



Yorkshire Forest District

Wykeham Forest Plan

FDP 23

2017

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Wykeham

1114.6 Hectares

Period of Plan: 2016 - 2025

1. Background

Wykeham Forest is part of a network of forests managed by Forest Enterprise (FE), Yorkshire Forest District, located within the North Riding Beat. It is situated approximately 7 kilometres west of Scarborough within the south-east corner of the North York Moors National Park.

The forest is a mixture of freehold and leasehold land secured by the Forestry Commission between 1924 and 1987 and was previously managed as rough pasture and moorland. A proportion of the land was already established with conifer and broadleaved woodland.

2. Describing the Site

2.1 Geology and Soils (FP Map 01)

Underlying geology is predominantly sedimentary sandstone of the lower calcareous grit formation formed in the mid-Jurassic period. The escarpment slope along Troutdale, the River Derwent and Cockrah wood is formed of Oxford Clay formation mudstone, Osgodby formation sandstone with a bed of Cornbrash formation limestone at the break of the slope. Between this and Troutdale Beck and the River Derwent is a complex of sandstone, siltstone and mudstone of the Long Nab Member formation.

The soils at Wykeham are heavily influenced by the underlying geology resulting in ironpan soils dominating the forest plateau, typical surface water gleys along the Troutdale scarp slope and outcrops of brown earths and podzolic soils associated with geology along the upper boundary and smaller valley systems at Bee Dale. Based on Forest Research Ecological Site Classification, soils range between slightly dry soil moisture regime (SMR) and very poor soil nutrient regime (SNR) on the plateau, and fresh SMR and medium SNR along the scarp slope and valley sides which impacts on the range of 'suitable' species that can be considered for planting/restocking.

2.2 Tree Species (FP Map - 02)

Larch is the dominant species accounting for 22% of the forest area closely followed by spruce at 20% and pine at 17.5%. Overall, conifers make up 68% of the forest area and broadleaf species 14.9%.

Unique to Wykeham is the establishment of the forest nursery on the plateau accounting for just over 70 hectares (ha), producing around 6 million conifer transplants annually for use by the public forest and the wider forest industry.

Open Ground accounts for 10.2% of the land at Wykeham, comprised of land currently felled awaiting regeneration, permanent open space (ecological and archaeological interest), tenanted agricultural land and built facilities such as offices and car parks.

There is a long-established and strong link with FC's research agency, Forest Research, with an outstation office based at North Moor. Wykeham Forest is one of 12 forest-scale trials in England, Scotland and Wales, on the public forest estate established to improve our knowledge and understanding of continuous cover forestry (CCF). Wykeham was chosen as one of the first of these pilot sites in 2000.

2.3 Wind Damage (FP Map – 04)

The wind throw hazard classification indicates a stable forest. Approximately two thirds of the forest is in the lower hazard classes 1 and 2 where thinning regimes are relatively unconstrained, and the remaining third is in the intermediate hazard class 3 where thinning options can be more limiting and particular care needs to be taken over the timing, pattern and intensity of thinning to avoid precipitating the onset of serious windthrow.

2.4 Landscape (Photographic montage)

The forest is situated in the 'Wykeham Forest' landscape character area¹ on the Tabular Hills in the south-east of the North York Moors National Park and is planted on a sloping plateau with a south-easterly aspect, largely hidden from the south. However, when viewed from the north the escarpment forms an imposing landscape feature and at Bakers Warren there is a stronger landform than on the scarp to the west. The northern boundary is defined by the sinuous watercourses of Trouts Dale Beck and the River Derwent where the adjoining land to the north is a mixture of mixed-woodland and hedgerow-enclosed, small-scale arable and pastoral fields.

The southern edge of the forest is steeply incised by Bee Dale and a lesser extent Yedman Dale. In both cases the boundary between PFE managed land and the neighbouring private forest is

indistinct in the landscape. Elsewhere the southern boundary mimics the strong geometric pattern of the neighbouring larger-scale arable fields.¹

By and large there has been little change between species groups and land-use types over the previous plan period. This should be expected where the pace of change is much slower through the application of continuous cover silviculture when compared with high-forest clearfell systems. Of note has been the increase in area of Sitka spruce from 16% in 2002 to 19%, this in part is due to this species being less palatable to deer browsing compared with other regenerating tree species. Although broadleaf cover has increased marginally from 154.8 to 166.5 ha this can be attributed in part to the restoration of conifer Plantations on Ancient Woodland Sites (PAWS) to site-native broadleaf species, primarily in Bee Dale and Yedman Dale. Although species diversification has been limited, there are noticeable signs of increased structural diversification where developing understorey is having an impact within the forests.

Recent clear felling across the scarp slope in Trouts Dale and Cockrah Wood have a more obvious impact, albeit the latter being less sympathetic to landform than originally intended.

2.5 People and Community (FP Map – 05)

The areas of freehold are dedicated as Open Access land through the Countryside Rights of Way Act (2000) and there exists an extensive network of public and forest roads, public rights of way and forest rides. There is limited informal parking provision at Bakers Warren and Raptor viewpoints. This is a very popular forest for visitors and residents of nearby settlements including Scarborough, Scalby, West and East Ayton for recreational walking, dog walking and horse riding with visitors seen on most days.

The Forest District hosts a number of motorsport events throughout the calendar year during which a number of stages utilise Wykeham Forest.

Although parts of the forest are freehold, there is limited potential to develop recreational use for people and businesses where these do not conflict with the plans aims, objectives and leasehold restrictions.

2.6 Natural Heritage (FP Map – 05)

Wykeham Forest is important for a wide range of flora, fauna and bio-diverse habitats. Statutory sites within the forest include Cockrah Wood Site of Special Scientific Interest (SSSI), cited in part for its population of May Lily, details for which may be found at; <http://www.sssi.naturalengland.org.uk>

¹ North York Moors National Park Landscape Character Assessment 2003

Ancient woodland, particularly conifer PAWS are important at Wykeham, accounting for 7.5% of the forest area. The previous plan recognised this and the benefit of restoring these and other sites to support site-native broadleaf species with felling and thinning work being carried out across 28.6 ha of secondary plantation and PAWS woodland.

The forest is home to a wide range of international, national and regionally important species: Schedule 1 birds of prey, Nightjar and several species of declining woodland birds including Willow Warbler, Garden Warbler, Redpoll and Linnet (see Appendix 2).

A network of rivers, streams, water courses and drains pass through and adjacent to the forest, providing a large area of riparian habitat. These sites typically support a more diverse woodland structure where native broadleaf tree species, shrubs and ground flora can naturally regenerate, providing ecologically diverse habitat corridors across the forest.

Calcareous springs with extensive tufa deposits, a unique habitat associated with the limestone outcrop along Trouts Dale escarpment along with species-rich woodland.

2.7 Cultural Heritage (FP Map 05)

Wykeham forest contains the highest concentration of scheduled monuments (74) within the district ranging from prehistoric linear boundaries, Iron-age barrows and 18th century rabbit warrens. There are also a significant number of associated unscheduled features.

3. Describing the Project

3.1 Project Brief

- manage natural and cultural heritage sites in accordance with their requirements as per agreed management plans,
- increase the proportion of native broadleaf cover, particularly across areas of PAWS, riparian zones and along steep-sided scarp slopes,
- consider the selection of alternative main tree species that will contribute toward a greater range of species diversity to maintain or increase timber productivity and increase resilience to plant health and biosecurity threats,
- increase the diversity of the age structure by use of appropriate silvicultural systems.

3.2 Objectives

Environmental

- Maintain and improve the ecological, cultural and heritage value of these woods, to be measured by Natural England, Historic England, Non-Government Organisations and FC systems accordingly.

- Improve the resilience and adaptation to climate change, pests and diseases of the natural environment, to be measured by FC systems accordingly.

Social

- Encourage communities to become involved across these woods, its management and direction through consultation in planning and participation in volunteering.
- Maintain and improve the forests contribution to the surrounding landscape character by increasing species and structural diversity, to be measured by external and internal fixed-point photography.

Economic

- Maintain the land within our stewardship under UKWAS certification, to be measured by independent surveillance audits.
- Improve the economic resilience of these woods from a more diverse range of site appropriate conifer and broadleaf species, to be measured by the Production Forecast and Sales Recording Package.

3.3 Constraints

- Potential forest health issues on pine (*Dothistroma*) and larch (*Phytophthora*).
- The retention of windfirm conifer stands on extended rotations that will allow the development of continuous cover forestry systems to facilitate species and structural diversity.
- Challenges of managing expectations for public access across the forest.
- Limiting the negative ecological impact by illegal off-roading activity and the management of mountain bike wild trails across sensitive sites i.e. Trouts Dale.

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 interest are taken during routine forest work. For Wykeham 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.

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 Wykeham 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’.
- 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 and ancient woodland.
- 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 Wykeham from which a selection has already been mentioned at 2.6 - Natural Heritage. Through this plan we will progressively move the areas of conifer in Troutsdale from SN Class 4 to SN Class 3 over multiple thinning and felling interventions.
- A number of watercourses currently identified as moderate or poor status through the Water Framework Directive (WFD) assessment are located adjacent to and downstream of Wykeham. Work undertaken through this plan will contribute to improving their water quality and aquatic ecology, through replacing existing conifer crops with predominantly broadleaf species and considering opportunities to address known issues. The implementation of continuous cover forestry systems and phasing of felling will avoid significant lengths of watercourse being felled at any one time throughout the approval period of the plan.

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.

Through this plan 84.3 ha are designated Candidate Natural Reserve at Cockrah Wood and adjacent Troutsdale Beck.

Long Term Retentions (LTR)

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.

Through this plan 20.7 ha are designated LTR.

Invasive species

There are currently no known invasive species that impact across this plan.

3.4.2 Timber Harvesting

We will continue to sustainably harvest timber from clearfell, group felling 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 Wykeham.

3.4.3 Landscape

Wykeham Forest lies within the North York Moors National Park, a protected and designated landscape. Views are varied with the forest most visible when seen from the north across to the scarp slope where the forest projects into Troutdale and Hackness valley. The broadly coniferous plantation dominates the gently graded plateau and the mixed and developing broadleaf woodland occupy the scarp slope and the incised becks and gills.

On a scale of low/medium/high, landscape sensitivity is considered to range from low across the plateau to medium along the scarp slope and valley sides.

The forest is dominated by evergreen conifer and deciduous larch species, ranging from the late 1920's afforestation to present day restocking. The continuing process of continuous cover is helping to create a more varied forest structure and species composition which is evident when viewed externally from public rights of way and internally from forest roads and rides.

Future felling should retain site-appropriate species such as Scots pine, Douglas fir and broadleaf species. The adoption of Continuous Cover Forestry (CCF) and smaller-scale felling responding to landform across the forest will contribute toward a more varied and intimate forest landscape.

3.5 Plan (FP Map 06)

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 set out in the fell and restock maps.

3.6 Areas (FP Maps 08 and 09)

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 Forest Plan folder.

Felling	Area - hectares	% of total area	Projected volume (m ³)
2016 – 2021 Clearfell	15.50	1.4	4725
2022 – 2025 Clearfell	19.90	1.8	6397
Continuous Cover*	41.10	3.7	13974
Natural Reserve	84.30	7.6	-

* Group/strip felling as part of a CCF shelterwood system.

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		
	2016	2066	2116	2016	2066	2116
Conifer	764.14	719.35	713.70	69	65	64
Broadleaf	166.61	260.70	283.40	15	23	26
Open ground/other *	183.85	134.55	117.50	16	12	10

* Agriculture/nursery/open/residential/car parks etc.

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 Standard and the U.K Forestry Standard 2011 i.e. Forests and

biodiversity, Forests and climate change, Forests and historic environment, Forests and landscape, Forests and people, Forests and soils, Forests and Water.

3.7.3 Harvesting

See 3.4.2. Forestry Commission staff 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.

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.

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 small group felling carried out as part of the CCF silvicultural systems 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 3 and Appendix 4 'Species by soil type' will help inform restocking options.

Reference to Predominantly Mixed Conifer on the Future Habitat & Species Map will be used to describe those areas where a range of 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.

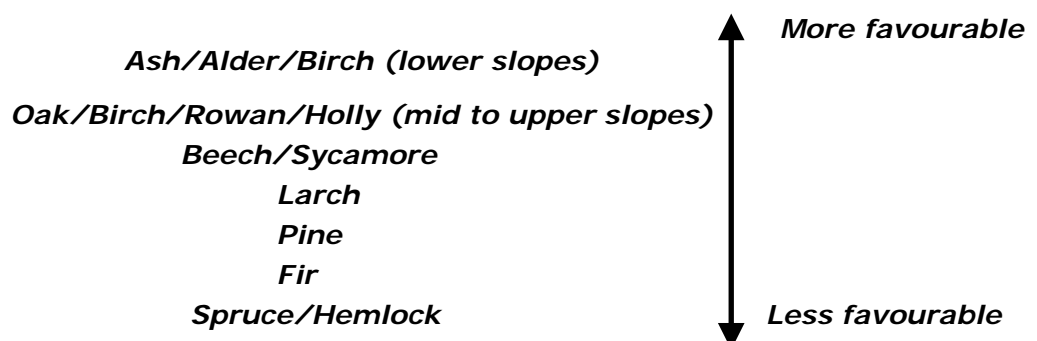
The continuous cover silviculture will be managed to encourage natural regeneration, although it is accepted that replanting will be required to maintain and further diversify the current range of species.

Broadleaf

The areas of PAWS at Bee Dale, Yedman Dale and Cockrah Wood 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 through CCF systems. The impact of *Chalara* on ash natural regeneration will be monitored during the life of the plan, although the acceptance of other site-native species will be considered as an acceptable alternative to achieve PAWS restoration.

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, Sitka spruce) 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 successional habitat through natural regeneration across conifer sites, particularly those where extensive archaeological features benefit from some canopy overstorey to help reduce the impact of deep bracken beds developing. This will create an ecotone of wooded heath, combining elements of heathland flora with broadleaf and conifer tree cover. 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 the wide range of woodland bird species. 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 will require a formal amendment of the plan plus the agreement of and approval by Forest Services 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 Forest Plan

All forest plans are formally reviewed as part of a “5-year mid term review” and the plan’s aims and objectives and its success at achieving those aims and objectives. This plan will be formally reviewed in 2021, the results from which will be shared with the NYMNP. 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

4.5 Habitat condition

Over the lifetime of the plan, areas of High Conservation Value forest such as Natural Reserves, and sites where increasing semi-naturalness is important (Troutsdale), we will monitor and record levels of change through the Sub-Compartment Database and the resulting Semi Natural Class scores. Across Natural Reserves we will maintain or improve their current SN Class status. Across non-designated stands in Troutsdale we will progressively move stands to SN Class 3 with a target of 40% broadleaf species canopy cover. This will take several thinning cycles whereby existing broadleaf trees will be managed to increase crown development and allow successive broadleaf regeneration to establish.

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.

5. Determination of Impact Significance and Mitigation

5.1 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. (www.forestry.gov.uk/keepersoftime)

Major threats to 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 management and development of our native woodlands.

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 across Wykeham forest. Maintaining a mixed resource of temporary and permanent open space will provide suitable habitat for Nightjar, Woodcock 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 Wykeham. 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).

Consultee	Date Contacted	Date response received
Statutory Consultees		
Forest Services	13/04/2016	
Natural England	25/04/2016	
National Park Authority	25/04/2016	
Historic England	25/04/2016	
Non Governmental Organisation		
Environment Agency	25/04/2016	
Neighbours		
Residential occupiers at North Moor village		
Community Groups		
Forest District	13/04/2016	
Others		
Butterfly Conservation Group	13/04/2016	13/05/2016
Scarborough Field Nats. Society	13/04/2016	
BTO	12/02/2016	24/03/2016
Forest Research	12/02/2016	13/04/2016
Dawnay Estate (freeholder)	16/05/2016	
Caley Estate (freeholder)	16/05/2016	
Mr Hutchinson, Brompton Moor House (tenant)	16/05/2016	
Mrs Lawson, Mt. Misery Farm (tenant)	16/05/2016	

Issues Raised

Overview of previous plan performance provided, draft objectives and issues/opportunities agreed for plan renewal.

Project brief and objectives sent to inform process of Forest Plan renewal.

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Overview of previous plan performance provided, draft objectives and issues/opportunities agreed for plan renewal.

Project brief and objectives sent to inform process of Forest Plan renewal.

No specific data but potential S41 species linked to particular habitat types.

Project brief and objectives sent to inform process of Forest Plan renewal.

Data received

FR Project, Team Leader and Field Station Manager to visit 10/11 May

Project brief and objectives sent to inform process of Forest Plan renewal.

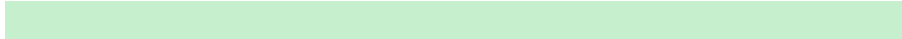
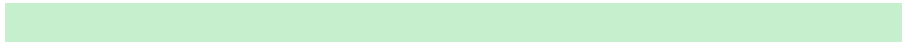
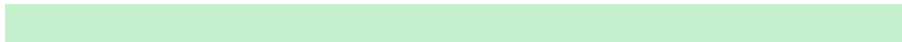
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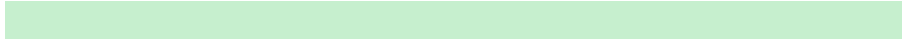
Project brief and objectives sent to inform process of Forest Plan renewal.

District response to issues

A range of internal issues were discussed reviewing past and future objective.



A range of internal issues were discussed reviewing past and future objective.



Information passed to FE Ecologist.

Data request for Bird Atlas data 2007 - 2011

Contacted FR to arrange meeting to discuss future management of live and long-term monitoring experiments.

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; a mosaic of open structure woodland/wooded heath. Maximise opportunities to incorporate strip/group felling in CFF management.
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 Tree pipit Redstart Garden warbler Willow warbler Willow tit Marsh tit Spotted flycatcher	Forest plateau, scarp slopes, dale sides and valley bottoms.	Maximise opportunities to incorporate strip/group felling in CFF management and thinning of closed canopy stands to improve shrub layer structure, structural and species diversity, enhance rides and diversify woodland edge, maintain diverse riparian woodland habitat, create and maintain successional woodland (birch)/scrub habitat and standing deadwood.

¹ Source – BTO Bird Atlas data for SE98 grid square.

BTO Bird Atlas data

Row Labels	Sum of n_records	Sum of maxcat
Garden Warbler	27	18
Goshawk	29	6
Great Grey Shrike	38	12
Hen Harrier	1	3
Hobby	3	1
Honey-buzzard	35	3
Kingfisher	9	20
Lesser Redpoll	4	6
Lesser Spotted Woodpecker	1	3
Marsh Tit	53	46
Merlin	4	10
Nightjar	19	2
Peregrine	7	6
Redpoll (Common/Lesser)	4	6
Redstart	6	9
Spotted Flycatcher	7	13
Tree Pipit	12	9
Turtle Dove	20	13
Willow Tit	12	18
Willow Warbler	76	36
Wood Warbler	2	4
Woodcock	15	14
Grand Total	384	258

count

Number of individuals encountered. Blank if no count was submitted.

maxcountall

Maximum count from any field method. As this is based on all data sources, the duration of recording effort is variable.

Appendix 3 – CCF justification

Site Factor	Suitability Score	Comment
Wind Hazard Classification: class 1 to 3	1	Tree stability may be a site-limiting factor across older stands in Troutsdale without a regular thinning history.
Soil fertility: Mainly very poor (podzolic ironpan), Medium to very rich (typical/podzolic B.E, typical SGW)	1 – Plateau 2 – Troutsdale, scarp slope	The scarp slope provides a distinct break in fertility, with a greater range of competing ground vegetation across Troutsdale.
Current species suitability: Pine species. DF, WRC, Larch species, silver birch. SS, NS, GF, WH	1 – Optimal 2 – Suitable 3 – Marginal	Existing species offers a broad selection that can be developed for natural regeneration with excellent advanced regeneration of larch, WH, GF, SS, birch and to a lesser extent DF across the plateau.

A combined score ranging from 3 to 6 and evidence of good advanced regeneration supports the decision why Wykeham was chosen as one of the forest-scale pilots for transformation to CCF. Although the transformation process is well developed across the plateau, parts of Troutsdale have only recently come back into active management through roading improvements. Older, 1st rotation stands will need to be thinned sensitively to reduce the risk of windthrow whereas

On the basis of the above information, we will consider CCF across even-aged conifer stands using a range of conifer species (LP, SP, SS and birch, but also enrichment planting with Macedonian pine, Western hemlock, Douglas and European silver fir where conditions allow), aiming 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 development of natural regeneration. Where appropriate these will be considered for developing toward CCF management as set out above.

The Forest Research ESC table below supports the range of target species considered for natural regeneration and those where enrichment planting will increase species diversity.

[Wykeham 5317 SE951882] Future Climate Analysis - 5km Area Projection UKCIP02

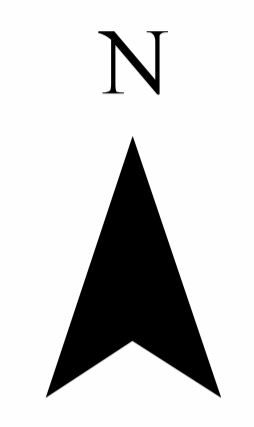
Species	Baseline			2050 Lo			2050 Hi			2080 Lo			2080 Hi		
	Lim Factor	Suitability	YC	Lim Factor	Suitability	YC	Lim Factor	Suitability	YC	Lim Factor	Suitability	Yield	Lim Factor	Suitability	YC
Corsican pine	AT5		12	DAMS		16	DAMS		16	DAMS		16	DAMS		16
Lodgepole pine	DAMS		14	DAMS		14	DAMS		14	DAMS		14	DAMS		14
Macedonian pine	SMR		12	SMR		12	SMR		12	SMR		12	SMR		12
Maritime pine	AT5		6	DAMS		8	DAMS		10	DAMS		10	DAMS		10
Monterey/Radiata pine	AT5		6	AT5		10	AT5		12	AT5		14	SNR		18
Scots pine	DAMS		14	DAMS		14	DAMS		14	DAMS		14	MD		12
Weymouth pine	SNR		8	SNR		10	SNR		10	SNR		10	MD		8
Norway spruce	DAMS		10	DAMS		10	MD		10	DAMS		10	MD		6
Oriental spruce	SNR		10	SNR		14	SNR		14	SNR		14	SNR		14
Serbian spruce	SNR		14	SNR		14	SNR		14	SNR		14	SNR		12
Sitka spruce	SMR		20	MD		16	MD		12	MD		14	MD		6
Douglas fir	DAMS		12	DAMS		14	DAMS		14	DAMS		14	DAMS		14
Hybrid larch	DAMS		14	DAMS		14	MD		12	MD		14	MD		0
Japanese larch	SMR		12	MD		12	MD		8	MD		8	MD		0
European larch	SNR		8	SNR		8	SNR		8	SNR		8	MD		2
Western red cedar	DAMS		14	DAMS		14	DAMS		14	DAMS		14	DAMS		14
Japanese red cedar	DAMS		14	DAMS		14	MD		10	MD		12	MD		0
European silver fir	SMR		10	SMR		14	MD		14	SMR		14	MD		2
Grand fir	SMR		10	SMR		12	SMR		12	SMR		12	MD		8
Noble Fir	SMR		8	SMR		8	MD		0	MD		2	MD		0

Nordmann fir	SNR		12	SNR		14	SNR		14	SNR		14	SNR		14
Pacific fir	SMR		6	SMR		6	SMR		6	SMR		6	SMR		6
Leyland cypress	SNR		16	SNR		16	SNR		16	SNR		16	MD		14
Western hemlock	SMR		8	SMR		8	SMR		8	SMR		8	SMR		6
Giant redwood	SNR		12	SNR		12	SNR		12	SNR		12	SNR		12
Coast redwood	SNR		14	SNR		16	SNR		18	SNR		18	SNR		18
Lawson's cypress	SMR		12	SMR		14	SMR		14	SMR		14	MD		12
Downy birch	SMR		0	SMR		0	SMR		0	SMR		0	SMR		0
Silver birch	DAMS		6	DAMS		6	DAMS		6	DAMS		6	DAMS		6

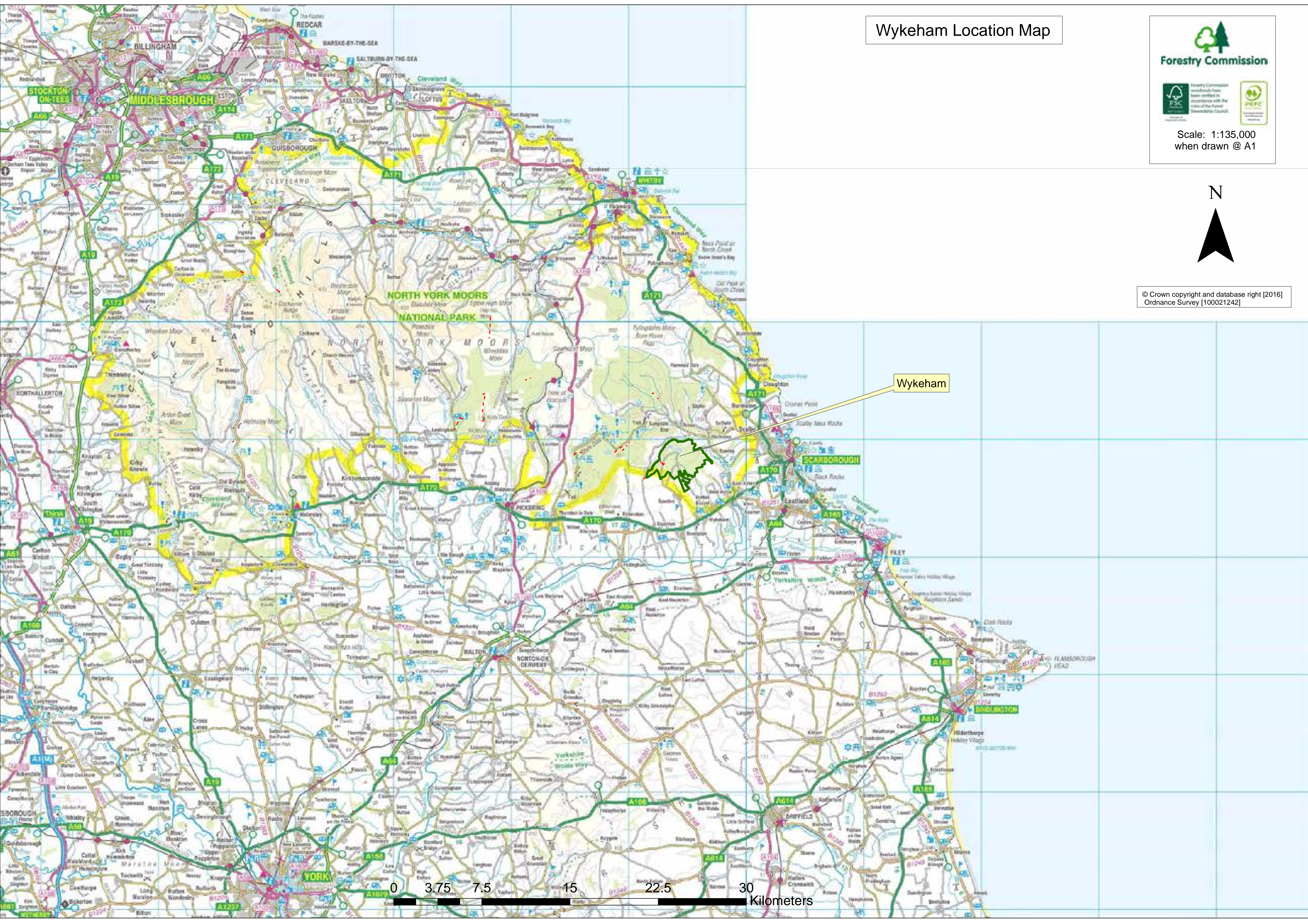
Wykeham Location Map



Scale: 1:135,000
when drawn @ A1



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Ordnance Survey [100021242]

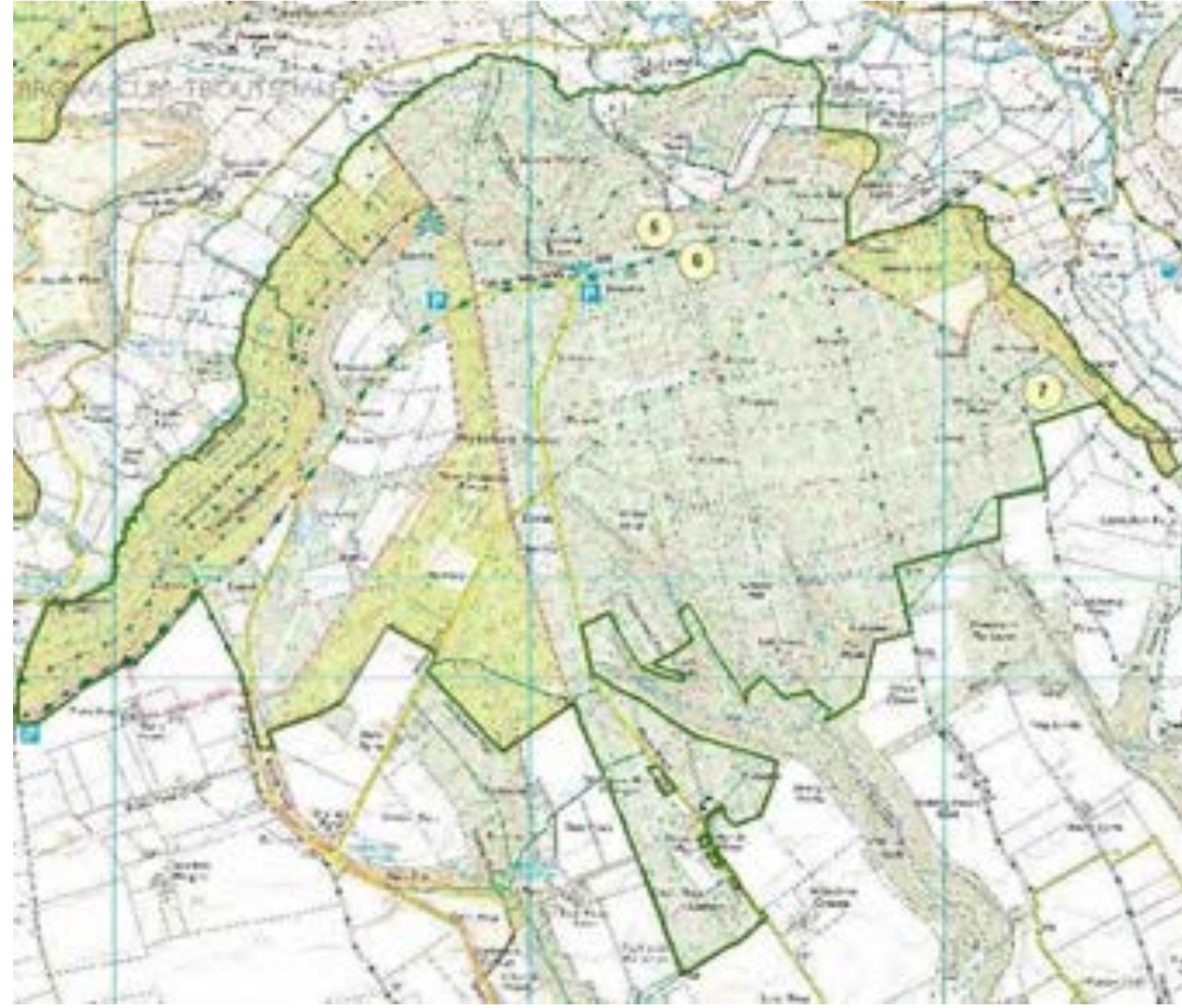


Wykeham



**WYKEHAM
YORKSHIRE DISTRICT
FOREST PLAN 23**

INTERNAL VIEWS



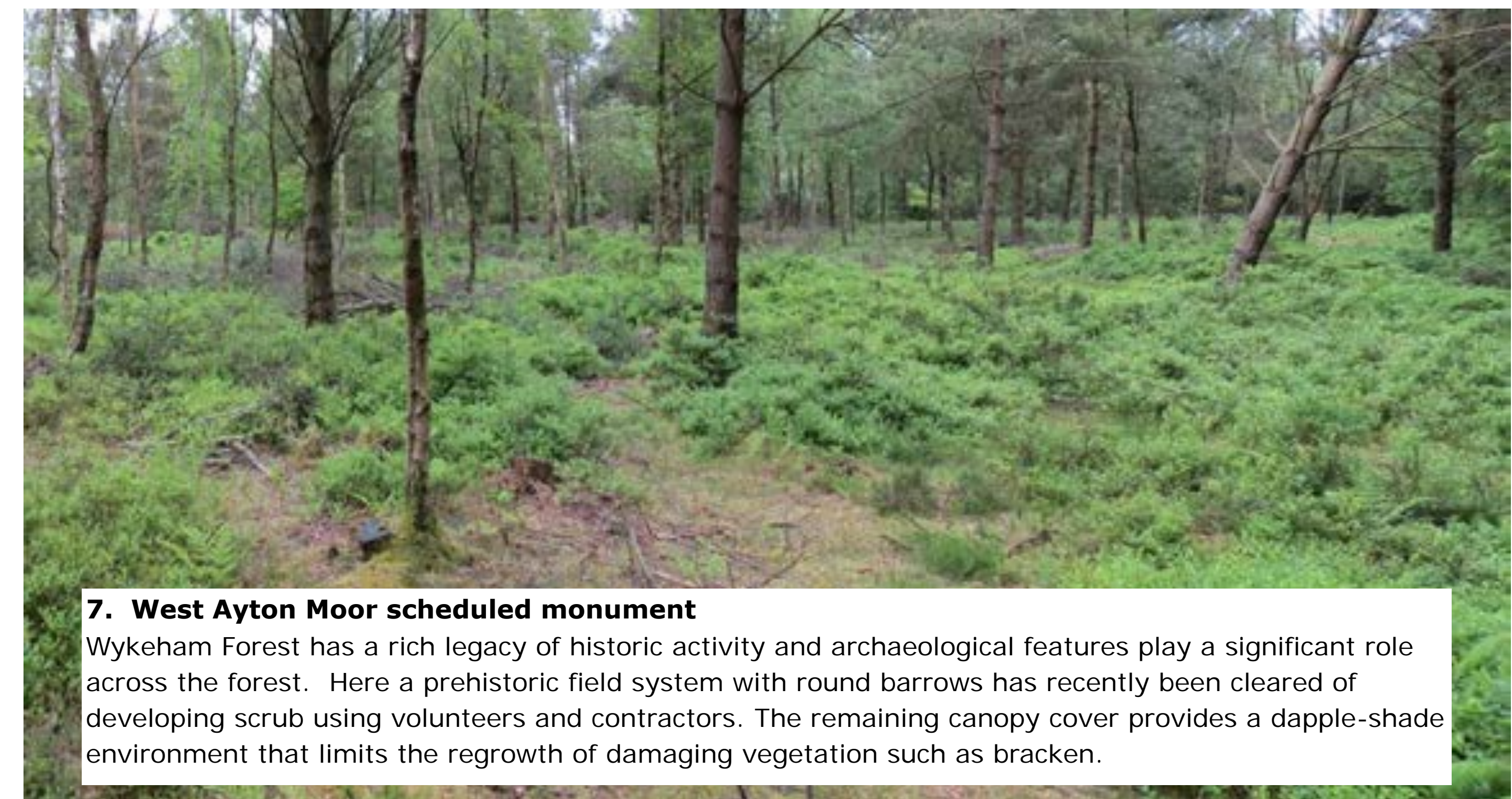
5. Enrichment planting in recently thinned pine

Ongoing management through continuous cover silviculture is providing opportunities to plant species matched to site conditions that currently don't grow there. In this instance Douglas fir are planted in groups and will develop alongside naturally regenerating birch, increasing species and structural diversity at a smaller scale



6. Western hemlock regenerating beneath a 1st rotation stand

A long-term Forest Research experimental plot demonstrates the ability of certain species to naturally regenerate where management prescriptions and conditions allow. Subsequent management will promote the development of further diversification in species and structure.

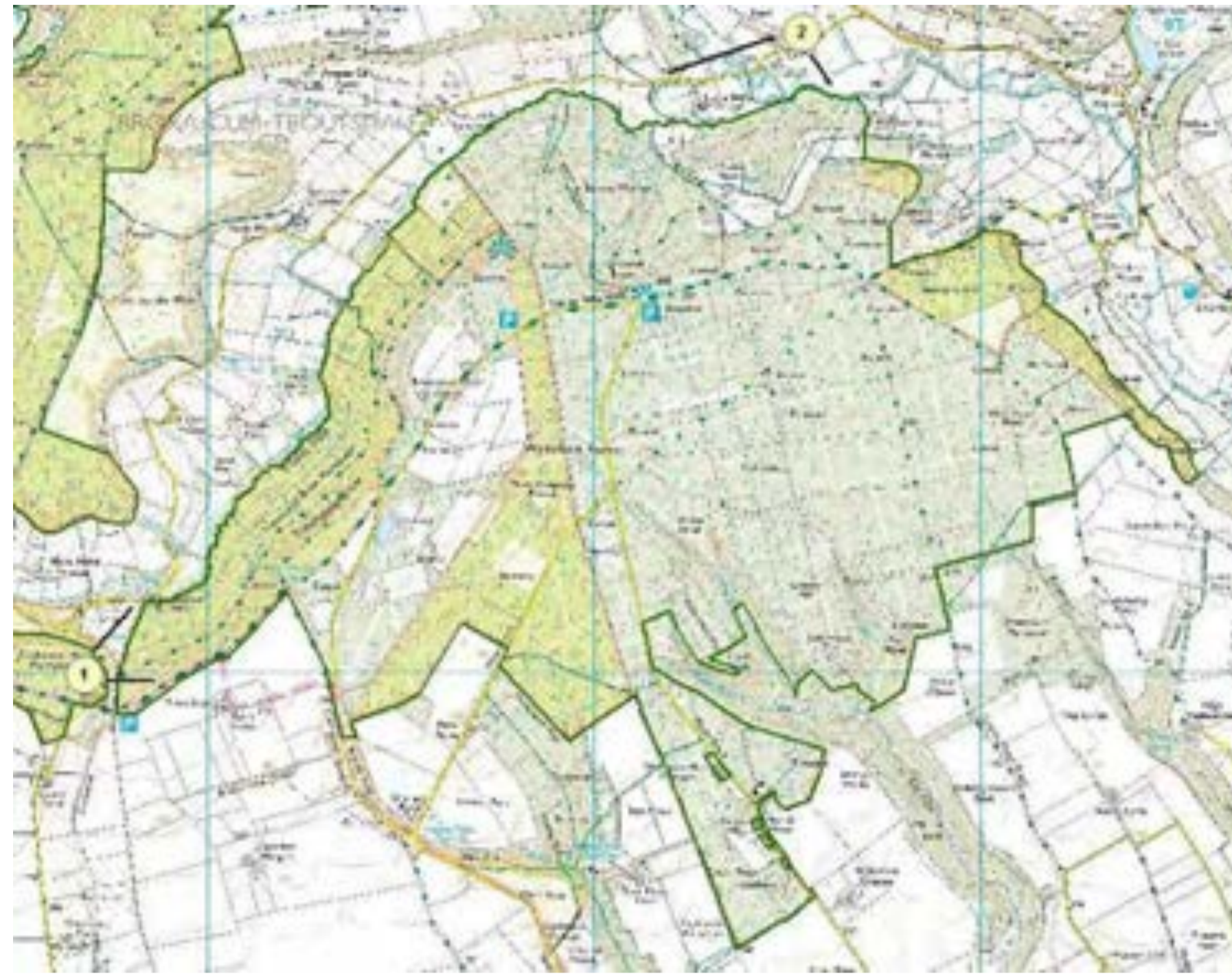


7. West Ayton Moor scheduled monument

Wykeham Forest has a rich legacy of historic activity and archaeological features play a significant role across the forest. Here a prehistoric field system with round barrows has recently been cleared of developing scrub using volunteers and contractors. The remaining canopy cover provides a dapple-shade environment that limits the regrowth of damaging vegetation such as bracken.

**WYKEHAM
YORKSHIRE FOREST DISTRICT
FOREST PLAN 23**

EXTERNAL VIEWS



1. Views of Trouts Dale from Snainton Lane

This part of the forest already benefits from a wider range of conifer and broadleaf species compared with other parts of Wykeham. Recent felling activity will provide opportunities to further increase structural and species diversity. Future management will look to gradually reduce the proportion of larch crops across the scarp slopes, manage the evergreen conifers via continuous cover systems and allow the semi-natural deciduous woodland to evolve further.

2. Mount Misery and Bakers Warren from Estell Lane

Evergreen conifer crops dominate this part of the forest although some larch can be seen as pure or intimately mixed stands. Continuous cover management will be applied across the lower and middle slopes where access for mechanical harvesting is not restricted. Where this is not practical to apply across the steeper, upper scarp slope, these crops will be managed on a high forest - clearfell system with coupe shape and size responding to landform.





**WYKEHAM
YORKSHIRE FOREST DISTRICT
FOREST PLAN 23**

EXTERNAL VIEWS

3. Bakers Warren from public right of way

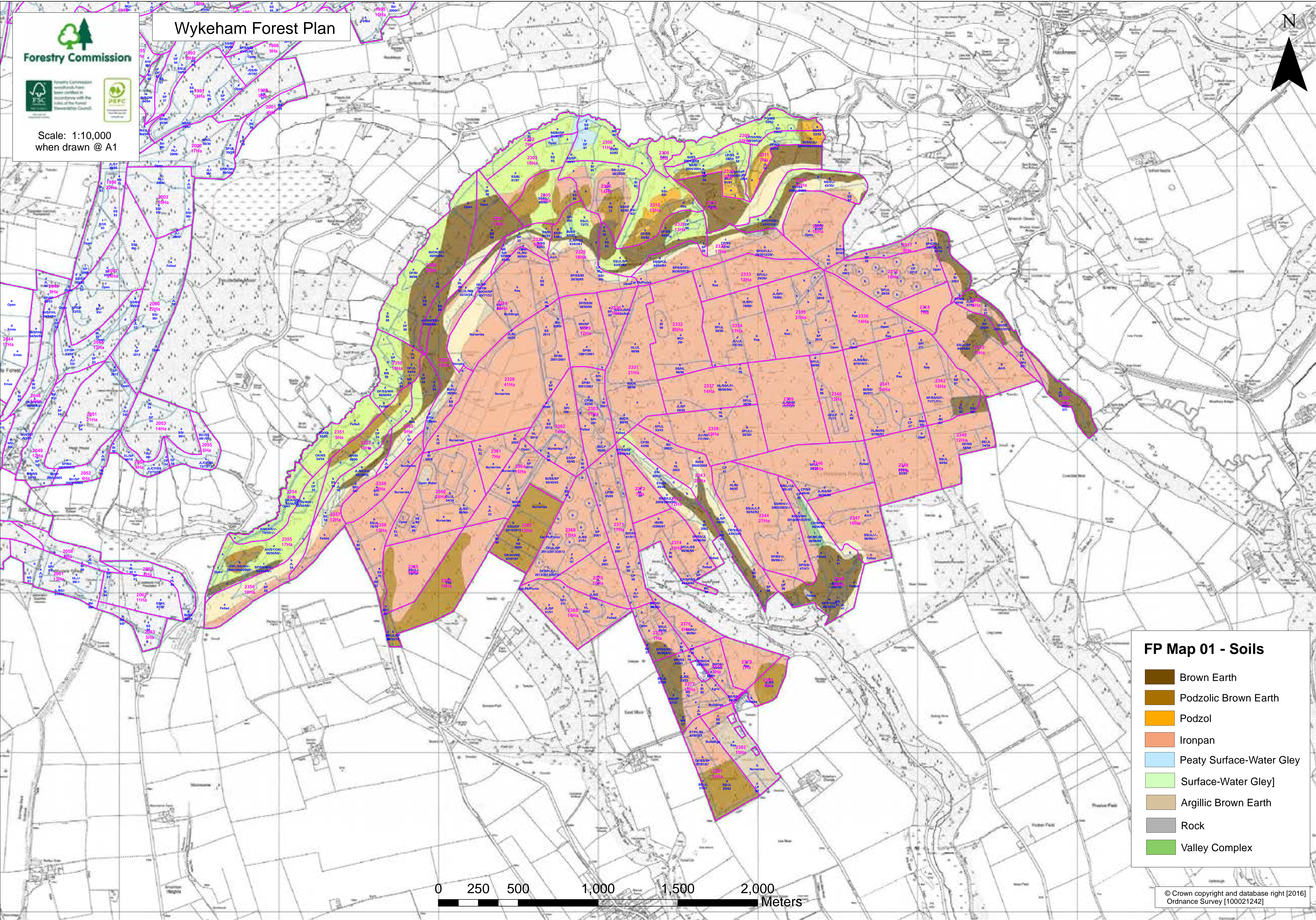
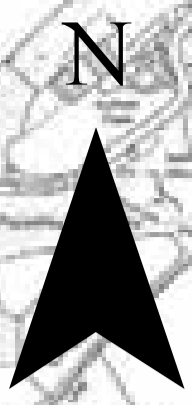
Evergreen conifer stands dominate this part of the forest although some structural diversity is evident with conifer crops ranging from 1928 to 1982 in the foreground. Species and structural change will be gradual as pure stands are actively managed to more mixed-species silviculture across the lower and middle slopes. The pace of change will be more visible across the steep upper scarp slopes with appropriate-sized clearfell coupes.



4. Cockrah Wood from public right of way at Selley Park

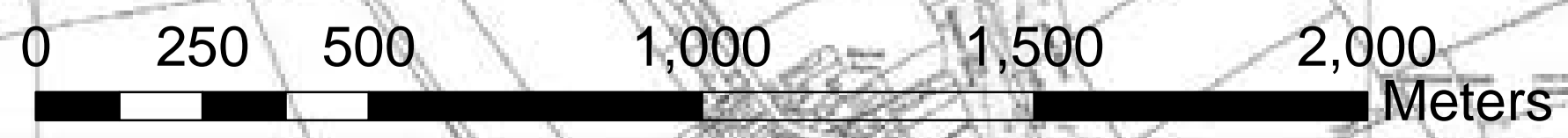
Deciduous larch stands dominate the upper scarp slope where limited access restricts management activity and silvicultural options. From this viewpoint the eye is quickly drawn to the recent felling that is less sympathetic to landform. Future activity will be at a much smaller scale, particularly where sensitive management is required to convert Cockrah Wood SSSI to broadleaf-dominated woodland.





FP Map 01 - Soils

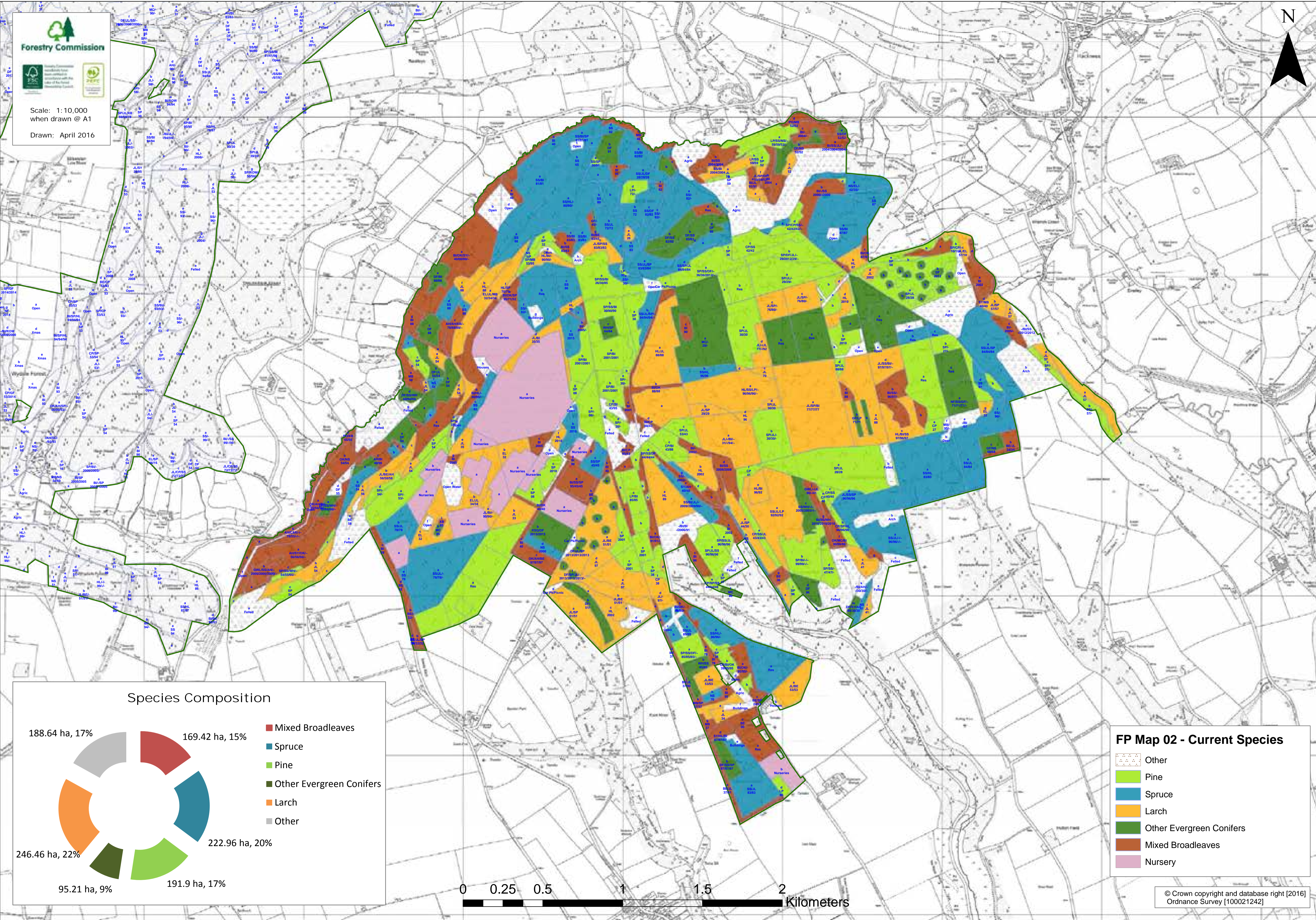
-  Brown Earth
-  Podzolic Brown Earth
-  Podzol
-  Ironpan
-  Peaty Surface-Water Gley
-  Surface-Water Gley]
-  Argillic Brown Earth
-  Rock
-  Valley Complex



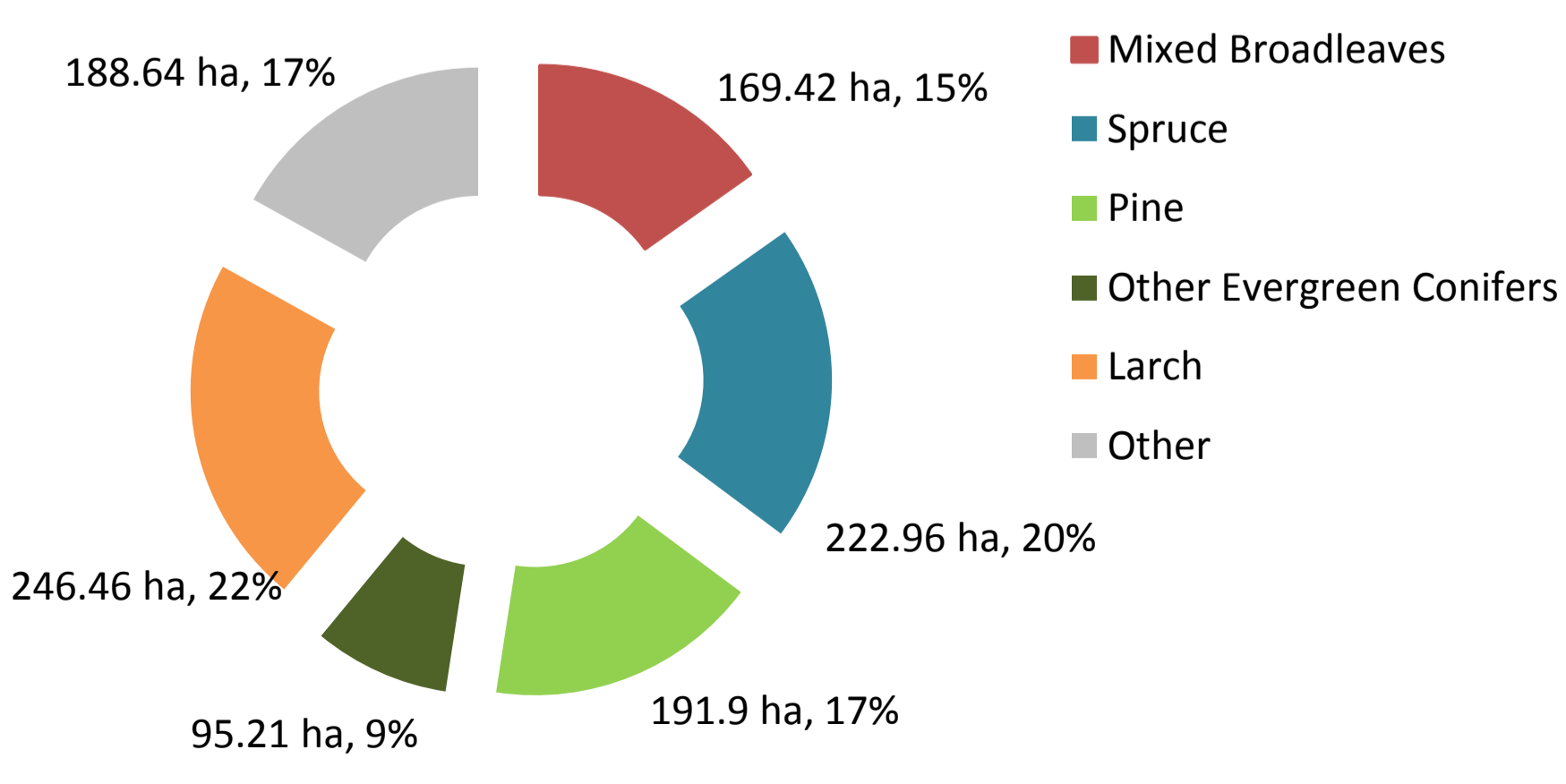
Forestry Commission

Scale: 1:10,000
when drawn @ A1

Drawn: April 2016



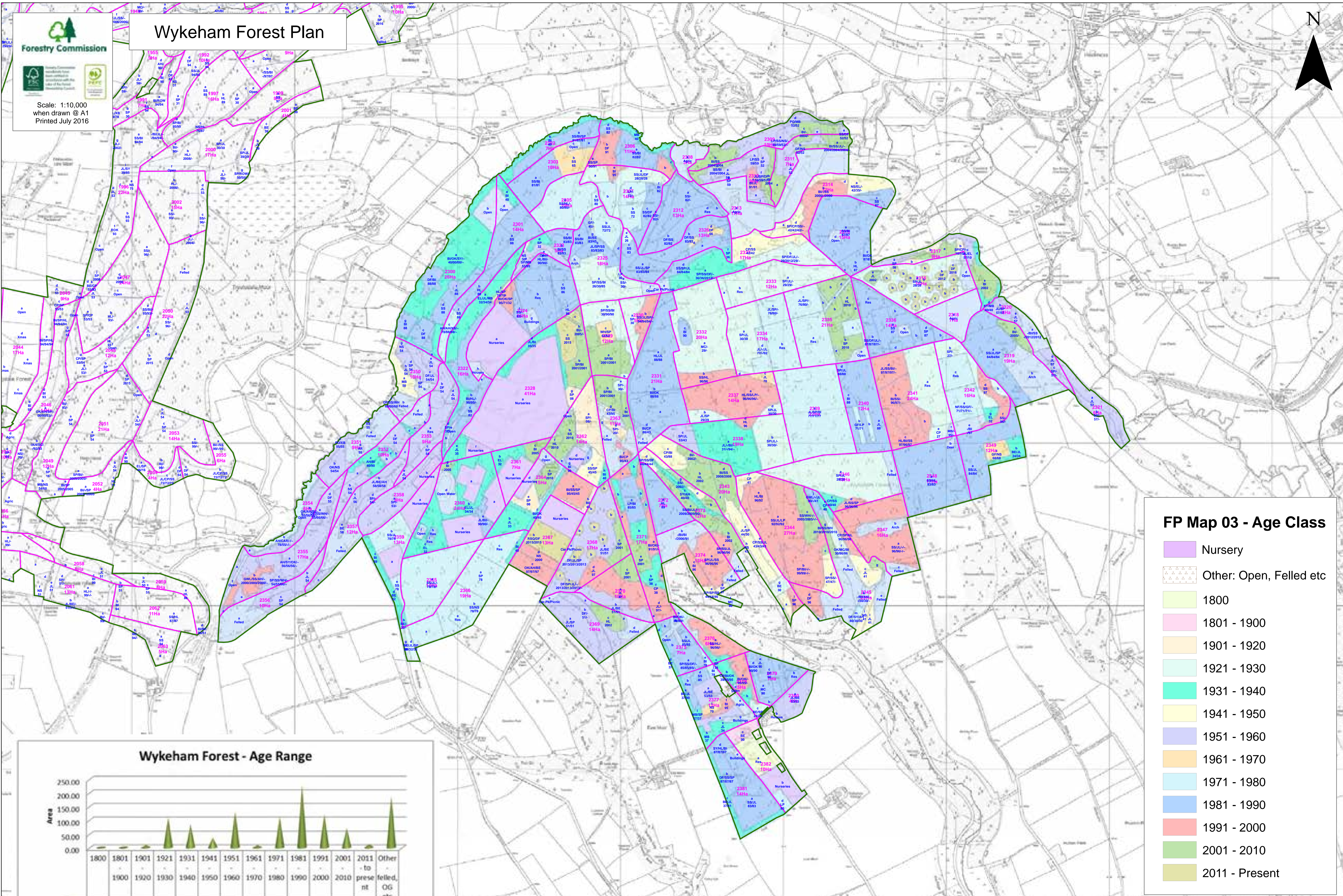
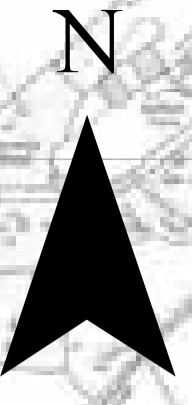
Species Composition



FP Map 02 - Current Species

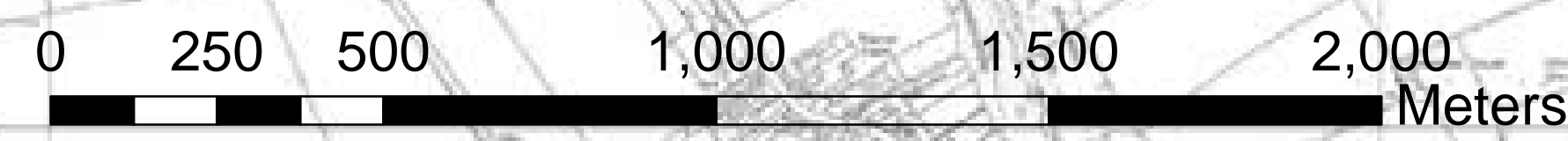
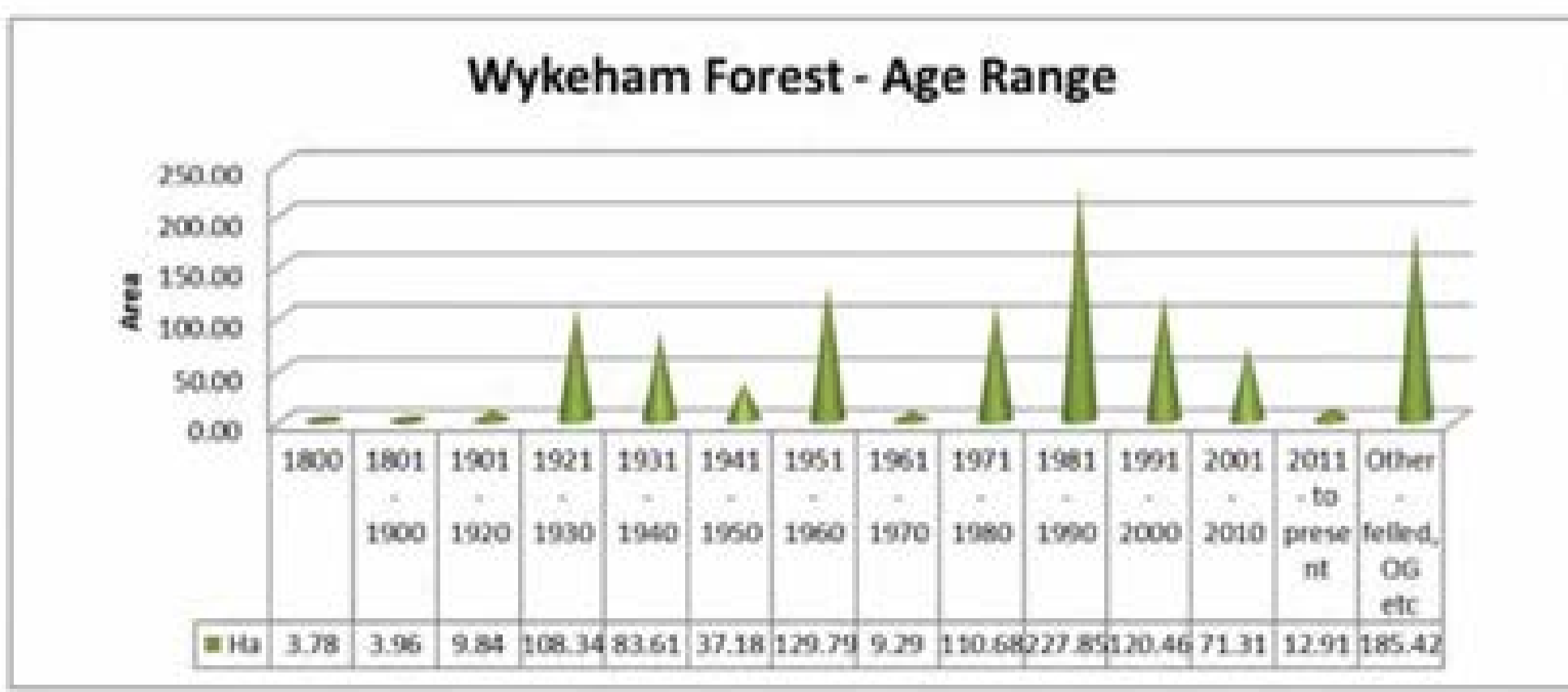


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 Printed July 2016



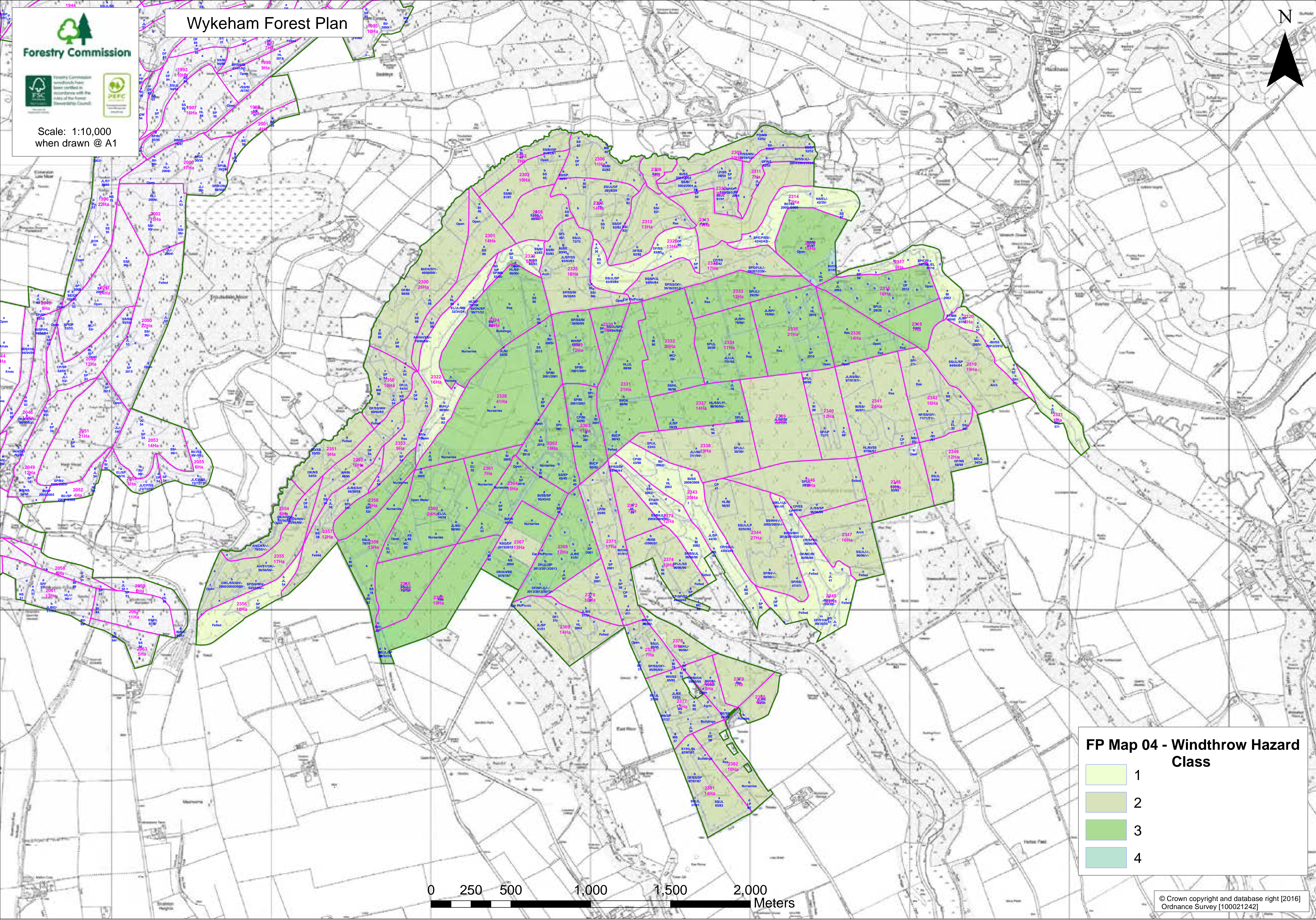
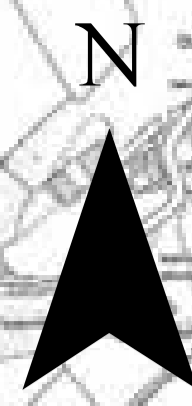
FP Map 03 - Age Class

- Nursery
- Other: Open, Felled etc
- 1800
- 1801 - 1900
- 1901 - 1920
- 1921 - 1930
- 1931 - 1940
- 1941 - 1950
- 1951 - 1960
- 1961 - 1970
- 1971 - 1980
- 1981 - 1990
- 1991 - 2000
- 2001 - 2010
- 2011 - Present

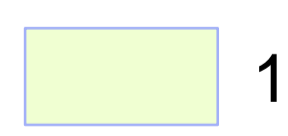


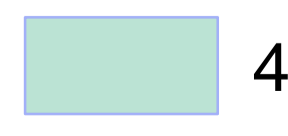


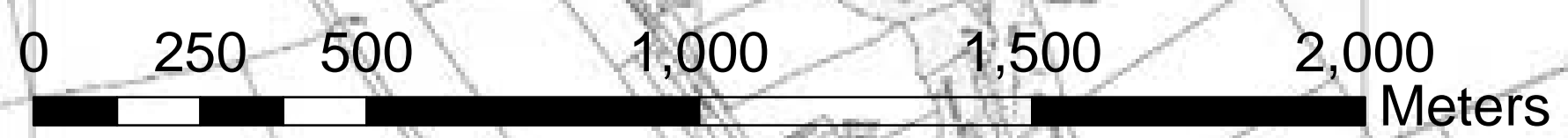
Wykeham Forest Plan

Scale: 1:10,000
when drawn @ A1




FP Map 04 - Windthrow Hazard Class

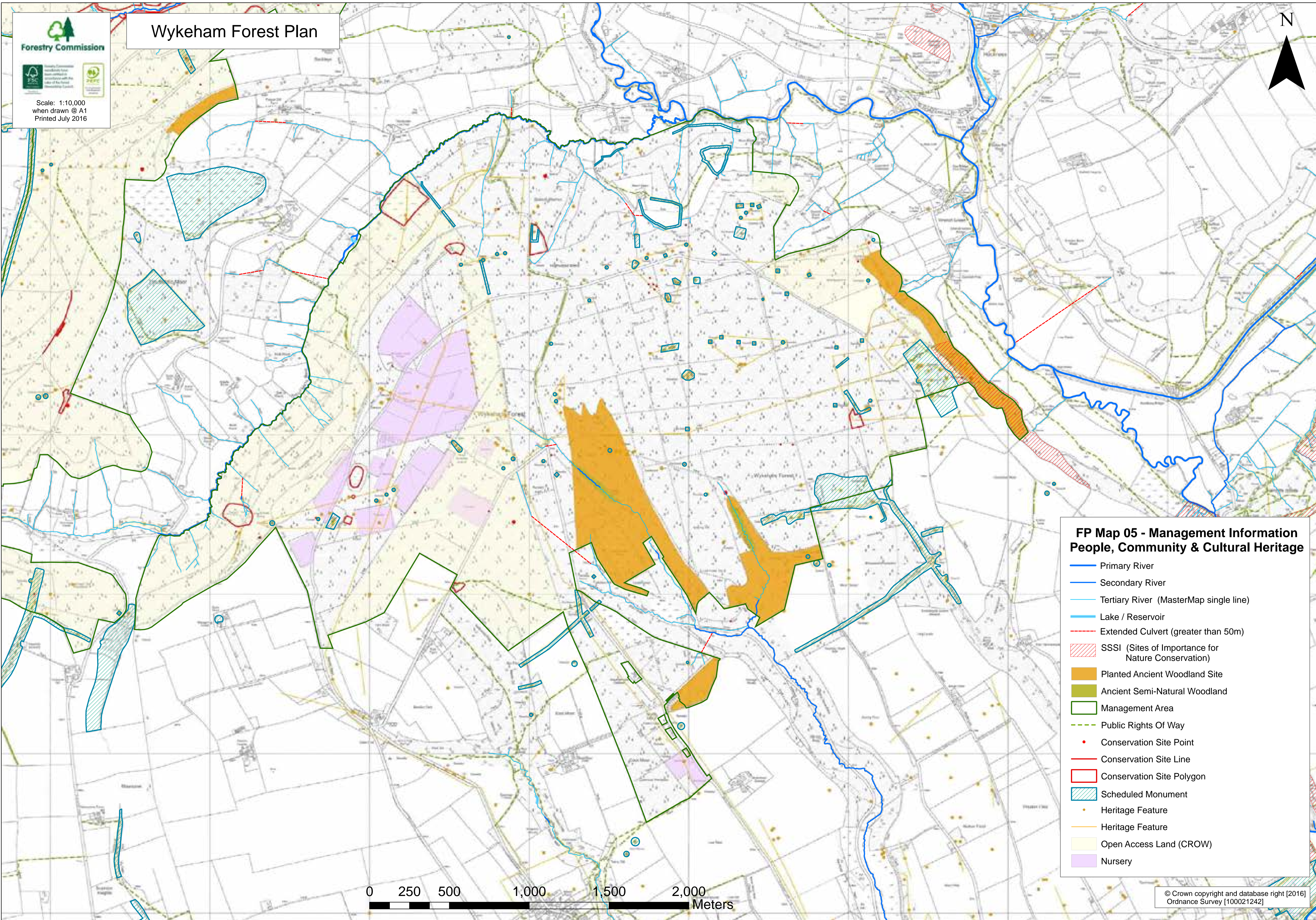
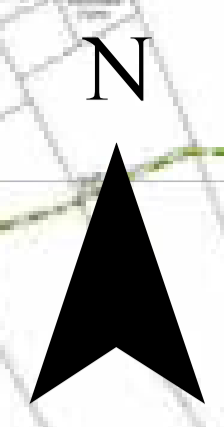
	1
	2
	3
	4



Wykeham Forest Plan



Scale: 1:10,000
when drawn @ A1
Printed July 2016



FP Map 05 - Management Information People, Community & Cultural Heritage

- Primary River
- Secondary River
- Tertiary River (MasterMap single line)
- Lake / Reservoir
- Extended Culvert (greater than 50m)
- SSSI (Sites of Importance for Nature Conservation)
- Planted Ancient Woodland Site
- Ancient Semi-Natural Woodland
- Management Area
- Public Rights Of Way
- Conservation Site Point
- Conservation Site Line
- Conservation Site Polygon
- Scheduled Monument
- Heritage Feature
- Heritage Feature
- Open Access Land (CROW)
- Nursery



Forest landscape character is strongly influenced by the escarpment wrapping around the gently sloping plateau.

- * Clearfell coupes will be designed to respond to landform and topography.
- * Continued management using continuous cover systems and extended rotation silviculture will contribute toward the development of a more diverse forest habitat.

Wykeham forest offers opportunities to develop significant benefits to improve ecological and archaeological features.

- * Cockrah Wood SSSI will be managed as agreed with Natural England to ensure it is maintained in target condition, gradually converting to broadleaf-dominant woodland. Planned research will help inform future management to support the May Lily.
- * Archaeological features will be managed to ensure their continued protection and integration with future habitat improvements as agreed with Historic England.
- * Increasing species and structural diversification across the forest will continue to support a mosaic of habitats and associated flora and fauna including upland heathland, limestone-rich tufa deposits and watercourses.

FP Map 06 - Analysis and Concept

- Predominantly productive mixed conifer
- Convert to predominantly mixed broadleaves
- Open, Nursery, agriculture, residential
- Restore ancient woodland sites
- Scheduled Monument
- Cockrah Wood SSSI
- Watercourses and riparian buffers

Sustainable timber production remains a priority objective across the forest whilst mindful of climate change impacts on species choice and plant health.

- * Alternative conifer species i.e. Serbian and Oriental spruce, Macedonian pine, Douglas and European silver fir and Coast redwood will be considered for restocking where conditions are suitable.
- * Develop continuous cover systems and extended rotation silviculture to allow natural regeneration and enrichment planting with alternative species to become established.
- * Gradually reduce the proportion of larch to reduce the risk and future impact from *Phytophthora ramorum*.

Restoring ancient woodland sites to native woodland species remains a priority objective.

- * Conifer stands will be restored to native species by thinning, felling, natural regeneration and controlling unwanted conifer regeneration.
- * Ancient woodland sites will be buffered by converting adjacent conifer stands to predominantly broadleaf woodland.
- * Maintain existing and develop additional deadwood resource through management interventions and allowing natural mortality of some large dimension trees.

The network of watercourses passing through Wykeham forest connect with downstream waterbodies are currently classed as 'Moderate' or 'Poor' under the Water Framework Directive.

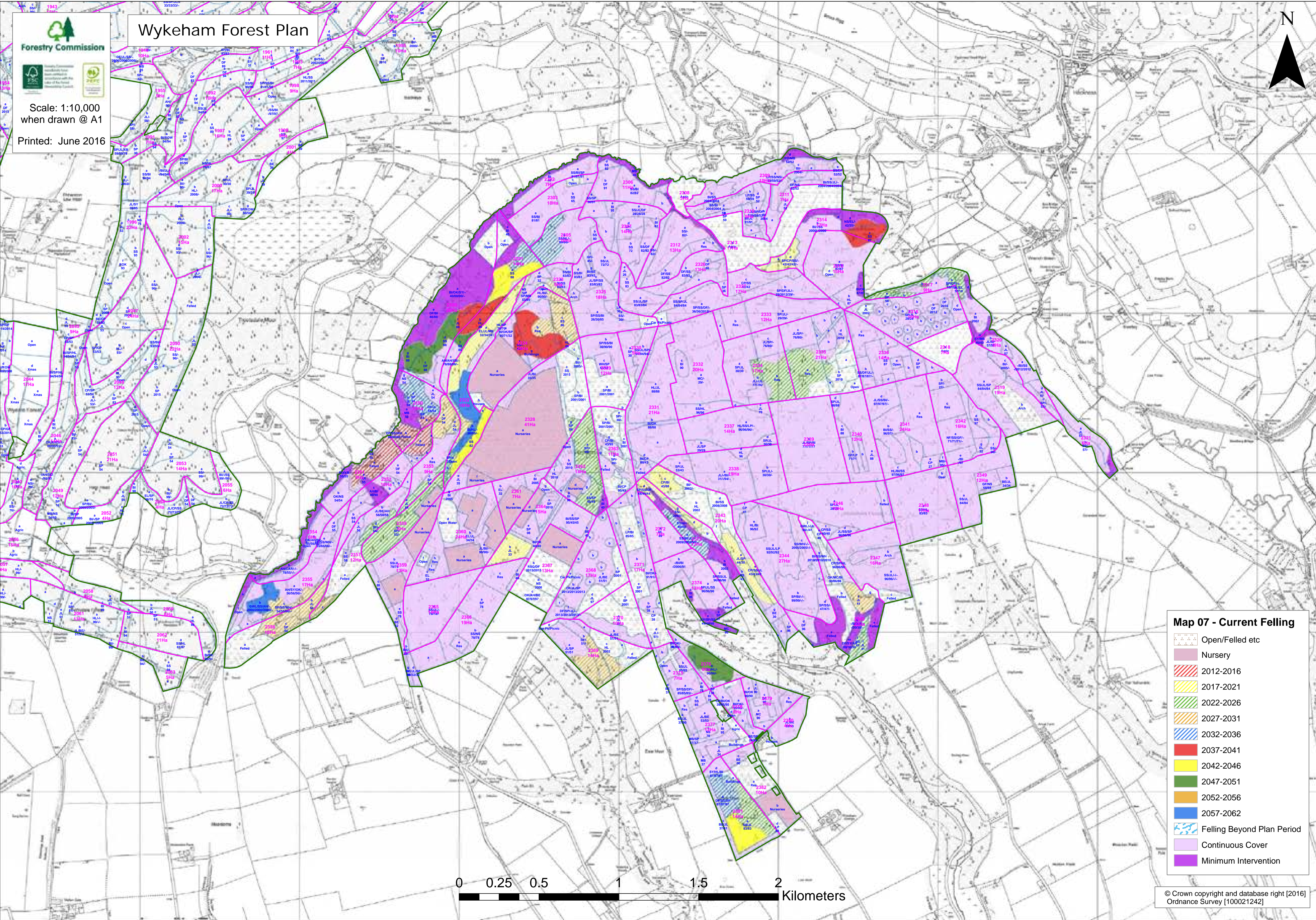
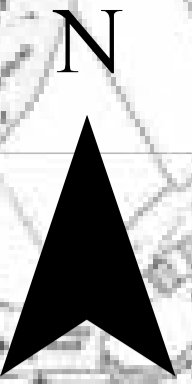
- * Future habitat along riparian corridors will replace conifer crops with broadleaf-dominant species, buffering the impacts of future forest management.

Wykeham Forest Plan



Scale: 1:10,000
when drawn @ A1

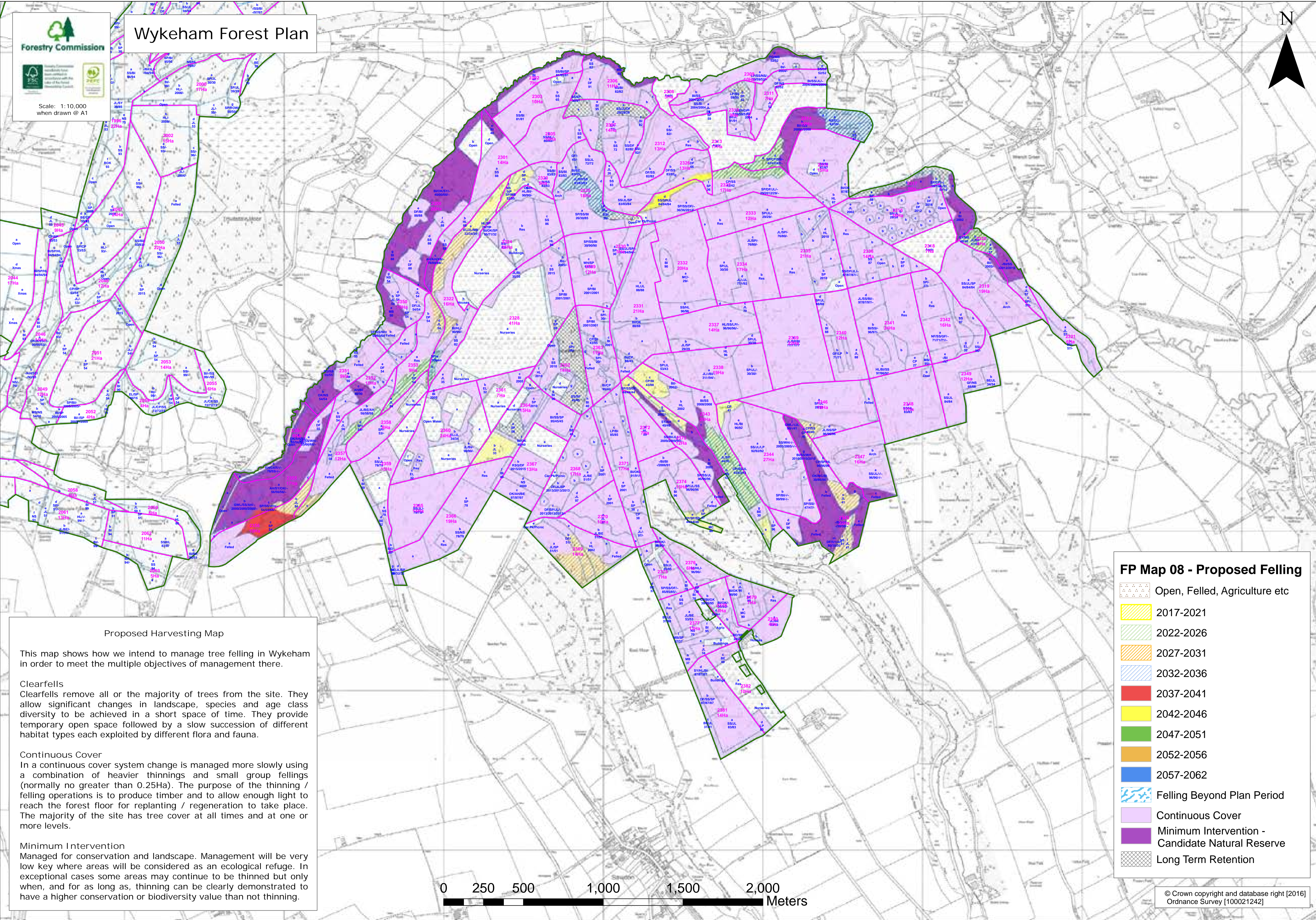
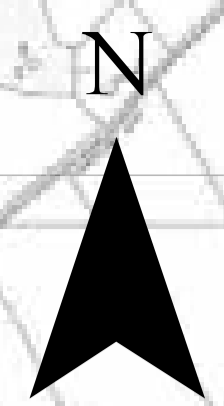
Printed: June 2016



Map 07 - Current Felling

- Open/Felled etc
- Nursery
- 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





Proposed Harvesting Map

This map shows how we intend to manage tree felling in Wykeham 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

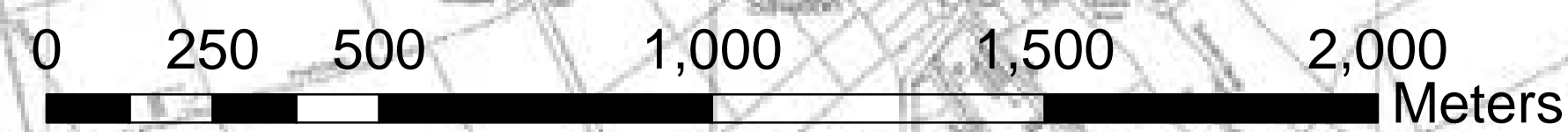
In a continuous cover system change is managed more slowly using a combination of heavier thinnings and small group fellings (normally no greater than 0.25Ha). The purpose of the thinning / felling operations is to produce timber and to allow enough light to reach the forest floor for replanting / regeneration 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.

FP Map 08 - Proposed Felling

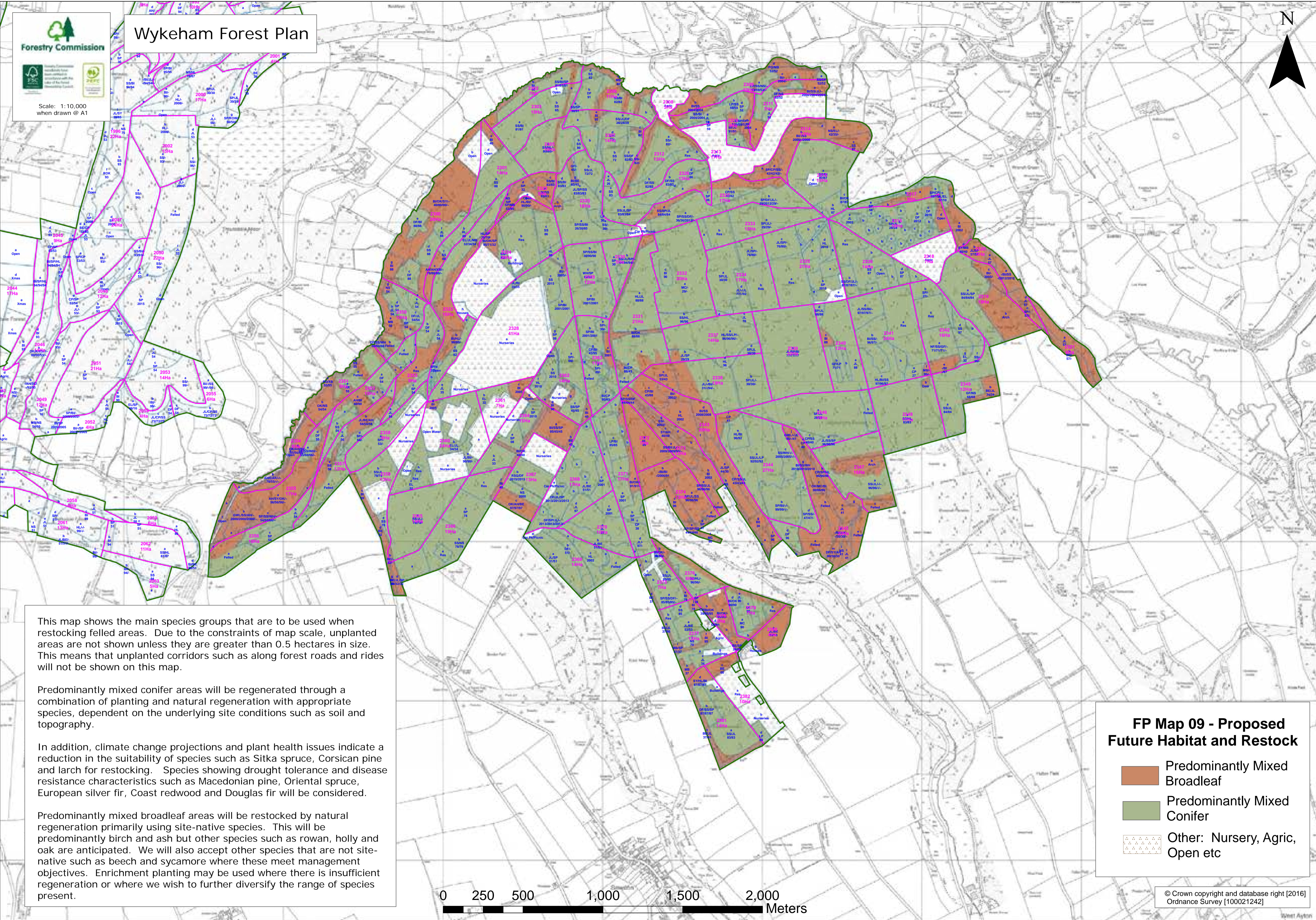
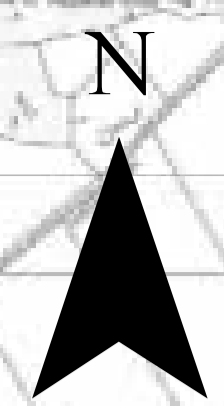
- Open, Felled, Agriculture etc
- 2017-2021
- 2022-2026
- 2027-2031
- 2032-2036
- 2037-2041
- 2042-2046
- 2047-2051
- 2052-2056
- 2057-2062
- Felling Beyond Plan Period
- Continuous Cover
- Minimum Intervention - Candidate Natural Reserve
- Long Term Retention





Wykeham Forest Plan

Scale: 1:10,000
when drawn @ A1





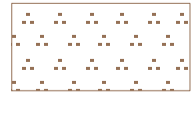
This map shows the main species groups that are to be used when restocking felled areas. Due to the constraints of map scale, unplanted areas are not shown unless they are greater than 0.5 hectares in size. This means that unplanted corridors such as along forest roads and rides will not be shown on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

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 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, 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 and ash 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.

FP Map 09 - Proposed Future Habitat and Restock

-  Predominantly Mixed Broadleaf
-  Predominantly Mixed Conifer
-  Other: Nursery, Agric, Open etc

