Miterdale Forest Plan 2018

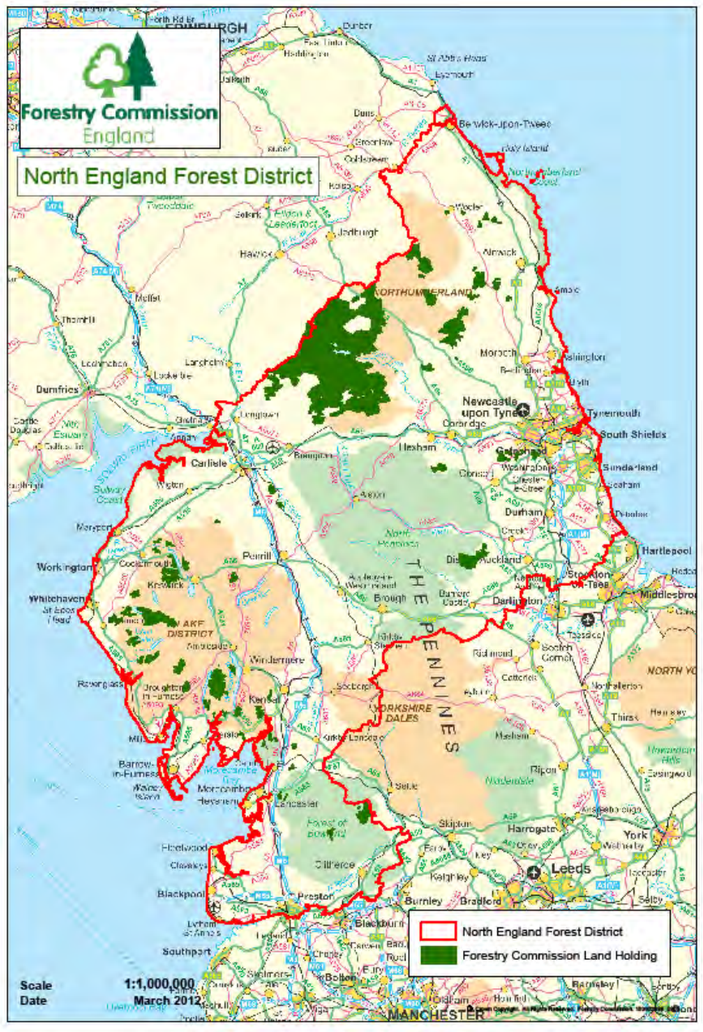
Forestry Commission England

North England Forest District

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.

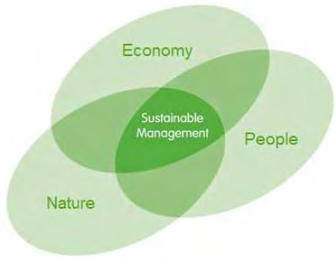


Our task is to realise the potential of each of the forests in our care for sustainable business opportunities, wildlife and nature conservation, and the enjoyment and well-being of local people and visitors. Each of our forests supports the economy through local jobs, sustainable timber production and 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 Standard (UKWAS) and the UK Forest Standard (UKFS).

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



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

- we will optimise the financial return from timber production compatible with achievement of other forest district objectives while complying with the UK Forestry Standard and meeting the requirements of the UK Woodland Assurance Standard.

- we will provide public access to all our forests and woodlands where there are no legal or safety restrictions. We will encourage and permit a wide range of recreational activities from walking and quiet enjoyment to more specialised activities 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

Miterdale Forest Plan

This is the fourth revision for the Miterdale Forest Plan, first approved in 1998 and reviewed in 2002 and 2006. The plan area now also incorporates Parkgate and Irton which was previously managed under a separate plan. Recent unplanned felling of Phytophthora ramorum infected larch over the last few years has necessitated changes to the scheduling of harvesting coupes and re-consideration of appropriate future species in some areas. Previous objectives relating to the restoration of Ancient woodland areas remain unchanged but the extent of conifer conversion to broadleaved woodland elsewhere in the forest has been reviewed to ensure that Miterdale retains its productive capacity in those areas where conifer crops are accessible and yield a good financial return.

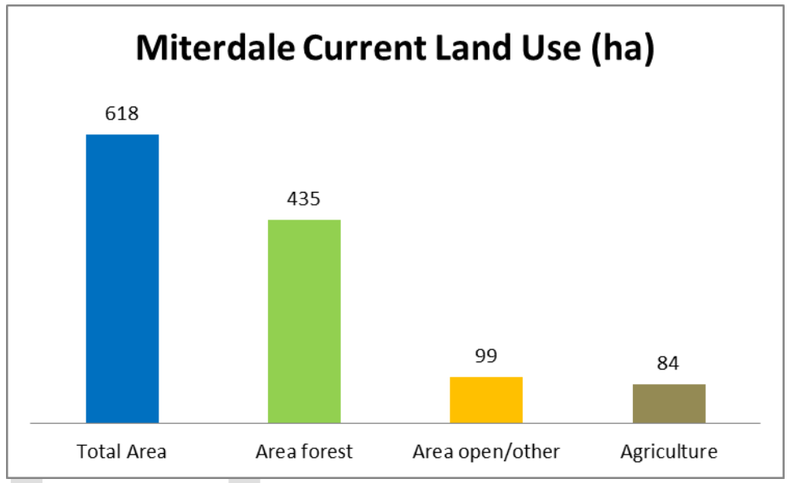
Part 1 Background Information

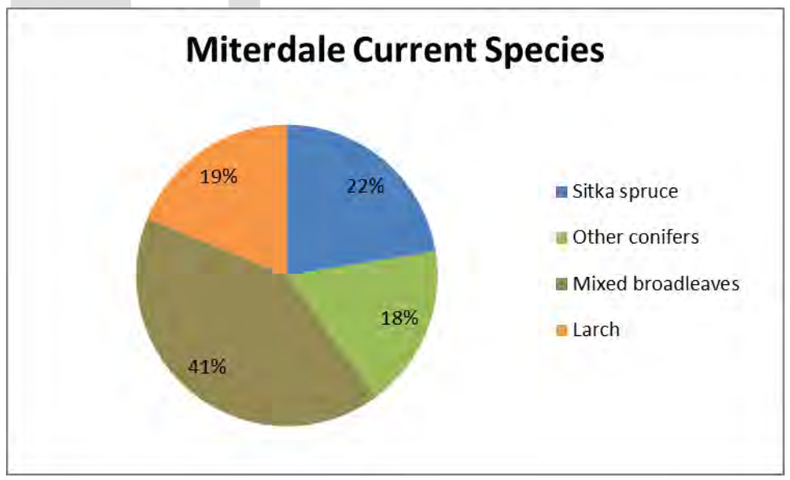
Introduction

Miterdale is situated south of Wasdale, within the Lake District National Park around 10km from the west coast of Cumbria at Ravenglass. Most of the land was acquired freehold between 1937 to 1957 with the exception of Parkgate which is leased from the Ainhouse Estate. The suite of woodlands consists of the areas of Miterdale, Miterdale Head, Irton and Parkgate. Miterdale lies on both sides of the valley of the River Mite and consists of two areas; Miterdale to the west and the more isolated Miterdale Head to the east end of the valley. Parkgate and Irton lie at the western end of one of the ridges leading down to the Wasdale Screes and both woods, whilst different in character sit well in the landscape with good connectivity to neighbouring woodland. In total the Forestry Commission owned land covered by this plan extends to 618 ha.

Current land use, woodland composition, species and timber potential

The valley bottom is dominated by farmland managed by tenants of Low Place Farm. Bordering with and linking into the farmland is ancient semi-natural Sessile Oak woodland, many with names such as Pickle Coppice, Great Bank Coppice which point to a previous use. Some of the oak woodland also includes a variety of mature conifer species which are being progressively thinned out. In the middle slope the coniferous crop contains a high percentage of larch with some areas of planting originating from the 1920s. Larch is an important landscape feature, the value of which has been recognised for a long time in the locality and disease outbreaks of Phytophthora ramorum presents challenges in maintaining both landscape and economic objectives. In addition there are a number of areas of Western Hemlock which need to be felled before they get to an age when they can regenerate profusely. Further up the slope on both sides of the valley spruce is the dominant species with the majority of the planting occurring through the 1950's to the early 1960's.





Sitka spruce and Japanese larch have historically been the main conifer species, both producing good quality timber for local processors on an industrial scale using modern mechanised machinery, thereby supporting the local economy. Recent planting presents a more balanced and diverse species structure in terms of the inclusion of broadleaf species and alternative conifer species. Birch is scattered throughout the woodland and alder and willow follow the network of streams.

Terrain is variable from generally level or gently sloping in the lower lying areas of Miterdale and Parkgate to steeper ground broken with rocky outcrops and wet areas on middle and upper slopes and in Irton. Timber harvesting can be done with mechanised harvester – forwarder based systems supplemented by skidders or high lead winch systems. Soils are mainly upland brown earths, rankers and peaty gleys and the productive capacity of the area is good, commercial plantations typically achieving Yield Class in the range 10 to 20.
As with many upland forests within Great Britain managing the risk of wind throw is a major constraint when allocating felling dates to crops. Economic felling age is often limited to the age at which they are expected to achieve terminal height (the height at which major wind blow can be expected). However, at lower levels Miterdale is typified by generally stable site types in terms of exposure, and much of the area has been classified as wind hazard class 2 to 3. Options on the timing of clearfelling and opportunities to thin or utilise continuous cover silvicultural systems will be reviewed as part of this plan revision. In practical terms any areas of windthrow below 3 should be thinable but much of the upper slope is within wind hazard class 4 to 5 and has therefore not been thinned.

Designated areas

Miterdale is situated wholly within the Lake District National Park within a World Heritage Site (UNESCO 2017 Outstanding Universal Value as a 'cultural landscape'). This designation gives the opportunity to demonstrate at a practical level how activities such as forestry, which have been prominent in shaping the landscape we see today, can be integrated to provide greater public benefits through sustainable land management delivering for people, nature and the economy.

Miterdale Head is a Site of Special Scientific Interest (SSSI) managed under a plan agreed with Natural England. Previous surveys have identified valuable soligenous mire habitat important for bryophytes such as Eriophorum latifolium and odonata including the Keeled Skimmer dragonfly. Additionally there are several areas of ancient semi natural woodland within areas of plantation on ancient woodland sites (PAW's) in Miterdale and Parkgate.

Conservation and Heritage

Miterdale Head SSSI is unique in being the only recorded example of relic hazel-birch woodland in West Cumbria. It is noted for its extremely rich oceanic moss and liverwort flora, which includes several exceptionally rare species.

Elsewhere, the conservation value of the forest is high, focused primarily on the areas of ancient semi-natural and ancient replanted woodlands. A variety of tree species including very large veteran trees such as Lime, Ash and Oak are present and open habitats include a wide range of flora and fauna. Much has been achieved over previous years to remove conifers and promote regeneration in these areas which also contain a high percentage of large diameters dead wood. Around 10ha of woodland along the River Mite is managed as a Natural Reserve with little intervention except on the grounds of public safety providing the opportunity for natural processes and woodland regeneration.

Two areas of open fell in Miterdale have been managed with very limited intervention and although little is known about their value the absence of any grazing over a long period of time means that they are likely to contain valuable species characteristic of ungrazed open fell habitat.

Miterdale is a diverse valley even given the large areas of conifer planting. This diversity is due to the variety of species planted and growing naturally, large unmanaged areas such a Great Bank, agricultural grazing in the valley bottom and the large areas of native woodland. In addition the different growth rates have given the forest a varied age structure and the variety of un-thinned, thinned, open space and links with agricultural land all adding to the mosaic. The area is home to Red Squirrel, deer and badgers as well as a range of other wildlife

Historical interest is concentrated in Irton which includes part of a larger scheduled ancient monument known as Mecklin Park Cairn Field (SMR no. 03709). The monument includes the remains of a Bronze Age cairnfield situated on a ridge which runs WSW towards Irton Pike. The cairnfield contains at least 30 cairns measuring between 1.5m and 5m in diameter and standing 0.5m to 1m in height. Several of the cairns are round cairns with visible kerb stones. One was excavated in 1958 and found to contain a flint knife, three flint scrapers, a barbed and tanged arrowhead, sherds of Food Vessel pottery and 125 jet beads. Further partial excavations of several other cairns indicates that the cairnfield includes both funerary cairns and prehistoric clearance cairns. The cairnfield lies within an area exploited for iron ore in the 19th century, with remains related to this mining activity extending across and beyond the boundaries of the monument. A series of post-medieval boundary walls run through the scheduled area, which are not included in the scheduling, although the ground beneath is included. The Forestry Commission manages the western 0.8ha of the monument which extends east to a total of 5.2ha.

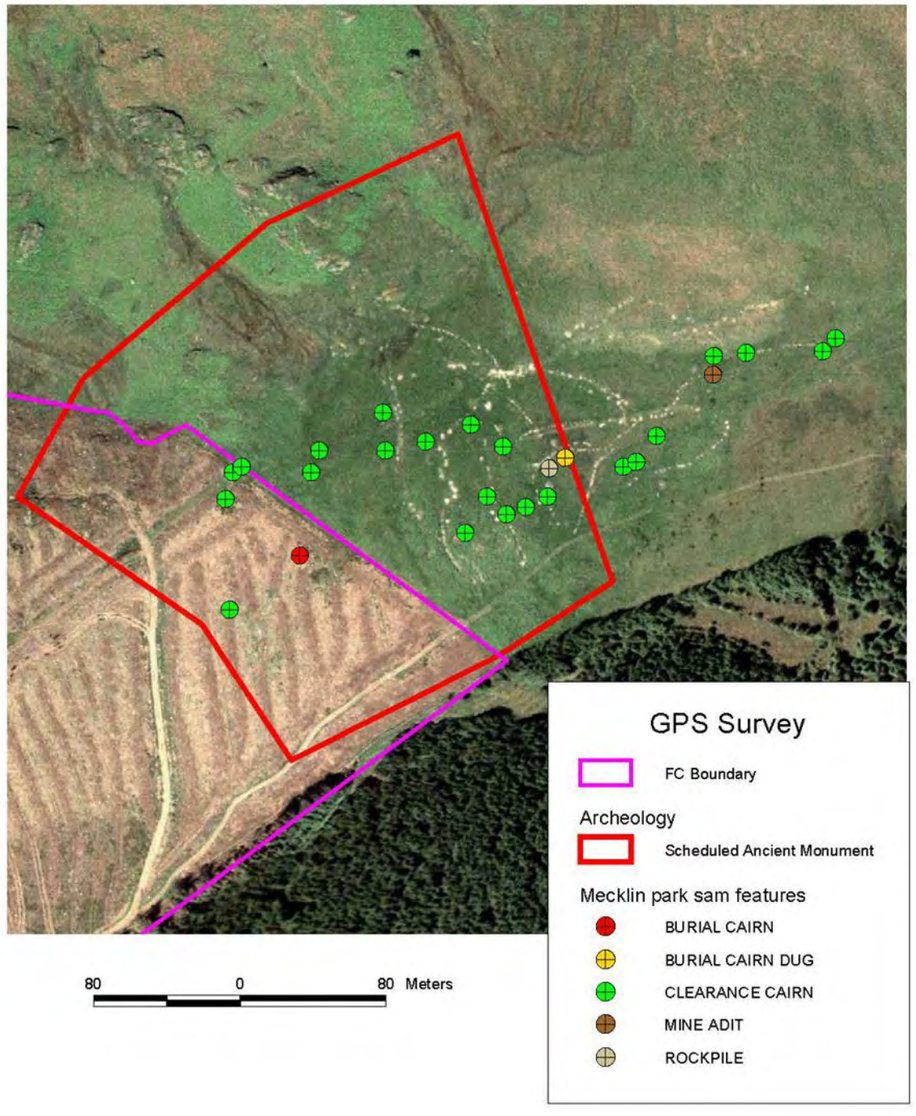


Plate 1 Aerial view of cairnfield Nov 2002

Elsewhere Miterdale is rich in historical features including the presence of old enclosure walls, field systems and an old farmstead. The oak woodland has many examples of charcoal platforms and pitsteads which demonstrate the historic significance of woodland throughout the Eskdale valley.

Plate 2 Charcoal platform (or 'pitstead') at Great Bank Coppice, Miterdale

Landscape

Miterdale is located within Area 44: Eskdale landscape character area (LCA) situated at the south western corner of the Lake District National Park, in close proximity to the western coast. Distinctive characteristics of the LCA include:

- Long valley of contrasts, moving west to east from the broad coastal plain at the western edge, to the soft, verdant, green landscape surrounding the river, with cascading becks in the middle section, to the rugged, craggy and bleaker mountain character at the eastern end of the valley.
- Strong enclosure patterns of pink granite stone walls criss-crossing the dale sides, which are clad in heather moorland and rough grass at higher altitudes.
- Use of local pink granite; boulders, river cobbles or quarried stone has created the most distinctive and recognisable building character in the Lake District. Also the use of St. Bees red sandstone in the 19th century for stone dressings, adds to the identity and sense of place.
- Large patches of woodland, broadleaved, mixed and coniferous give a well wooded feel apart from at the eastern end of the valley.
- Steep and dramatic twisting path of Hardknott Pass leads visitors into and out of the valley at the eastern end.

- Muncaster Castle, with its extensive gardens and woodland is a striking landscape feature perched on a high shelf above the floor of the valley at its western end.
- Meandering River Esk, which often cascades and tumbles down the valley and is lined with patches of linear woodland, provides the central focus of the area.
- Accessible and popular landscape.
- Series of tarns perched above the valley sides (including Blea Tarn and Stony Tarn).
- Predominantly a tranquil valley especially at the foot of the High Fells in the east. The strong sense of tranquillity is due to the openness and perceived naturalness of the valley in addition to the relative absence of settlements and night time light pollution.

Guidance in relation to managing change or development emphasises the need to maintain the strong sense of isolation, tranquillity and sense of place.

The forest is visible from many viewpoints including Birker Fell, Muncaster Fell, the Scafell range and the minor roads between Santon Bridge, Eskdale Green and Holmrook. The diverse nature of the tree species, including the large broadleaf component within Miterdale, Parkgate and Irton coupled with an existing planting pattern which reflects the underlying land form (for example in Parkgate where the five knolls that underlie the woodland are not obscured by planting) means that the woodlands generally fit well in the landscape with strong links to neighbouring woodland. Actions from previous plans have focused on landscape improvement connected to the shape and location of the upper forest boundary. Many of these harsh forest boundaries from the first rotation planting have now been removed, for example at Irton Pike adjacent to Mecklin Park, the Wasdale ridge in Miterdale and the square planting on the north side of Miterdale Head. Harvesting along the boundary with the neighbouring Ainhouse Estate woodlands in Miterdale was delayed in an attempt to coordinate felling; however, these crops are now becoming unstable and subject to wind damage and need to be felled. Recent felling and conifer restocking on the adjacent ownership has now been completed and opportunities to mitigate straight edges along the ownership boundary will need to be taken at the restocking stage.

Communities and recreation

Recreation use in Miterdale is low key, quiet and informal in keeping with its location within the Lake District National Parks "Quiet Western Fells" zone and the LCA description. It is popular with walkers passing through from the surrounding area on the network of public footpaths and bridleways but there are no formal facilities provided other than an informal car park beside the river Mite. Where we hold the freehold there is freedom of access on foot and cycle over the forest road system.

The Lake District National Park is responsible for the maintenance of the public rights of way. Some of the paths are constricted and overshadowed by adjacent trees causing walkers to walk over a narrow section of path. This means that some sections are wet and eroded but this is improving with the previous and continuing objective to incorporate more open space along public rights of way to allow paths to dry out, increase their widths and improve internal and external views from the forest.

It is considered that the current level and type of use is appropriate for the area and no formal recreational provision is envisaged at the present time.

Pests and diseases

The varied age structure and range of species provides ideal habitat for Roe and Red deer. The population is monitored and managed by Forestry Commission rangers to an appropriate density in order that natural regeneration is possible. The Red deer are held in high regard with the general public and careful management is implemented to provide opportunity for people to see the deer. Roe deer numbers are increasing as the forest diversifies.

Grey squirrels are also present, often reported on the western edges of the forest and pose a threat to the local population of native red squirrels and have the potential to cause damage to mature trees.

Larch is threatened by the disease Phytophthora ramorum and there have been several outbreaks within the forest in recent years. Our strategy is to respond swiftly and expediently to outbreaks through adherence to Statutory Plant Health Notices as issued and agreed with Forest Services to try to reduce the spread of the disease within the forest and to neighbouring woodland. Consequently there will be no future restocking of larch; however in thinned areas of continuous cover natural regeneration will be accepted and monitored in the future. Larch is an important species within the landscape providing seasonal changes in colour and texture across the forest. As part of our strategy to deal with the impact of the disease the Forestry Commission is actively exploring the use of alternative species choice which is a positive outcome in terms of increasing the opportunity for diversification and improved future resilience.

Access and roading

Access to the forest for haulage is via minor roads from the west. The internal road network is complete and provides satisfactory access to all parts of the forest and there are no plans for further development or extension other than for routine maintenance.

Part 2 Analysis and Concept

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

Factor	Opportunities	Issues
Current species	Diversification of species composition is being achieved with the inclusion of Mixed broadleaves and other conifer species. Mixed conifer stands remain the primary economic species for timber production through the next rotation.	Crops are becoming increasingly unstable. Western Hemlock has high regenerative capacity and shade tolerant character which poses threat to ASNW. Larch is at risk from Phytophthora ramorum.
Management type	Potential for long term retention of more open grown areas of conifer and mixed broadleaved areas at lower elevations. Depending on future stability there may be opportunity for wider continuous cover management in some coupes currently managed through clearfell system. Elsewhere coupe clearfell systems are appropriate in terms of scale.	Wind hazard, soils and localised conditions will influence ability to thin and retain some crops. Decisions regarding thinning viability or conversion to continuous cover will be made in response to these factors.
Biodiversity and heritage	High conservation value of the woodland habitat associated with areas of ASNW throughout the forest. Continue with PAW's restoration work. Designated heritage features are located within open areas and therefore at low risk from future operations.	Natural regeneration onto the SAM. Western Hemlock regeneration into areas of ASNW. Threats to native red squirrel population by grey squirrels.
Access/Roading	Adequate internal network of forest roads.	
Harvesting	Coupes scheduled within the period of the plan will produce good volume of marketable timber.	Unscheduled early harvesting of larch in response to Statutory Plant Health Notices means that much of the forest will not produce timber again until beyond 2050 and may impact on scheduling of coupes in future years.
Pests and disease	Alternative species choice to replace felled larch will contribute to diversity and future resilience.	Larch is at risk from Phytophthora ramorum. Damage to softer conifers by deer may necessitate use of deer fencing.
Future Species/ Climate change	Restocking with conifer species where there are no statutory designations and there is good access for timber harvesting will optimise future productivity of the forest. Species diversification with an introduction of alternative conifers such as Norway Spruce, Western red cedar, Serbian Spruce, Macedonian Pine and native Mixed Broadleaves. Sitka Spruce remains viable based on climate change projections. Prioritise broadleaved conversion to areas which enable good habitat linkage with existing areas of ASNW.	Need to balance diversification with maintaining economic viability of the forest through subsequent rotations. Managing conifer regeneration in areas of ASNW, SAM and into areas of broadleaved conversion.
Public access	Limited use of the forest is adequately served by the access available to the public. Explore opportunities to allow access to non-freehold areas in Parkgate.	Public access to Parkgate is prohibited due to leasehold restrictions. Maintaining isolated PROW's with routes clear of obstruction and encroachment of trees.

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 <u>Wood Production</u> – '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 Standard'*	Clearfell 52ha in the period 2018-2026 generating approx. 20,000 m^3 of timber. Establish economically viable commercial crops to maintain future productivity of the forest where there are no other overriding environmental, landscapes or social considerations. Seek to optimise value of larch felled under SPHN through effective marketing.
NATURE and HERITAGE *'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'*	Continued restructuring of the forest through felling and restocking with a variety of conifer and broadleaved species. Transform suitable areas of the forest into management under Continuous cover. Ensure the regeneration, extension and survival of areas of ASNW. Create new areas of mixed broadleaved and open woodland habitat in the previously felled area north east of Great Bank Ensure the protection and survival of historic features especially the scheduled ancient monuments on Irton Pike by removing Sitka regen.
PEOPLE '*We will provide public access to all our forests and woodlands where there are no legal or safety restrictions…'*	Maintain public rights of way to a good standard to facilitate public access and maintain key open views from the forest such as at Irton Pike. Continue to consult and involve the local community through attending meetings where appropriate and on-site signage.

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 Sustainable economic regeneration	Marketable parcels of timber on offer to the market Maintain timber harvesting access and infrastructure	Contract and sales records
NATURE and HERITAGE Nature conservation Historic features	Maintain character of ASNW and increase extent of this habitat as appropriate Protect and enhance scheduled monument and other features of interest	Delivery of felling plan and assessment at five year review
PEOPLE Visual enhancement	Ongoing restructuring of the woodland	Five year Forest Plan review

Part 5 Forest Plan Maps

- Location – showing location in context of other FEE woodland in the local area
- Current Species – species composition in 2018
- Land Use –present land use categories
- Landform – indicating topography within the forest and local area
- Soils – indicating soil composition across the forest
- Wind Hazard – windiness of the site based on Wind Hazard Classification
- Yield Class – indicating the productivity of the current species
- Conservation and Heritage – statutory and non-statutory conservation and heritage features
- Access and Services - formal public rights of way, FC access and local services
- Opportunities and Issues – summary of future opportunities and current issues
- Design Concepts – broad concepts and zoning of management
- Operations Proposals – showing felling proposals and areas of Long Term Retention or alternatives to clearfelling (ATC)
- Future Species – representing the long term vision for future species composition

Forestry Commission England

Miterdale Location

N

1:50,000

Miterdale

Other FC woodland

Forestry Commission England

Miterdale Current Species

N

1:16,000

COPELAND DISTRICT

- Open
- Broadleaved
- Pines
- Other conifers
- Larch
- Spruce

Forestry Commission England

Miterdale Land Use

N

1:16,000

COPELAND DISTRICT

Agricultural land
Quarries
Car Parks
Open water
Open land
Recently felled
Woodland area

Forestry Commission England

Miterdale Landform

N

1:16,000

Terrain is variable from generally level or gently sloping in the lower lying areas of Miterdale and Parkgate to steeper ground broken with rocky outcrops and wet areas on middle and upper slopes and in Irton.

The diverse nature of the tree species coupled with an existing planting pattern which reflects the underlying land form means that the woodlands generally fit well in the landscape with strong links to neighbouring woodland.

Watercourses

50m contours

Forestry Commission England

Miterdale Soils

N

1:16,000

- Other
- Typical brown earth
- Upland brown earth
- Ranker
- Surface water gley

Forestry Commission England

Miterdale Wind Hazard Class

N

1:16,000

COPELAND DISTRICT

0
1
2
3
4
5

The Wind Hazard Class map indicates zonation of the forest in terms of tree stability, based on exposure and soil type. Zone 1 is the most windfirm and Zone 5 the least.
In practical terms crops in zones 1 to 3 should be thinnable, whilst zones 4 to 5 would not be thinned. Lower numbered zones therefore provide more opportunity for extended rotation lengths and implementation of Low Impact Sivicultural Systems (LISS) such as Continuous cover and long term retention.

Forestry Commission England

Miterdale Yield Class

N

1:16,000

COPELAND DISTRICT

0
2 to 4
6 to 8
10 to 12
14 to 16
18 to 20
22 to 24

Yield Class is a measure of how fast the trees are growing. For example, if they are yield class 12, the trees will put on 12m3 of growth/hectare/annum as an average over the trees lifespan.

Forestry Commission England

Miterdale Conservation and Heritage

N

1:16,000

COPELAND DISTRICT

WITH SANTON CP

- Watercourses
- Heritage point
- Scheduled monument
- Heritage feature
- SSSI
- ASNW
- Local wildlife site
- FC Natural Reserve

Forestry Commission England

Miterdale Access and Services

N

1:16,000

COPELAND DISTRICT

IRTON WITH SANTON CP

- Water_supply
- Powerline
- Unclassified road
- Permissive path
- Bridleway
- Footpath
- Dedicated land under CROW

Forestry Commission England

Miterdale Opportunities and Issues

N

1:16,000

Crops and regeneration are of manageable size to be felled to waste

Initiate a phased felling plan prioritising the lesser stable crops. Neighbouring crops have been felled and replanted

Planted Sitka spruce and regenerating conifer within Mecklin Park Scheduled monument area

Some crops, previously retained to help mitigate neighbour boundary issues are becoming increasingly unstable and need to be felled.

No public access permitted in Parkgate due to leasehold

Opportunity for further native broadleaved woodland expansion

Conifer crops growing well are capable of producing a sustainable yield of timber contributing toward sustainable home grown timber resource

Natural regeneration of Western Hemlock and other conifers into areas of ASNW

Areas of larch are under threat from Phytophthora ramorum

Grey squirrels pose a threat to the native red squirrel population

Respond to disease outbreaks and adhere to SPHN's expediently to help prevent the spread to other crops and neighbouring woodland. Future species utilising a wider range of alternative species will contribute toward future resilience and species diversification

Species diversification using a wider range of conifer and small seeded broadleaved species will favour red squirrels

Opportunities

Issues

Scheduled monument

Forestry Commission England

Miterdale Design Concepts

N

1:16,000

Open Landscape Zone
This zone includes agricultural land within our landholding, areas of permanent unplanted open ground and areas that have been previously felled with the objective of converting to permanent open habitat. Landscape enhancement and historical feature/cultural landscape protection are the principle objectives.

Biological Zone
Throughout this zone the focus of management will be toward biological and ecological enhancement. Within this zone are the areas of ASNW, SSSI, Natural Reserve, Local wildlife sites and woodland expansion managed through a combination of Low Impact Silvicultural Systems (LISS) such as Continuous cover, Minimum Intervention or Long Term Retention.

Productive Zone
Throughout this zone crops will be managed with the objective of optimising their economic return and restocking to encourage species diversification. At higher elevations management will be mainly through a clear fell and restock regime, at lower elevations thinning and continuous cover management will be preferred where crop stability permits.

- Open landscape Zone
- Biological Zone
- Productive Zone

Forestry Commission England

Miterdale Operations

N

1:16,000

COPELAND DISTRICT

- Open
- 2017-2021
- 2022-2026
- 2027-2031
- 2032-2036
- >2042
- Long term retention
- CCF/Min Intervention

Forestry Commission England

Miterdale Future Species

N

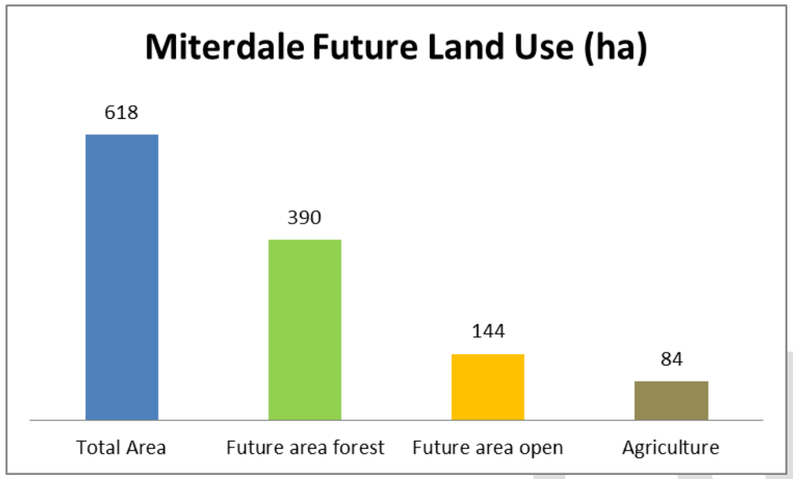
1:16,000

COPELAND DISTRICT

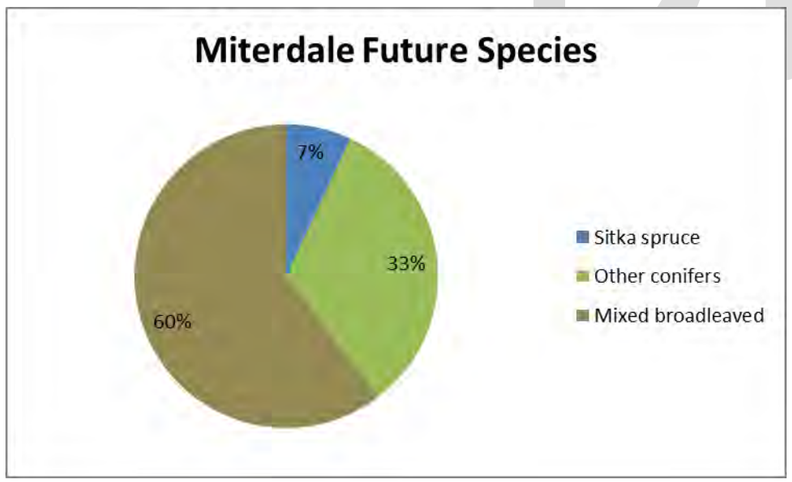
- Open
- Mixed broadleaved
- Open broadleaved habitat
- Sitka spruce
- Other conifers
- Mixed woodland

Part 6 Forest Plan Outcomes

Future Area and Land Use



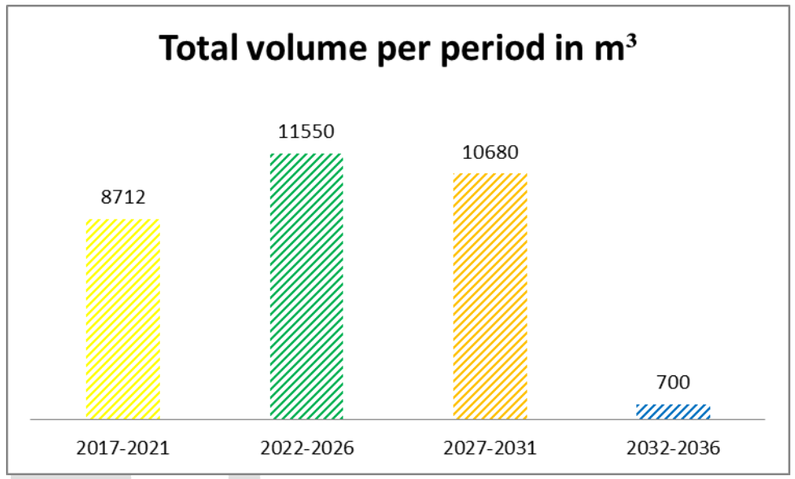
Future Species

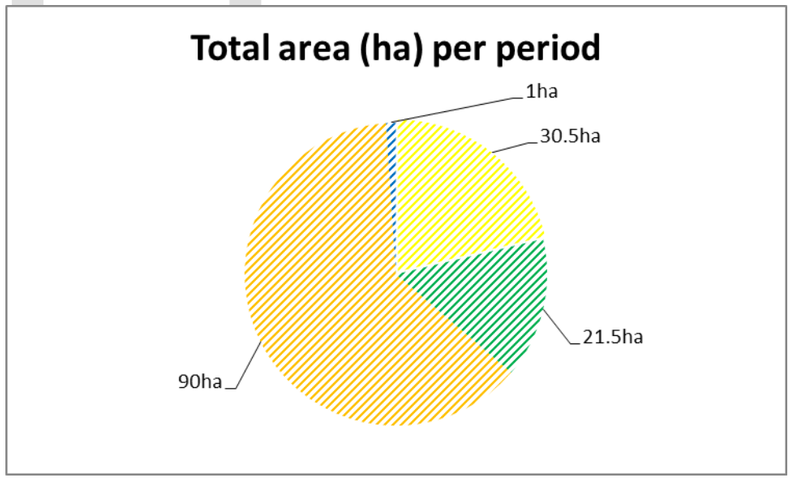


The combined percentage of future species composition exceeds the requirements for UKFS and UKWAS (65% primary species (Sitka spruce), 20% secondary species (Other conifers) and 5% mixed broadleaves).

Timber production

Average timber production (clear felling only), per five year period is shown below. Over the 10 year approval of the plan we will harvest approximately 52ha generating in the region of 20,000m³ of timber.





Productivity

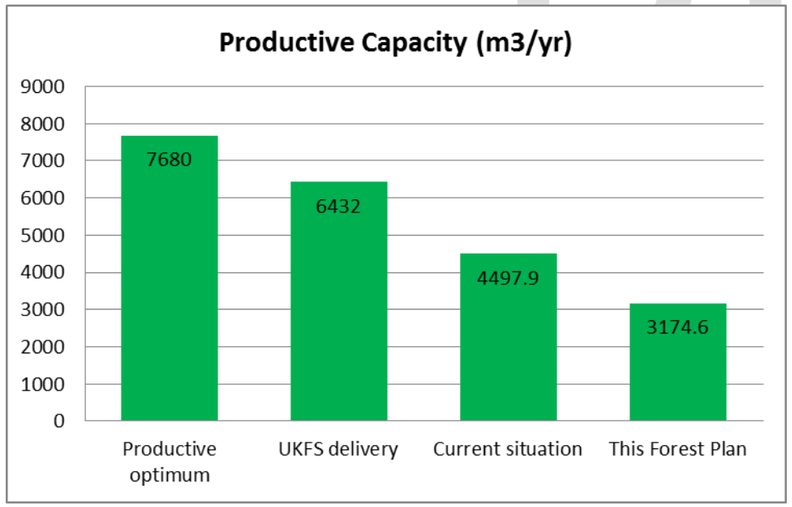
The productive potential of the forest is optimised through timber production achieved through delivery of the harvesting plan. This is represented in the Productive Capacity Analysis below which shows the relative productive capacity (m^3/year) of the forest based on average yield class as a comparison between the following scenarios;

1. Productive optimum – productive capacity assuming that the total productive area (10% open) is planted with the optimum commercial species suited to the site (i.e. Sitka spruce YC 16).

2. UKFS delivery – productive capacity achievable through minimum compliance with a species percentage mix comprising 65% primary species (SS YC 16), 20% secondary species (MC YC 14), 5% broadleaved (YC 4) and 10% open space.

3. Current situation - productive capacity based on the current percentage species mix from the previous plan with 18% open.

4. This Forest Plan – productive capacity based on the percentage species mix from this plan with 27% open.



Landscape Appraisal

The photographic survey and landscape assessment from the previous forest plan in 2006 identified a number of key areas of concern in relation to landscape sensitivity. These were mostly concerned with mitigating the harsh boundary between mature forest and open fell at Miterdale head and the upper forest boundaries at Irton Pike, Great Bank and below the Wasdale ridge south of Irton Fell. These issues have been addressed and are summarised below:

Wasdale Head – all the conifer has been removed and the process of conversion to native broadleaved woodland is underway.

Irton Pike – felling below the summit has opened up distant views of this prominent landscape feature. The upper forest edge adjacent to Mecklin Park has also been removed with restocking kept well back from the boundary. Some young spruce needs to be felled within the Scheduled Monument which is planned in the 2017-2021 felling period.

Wasdale ridge – the previous unthinned spruce crop has been felled. Restocking will incorporate a wider variety of species with the aim to blend with the adjacent private conifer woodland to the west and broadleaved species below the forest road. A significant area of open ground will be maintained to ensure that the upper forest edge is well below the Wasdale ridge skyline. The area of open ground extends eastwards to connect with the dominant open ground feature of Great Bank.

Great Bank – the previous unthinned spruce plantations that wrapped around the back of Great Bank have been felled. Much of the felled area will remain as open habitat, however there are opportunities to incorporate an expansion of native broadleaved and open broadleaved habitat in this area to link with the planned and existing broadleaved woodland down towards Low Place.

Elsewhere the woodlands of Miterdale, Irton and Parkgate fit well within the wider landscape and blend with the mosaic of neighbouring woodland and farmland with its characteristic geometric field patterns and drystone walls. These large areas of woodland incorporating broadleaved, mixed and coniferous species create a well wooded feel to the valley which is characteristic of the Landscape Character of the area.

An important consideration is to ensure that the benefits outlined above do not become compromised by undesired regeneration. Some conifer natural regeneration into areas of open ground is inevitable; however, monitoring will be needed to ensure that levels of regeneration do not reach such density that will compromise the achievements made in the future.

Natural Capital and Ecosystem Services

The productivity analysis refers to timber production and gives a general indication of the productive capacity of the forest. However, timber represents only part of the picture and Natural Capital refers to the stock of all natural assets upon which the economy and society is built. Natural capital produces value for people in the form of 'goods' such as timber or minerals and 'services' such as climate regulation and air purification. To realise the benefits of some natural assets, humans need to intervene (e.g. harvesting timber) but in other instances natural capital produces value through natural processes (e.g. trees reducing flooding).

Forest Enterprise England (FEE) published its third organisational Natural Capital Account (NCA) in 2018 as a transparent way of quantifying the value of natural assets beyond what is seen in a typical financial account. Whereas income from car parking and timber are available in FEE's annual accounts, the NCA also recognises values for natural services, such as the well-being our woods bring to people, and the atmospheric carbon our trees are storing, thereby providing a more representative picture.

A key feature of a natural capital approach is that it is looking at the asset value rather than the value of the services provided now, i.e. it takes the value of the services that will be provided into perpetuity (and whether they are going to increase or decline) and assigns a current 'net present value' to give a total asset value. FEE's NCA looks at the whole of the public forest estate (PFE) and calculates the value of all the natural capital FEE is custodian of in a 'top down' way. This is useful for the organisation to understand whether it is strategically delivering its mission, and to evidence the value of the work we do to others. However it is at such a large scale that it doesn't provide practical information that can help individual decisions within the organisation.

FEE is exploring whether using a natural capital approach could help decision making for land use choices for specific sites and forest design planning and is in the process of developing and testing a natural capital tool to do this. The Miterdale forest plan delivers ecosystem services and other non-market benefits included in biodiversity, climate change mitigation, water, people and landscape including public health and well-being, productivity through increased carbon sequestration, species diversification and climate change resilience, landscape enhancement and increased native woodland and priority habitats. In the future we hope to be able to assess these non-financial benefits using this tool to provide a breakdown of the natural capital costs and benefits associated with the plan to support the decision making process.

The United Kingdom Forest Standard (UKFS)

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

The Miterdale Forest Plan is able to demonstrate that relevant aspects of sustainable forest management have been considered and the stated objectives in Part 3 and outcomes in Part 6 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; 7% Sitka spruce, 33% other conifers and 60% mixed broadleaved and 27% open space, exceeds UKFS requirements. Long term structure will improve through linking of permanent broadleaved and open habitats and expanding the range of continuous cover management.
Silvicultural	A combination of clearfell and restocking will be continued with Continuous Cover of areas of mixed conifer and broadleaved woodland at lower elevations.
Biodiversity	Habitats and species are considered during the planning phase. Ecological connectivity achieved by extending and linking areas of broadleaved woodland and open space will ensure that the area is managed with conservation and biodiversity as an ongoing objective.
Climate change	Long Term Retention areas will minimise soil disturbance. Forest resilience will be enhanced over time through greater species diversity, particularly establishment of alternative conifer

	species 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 at the time of restocking.
Landscape	The planning process refers to the Local Landscape Character to inform the forest design. Visual sensitivity and consideration to visibility and the importance and nature of views of the woodland from key viewpoints is used to inform shape, landform and scale. Particular emphasis is made on mitigating geometric shapes, symmetry and distinct parallel lines in the landscape through species choice, forest edge and coupe design.
Historic	Historic features are recognised and their safeguard will be routinely 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	Quality will be protected through adherence to Forest and Water guidelines as a minimum during harvesting and forest management operations.

Longer term management proposals

Forest management in the UK is facing many challenges both now and for the future with issues and threats associated with climate change, disease and economic uncertainty. As custodians of the nation's public forest estate for 100 years Forest Enterprise have sustainable forest management at its core with the aim of delivering wide ranging objectives for people, nature and the economy. The proposals in this plan will lead to a more diverse and resilient woodland, with a greater range of species and habitats. Substantial areas of alternative conifer species will have been established, and the extent and range of native broadleaved species and more diverse open habitat will have been extended particularly on the transitional boundary between forest and open fell.

Timber production of home grown quality timber remains a priority and will continue through a combination of clearfelling and continuous cover silvicultural techniques with the focus on maintaining and possibly expanding productive woodland with species best suited to site conditions including a wider range of conifers and broadleaves at the lower elevations. This strategy will also contribute toward climate change mitigation, flood alleviation and long term forest resilience.

Public recreational use of the forest is likely to remain low; however, this is in keeping with the character of the forest and locality within this part of the Lake District National Park. By continuing to manage our woodlands sustainably we will continue to provide a high quality experience for the enjoyment, health and well-being of all our visitors for the next 100 years.