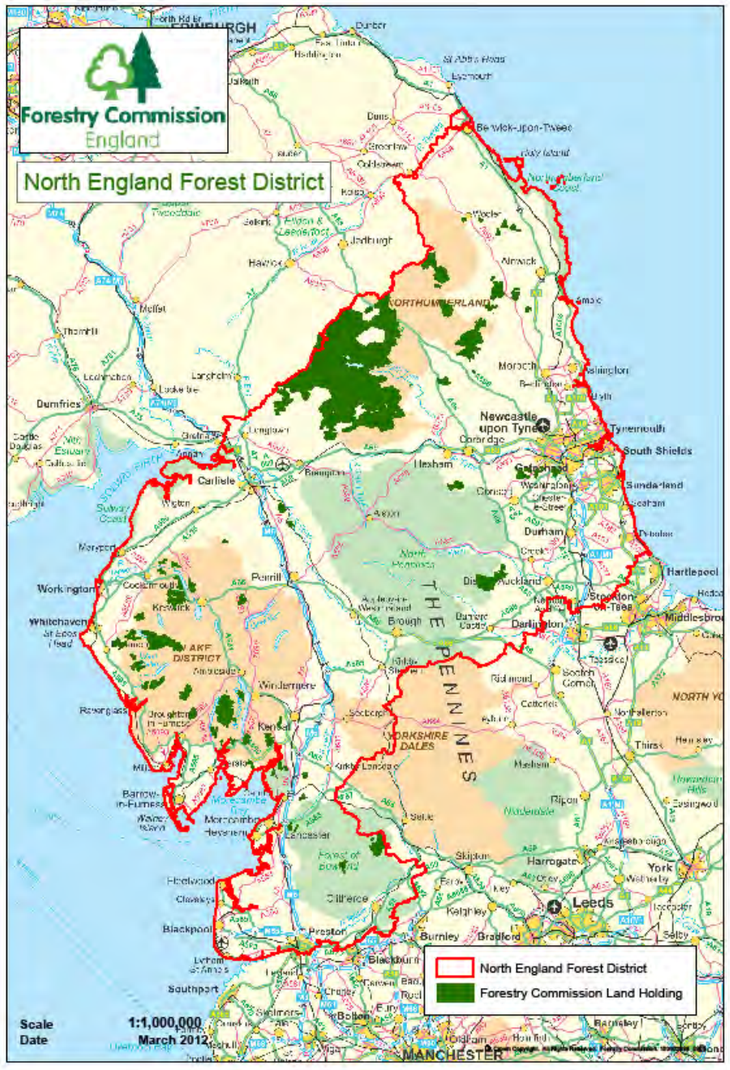
Knots Wood Forest Plan 2016

Forestry Commission England

North England Forest District

Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.



Planning and District Context

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

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

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

The woodlands of the district are currently arranged in 62 management areas, and their management is covered by individual ten year Forest Plans that identify local issues and the broad silvicultural management of the woods. Forest Plans are reviewed every five years.

These plans and their associated forest operations ensure that produce from the woodlands is endorsed by the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) as being produced from woodlands under good management that meet the requirements of the UK Woodland Assurance Scheme (UKWAS) and the UK Forest Standard (UKFS).

Individual Forest Plans aim to deliver a range of public benefits with achievable objectives that deliver the three drivers of sustainable land management outlined in the North England Forest District Strategy.

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

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

Knots Wood Forest Plan

This is the third revision for Knots Wood Forest Plan.

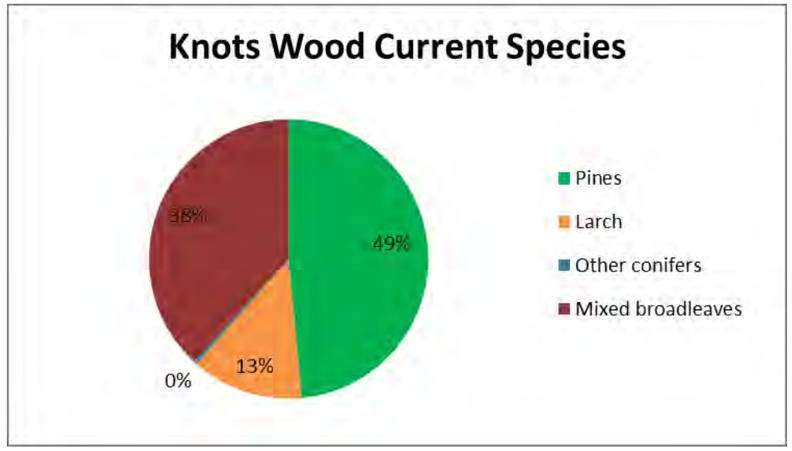
Part 1 Background Information

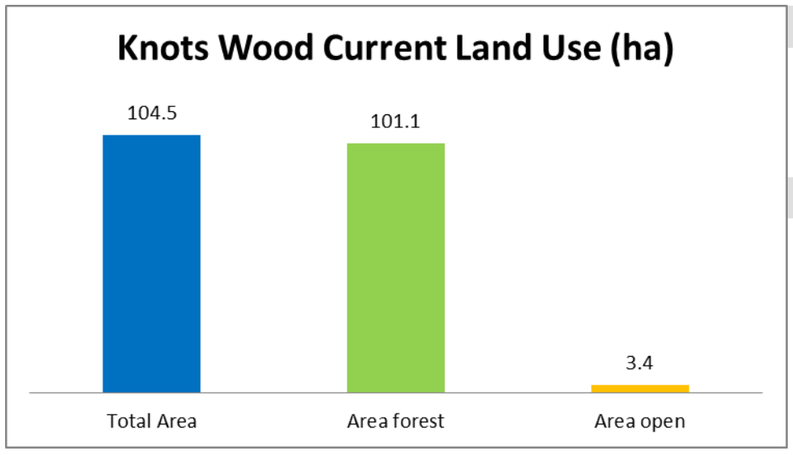
Introduction

Knots Wood is situated 2 kilometres to the east of Lancaster and lies within the Forest of Bowland Area of Outstanding Natural Beauty. The main block of Knots Wood and the associated outlying woods extend over a land area of 104 hectares. The land is leased from Quernmore Estate since 1952 and planted with productive tree species between 1955 and 1961. Over the period of the previous plan a programme of phased felling and restocking has been initiated.

Current Woodland composition

Of the total area approximately 100ha is afforested which includes 11ha unproductive land (intruded broadleaved species and bare land) and 3ha as permanent open land.



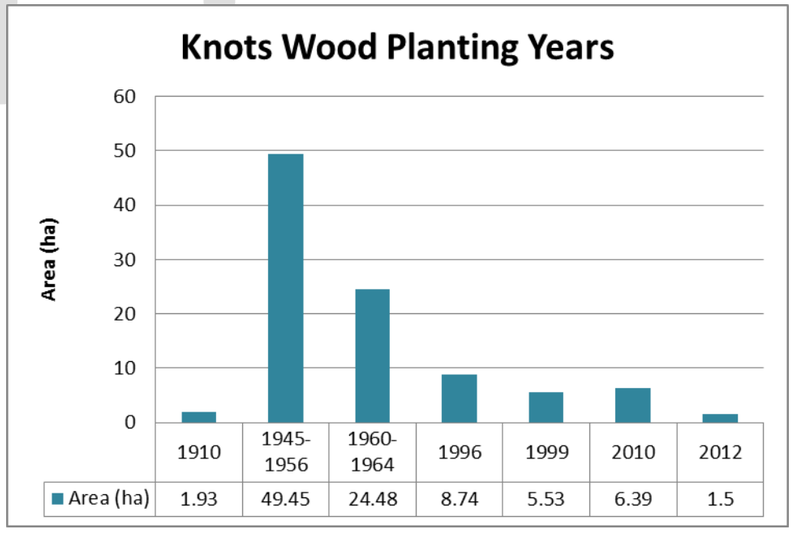


Species and timber potential

The dominant tree species within the main block of Knots Wood is Scots pine with some areas of other conifers, larch and beech. There is also an increasing proportion of locally native woodland that is dominated by birch, but includes oak and other minor tree species. Initially Scots pine proved to be fairly productive, achieving yield classes of 10 to 12. More recently severe damage by grey squirrels has caused many tree crowns to snap and some of the stands are looking rather moribund with a subsequent reduction in productive capacity. A Yield Class survey in 2015 highlighted the poor productivity of the principle commercial species, Scots pine and opportunities to generate future economic value of the woodland through the establishment of alternative species is an objective of the revised forest plan.

Age class

Knots Wood was planted predominantly from 1955 to 1961 and these early plantings are now approaching economic maturity. A program of felling and restocking has been underway since mid-1990.



Designated areas

Knots Wood lies within the Forest of Bowland Area of Outstanding Natural Beauty (AONB). The outlying woods of Longmire, Bushy Pasture and Lythe Brow are designated as Plantations on Ancient Woodland Sites (PAW's). These woods include some relic native tree species but are currently dominated by larch, beech and sycamore plantation. Due to difficult access, both too and within these woodlands, very little management work has been undertaken.

Landscape, Topography and Soils

Knots Wood, Longmire, Bessymire and Bushy Pasture are located in a prominent position on a small hill and lie between 50 and 150 metres above sea level. The western side of Knots Wood is particularly visible from the M6 motorway. Flodden Hill and Lythe Brow woods are located on a steep slope with a westerly aspect forming a narrow strip of woodland that is particularly visible from the busy minor road from the east of Lancaster to Caton. The soils within all the woods are mainly surface water gley and brown earth overlying gritstone bedrock which is exposed in several places as small scars and rocky knolls within Knots Wood. The thin nature of the soils and underlying bedrock presents challenges for ground preparation to enable tree establishment and planting of conifers has been costly and problematic.

Knots Wood, west of Quernmore, is classified in the 'Farmed Ridges' Landscape Character Type within the AONB. Although relatively low in comparison to the Bowland Fells, the sinuous gritstone outcrops which form the distinctive Farmed Ridges provide a textural backdrop to the surrounding lowlands. The ridges, which rise quite dramatically from the surrounding landscape to elevations of 140-230m, have distinctive rounded profiles and are predominantly covered with a mosaic of mixed pastoral farmland and visually striking broadleaved woodlands. The ridge tops which afford long, open views across surrounding lowlands are often crowned with a woodland, settlement or road.

Knots Wood and the outlying woodlands are characteristic of the dense, mixed woodland which occur on the top of the ridge and contribute to the distinctive landscape pattern of mixed woodland and pastoral farmland.

Conservation and Heritage

Within the plan area are the ancient woodland sites of Lythe Brow, Flodden Hill, Longmire, Bessymire and Bushy Pasture. Though there are elements of relic native woodland, these sites are mostly covered by non-native plantations established in the early 1960s. Ideally, in a bid to restore native woodland cover, the non-native plantations should gradually be removed through a programme of thinning and felling. Due to the presence of these outlying woodlands on past "disposal" lists and to problematic access, no thinning of trees or much other work has been undertaken. The legal status and physical nature of access routes will be reviewed and the potential for practical and efficient working within the woodlands explored.

Along the western edge of Knots Wood is a County Biological Heritage Site (BHS) recognised for its ornithological interest. A grey heronry, previously located at the northern end of the wood with peak occupancy in 1991 of 21 pairs, has since been noted in the present location by Lancashire County Council. The move from the traditional nesting site was probably as a result of disturbance caused by the laying of a gas pipeline outside the wood and numbers have declined to 7-8 pairs.

Towards the southern end of Knots Wood lies a small circular depression. The natural drainage outlet from this depression has been partially blocked at some point in the past, possibly to create a pond. Whilst not of a robust size, a lowland sphagnum bog has subsequently formed with localised biological interest. The area should be managed to maintain wet conditions and to prevent succession to woodland.

The more general biological interest within Knots Wood is in the process of being improved. This is through the phased felling and restocking of timber stands to increase the structural diversity of the woodland. At the restocking phase the establishment of a mosaic of permanent open space and native tree cover is being encouraged. This will be focused along woodland edges, adjacent to watercourses and in the vicinity of informal paths and rides. New native tree cover will mostly be achieved through the retention of natural regeneration of birch, rowan and holly in addition to some planting of sessile oak.

The only known features of historical interest include a number of old quarry sites and the boundary wall on the north-east edge of Knots Wood. These features will be routinely protected during any forest operations and maintained as necessary.

Communities and recreation

It is Forestry Commission policy to promote informal recreation such as walking, cycling, picnicking, and studying wildlife. We also seek to provide opportunities for more specialist users and for events when this is compatible with site conditions and other management objectives.

There are no public rights of way through the woodlands and access for public recreation is presently precluded by leasehold constraints. Occasional use by orienteers for training and events is permitted by agreement. The sporting rights are held by the Forestry Commission which is currently let.

However, the close proximity to Lancaster provides potential for the Forestry Commission to manage Knots Wood positively for wider public benefit. This could only be achieved through the acquisition of the freehold or through a change in lease conditions by agreement with our lessor. If the provision for public access could be secured there could be potential to deliver multiple benefits such as recreation, health and well-being, community engagement, conservation and local woodland management opportunities. Although not critical to the delivery of the plan securing public access will remain an aspiration through the period of the next plan.

Pests and diseases

Roe deer are resident in the area and there is potential for damage to both tree crops and other habitat types through browsing and grazing. The stalking rights are let to a third party and an annual cull is agreed with Forestry Commission rangers. Under the present fell and restock regime it has become impractical to achieve successful establishment without protection in the form of deer fencing.

Grey squirrels are prevalent throughout all the woodlands and are causing significant damage to mature tree crops. Previous attempts at population control have proved futile given the proximity to neighbouring woodland where little grey squirrel culling has taken place.

Rhododendron is extensive throughout Knots Wood and significant resources have been deployed in a bid to reduce the presence of this invasive species. A continued programme of work is essential though total eradication seems unlikely whilst there are seed sources on neighbouring land. Previous management has focused on the removal of rhododendron from within and around stands of timber which are approaching their harvesting date in an attempt to reduce levels of infestation post restocking or regeneration.

Larch is under potential threat from the disease Phytophthora ramorum and consequently there will be no restocking of larch in the near future. However, larch will be retained and accepted as a future component where it has been previously planted or where it is regenerating naturally.

Access and roading

Knots Wood is accessed from the minor public road from Lancaster to Caton. Access for lorries is restricted to a southerly approach and works to improve the entrance to allow lorries to approach from the direction of the M6 through Caton would be advantageous. Within Knots Wood the forest road extends a short way to a turning area beyond which the network of rides is not suitable for haulage. Upgrade of the existing forwarder track to enable lorry access through Knots Wood to link with forwarder access across fields to Bushy Pasture and Longmire Woods would enable commencement of economically viable PAW's management of these woodlands and improve accessibility for management throughout Knots Wood.
Access to and within Flodden Hill and Lythe Brow wood is very restricted. Although a right of access exists across fields south of Deys Farm into Flodden Hill access within the woodland is restricted and currently unsuitable for harvesting machinery. Future opportunities to convert these PAW's woodlands to native species will be subject to construction of suitable access.

Part 2 Analysis and Concept

The factors outlined in Part 1 present various opportunities and issues. These are summarised below and represented on the accompanying map:

KNOTS WOOD Factor	Opportunities	Issues
Soils	Soils generally good which provide potential for wider species diversity	Shallow soils overlying gritstone. Costly ground prep and problematic establishment with multiple beat up required. Weed growth
CCF	Knots Wood particularly visible from the M6 corridor and eastern outskirts of Lancaster so CCF would benefit landscape. Climate change mitigation and improved long term resilience. Greater species diversity. Low wind hazard.	Species diversity only achievable by under planting of shade tolerant species. Protection from deer crucial to successful establishment.
Biodiversity	Protect heronry and localised features Improved harvesting access would enable commencement of PAW's and CCF management	PAW's currently not managed (access issues)
Access/Roading	Good links and close to M6 Internal access could be improved by extending forest road to link with a turning area and forwarder access into Bushy Pasture/Longmire Wood	No access to manage outlying PAW's woods Poor access into wood from highway Agreement/permission needed from lessor to upgrade right of access across field to metalled track to Longmire/Bushy Pasture Lythe Brow inaccessible for economic management without significant investment in temporary roading and transfer point across field
Harvesting	Thinning opportunity – delay clear fell or move toward alternative silvicultural system Scale and shape of current coupes over next 10 years is appropriate but beyond this there may be some landscape issues as coupes would be visible on the skyline	Harvesting of 2012-2016 coupes not happened yet but in marketing plan for 2016-17. BHS has been relocated in a coupe currently scheduled for harvesting in 2016. Fell and restock system problematic and expensive due to nature of soils, weed growth and natural regeneration of birch on restock areas.
	viewed from the west Developing understorey of MB and localised evidence of Grand fir regeneration would suggest that CCF could be achievable.	
Pests and disease	Focus thinning to remove larch component and diversify with other species.	P.Ramorum – larch no longer desirable future species Rhododendron – significant impact and cost for removal. Neighbouring woodland needs management too. Grey squirrel – control possible but infill from neighbouring woods. In past prevalent post thinning with much resultant crown breakage and reduce productivity
Future Species/ Climate change	Opportunity for species diversity and increased resilience through underplanting and management by CCF. Potential alternative conifer species could include WRC, DF, ESF, GF, NF, RSQ and JCR. Developing MB understorey could provide woodfuel opportunities.	Under clearfell system species choice limited to light demanding species i.e. pines which will limit diversity. Larch no longer desirable species choice. Access improvements particularly needed to enable restoration of PAW's woods.
Current species	Scots pine over storey is wind firm.	Dominated by Scots pine. More recent larch planting no longer an option. Limited species diversity. Grey squirrel damage has affected the yield of SP P99 SP/JL restocking includes a high % of birch regeneration.
Public access	Provision of public access desirable and close proximity to city of Lancaster provides numerous opportunities. Forest Plan should include an action to explore all potential opportunities to secure public access. CCF would enhance visual quality and community value should public access be secured in the future.	Leasehold excludes public access and no formal PROW's are present in the vicinity.

<u>Appraisal of Opportunities and Constraints</u>

The current Forest Plan provides limited opportunity to achieve key national priorities for woodland management, 'People, Economy or Nature'. Economic potential of timber is restricted by the current species and clearfell/restocking regime. Conversion to an alternative system of woodland management (CCF) would have economic benefit through reduced restocking costs and potential to develop wider species diversity. If public access could be secured through negotiation with our lessor there is potential to make a significant contribution toward 'People' through community and public engagement. Long term conversion of the outlying PAW's woodlands could be achieved if internal access issues are addressed which would have positive biodiversity benefit.

Part 3 Objectives and Proposals

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

Forest District Strategic Goal	How Forest Plan delivers
ECONOMIC Wood Production – *'we will optimise the financial return from timber production compatible with the achievement of other district objectives whilst complying with the UK Forestry Standard and meeting the requirements of the UK Woodland Assurance Scheme'*	CCF provides opportunity for sustainable forest management maintaining productivity through the introduction of a wider range of conifer species determined through use of Ecological Site Classification (ESC). Potential alternative conifer species could include WRC, DF, ESF, GF, NF, RSQ and JCR. Developing mixed broadleaved areas provide local woodfuel market opportunities.
NATURE *'we will continue to diversify the age class structure of our even-aged woodlands and increase the value of all our woodlands and forest for wildlife'* *'we will ensure that rare and threatened habitats are protected and managed to maintain or enhance their conservation value'*	Environmental improvements will be delivered through forest restructuring achieved through forest planning, thinning and restocking and open space management. Continuous Cover Forestry will provide opportunity for wider species range and age structure. Initiate programme of rhododendron clearance linked to under planting of alternative conifer species. Take opportunities during routine thinning operations to widen rides to facilitate effective deer management throughout the woodland. Protection of BHS features through long term retention of mature over storey. Initiate economically viable management of PAW's woodlands with improved access.
PEOPLE '*we will utilise the land and resources at our disposal to assist communities close to our forests to enhance their environments and hence their quality of life'* '*we will provide public access to all our forests and woodlands where there are no legal or safety restrictions…'*	Improve the internal and external attractiveness of the woodland through restructuring and species choice. Species diversity and sympathetic management of external boundaries to enhance visual impact of the forest from public rights of way and the wider landscape. Provision for public access remains an aspirational objective within the plan.

Part 4 Monitoring plan

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

Objective	Criteria for success	Assessment
ECONOMIC Wood production	Marketable parcels of timber on offer to the trade. Improved timber harvesting access and infrastructure	Production forecast and sales records Harvesting facilitated according to the management plan
Sustainable economic regeneration	Successful establishment of underplanting.	Restocking assessment
NATURE Restructuring	Delivery of Forest Plan felling/thinning and restocking proposals	Five yearly Forest Plan review
PEOPLE Visual enhancement to visitors.	Establishment of mixed woodland and ongoing restructuring of the plantations.	Five year Forest Plan review.

Part 5 Forest Plan Maps

- Location – 1:50,000 scale showing location in context of other woodland in the local area
- Current Species – species composition in 2016
- Landform – indicating topography of the woodland and local area
- Wind Hazard - windiness represented by Detailed Aspect Method Scores (DAMS)
- Soils – indicating soil composition across the woodland
- Conservation and Heritage – statutory and non-statutory conservation and heritage features.
- Recreation, Access and Services - formal public rights of way, FC access and local services.
- Issues and Opportunities – representation of significant issues and opportunities to be considered in the final design concept
- Operations Proposals – showing felling periods, areas of Continuous Cover Management and location of proposed new road lines and access requirements which require EIA screening.
- Future Species – representing design concepts and the long term vision for future species composition and open habitat.

Forestry Commission England

Knots Wood Location

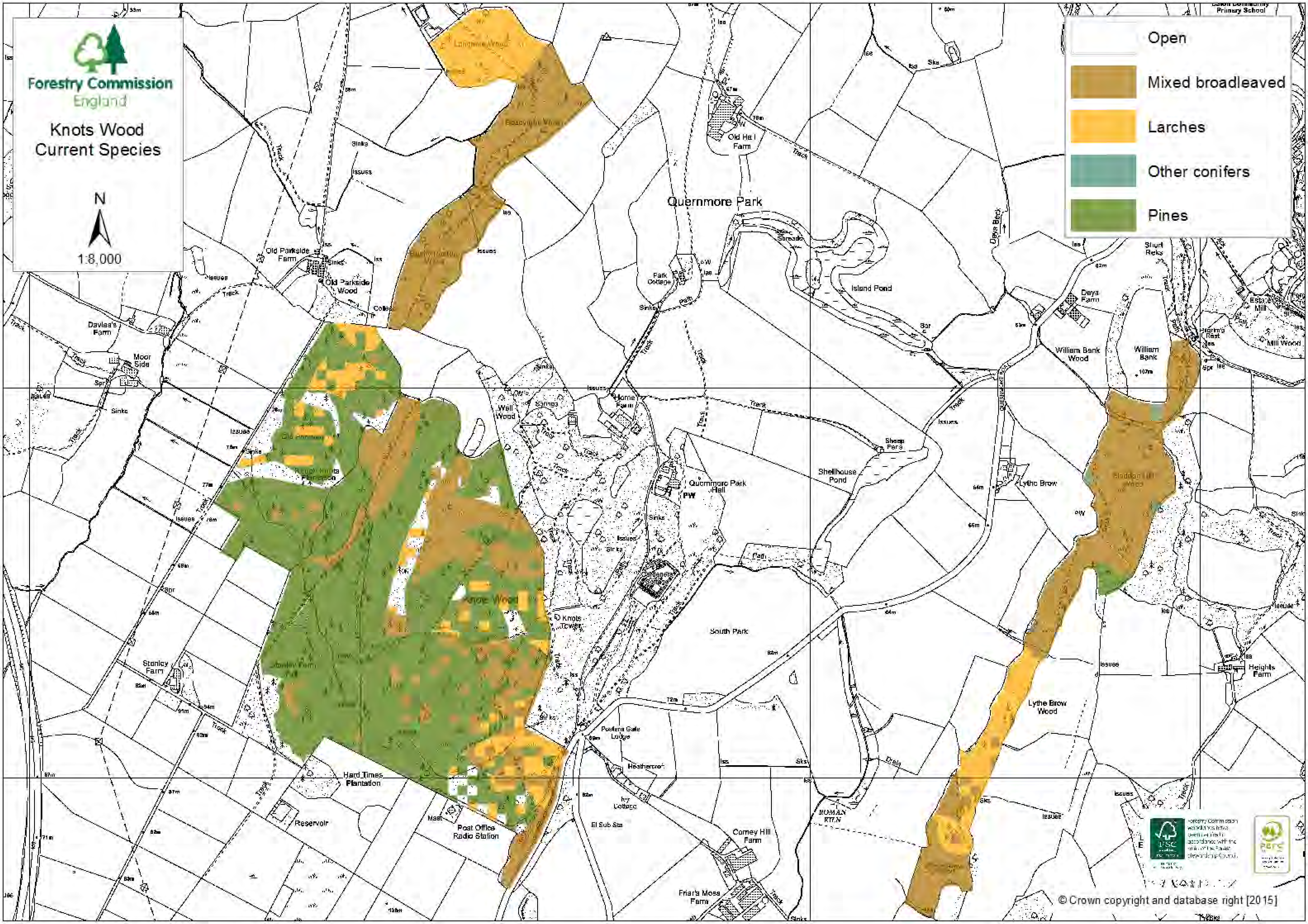
N

1:50,000

Knots Wood

Other FC Woodland

LANCASTER DISTRICT


Forestry Commission
England
Knots Wood
Current Species
N
1:8,000
Open
Mixed broadleaved
Larches
Other conifers
Pines
Quernmore Park
Old Parkside Farm
Old Parkside Wood
Davies's Farm
Moor Side
Old Hall Farm
Island Pond
William Bank Wood
William Bank
Deys Farm
Home Farm
Well Wood
Quernmore Park Hall
Shellhouse Pond
Lythe Brow
Knots Tower
South Park
Stanley Farm
Hard Times Plantation
Reservoir
Post Office Radio Station
Postern Gate Lodge
Heathercroft
Ivy Cottage
El Sub Sta
Corney Hill Farm
Friar's Moss Farm
Lythe Brow Wood
Heights Farm
ROMAN KILN
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Forestry Commission England

Knots Wood Landform

N

1:8,000

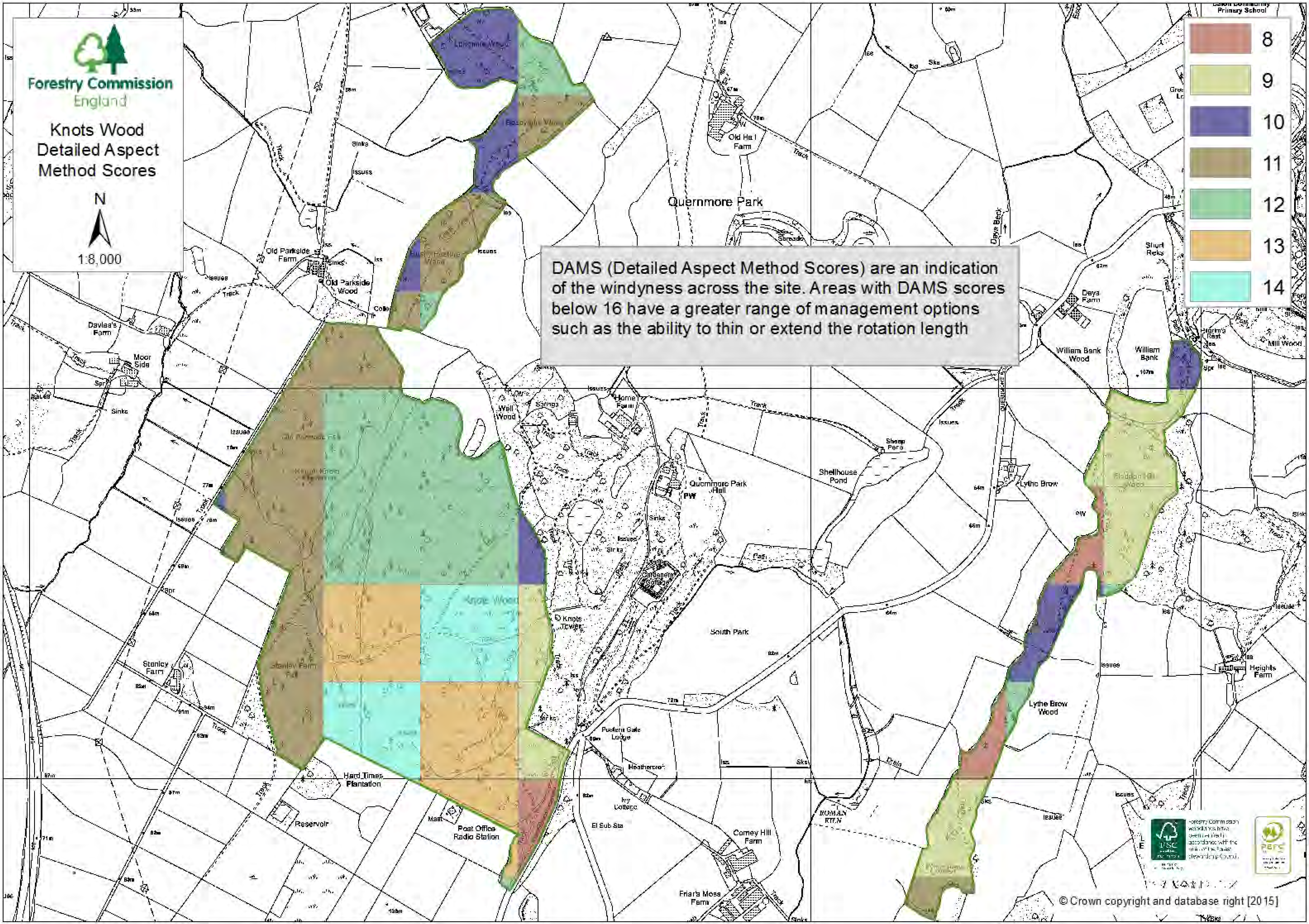
50m Contours

Watercourses

Longmire and Bushy Pasture lie to the north of Knots Wood occupying gently rolling terrain

Knots Wood is located in a prominent position occupying a hilltop and lies between 50 and 150m above sea level. The wood is particularly visible from the motorway

Flodden Hill and Lythe Brow are located on a steep slope with a westerly aspect overlooking the valley.



Forestry Commission
England
Knots Wood
Detailed Aspect
Method Scores
N
1:8,000
8
9
10
11
12
13
14
DAMS (Detailed Aspect Method Scores) are an indication of the windyness across the site. Areas with DAMS scores below 16 have a greater range of management options such as the ability to thin or extend the rotation length
Quernmore Park
Old Parkside Farm
Old Parkside Wood
Davies's Farm
Moor Side
Old Hall Farm
Quernmore Park Hall
Knots Tower
South Park
Shellhouse Pond
Lythe Brow
Lythe Brow Wood
William Bank Wood
William Bank
Deys Farm
Heights Farm
Stanley Farm
Hard Times Plantation
Reservoir
Post Office Radio Station
Postern Gate Lodge
Heathercroft
Ivy Cottage
Corney Hill Farm
Friar's Moss Farm
Knots Wood
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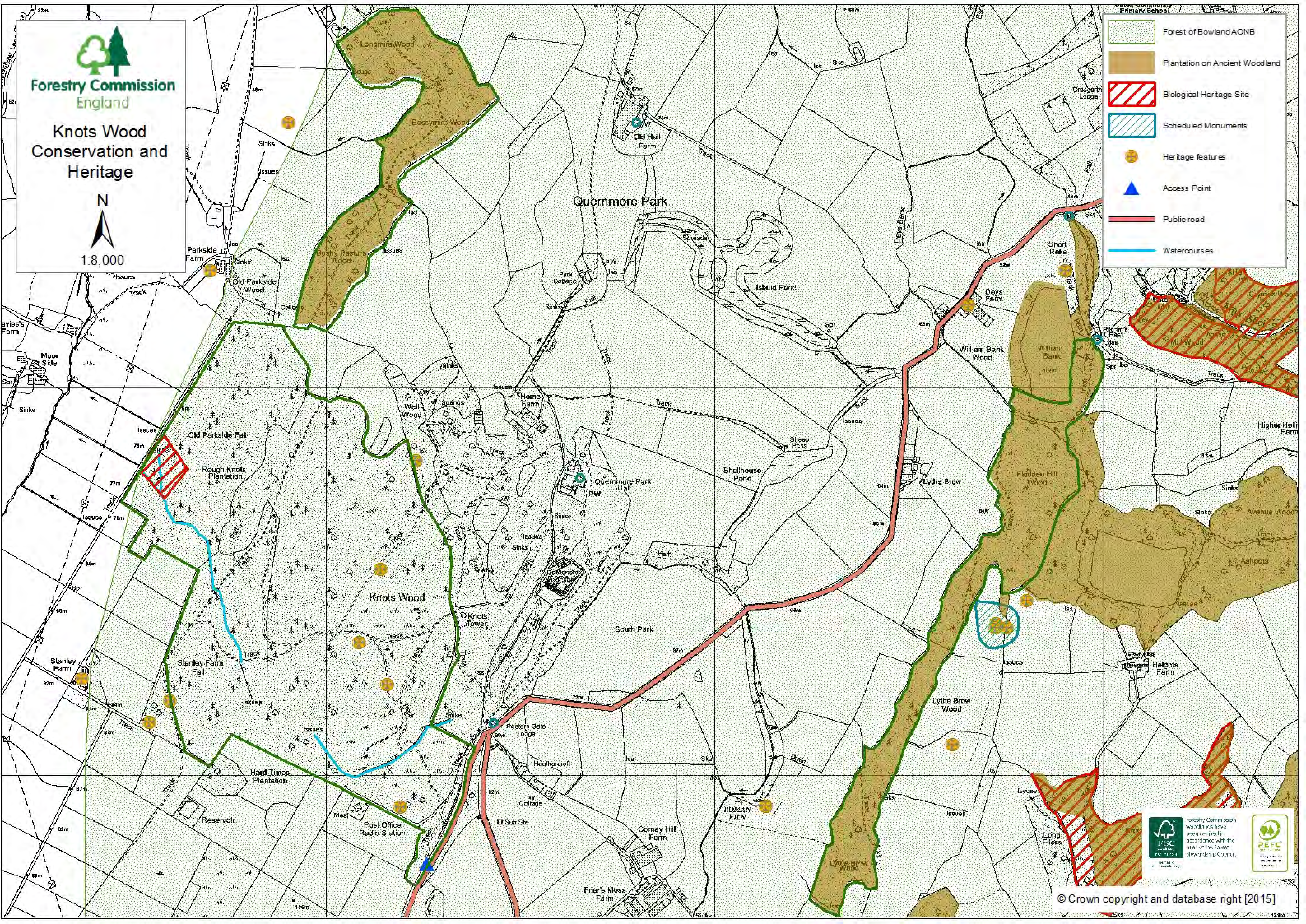
Forestry Commission England

Knots Wood Soils

N

1:8,000

- Brown Earth
- Ironpan
- Surface Water Gley


Forestry Commission England
Knots Wood Conservation and Heritage
N
1:8,000
Forest of Bowland AONB
Plantation on Ancient Woodland
Biological Heritage Site
Scheduled Monuments
Heritage features
Access Point
Public road
Watercourses
Quernmore Park
Knots Wood
Old Parkside Fell
Rough Knots Plantation
Stanley Farm Fell
Hard Times Plantation
Reservoir
Post Office Radio Station
Postern Gate Lodge
Quernmore Park Hall
South Park
Shellhouse Pond
Lythe Brow
Lythe Brow Wood
Island Pond
William Bank Wood
Heights Farm
Long Fliers
Friar's Moss Farm
Cornay Hill Farm
Old Hall Farm
Parkside Farm
Old Parkside Wood
Stanley Farm
Knots Tower
Home Farm
Well Wood
Deys Farm
Short Reke
Higher Hall Farm
Avenue Wood
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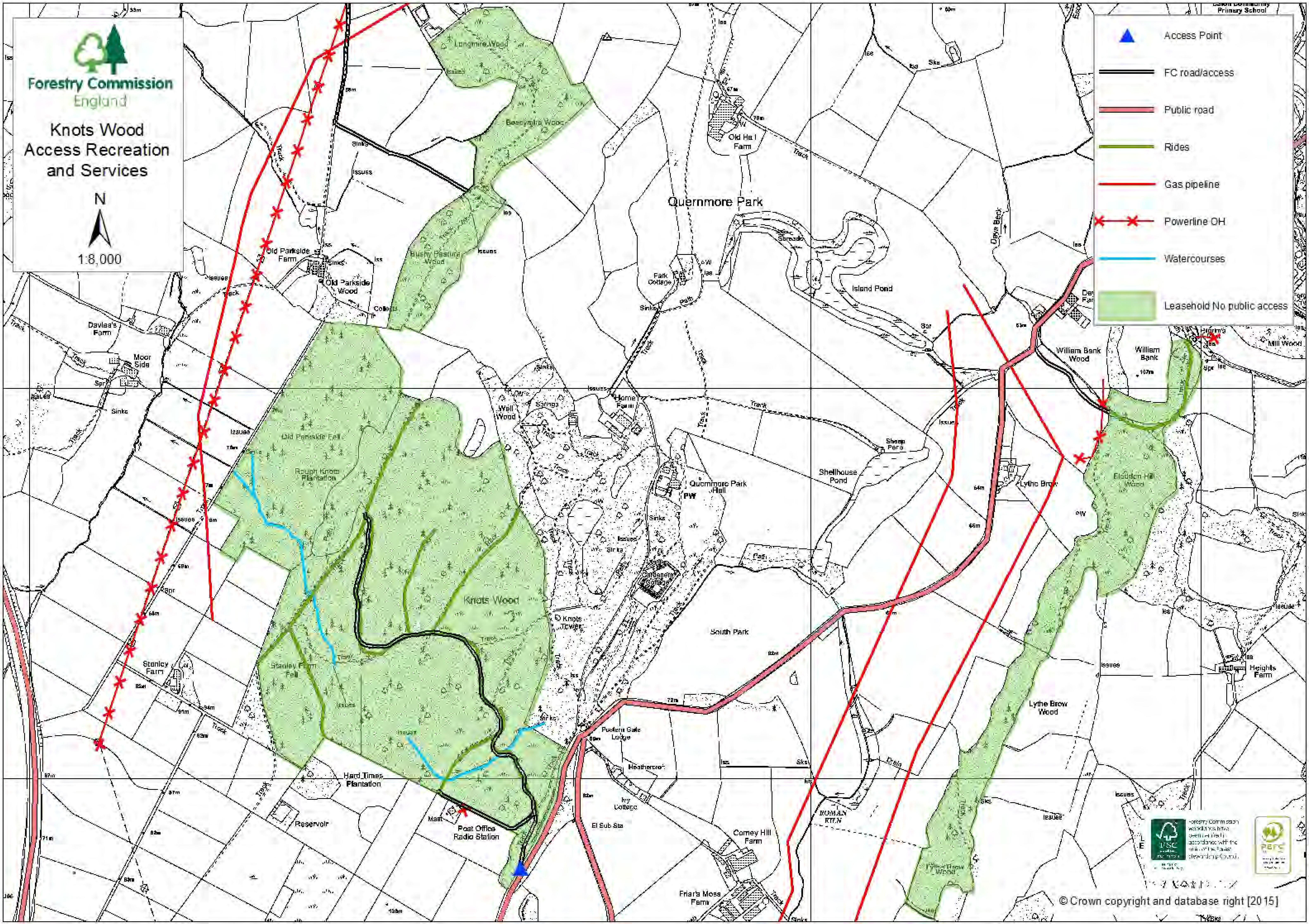

Forestry Commission
England
Knots Wood
Access Recreation and Services
N
1:8,000
Access Point
FC road/access
Public road
Rides
Gas pipeline
Powerline OH
Watercourses
Leasehold No public access
Longmire Wood
Beesymire Wood
Bushy Pasture Wood
Old Parkside Farm
Old Parkside Wood
Davies's Farm
Moor Side
Old Parkside Fell
Rough Knots Plantation
Knots Wood
Stanley Farm Fell
Stanley Farm
Hard Times Plantation
Reservoir
Post Office Radio Station
Quernmore Park
Old Hall Farm
Park Cottage
Island Pond
Home Farm
Well Wood
Quernmore Park Hall
Shellhouse Pond
Sheep Fold
Knots Tower
South Park
Postern Gate Lodge
Heathercroft
Ivy Cottage
El Sub Sta
Corney Hill Farm
Friar's Moss Farm
ROMAN KILN
William Bank Wood
William Bank
Mill Wood
Lythe Brow
Flodden Hill Wood
Lythe Brow Wood
Heights Farm
Dave Beck
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Forestry Commission England

Knots Wood Issues and Opportunities

N

1:10,000

Beech component provides economic woodfuel potential

Low wind hazard classification. Scots pine overstorey wind firm.

Limited access to Longmire and Bushy Pasture PAW's restoration dependant on access. Larch at risk from Phythoptora ramorum.

Generally good soils provide opportunity for wider species diversity. Climate change mitigation and improved resilience to pests and disease.

Potential for CCF management - benefits to landscape, wider species diversity, reduced restocking costs. Clearance of rhododenron as part of underplanting program.

Extension of forest road and provision of forwarder access through to Bushy Pasture Wood would improve economic viability of harvesting operations and PAW's restoration

Extensive rhododendron within Knots Wood and neighbouring woodland. Risks associated to Phythoptora ramorum and impact on restocking

Current fell and restock management regime hindered by problematic restocking, prolific birch regeneration, restricted choice of light demanding species at restocking. Landscape implications for hilltop coupes in the future.

Leashold excludes public access. No formal public rights of way

Close proximity to Lancaster - opportunities for public access and wider community engagement

Field survey indicates that yield class of Scots pine is lower than predicted. Average YC measured is 10

Moribund pine would provide a good overstorey for establishment of alternative conifers by underplanting in CCF regime

Larch at potential risk from Phythoptora ramorum

Restricted access for lorries which currently have to approach from the south.

Good road access north via Caton direct to M6. Potential to improve access for lorries

No access to and within Flodden Hill and Lythe Brow Woods. PAW's restoration dependant on access. Larch at risk from Phythoptora ramorum. Woods are visible in the landscape.

- Opportunities
- Issues
- New turning area
- Proposed forwarder route
- Proposed forest road
- FC Roads/Access
- Access Point
- Public road

Forestry Commission England

Knots Wood Operations

N

1:8,000

Continuous cover forestry (CCF) is an approach to the sustainable management of forests whereby forest stands are maintained in a permanently irregular structure, which is created and sustained through the selection and harvesting of individual trees.The term "continuous cover forestry" does not equate exactly to any one particular silvicultural system, but is typified by selection systems. Different existing forest stands may require different silvicultural interventions to achieve a continuously productive irregular structure.
Repeated interventions, typically at intervals of between 3 and 7 years, focus on the removal of trees which are interfering with the growth of trees with greater potential, the harvesting of crop trees at their optimum size, and the promotion of regeneration and small trees, such that an irregular stand structure is maintained in perpetuity

Right of access only.
Inadequate for timber operations

New forwarder road to improve internal access for timber harvesting and PAW's management of Bushy Pasture and Bessymire woods. EIA screening required.

Right of access only. No route exists across field.

New forest road extension and turning area to improve internal access for timber lorries. EIA screening required.

Proposed improvements to entrance to facilitate access for timber lorries approacing from the north. EIA screening required.

- Proposed forwarder route
- Proposed forest road
- FC Roads/Access
- New turning area
- Access Point
- Public road
- 2016
- 2017-2021
- 2022-2026
- 2027-2031
- 2032-2036
- 2049 onwards
- CCF/Min intervention

Forestry Commission England

Knots Wood Future Species

N

1:8,000

- Open
- Mixed broadleaves
- Mixed broadleaves/Pines
- Other conifers/Larches
- Other conifers/Mixed broadleaves
- Other conifers/Pines
- Pines/Mixed broadleaves

Quernmore Park

Knots Wood

Part 6 Forest Plan Outcomes

Landscape Appraisal

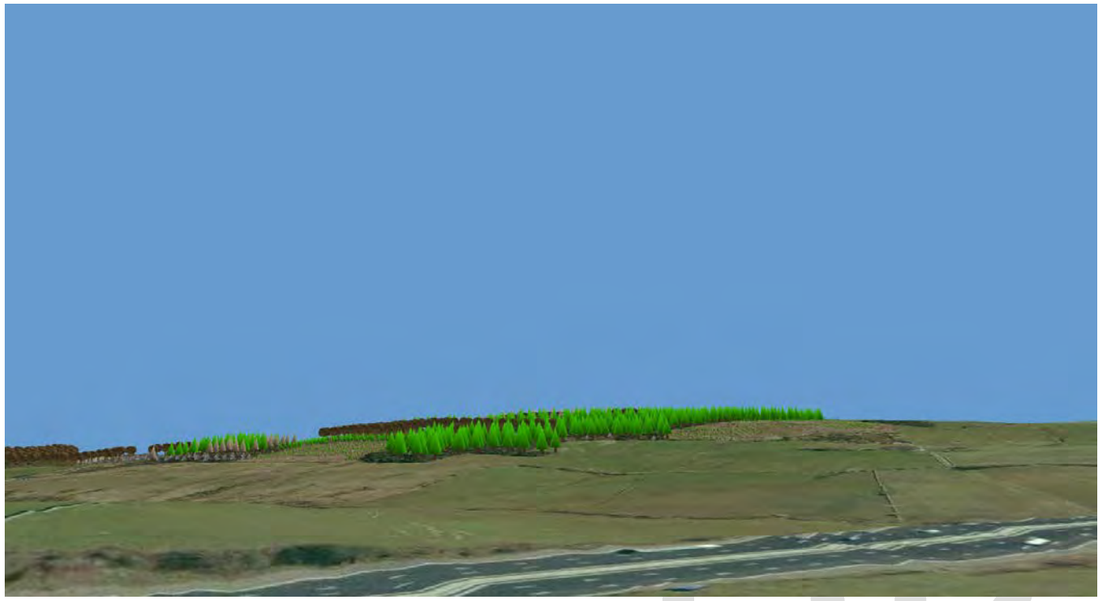
Visual sensitivity is analysed with consideration to visibility and the importance and nature of views of the forest from several key viewpoints. Shape, landform and scale are considered with particular emphasis on mitigating geometric shapes, symmetry and distinct parallel lines in the landscape through species choice, upper forest edge design coupe design and scheduling of harvesting.

Knots Wood is situated on a hilltop and is most prominent from the west, particularly from the M6 and outskirts of Lancaster. The outlying woodlands are less visible with the exception of Lythe Brow and Flodden Hill which, with their west facing aspect, are highly visible from the valley. As no significant management is planned for Lythe Brow and Flodden Hill through the period of the plan the 3D images below focus on the landscape impact from the M6.

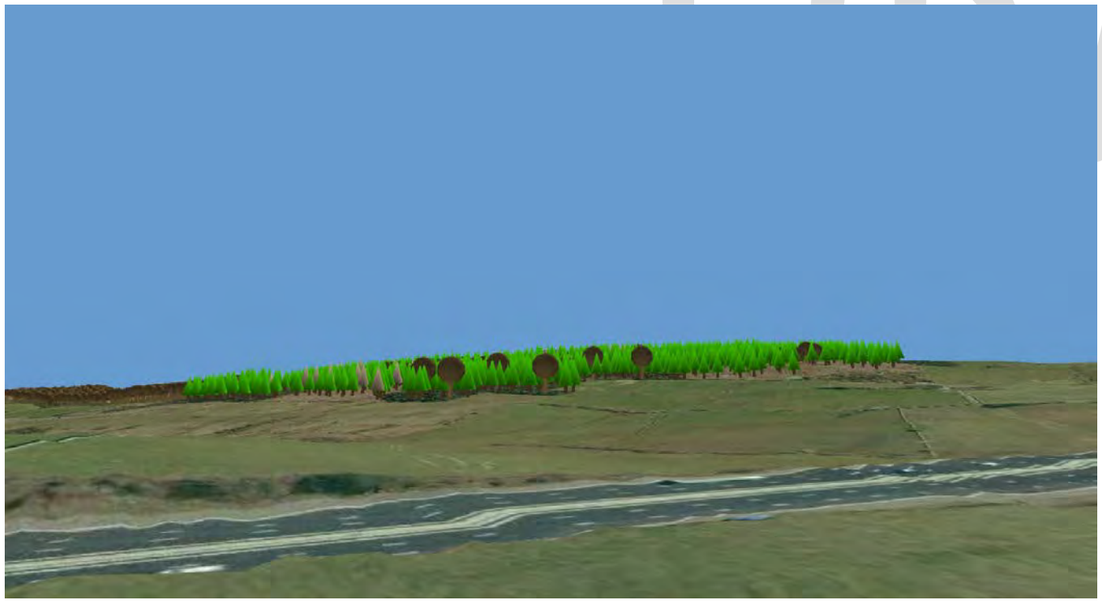
Knots Wood viewed from the west, outskirts of Lancaster.

Knots Wood, including neighbouring woodland in foreground viewed south from the Caton road.

Lythe Brow viewed south from the Caton Road.



3D representation from M6 (2016) highlighting the most recent restock area along the western edge.

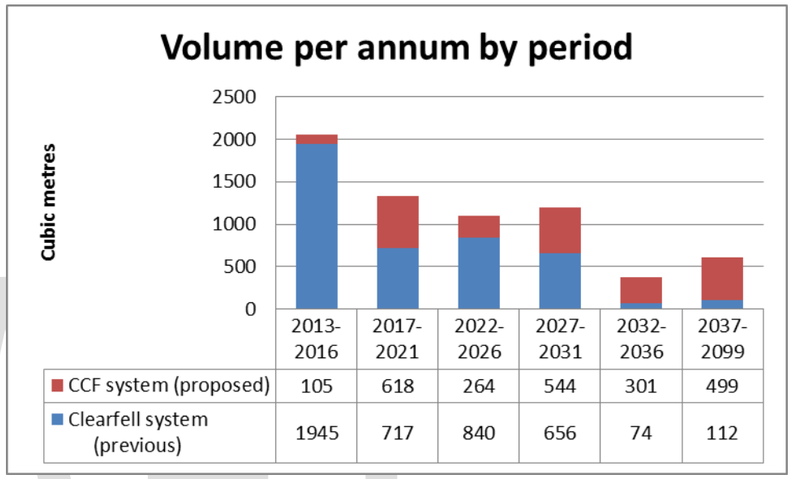


3D representation from M6 (2999) managed through Continuous Cover principles.

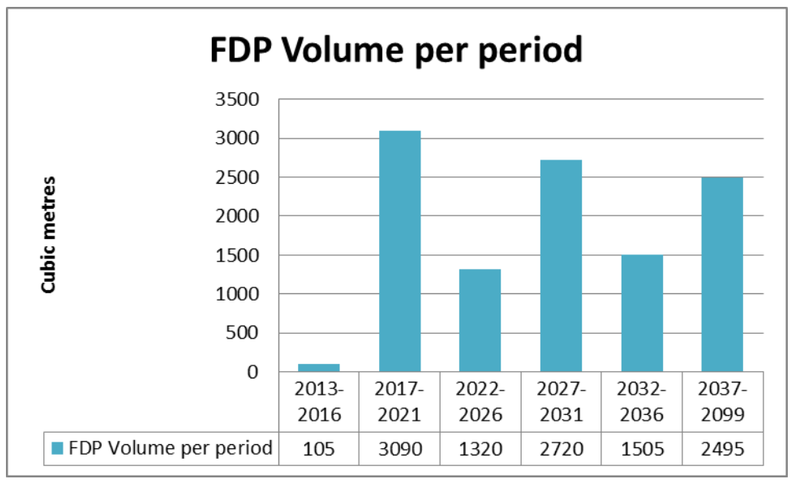
The representations of current and future woodland structure demonstrate the landscape impact of recent clearfell and restocking. Landscape continuity will be enhanced under the proposed CCF management.

Timber production

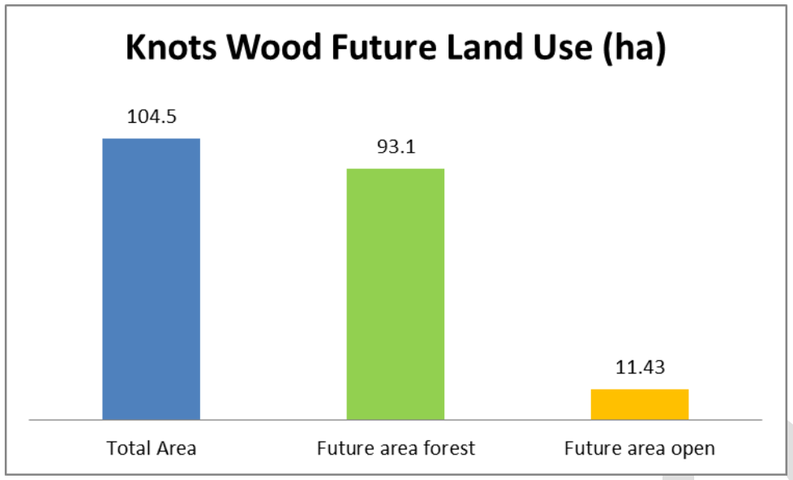
The table below indicates the comparison of annual volume between the current clearfell and restock system and the proposed continuous cover management. Although there is an initial reduction in production under CCF the volume is more sustainable over a longer time period achieved through regular ongoing thinning operations.



Yield is sustained into the future initially through thinning of the over storey and later through management of the developing mixed species under storey. Greater species diversity of the under planted stock will provide a wider range of future marketing options.

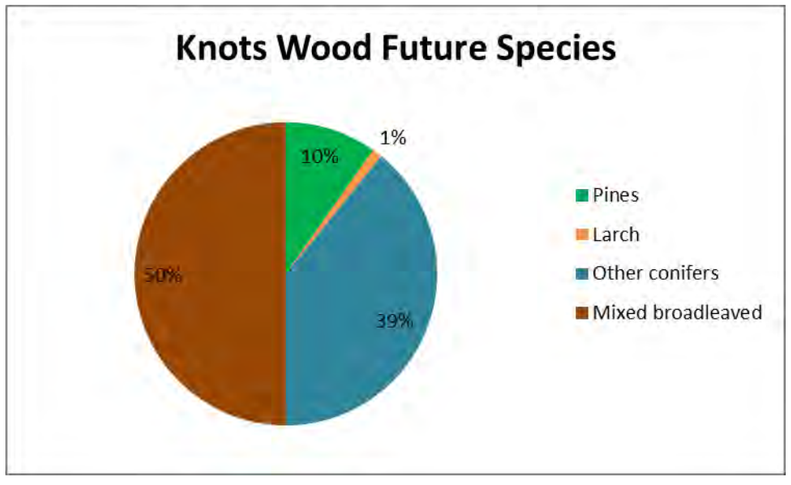


Future Land Use



Future Species

The combined percentages of future species composition shown below exceed the minimum requirements for UK Woodland Assurance Scheme and UK Forest Standard. The change in composition from a predominantly coniferous over storey to that of a broadleaved structure will be a gradual process over time through successive thinning interventions. The aim is to substitute commercial conifer for a wider selection of broadleaved species, for example red oak, sessile oak, birch and beech which will have an economic value as woodfuel or other wood products.



Productivity

The productive potential is optimised through timber production achieved through delivery of the harvesting plan and delivery of ecosystem services and other non-market benefits included in biodiversity, climate change mitigation, water, people and landscape. This is represented in the Productive Capacity Analysis below:

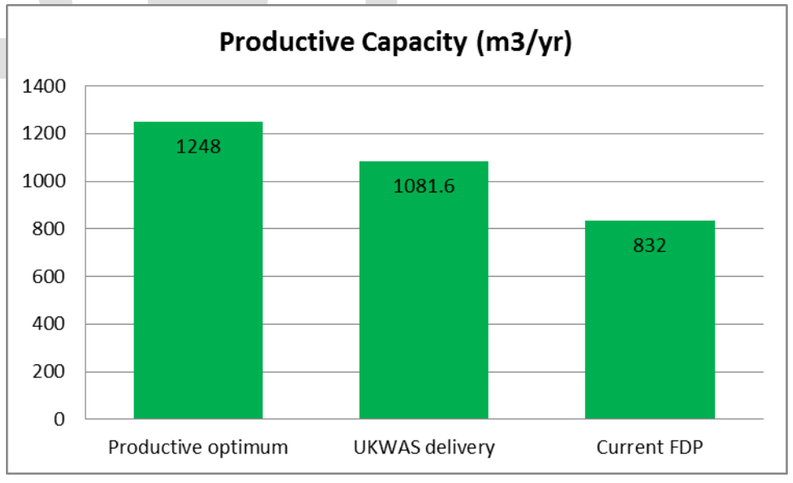
The graph shows the relative productive capacity (m^3/year) of the woodland based on average yield class as a comparison between the following scenarios;

1. Productive optimum – productive capacity assuming that the total productive area is planted with the optimum commercial species suited to the site (i.e. Scots pine YC 12).

2. UKWAS delivery – productive capacity achievable through minimum UKWAS compliance with a species percentage mix comprising 65% primary species (SP YC 12), 20% secondary species (MC YC 12), 5% broadleaved (YC 4) and 10% open space.

3. Forest Plan – productive capacity based on the percentage species mix and open land from this plan.

Note: The difference between UKWAS delivery and Forest Plan also includes requirements such as riparian corridors, landscape, ancient woodland, heritage etc. which require going beyond the minimum species composition and open space percentages to achieve UKFS.



The United Kingdom Forest Standard (UKFS)

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

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

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

Productivity	The productive potential is dictated by timber production achieved through delivery of the harvesting plan and delivery of ecosystem services and other non-market benefits included in biodiversity, climate change mitigation, water, people and landscape. This is represented in the Productive Capacity Analysis graph.
Structure	Future species composition; 39% mixed conifer, 10% pines and 50% mixed broadleaved, exceeds UKFS minimum requirements. Long term structure will improve through linking of permanent broadleaved and open habitats (10%).
Silvicultural	Continuous cover forestry (CCF) principles will be adopted with long term retention (LTR) of areas of broadleaved woodland. This will improve species and age class diversity.
Biodiversity	Priority habitats and species are considered during the planning phase. Ecological connectivity achieved by extending and linking areas of native broadleaved woodland and open space will be enhanced ensuring that the area is managed with conservation and biodiversity as a major objective.
Climate change	CCF and LTR areas will minimise soil disturbance. Forest resilience will be enhanced over time through greater species diversity, particularly establishment of alternative conifer species (39%), with age and stand structure diversification to help mitigate climate change and disease/pest outbreaks. Ecological Site Classification will be used to identify the most appropriate species.
Landscape	The planning process refers to the Local Landscape Character Assessment to inform the forest design. Visual sensitivity is analysed in the landscape appraisal with consideration to visibility and the importance and nature of views of the woodland from several key viewpoints. Shape, landform and scale are considered with particular emphasis on mitigating geometric shapes, symmetry and distinct parallel lines in the landscape through species choice, upper forest edge design and coupe design.
Historic	Historic features are recognised and their safeguard will be incorporated into operational management.
People	The Forest Plan is consulted with individuals, the local community and organisations with an interest in the management of the forest.
Water	Water quality will be protected through a CCF management regime with adherence to Forest and Water guidelines as a minimum during harvesting and forest management operations.

Longer term management proposals

The proposals in this plan should lead to a more diverse and resilient woodland, with a greater range of species, age class and habitats providing long term sustainability and greater resilience to future pests and disease. A wider range of conifer species will have been established, and the range of broadleaved species will have been extended.

Timber production will continue with successive thinning under a continuous cover regime which will also contribute toward climate change mitigation. Establishment of a broader suite of commercial species will provide long term sustainability and the development of broadleaves will offer potential for local woodfuel markets.

If public access can be secured in the future the objectives in this plan will lead to woodland which will be attractive to visitors and sympathetic to the landscape