale and Flainsey Rigg—A popular view at the start of the Forest Drive before dropping down into Dalby Village. Previous felling and restocking has broken up the even-aged first rotation of conifers planted in the 1920's. As the mature conifer trees in the foreground are gradually cleared, wider views of the rigg ends and dales will be revealed. →



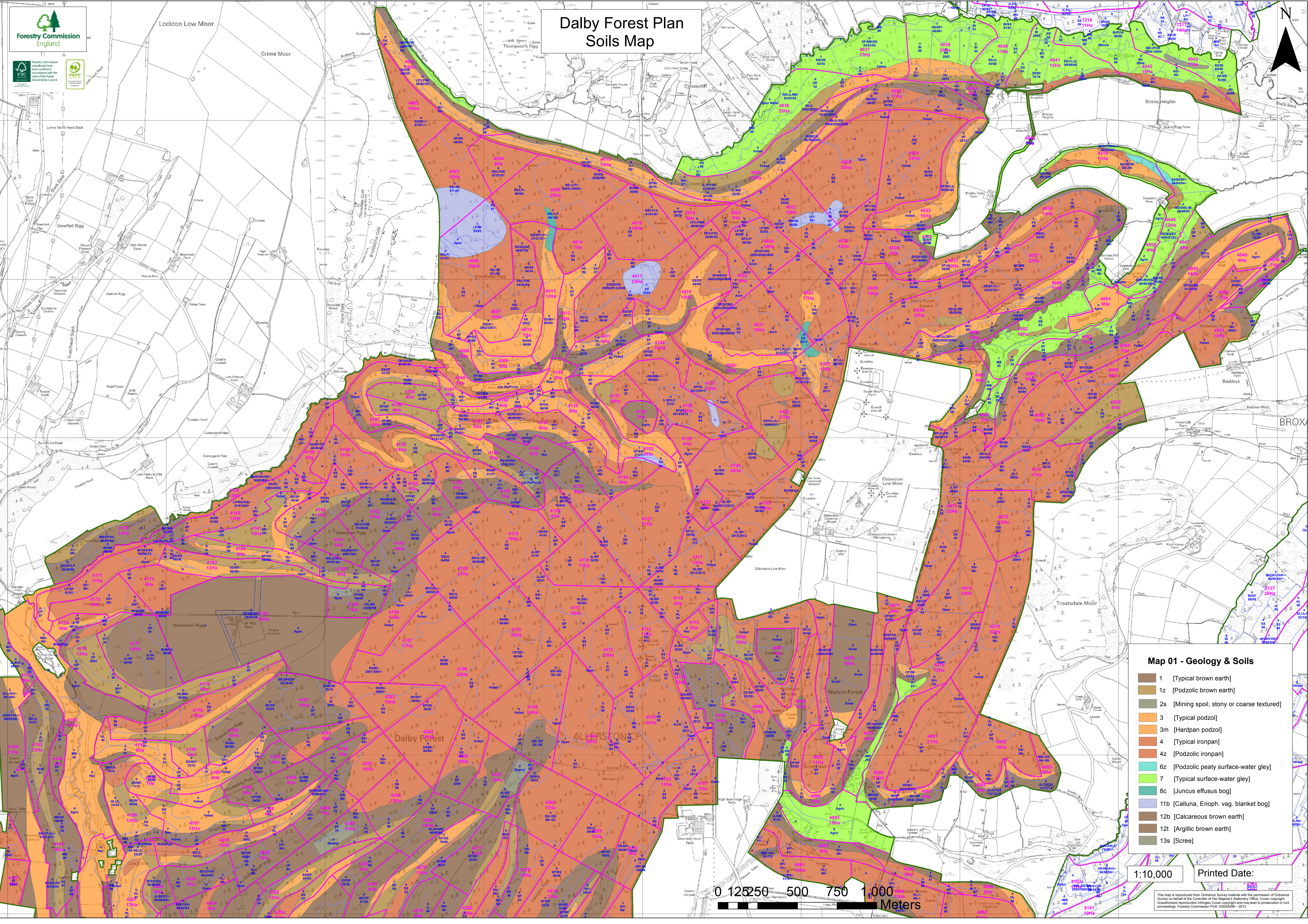
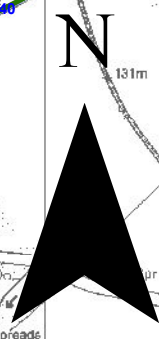
View 7 from Seivedale fields down Thornton Dale towards Dalby Visitor Centre. The wide range of species and structural diversity fits well within the close and intimate landscape where the Forest Drive and recreation facilities are integrated across the forest ←

View 8 from Visitor Centre café toward Snever Dale and Seive Dale - Dalby Visitor Centre acts as the hub for recreation activity, with formal and informal play areas drawing significant visitor numbers to this part of the forest. Careful planning of felling and thinning activity will look to maintain areas of large trees and mature stands while developing the next generation of trees through Continuous Cover systems. →





Dalby Forest Plan Soils Map

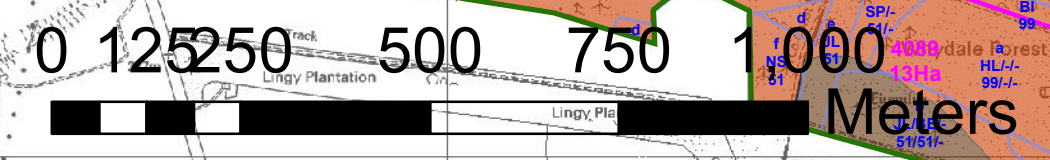


Map 01 - Geology & Soils

1	[Typical brown earth]
1z	[Podzolic brown earth]
2s	[Mining spoil, stony or coarse textured]
3	[Typical podzol]
3m	[Hardpan podzol]
4	[Typical ironpan]
4z	[Podzolic ironpan]
6z	[Podzolic peaty surface-water gley]
7	[Typical surface-water gley]
8c	[Juncus effusus bog]
11b	[Calluna, Erioph. vag. blanket bog]
12b	[Calcareous brown earth]
12t	[Argillic brown earth]
13s	[Scree]

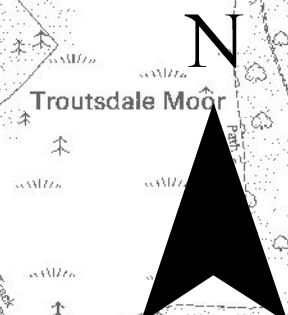
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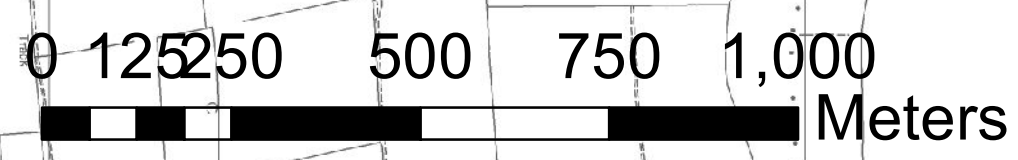
Dalby Forest Plan Soils Map



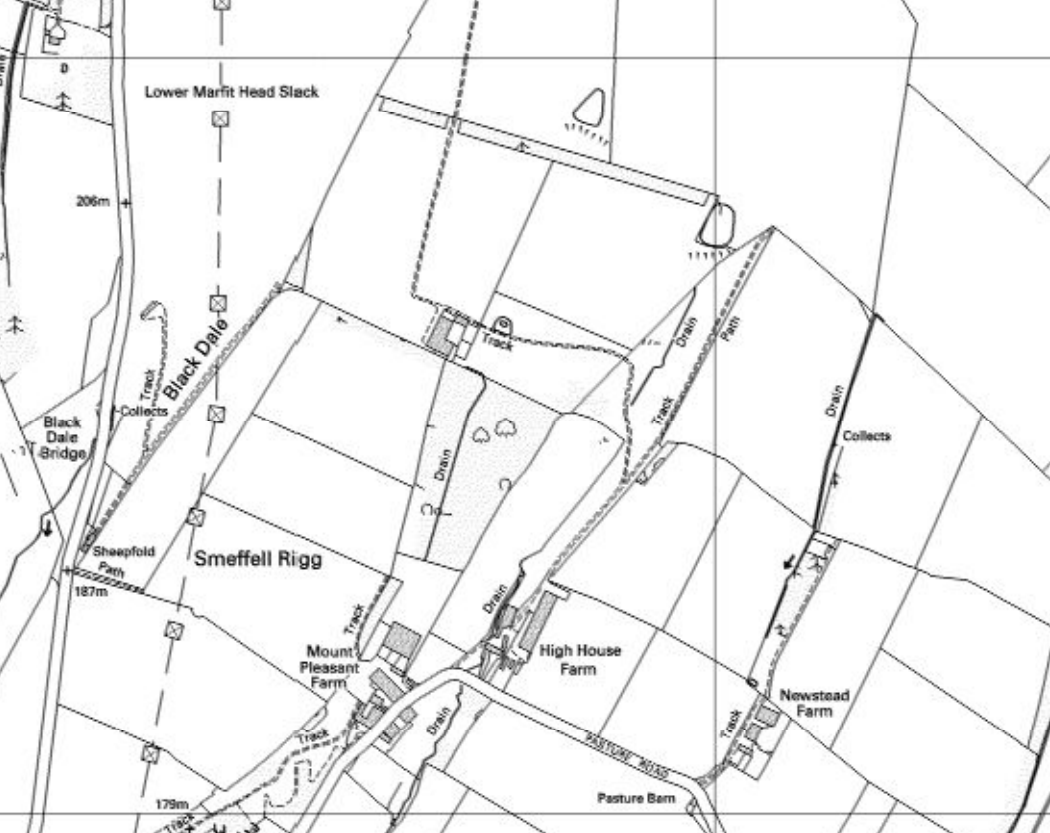
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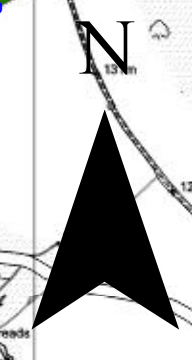
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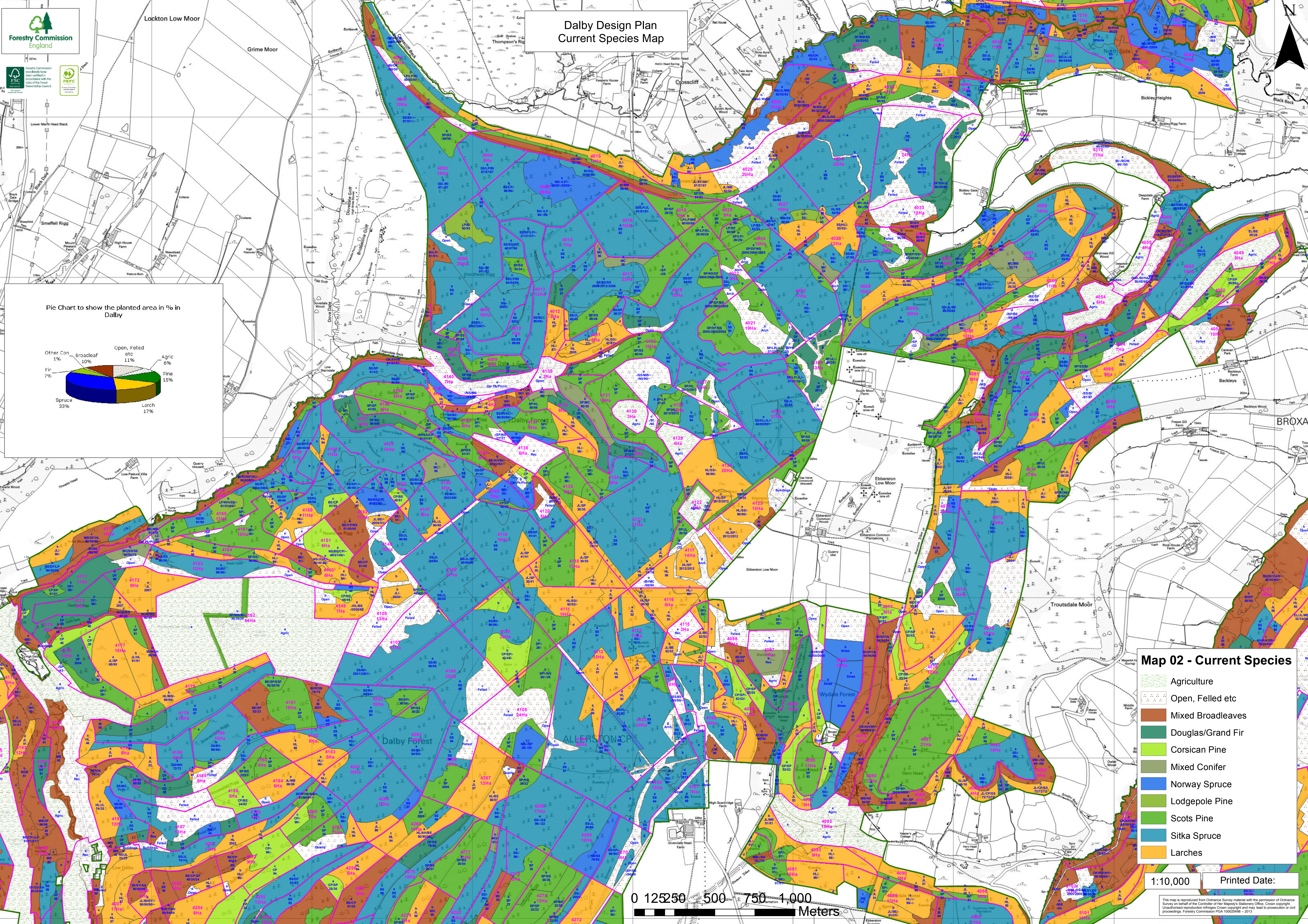
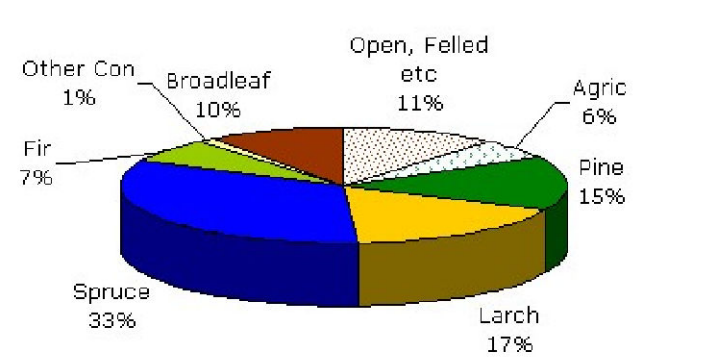
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Dalby Design Plan Current Species Map



Pie Chart to show the planted area in % in Dalby

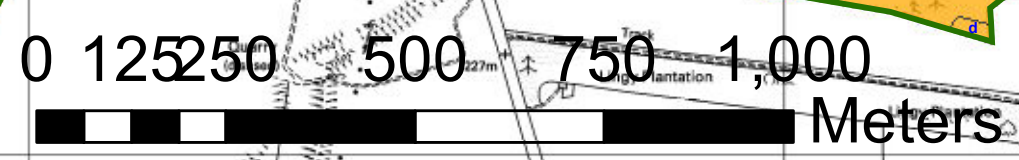


Map 02 - Current Species

- Agriculture
- Open, Felled etc
- Mixed Broadleaves
- Douglas/Grand Fir
- Corsican Pine
- Mixed Conifer
- Norway Spruce
- Lodgepole Pine
- Scots Pine
- Sitka Spruce
- Larches

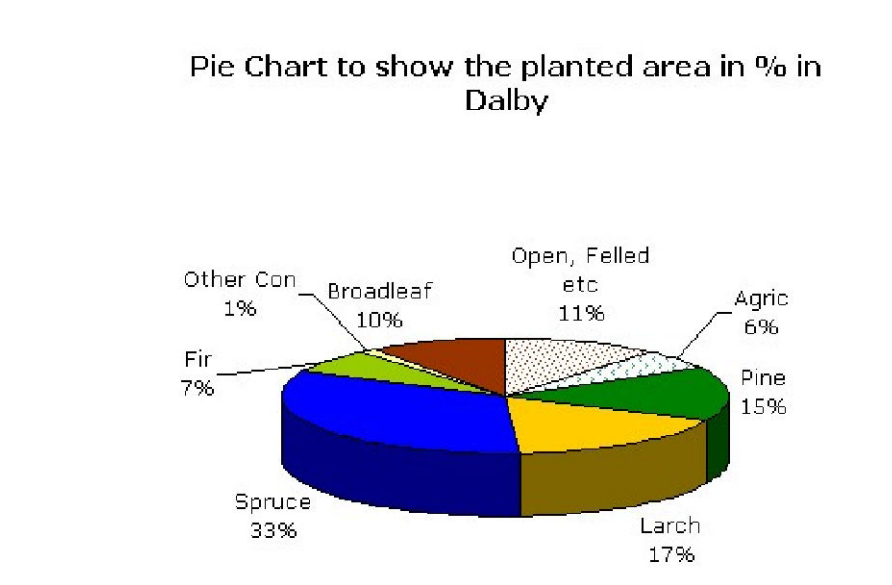
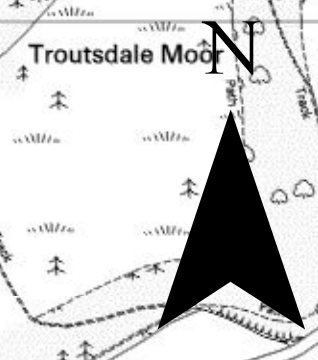
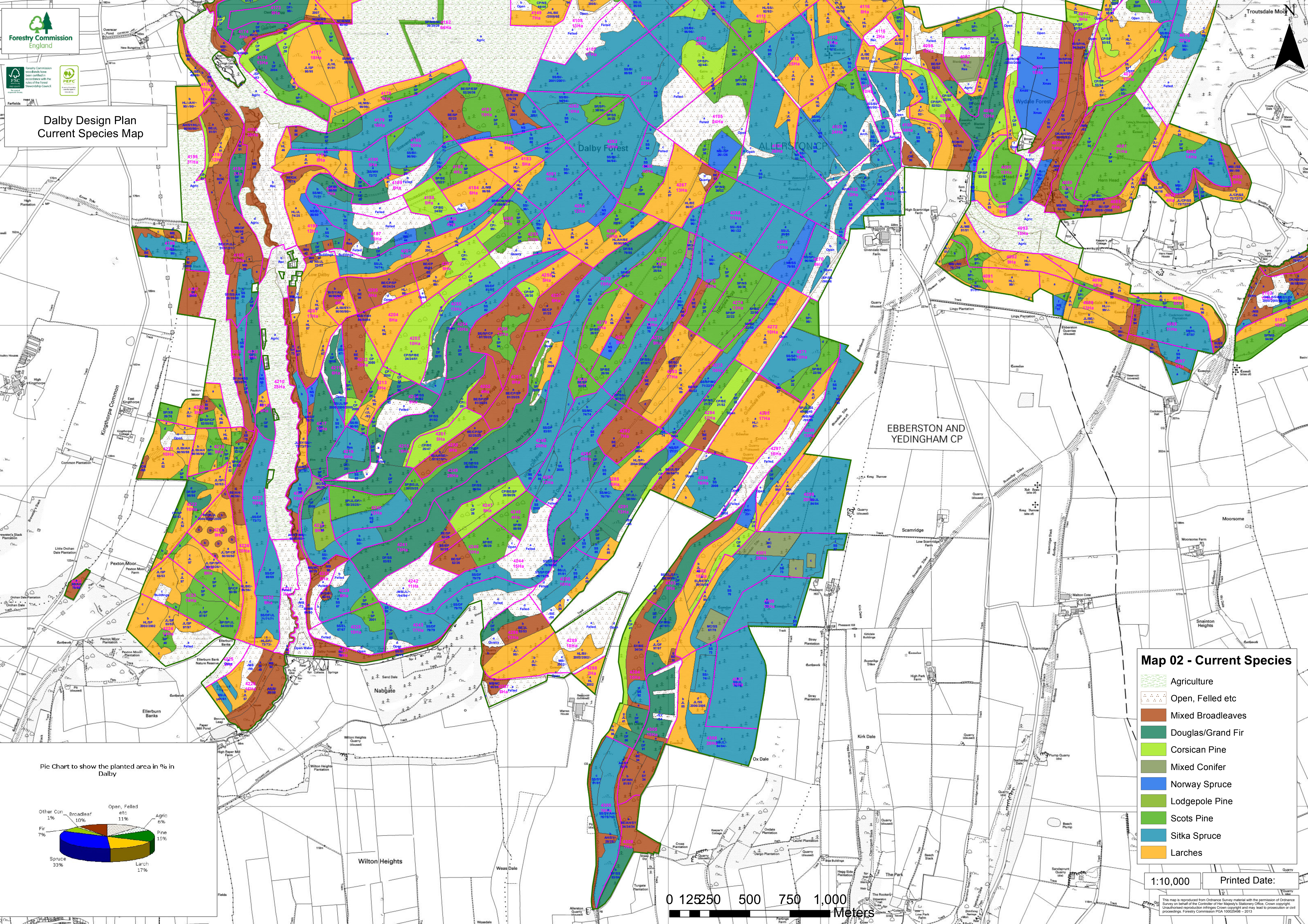
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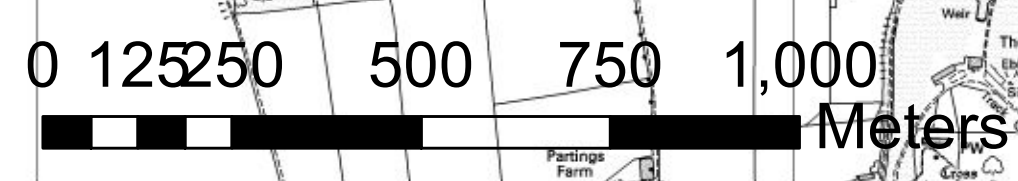
**Dalby Design Plan
Current Species Map**



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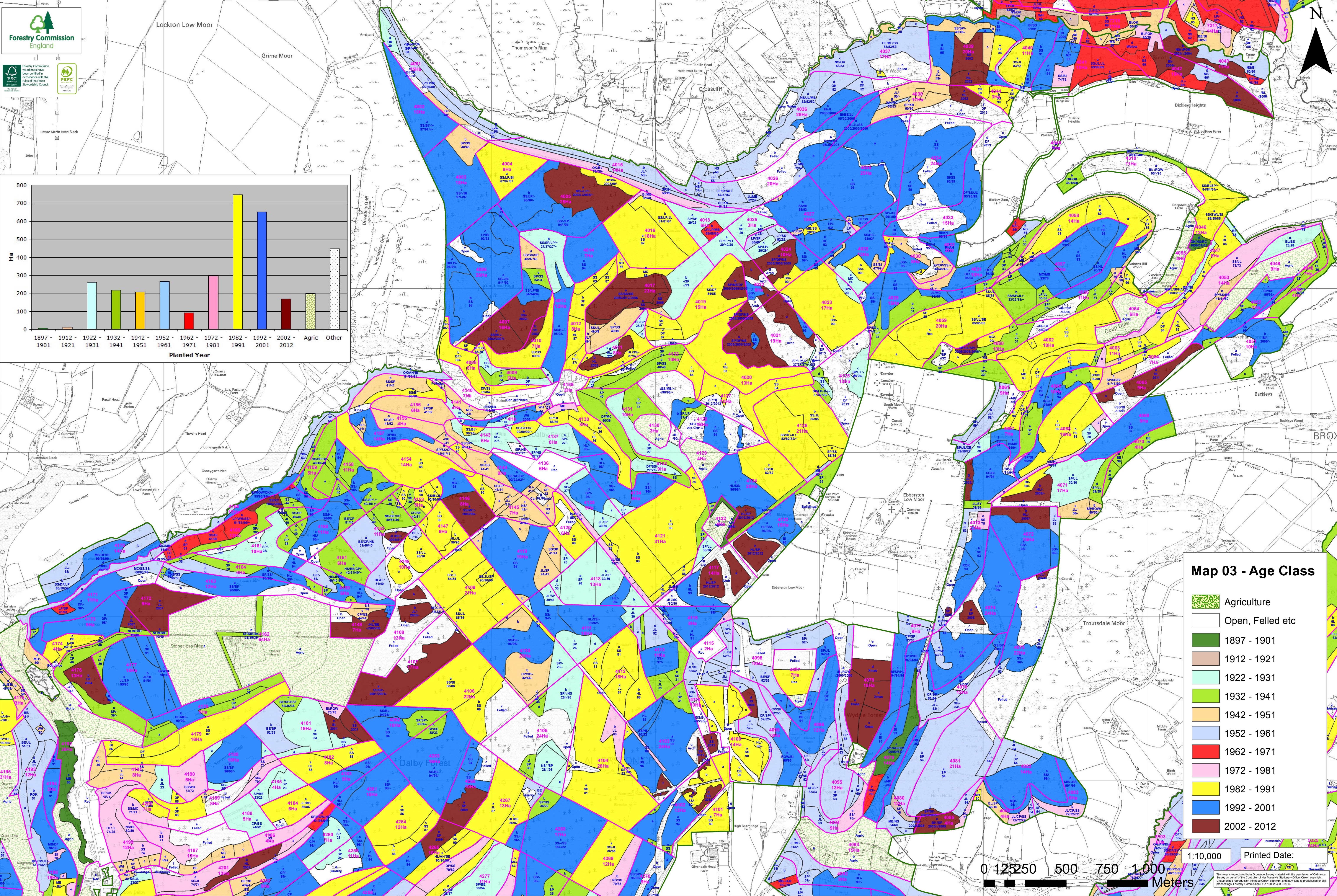
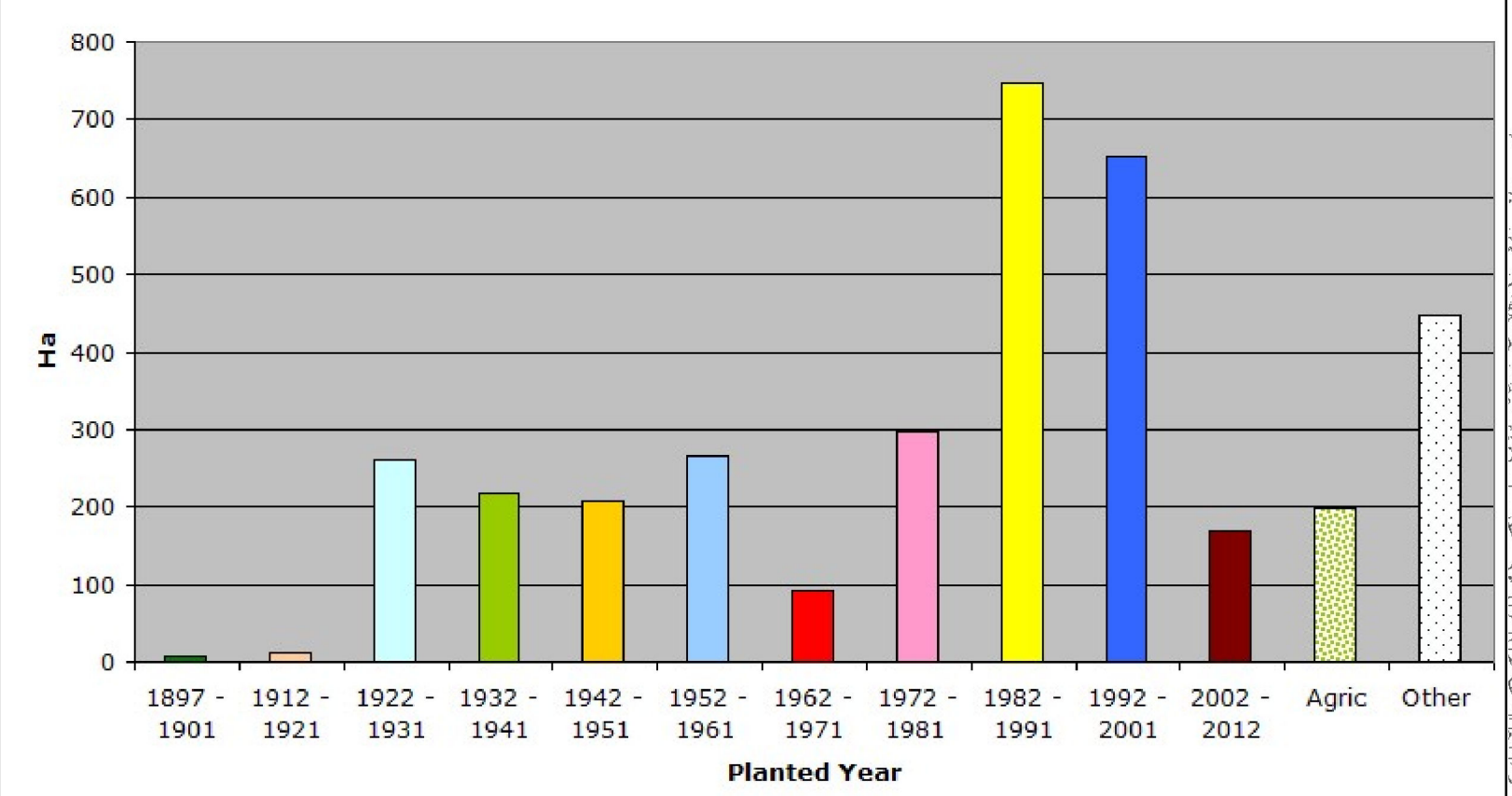
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Lockton Low Moor
Grime Moor



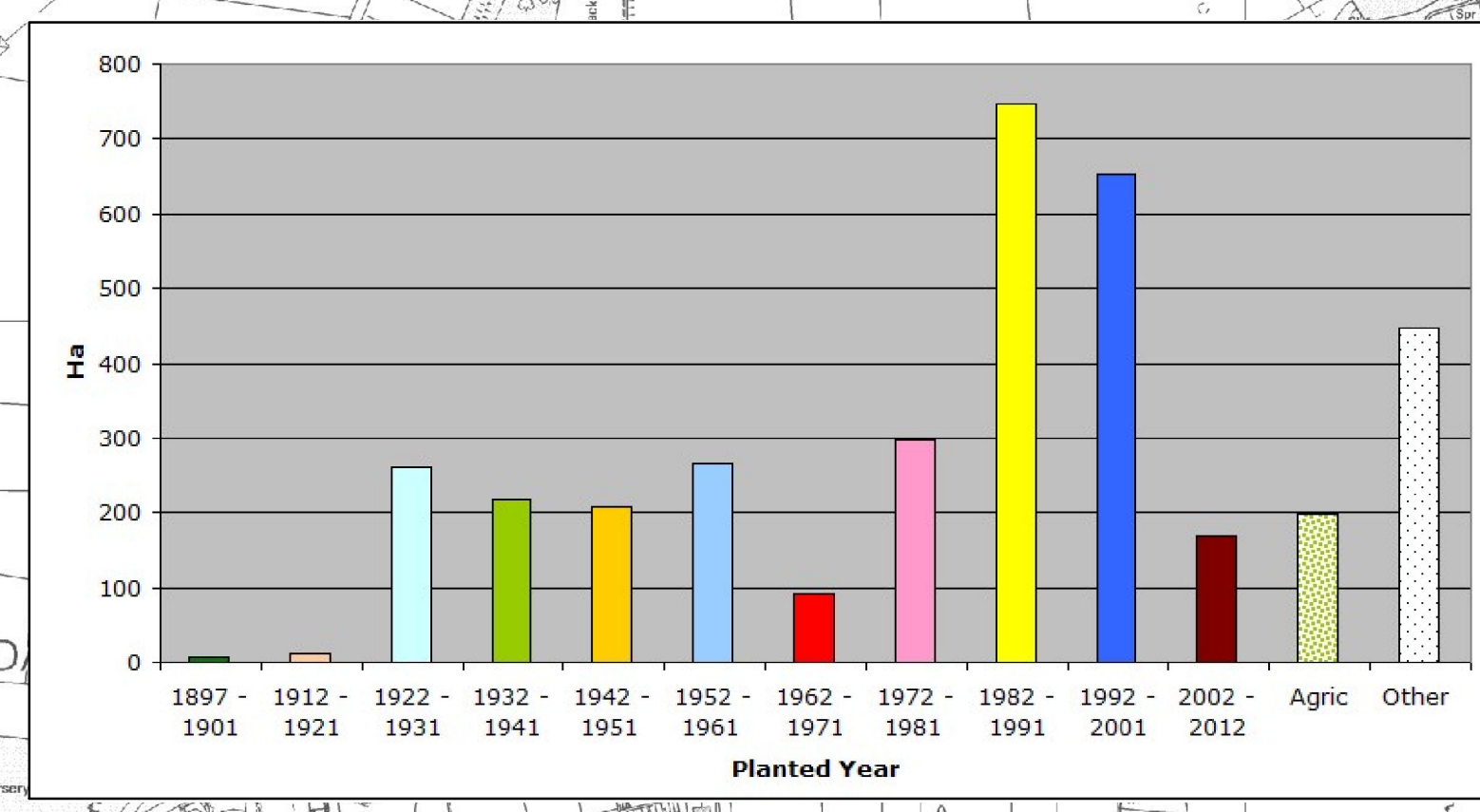
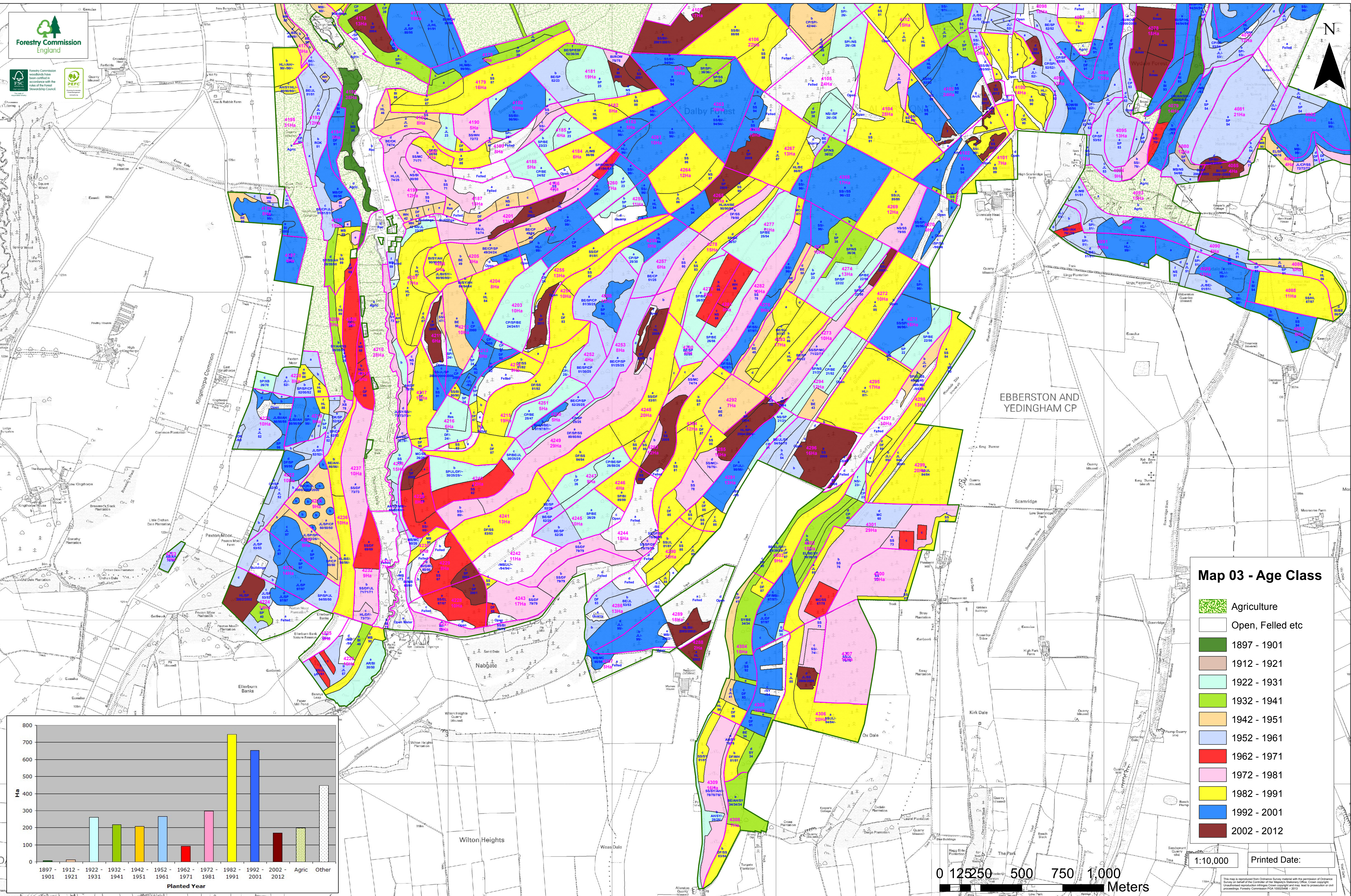
Map 03 - Age Class

- Agriculture
- Open, Felled etc
- 1897 - 1901
- 1912 - 1921
- 1922 - 1931
- 1932 - 1941
- 1942 - 1951
- 1952 - 1961
- 1962 - 1971
- 1972 - 1981
- 1982 - 1991
- 1992 - 2001
- 2002 - 2012

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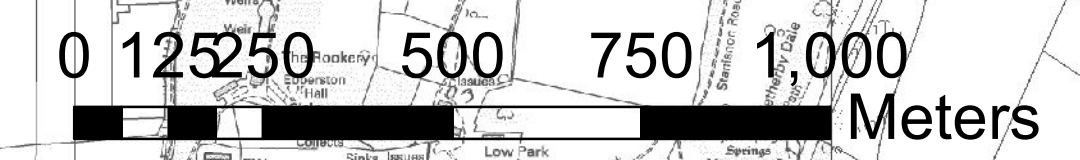
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Map 03 - Age Class

- Agriculture
- Open, Felled etc
- 1897 - 1901
- 1912 - 1921
- 1922 - 1931
- 1932 - 1941
- 1942 - 1951
- 1952 - 1961
- 1962 - 1971
- 1972 - 1981
- 1982 - 1991
- 1992 - 2001
- 2002 - 2012

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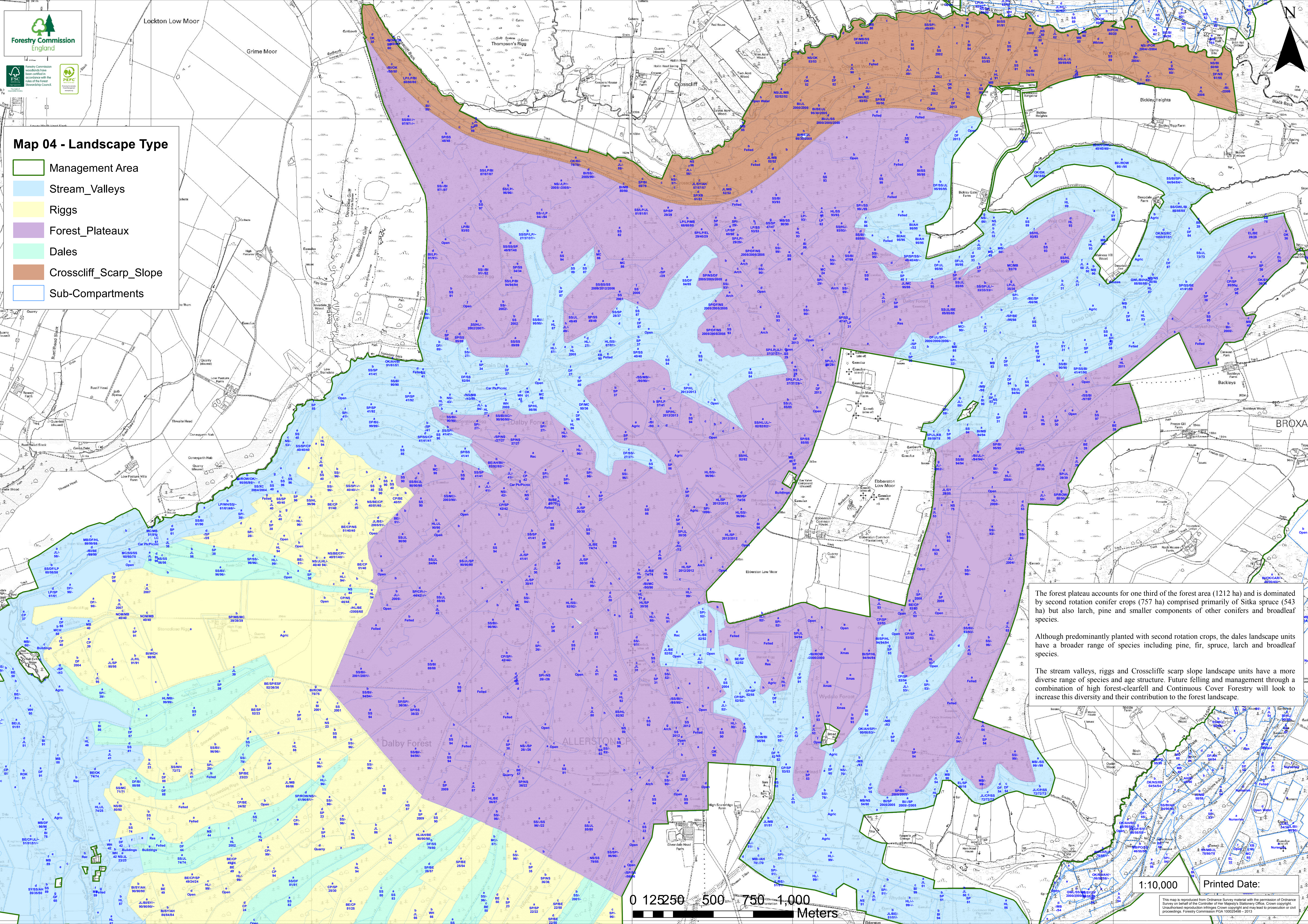
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Lockton Low Moor
Grime Moor

Map 04 - Landscape Type

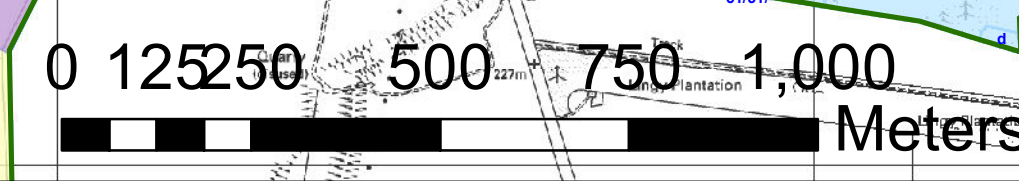
- Management Area
- Stream_Valleys
- Riggs
- Forest_Plateaux
- Dales
- Crosscliff_Scarp_Slope
- Sub-Compartments



The forest plateau accounts for one third of the forest area (1212 ha) and is dominated by second rotation conifer crops (757 ha) comprised primarily of Sitka spruce (543 ha) but also larch, pine and smaller components of other conifers and broadleaf species.

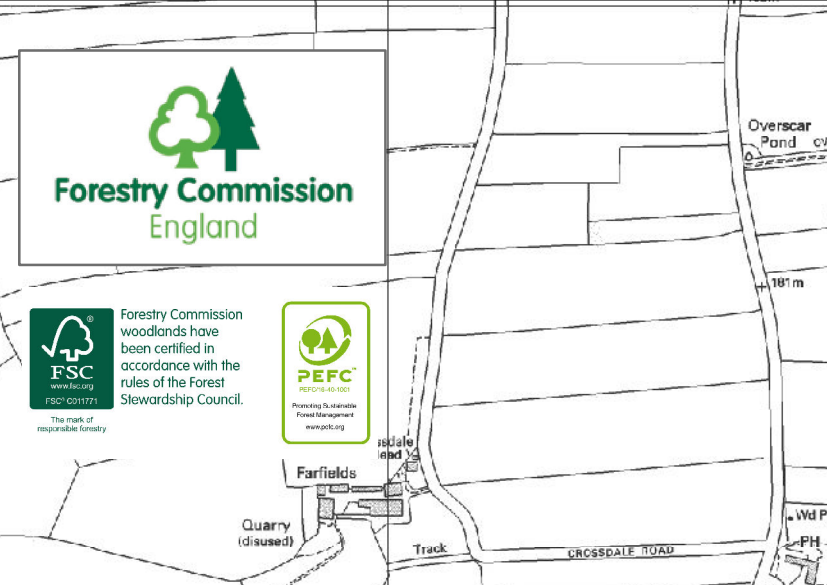
Although predominantly planted with second rotation crops, the dales landscape units have a broader range of species including pine, fir, spruce, larch and broadleaf species.

The stream valleys, riggs and Crosscliffe scarp slope landscape units have a more diverse range of species and age structure. Future felling and management through a combination of high forest-clearfell and Continuous Cover Forestry will look to increase this diversity and their contribution to the forest landscape.



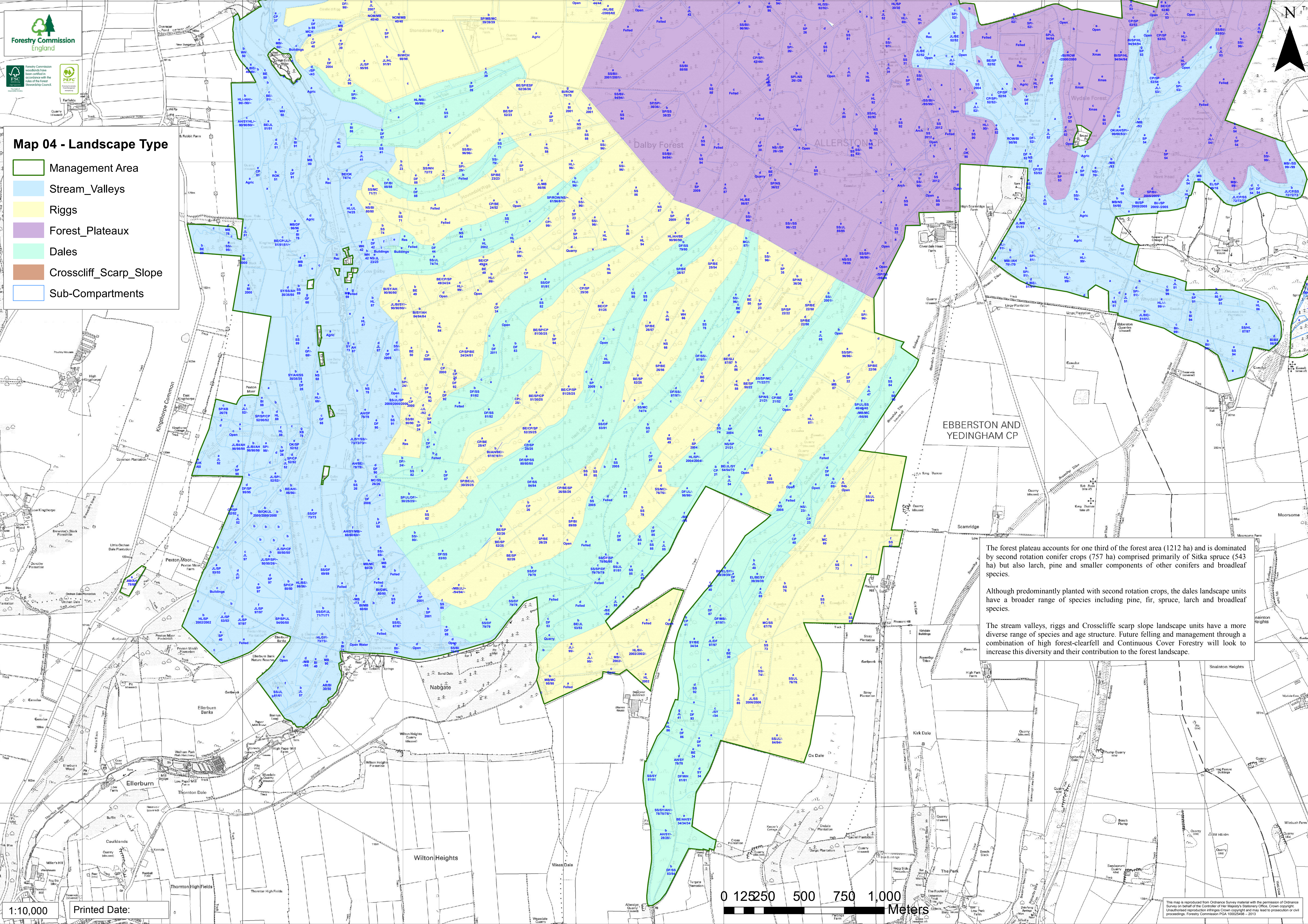
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Map 04 - Landscape Type

- Management Area
- Stream_Valleys
- Riggs
- Forest_Plateaux
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- Crosscliff_Scarp_Slope
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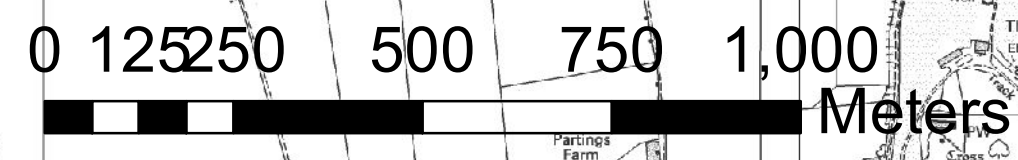


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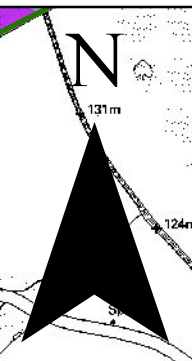
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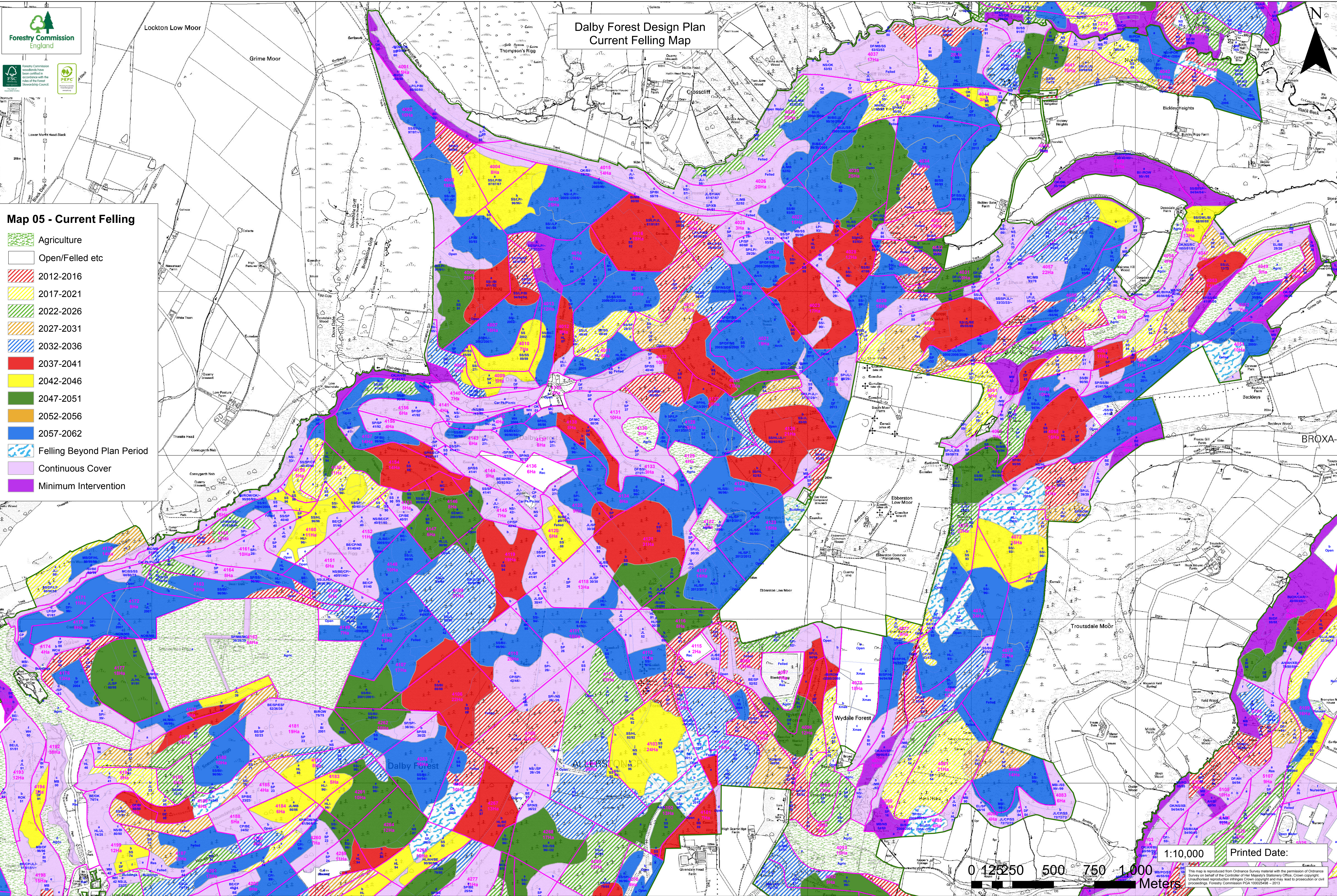


Dalby Forest Design Plan Current Felling Map

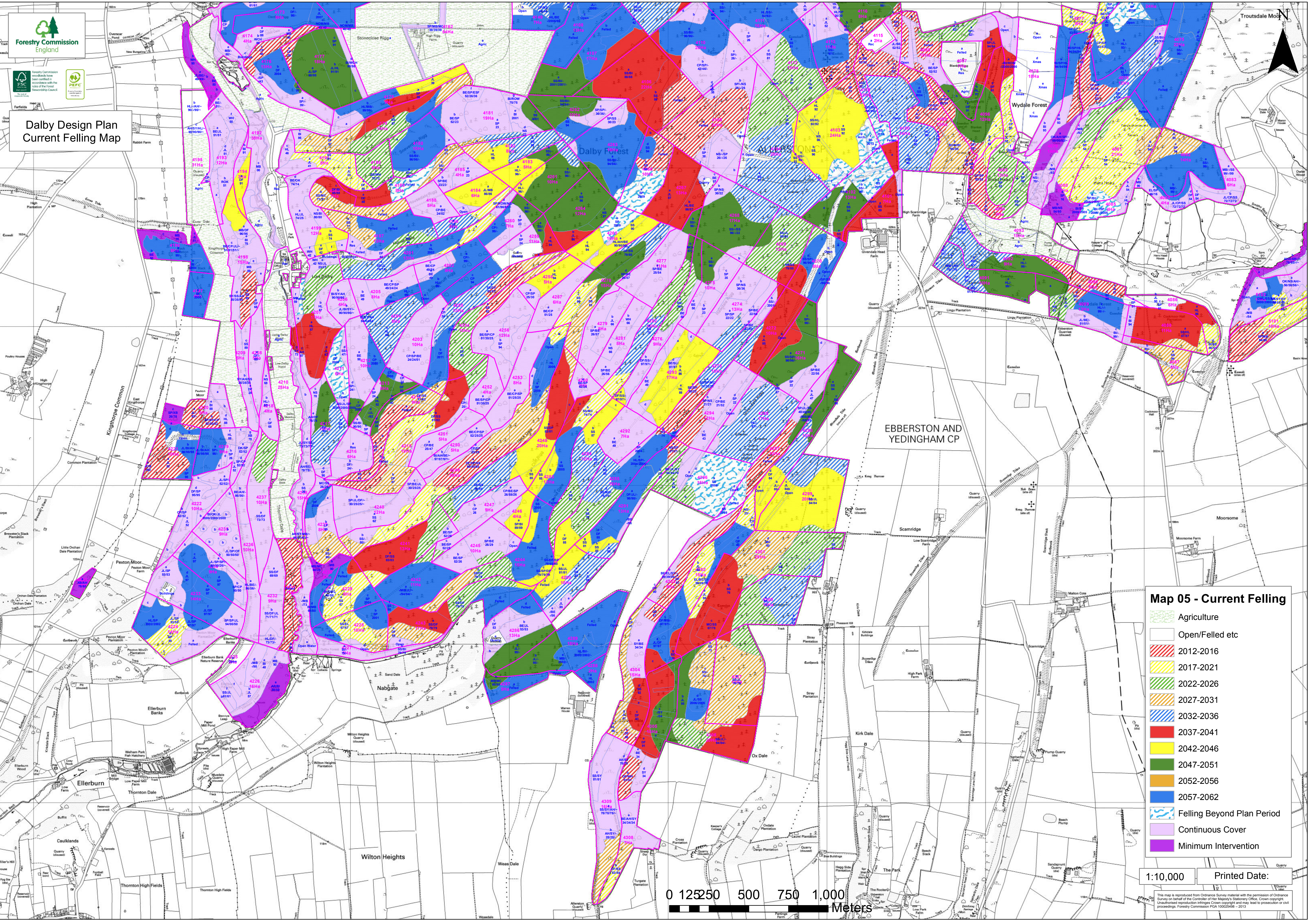


Map 05 - Current Felling

- Agriculture
- Open/Felled etc
- 2012-2016
- 2017-2021
- 2022-2026
- 2027-2031
- 2032-2036
- 2037-2041
- 2042-2046
- 2047-2051
- 2052-2056
- 2057-2062
- Felling Beyond Plan Period
- Continuous Cover
- Minimum Intervention



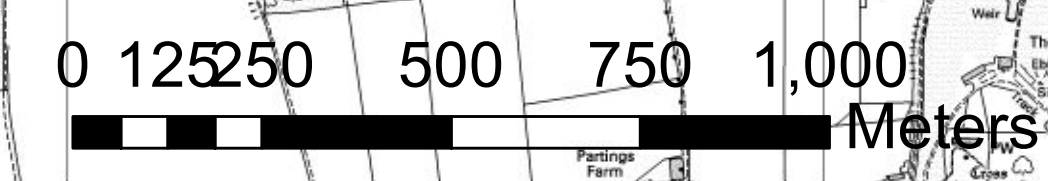
**Dalby Design Plan
Current Felling Map**



Map 05 - Current Felling

- Agriculture
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- 2012-2016
- 2017-2021
- 2022-2026
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Dalby Forest Plan Yorkshire Forest District Natural Heritage

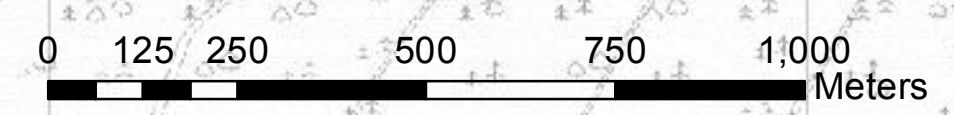
Map 06 - Management Information Natural Heritage

- Ancient Semi-Natural Woodland
- Planted Ancient Woodland Site
- Primary River
- Secondary River
- Tertiary River (MasterMap single line)
- Lake / Reservoir
- Conservation Site Point
- Conservation Site Line
- Conservation Site Polygon
- SAC (Sites of Importance for Nature Conservation)
- SSSI (Sites of Special Scientific Interest)
- Management Area

To improve ease of use, management information for Dalby has been broken down into three sections: Natural Heritage/People, Community & Cultural Heritage/Wayleaves & Services. The three parts taken together show the main issues that have to be considered before taking management decisions in this forest. They summarise information obtained from a variety of statutory sources and individuals, and may provide a first point of reference for forest managers.

Fragments of limestone grassland and ancient semi-natural woodland throughout the forest will be identified during the planning of forest operations, and appropriate action taken to safeguard these sites.










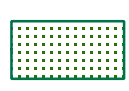
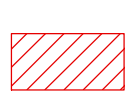

The ancient woodlands data shown is from the Inventory of ancient woodland, drafted by English Nature. During 2000 a survey was made of FE ancient woodlands within the Forest District. A part of this work looked at semi-naturalness, as measured by the extent of native tree species in the canopy. Areas with greater than 80% native canopy species are taken to be semi-natural woodland, and where these occur within ancient woodland sites as ancient semi-natural woodlands. The full results of the survey were published in November 2001.



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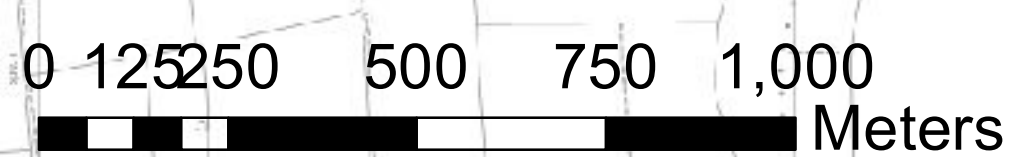
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Map 06 - Management Information Natural Heritage




















-  Ancient Semi-Natural Woodland
-  Planted Ancient Woodland Site
-  Primary River
-  Secondary River
-  Tertiary River (MasterMap single line)
-  Lake / Reservoir
-  Conservation Site Point
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-  SSSI (Sites of Special Scientific Interest)
-  Management Area

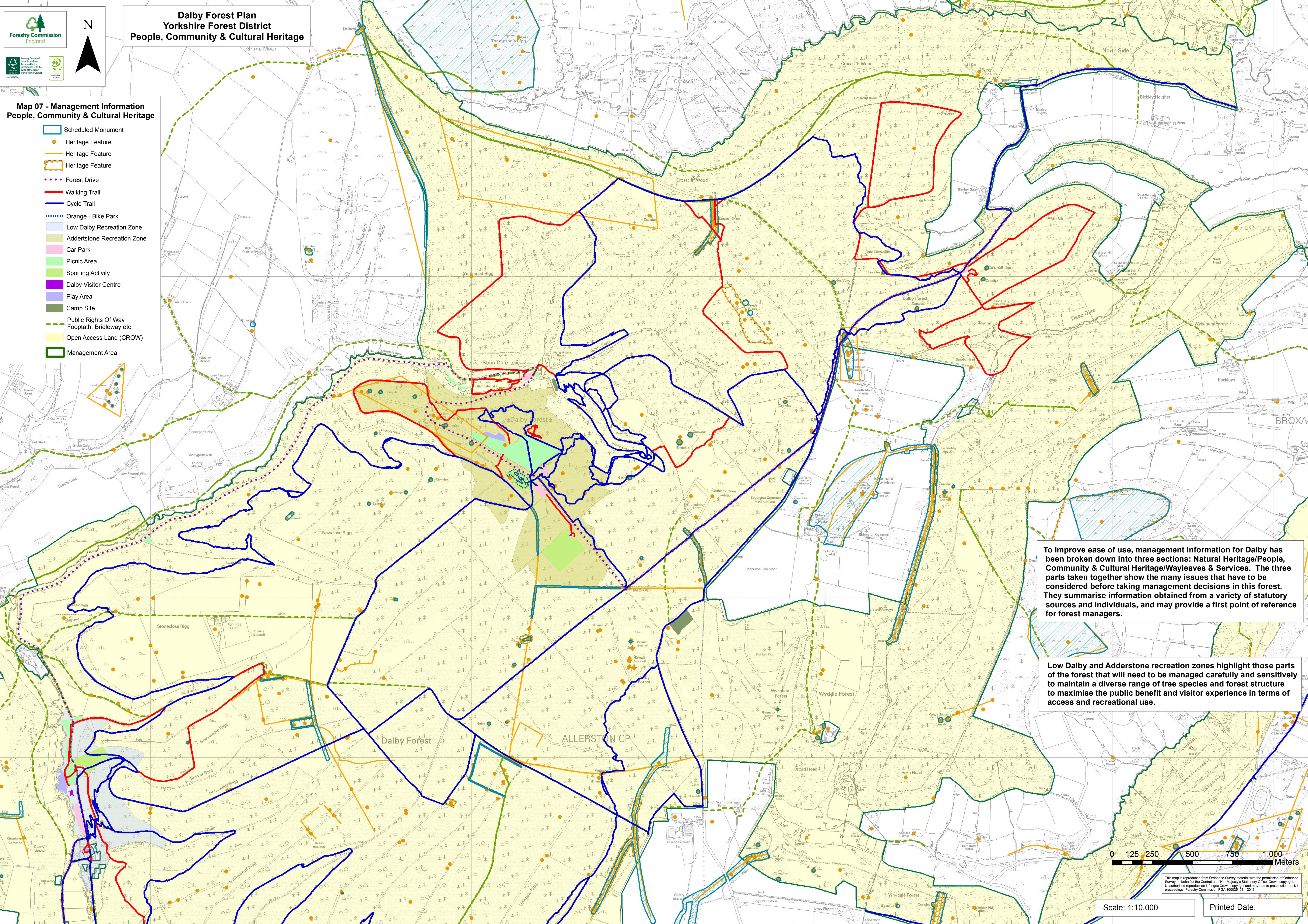
FC land adjacent to the Special Area of Conservation (SAC) in Sand Dale and Ellers Wood, designated for the snail *Vertigo geyeri*, will be managed to create suitable habitat for the conservation and expansion of this species.

Fragments of limestone grassland and ancient semi-natural woodland throughout the forest will be identified during the planning of forest operations, and appropriate action taken to safeguard these sites.



Map 07 - Management Information
People, Community & Cultural Heritage

-  Scheduled Monument
-  Heritage Feature
-  Heritage Feature
-  Heritage Feature
-  Forest Drive
-  Walking Trail
-  Cycle Trail
-  Orange - Bike Park
-  Low Dalby Recreation Zone
-  Adderstone Recreation Zone
-  Car Park
-  Picnic Area
-  Sporting Activity
-  Dalby Visitor Centre
-  Play Area
-  Camp Site
-  Public Rights Of Way
Footpath, Bridleway etc
-  Open Access Land (CROW)
-  Management Area



To improve ease of use, management information for Dalby has been broken down into three sections: Natural Heritage/People, Community & Cultural Heritage/Wayleaves & Services. The three parts taken together show the many issues that have to be considered before taking management decisions in this forest. They summarise information obtained from a variety of statutory sources and individuals, and may provide a first point of reference for forest managers.

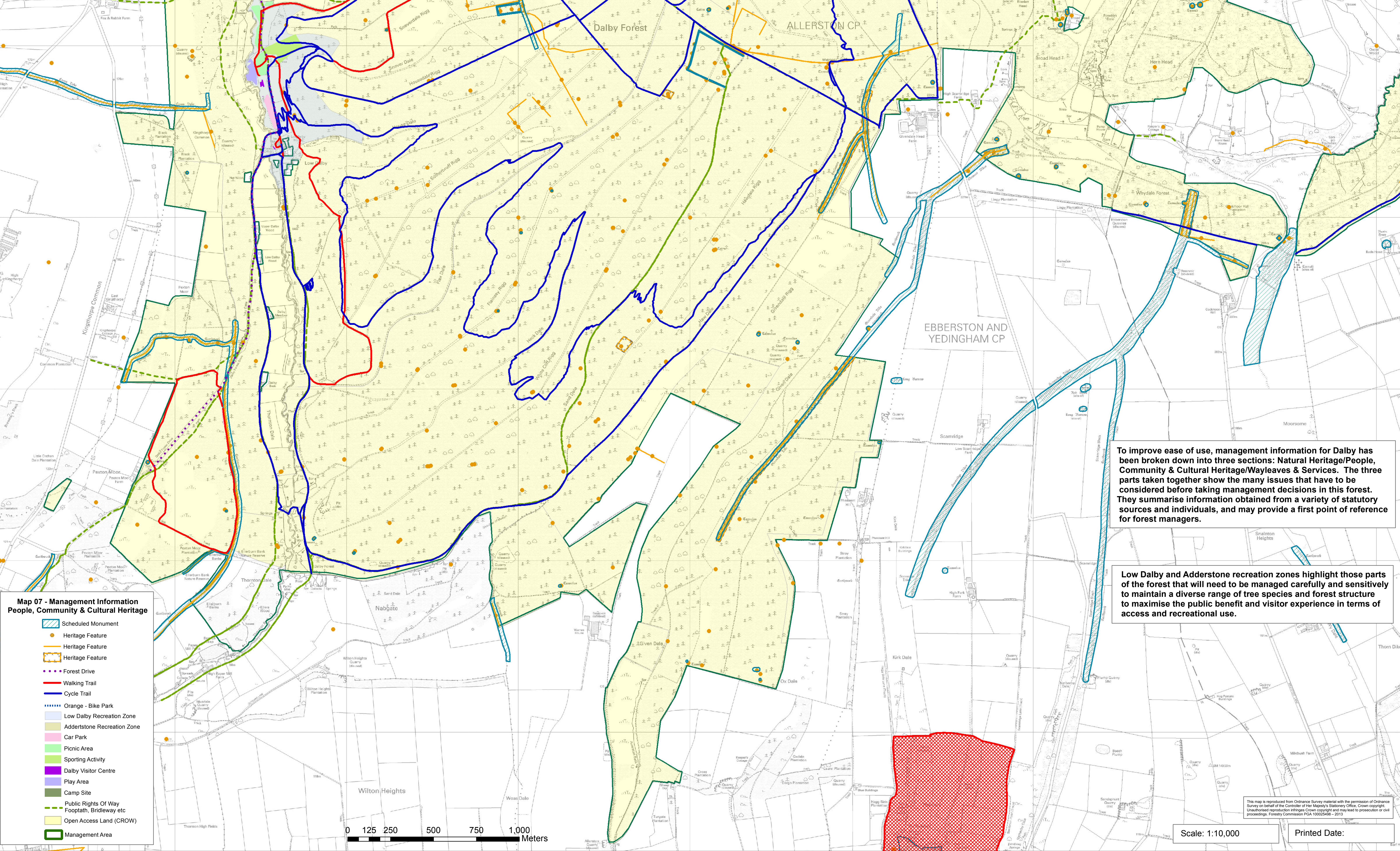
Low Dalby and Adderstone recreation zones highlight those parts of the forest that will need to be managed carefully and sensitively to maintain a diverse range of tree species and forest structure to maximise the public benefit and visitor experience in terms of access and recreational use.
















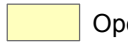



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Scale: 1:10,000 Printed Date:

Dalby Forest Plan
Yorkshire Forest District
People, Community & Cultural Heritage



Map 07 - Management Information
People, Community & Cultural Heritage

-  Scheduled Monument
-  Heritage Feature
-  Heritage Feature
-  Heritage Feature
-  Forest Drive
-  Walking Trail
-  Cycle Trail
-  Orange - Bike Park
-  Low Dalby Recreation Zone
-  Adderstone Recreation Zone
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Lockton Low Moor

Grime Moor

Dalby Forest Plan Yorkshire Forest District Services & Wayleaves

Map 08 - Management Information Services & Wayleaves

- ↑ Radio Mast
- ✕ Powerline Overhead
- - - Powerline Underground
- Gas Pipeline
- ⋯ Telephone Line Underground
- ⋯ Telephone Line Overhead
- ◆ Water Supply Point
- Water Pipeline
- FC Roads
- ▭ Management Area

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Wayleave and service lines have been drawn from a number of different sources and although every effort has been made to ensure their veracity, this information should not be treated as the definitive map.

0 12500 500 750 1000
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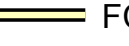

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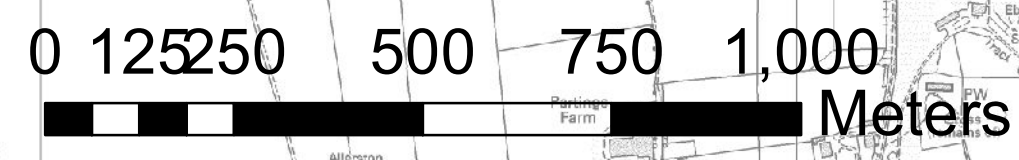
Dalby Forest Plan Yorkshire Forest District Services & Wayleaves

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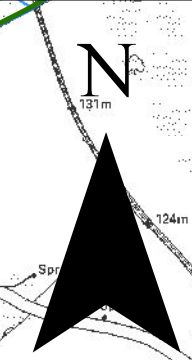
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Dalby - Proposed Felling Map



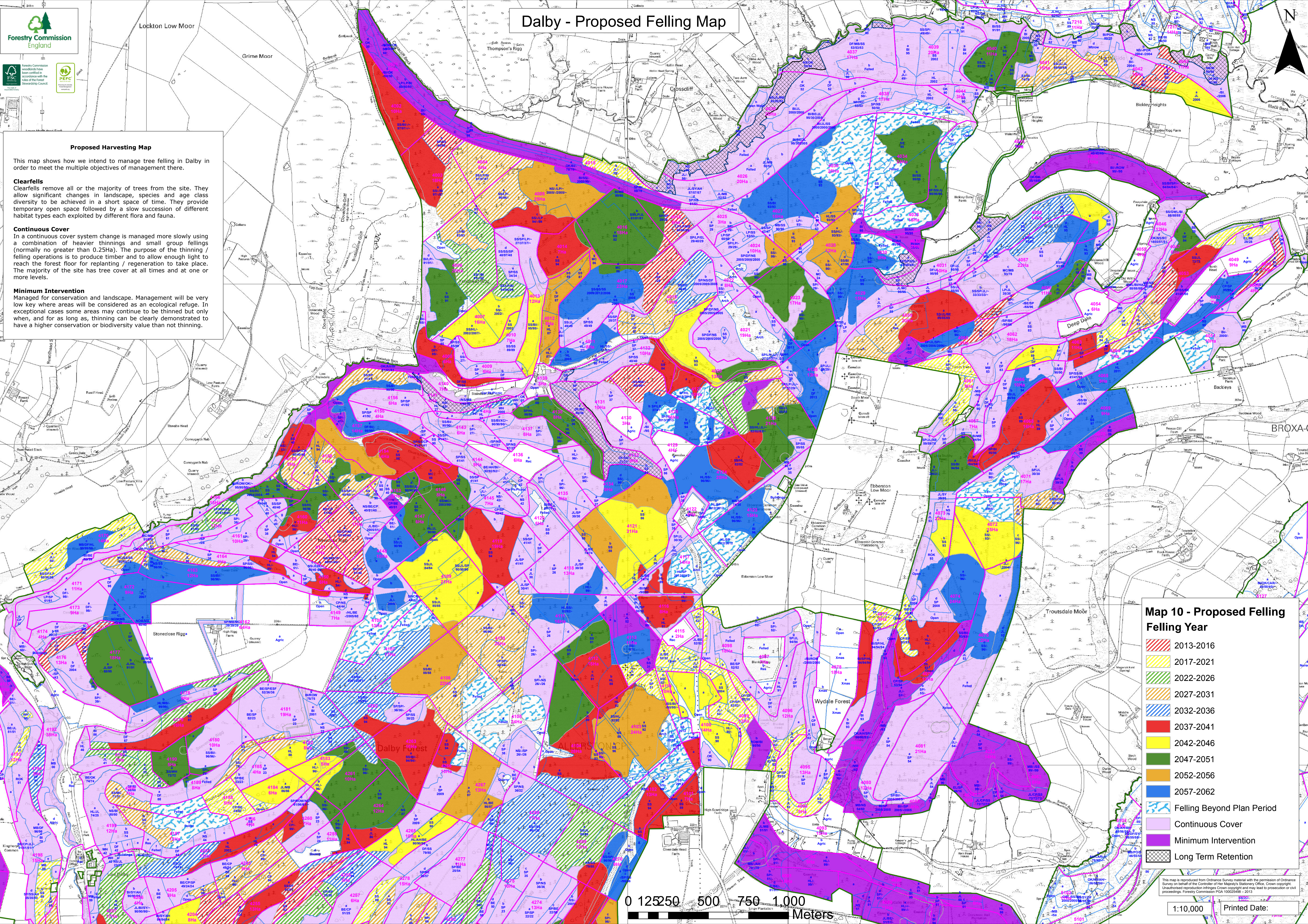
Proposed Harvesting Map

This map shows how we intend to manage tree felling in Dalby 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.

Continuous Cover
In a continuous cover system change is managed more slowly using a combination of heavier thinnings and small group fellings (normally no greater than 0.25Ha). The purpose of the 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 the site has tree cover at all times and at one or more levels.

Minimum Intervention
Managed for conservation and landscape. Management will be very low key where areas will be considered as an ecological refuge. In exceptional cases some areas may continue to be thinned but only when, and for as long as, thinning can be clearly demonstrated to have a higher conservation or biodiversity value than not thinning.



Map 10 - Proposed Felling Felling Year

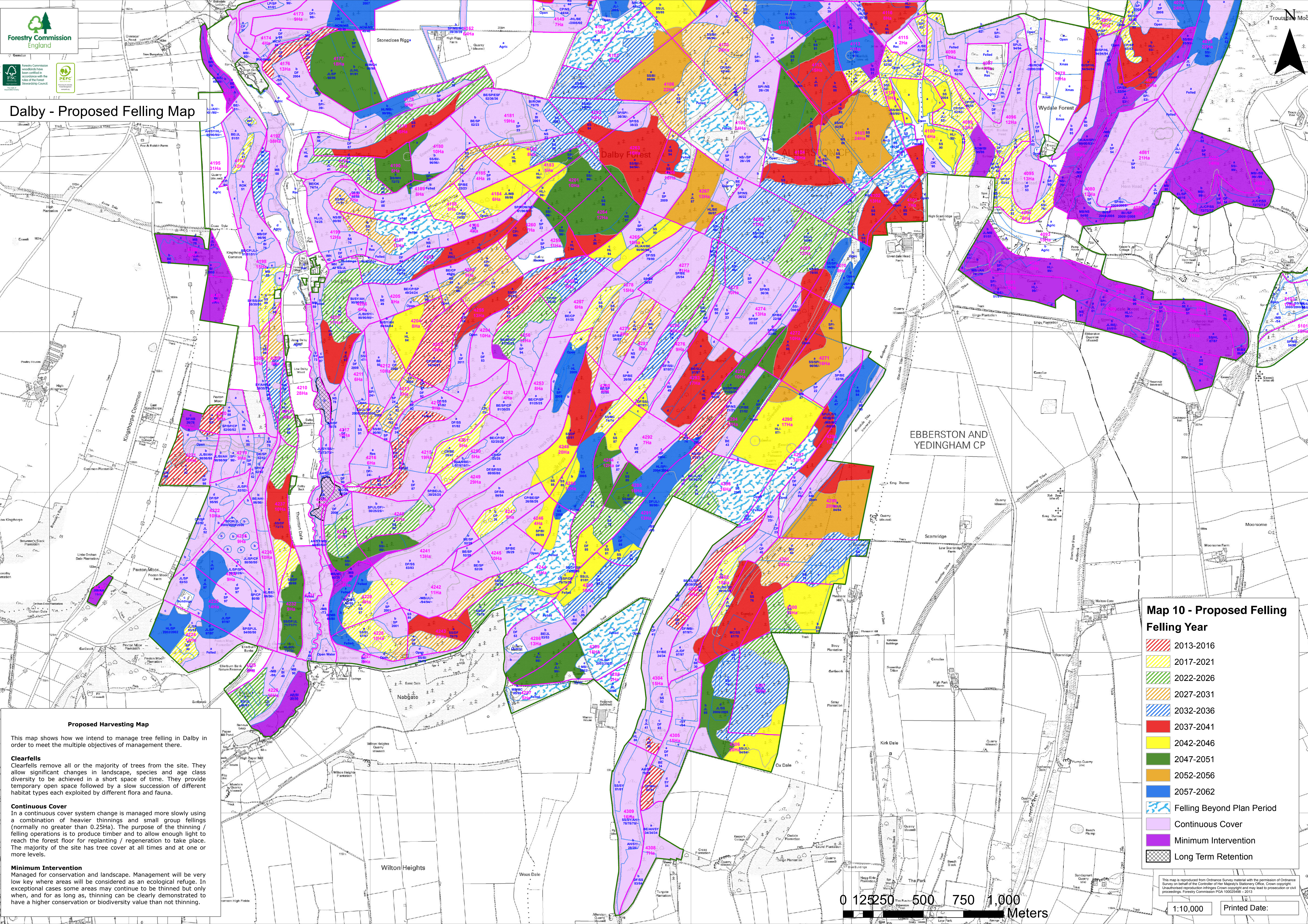
- 2013-2016
- 2017-2021
- 2022-2026
- 2027-2031
- 2032-2036
- 2037-2041
- 2042-2046
- 2047-2051
- 2052-2056
- 2057-2062
- Felling Beyond Plan Period
- Continuous Cover
- Minimum Intervention
- Long Term Retention

0 1250 500 750 1000 Meters

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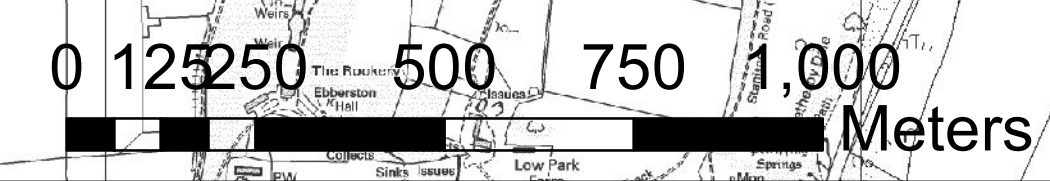
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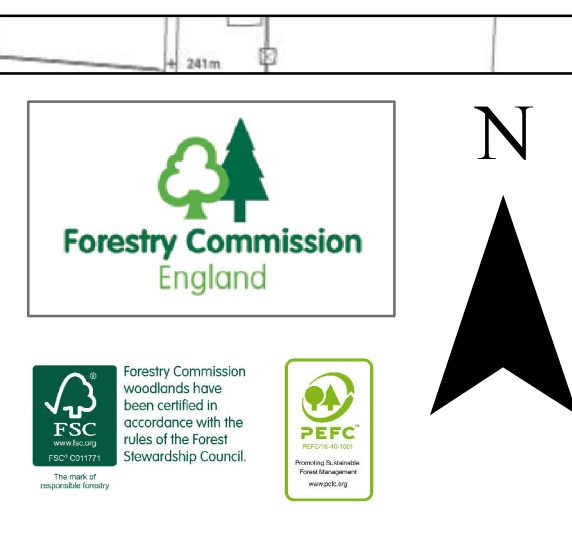
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Map 10 - Proposed Felling

Felling Year

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Map 09 - Analysis and Concept

- Restore Ancient Woodland
- Convert conifer to predominantly broadleaf
- Productive conifer sites
- Scheduled Monument
- SSSI

Dalby Forest Plan Yorkshire Forest District Analysis and Concept

Dalby forest offers landscape-scale opportunities to benefit both ecological and archaeological features.

- * Ancient woodland will continue to be restored to site-native species.
- * Conifer dominant stands on or adjacent sensitive sites i.e. SSSI's, heathland, tufa fens, and riparian zones will be converted to predominantly broadleaf woodland
- * Sensitive management of archaeological features will ensure their long-term protection and allow species-rich habitat networks to establish.

Forest landscape character is a complex of plateaux, riggs and dales, stream valleys and Crosscliffe scarp slope.

- * Clearfell coupes will be designed appropriate to landform and local landscape.
- * Extend open ground and broadleaf woodland along dale and valley bottoms

Dalby is a popular destination for a wide-range of recreation activities

- * Enhance and diversify composition and structure to improve the visitor experience.
- * Consider opportunities to link historical features with walks and trails to enhance visitor experience and understanding of wider forest environment.

Sustainable timber production remains a priority objective across the more accessible parts of the forest whilst mindful of climate change impacts on species choice.

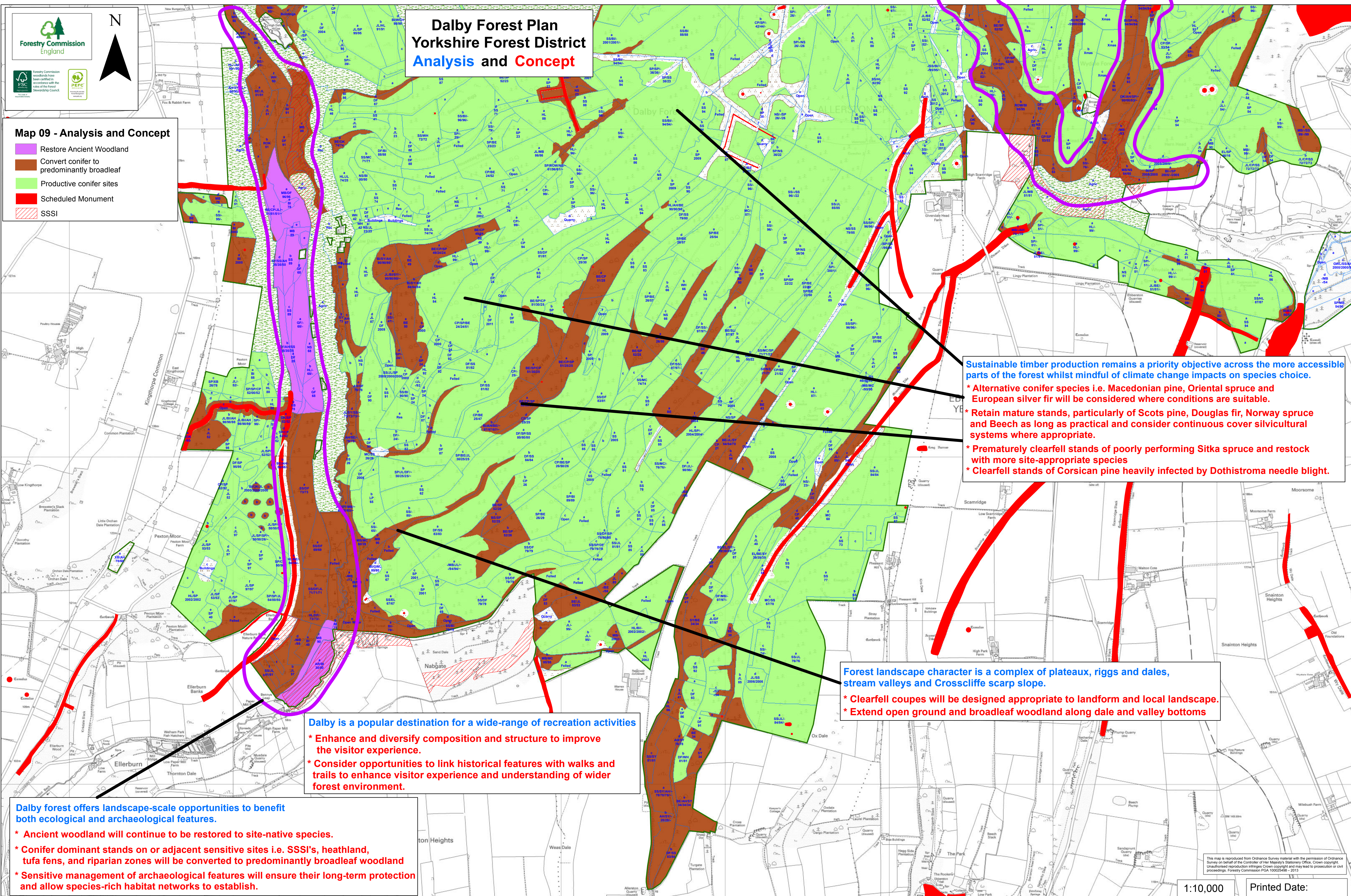
- * Alternative conifer species i.e. Macedonian pine, Oriental spruce and European silver fir will be considered where conditions are suitable.
- * Retain mature stands, particularly of Scots pine, Douglas fir, Norway spruce and Beech as long as practical and consider continuous cover silvicultural systems where appropriate.
- * Prematurely clearfell stands of poorly performing Sitka spruce and restock with more site-appropriate species



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- * Clearfell stands of Corsican pine heavily infected by Dothistroma needle blight.

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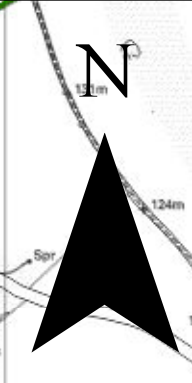
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Dalby Design Plan Future Habitat & Restock Map

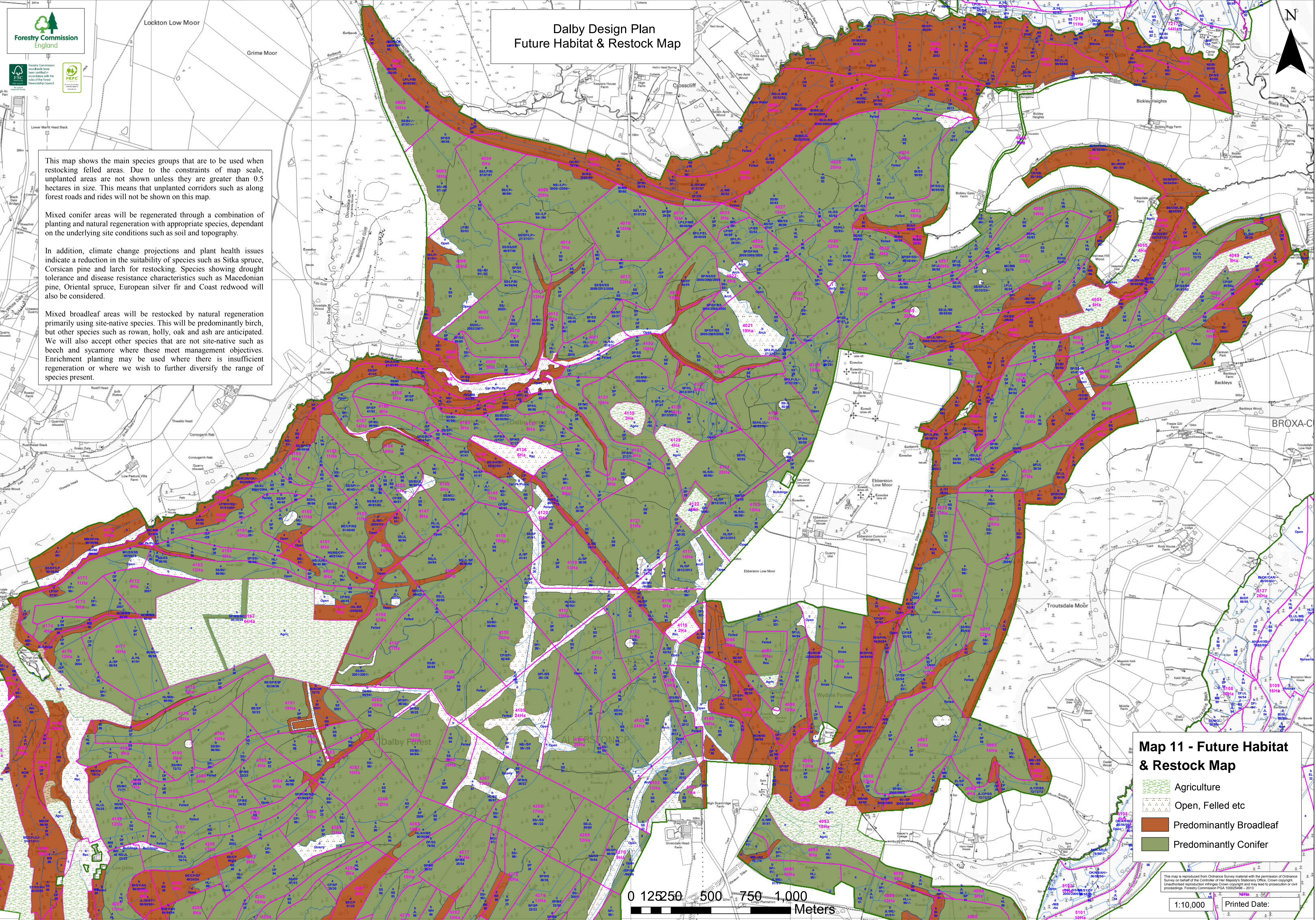


This map shows the main species groups that are to be used when restocking felled areas. Due to the constraints of map scale, unplanted areas are not shown unless they are greater than 0.5 hectares in size. This means that unplanted corridors such as along forest roads and rides will not be shown on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

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

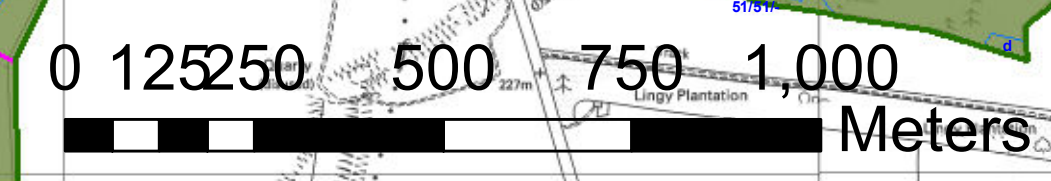
In addition, climate change projections and plant health issues indicate a reduction in the suitability of species such as Sitka spruce, Corsican pine and larch for restocking. Species showing drought tolerance and disease resistance characteristics such as Macedonian pine, Oriental spruce, European silver fir and Coast redwood will also be considered.

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, oak and ash 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.



Map 11 - Future Habitat & Restock Map

- Agriculture
- Open, Felled etc
- Predominantly Broadleaf
- Predominantly Conifer



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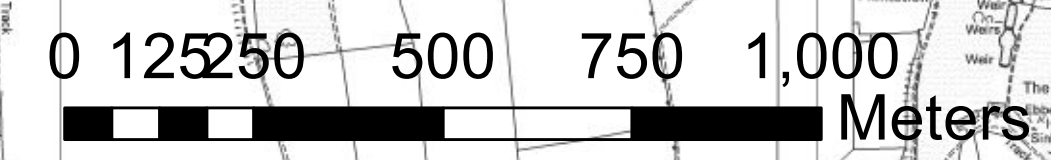


Dalby Design Plan
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