

Forest Plan

Cardinham

2014 - 2024



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





CONTENTS		Page	CONTENTS	Page
Application Form 1.0 Forest Plan Summary		2 3	6.0 Silvicultural Management & Implementation	12
2.0 Policy & Context			Current Land Use Current Species Groups Age Structure	12
2.1 2.2 2.3	Strategic Objectives Consultation Implementation	4	Future Species Woodland Naturalness NVC Classification	13 14
2.4 2.5	Protected species and habitats Cultural Heritage	5	PAWS Management Maps	15
3.0 Location Map		6	Concept Summary of Silvicultural Systems	16 17
4.0 General Description 4.1 Woodland Summary		7	Felling and Management Types Schedule for canopy removal in Shelterwood areas	18 19 20
4.1.1 3.2 3.3 3.4	Timber Production Forecast Location and Access Tenure & management Agreements Physical Environment	9 10	Future Species / habitat Felling in Plan Period Restocking / Regeneration in Plan Period	21 22
3.5	Landscape setting & designations		Monitoring	23
5.0 Managei	ment Objectives	11	Appendix 1- Consultation Appendix 2 – Major Policy Documents	24 26

Page



1.0 Cardinham Forest Plan Summary

The Cardinham Forest Management Unit (FMU) extends over 265 Hectares (654 acres) of the Public Forest Estate. It is situated just to the east of Bodmin.

The woodland is a mix of conifer (78%) and broadleaves (22%) most of which are being actively managed to provide timber for local and national markets (approximately 1000 - 2000 cubic metres of timber per year) and to improve the quality of the remaining crop. Roughly 238 hectares (90%) of the area is classed as an 'Ancient Woodland Site', which means that an area has been continually wooded since AD 1600. In the period 2010 – 2012 a disease called Phytophthora Ramorum had infected and was killing a particular species of conifer called larch. Some 17 hectares (42 acres) of young and mature larch crops were cleared which left a greater than normal amount of non wooded areas.

Cardinham is owned freehold by the Forestry Commission and is dedicated open access under the countryside rights of way act. There is a managed car park which provides access to over 34 Km (21 miles) of forest roads, rides and trails over varied terrain and slopes and is popular with local people for walking and horse riding. For cyclists there are 18 Km (11 miles) of purpose built cycle trails. There are also several heritage features within the FMU, but none are scheduled.

The woodland habitat supports a wide variety of wildlife including ground nesting and other birds, several birds of prey and various species of butterflies. There is also red deer, roe deer and grey squirrel.

The purpose of this Forest Plan is to make people aware of the way the Forestry Commission manage the public forest estate and its planned future management of this site. It aims to outline how every aspect of the forest will be managed for timber production, habitats and landscape as well as look at other elements such as how recreational opportunities in the forest will be managed. Forestry requires us to be forward looking and so this current management plan gives details of the management of Cardinham from 2014 until 2024. The plan outlines our intentions for the continued management of the site and contains information on the following topics:

Continue the process of restoring ancient woodland sites. Many of the ancient woodland sites currently have a commercial crop of conifer or non native broadleaves growing on them. These areas are called 'Plantation on Ancient Woodland Sites' or PAWS. There will be a number of ways in which restoration will be implemented depending upon the character and requirements of each area. However in the majority of cases the process will be carried out gradually and in some instances will take many generations, perhaps hundreds of years, to complete. Whilst habitat improvement is the main objective in PAWS it is also of fundamental importance that productivity and sustainable forest management continues in these areas. A key component in achieving success will be to monitor representative sites.

Increase resilience to climate change, pets and diseases. We will achieve this by increasing the diversity of tree species and age structure of the woodland. Because of the level of clearfelling which has taken place in recent years we are looking to implement and develop continuous cover management systems. This means establishing one or more storeys of young trees in an area before the canopy of older trees is removed.

Forests for people. The Forestry Commission will continue to forge links with local councils, user groups and other organisations to pursue any opportunities to improve the existing recreational facilities at Cardinham.



2.0 Policy & context

The Forestry Commission has been independently audited against the UK Woodland Assurance Standard (UKWAS) and its management standards have been endorsed by the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC). The FC is committed to maintaining woodland management to these standards.

This plan has been prepared in order to achieve compliance with UKWAS and comply with FSC and PEFC standards.

The Public Forest Estate in the Cardinham Forest Management Unit lies within West England Forest District which covers the west of England as far as North Shropshire.

2.1 Strategic objectives for the management of woodland on the Public Forest Estate in the South West.

Management of woodlands on the Public Forest Estate will deliver Government aims for forestry in England as described in the Forestry Policy Statement which is available from the DEFRA website. In Summary we will seek to achieve the following key objectives:

- Protecting the nation's trees, woodlands and forests from increasing threats such as pests, diseases and climate change,
- Improving their resilience to these threats and their contribution to economic growth, people's lives and nature,
- **Expanding** them to increase further their economic, social and environmental value.

Further details on how these objectives will be achieved and implemented in West England are available in our strategic plan due for publication in 2014.

2.2 Consultation

Consultation has been carried out with identified stakeholders as shown in the consultation record at appendix 1. Our method of identifying consultees is based upon the three major sensitivities of any particular woodland : landscape, recreation and environment, coupled with the level of change we anticipate being caused by the renewed Plan.

2.3 Implementation of plan objectives

Before major forest operations are undertaken a documented Operational Site Plan is completed for the proposed operation. This identifies site constraints and opportunities and ensures that all actions are consistent with current statutory and UKWAS requirements.

2.4 Protected Species and habitats

Where the Operational Site Plan has confirmed that European Protected Species (EPS) or other protected species or habitats are present on a site, operations are undertaken in accordance with guidelines agreed by Natural England.

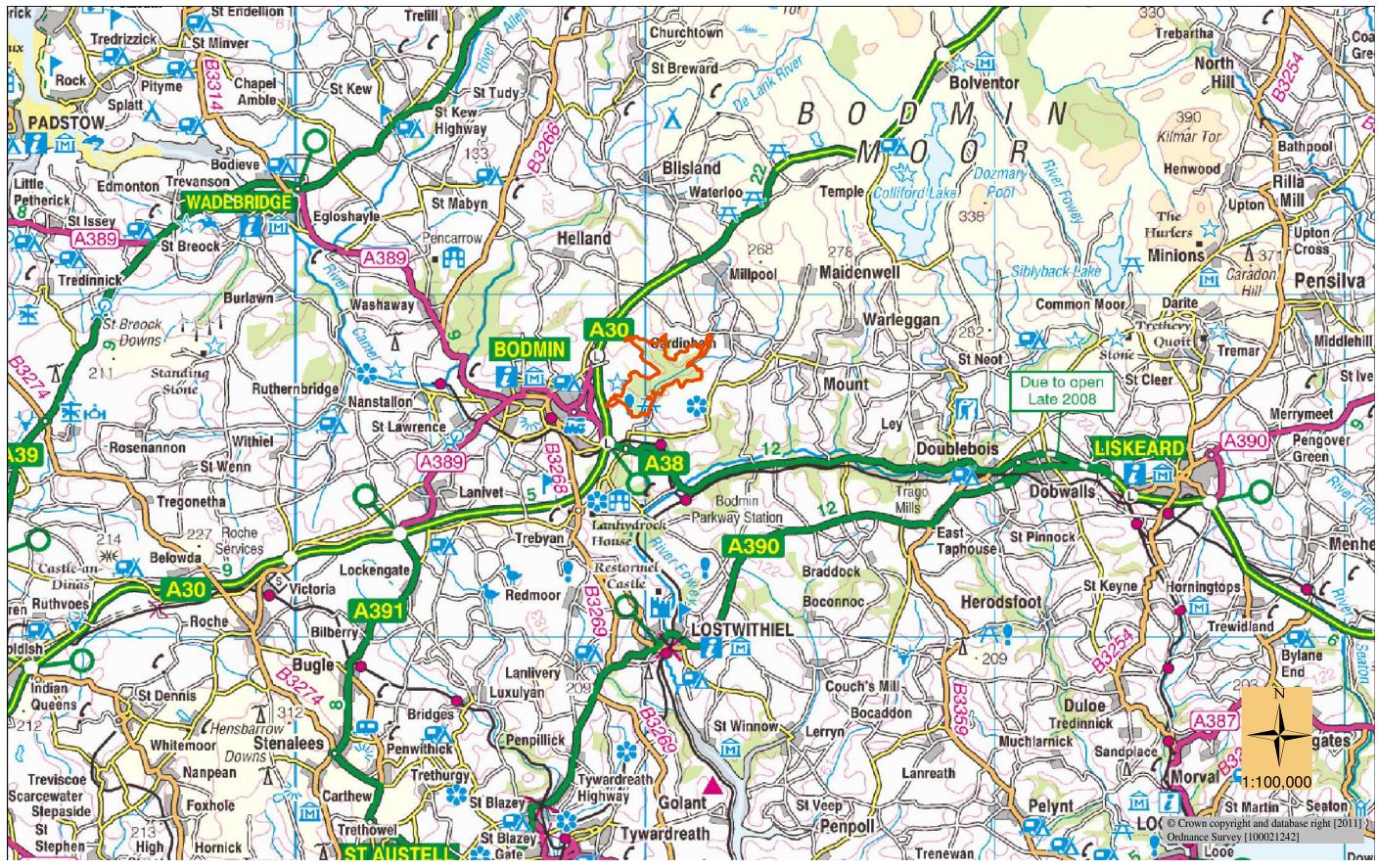


2.5 Cultural Heritage

Work on all heritage features are subject to an agreement with Local Authority. Heritage features will be identified by liaising with the relevant representative within the organisation and a suitable working method agreed prior to operations via the Operational Site Plan process.



3.0 Location Map



6



4.0 General Description

Торіс	Description	Implications for Management	
4.1 Woodland Summary	The Cardinham Forest Management Unit (FMU) extends over 265 Hectares of the Public Forest Estate in Cornwall. It is a highly fertile valley woodland typical of Cornish woods. The woodland is a mixture of productive conifer plantation and mature / regenerating broadleaves. Age structure has been diversified during the last 20 years but 70% of plantations are between 30 and 40 years of age. (See Age Structure chart in section 6.0, page 12) There is a wide range of tree species present but the vast majority of introduced species are douglas fir (44%) and spruce (19%). (See species mix chart in section 5) Approximately 90% is classified as an ancient woodland site and isolated pockets / individual remnants of native broadleaves are evident, particularly adjacent to water courses. The Ancient woodland survey show predominantly W10 (181 ha) – Pedunculate oak, bracken, bramble with smaller areas of W16 (50 ha) oak, birch and wavy hair grass and W14 (3 ha) – beech bramble. There are populations of Pearl bordered fritillary & Small pearl bordered fritillary, an important and locally rare butterfly identified in a site managed by Butterfly Conservation which is immediately adjacent to Cardinham. There are areas of permanent open space within the forest and along forest road, ride and watercourses.	opportunity for expansion. Additional areas of open space need to be identified. These areas should be located where they can be maintained and where they provide most ecological benefit, particularly to provide habitat and corridors to allow expansion of the population of Pearl bordered fritillary & Small pearl bordered fritillary.	Continue but acce species opportur not via achieve Assess diversific utilising

Proposals

AWS areas

ue to manage on a rotational basis cept natural regeneration of desirable when available. Where the unity for continuous cover systems is iable schedule felling coupes to e greater age diversity.

the potential for greater species fication on a site by site basis g the Forestry Commission 'Ecological assification' tool and climate change

areas

se the potential for natural ration of native species throughout PAWS strategy maps). Monitor pment in a representative selection of on a 5 year basis. Following ring, depending upon progress, it be necessary to enrich some areas native broadleaves and, or install nal deer protection measures to t browsing.

Space

als for maintenance of existing and n of new areas of open space are d on 'Regeneration within plan period on page 22. Liaise with Butterfly vation about populations of various ly species. Develop existing road, nd water course corridors to provide nal managed open space.



Торіс		Descrip	tion		Implications for Management
	Timber Proc	luction I	Forecas	t	
4.1.1 Woodland Summary	Forecast based	d on the ex	xisting F	orest Plan:	
(Production)	Forecast Period	All Species	All Conifers	All Broadleaves	
	2013-2016 2017-2021 2022-2026 2027-2031 2032-2036 2037-2041 2042-2046 2047-2051 2052-2056 2057-2099	966 1622 1133 1421 1862 2143 1615 1280 2405 1646	1588 1083 1385 1804 2034 1359 1255 2395	34 50 36 58 108 256 25 10	
	Forecast based	l on this F	orest Pla	in:	
	Forecast Period	All Species	All Conifers	All Broadleaves	
	2013-2016 2017-2021 2022-2026 2027-2031 2032-2036 2037-2041 2042-2046 2047-2051 2052-2056 2057-2099 (The figures shown volume production standing.)				

Proposals



Торіс	Description	Implications for Management	
4.2 Location, Access & Recreation	Cardinham Woods lies East of Bodmin and on the southern fringes of Bodmin Moor separated from the town by the A30. The A38 to the south of Cardinham Woods runs between Bodmin and Liskeard. It is within Bodmin and Cardinham Parish council areas. Vehicular access is restricted to a single council road onto a private road owned by the Forestry Commission, this road also leads to a number of private residential houses. Internally the woodland is serviced by a good network of forest roads, tracks, rides and routes suitable for forest machine access. The entire woodland is dedicated as open access under the countryside rights of way act. There is a pay and display car park, toilet facilities a picnic / barbeque area and a café on site. Several dedicated cycle routes and other way marked trails are maintained by the local team. In addition to the forest road, ride and trail network there are a number of footpaths and bridleways.	 woodland. There needs to be a balance struck between forest management priorities and the increased / increasing recreational use. The commercial value of timber and recreation is significant within this woodland, yet there is great potential for ecological gain also. 	visitors marked t Foster e groups potential

Proposals

in open access and provision for sincluding the car park and way d trails at the current standard.

existing links with local councils, and organisations who may be al partners for future development.

the profile and popularity of ham to actively promote voluntary to assist in the maintenance and management of the woodland and ources (recreational and ecological).

lly consider impacts of additional cional infrastructure and usage on s and habitats.



Торіс	Description	Implications for Management	
4.3 Tenure & management agreements	The entire area is registered as freehold woodland with the Land Registry.	There are no commercial shooting leases, mainly because of the high public usage. The café is run as a franchise through a 3 rd party provider.	There a shooting Engagen may be
4.4 Physical Environment	Elevation of the plan area ranges from 50m to 170m above datum. Discrete areas and valleys have a range of aspects and some parts are on relatively flat plateaus. Average annual rainfall is 1295mm. Ranging from 500mm in the Summer to 795mm in the winter. The underlying geology is mid Devonian slates. Soil type is Upland Brown Earth (1u) with shallow rock in places. The full FC soil code is 1u/(1ua)/(13r). There is obviously a variation across such a wide area but in general the Soil Moisture Regime is fresh and the Soil Nutrient Regime is medium.	Classification tool (ESC) rates the main species currently on site at the present time as follows : <u>Douglas Fir</u> - Marginal. Limiting Factor is stability / wind firmness. <u>Sitka Spruce</u> - Very Suitable. <u>Beech</u> - Suitable <u>Pedunculate Oak</u> - Suitable Using the same tool the 2050 HI model	woodlan site na favourec allow an monitor The nor primarily species, individua they are choice for felling in allow fo type to s taken to
4.5 Landscape Setting and Designations		Relevant extracts from the NE LCA: Numerous broadleaved wooded valleys, varying greatly in size. Northern valleys generally narrow and densely wooded.	Manage environr ensure complim

Proposals

are no intentions to lease any grights.

ement with other 3rd party providers e considered.

ne areas designated as ancient and sites the choice of species will be native broadleaves. Therefore the ed approach, in general, will be to areas to regenerate naturally and or proportions of species components.

on ancient woodland areas will be ily restocked with productive conifer s, but any existing groups or ual broadleaves will be retained if re stable and safe. The exact species for coupes beyond the next round of interventions will be left open to for more accurate matching of site o species choice. Opportunities will be to diversify the range of species used.

e the woodland to deliver economic, nmental and social benefits and that future management ments the local landscape.



5.0 Management Objectives

• Continue sustainable management of the woodland resource and develop woodland resilience.

There will be a presumption for thinning all areas. Continuous cover and low impact silvicultural systems will be adopted where applicable. Where this is not a viable option, clear felling will continue with the intention of diversifying age structure and species composition. Clearfell coupes in the 10 year plan period will be fairly small and, on ancient woodland sites, targeted where there is most gain in terms of enhancing ancient woodland restoration. Select species and provenance according to site characteristics and potential to adapt to changes in climate.

• Maintain the wooded landscape.

Ensure guality of coupe design enhances the external landscape. Monitor development of areas designated as successional habitat and react to natural processes to influence the diversity and productivity and continue to manage invasive exotic weed competition in these areas.

• Enhance the woodlands value for nature conservation and biodiversity.

Move to a greater cover of native broadleaves in time, with the emphasis on Plantation on Ancient Woodland sites. Continue to diversify the woodland age structure and tree species diversity. Consolidate existing managed open space and develop a matrix of open and semi open habitat to provide linkages for nature through management of existing corridors, particularly ride and water courses.

Conserve all cultural and heritage features.

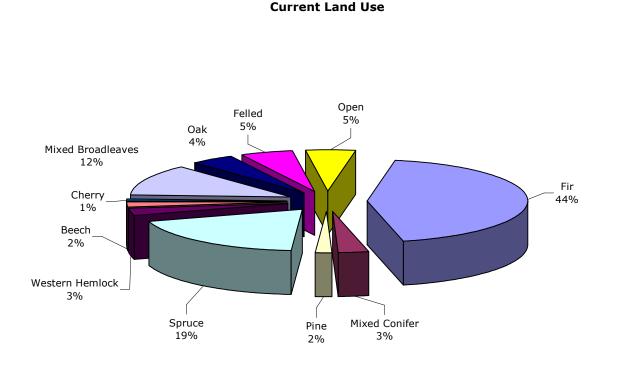
Adopt appropriate mitigation measures to avoid damage and where possible improve any issues which may increase the risk of deterioration.

• Maintain open access and existing facilities for formal and informal recreational activity. Develop opportunities to expand infrastructure.

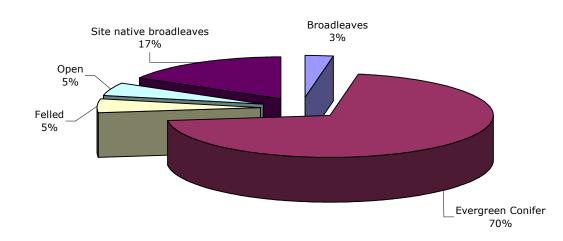
Enhance visitor experience by managing internal landscaping along existing corridors, and maintaining access points. Continue liaison with local organisations and pursue any opportunities for partnership working and external funding.

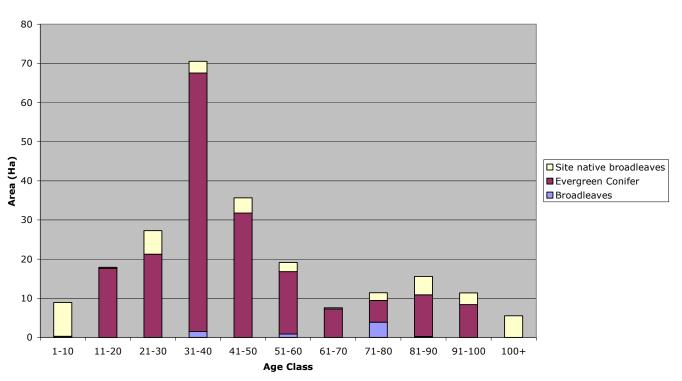


6.0 Silvicultural Management and Implementation



Current Species Groups and Land Use (Summary)





Species and Habitat Composition

This forest plan starts to deliver a move from conifer plantation towards a greater proportion of broadleaved species. There is advanced regeneration of various broadleaved species, shown as MB in the illustrations on this page. The amount of permanent open space will be increased during the life of this plan, with the specific intention of developing suitable habitat and linkages for the Pearl-bordered Fritillary.

Age structure

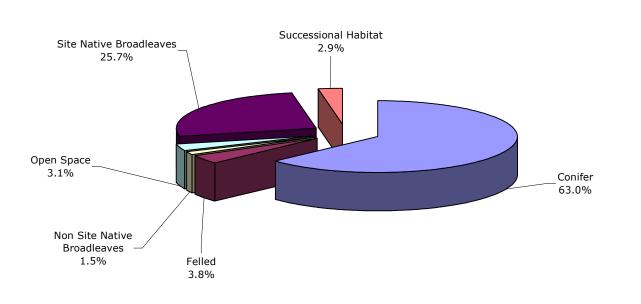
The plan aims to increase the diversity of the age structure and begin the process of achieving a greater degree of naturalness.

12

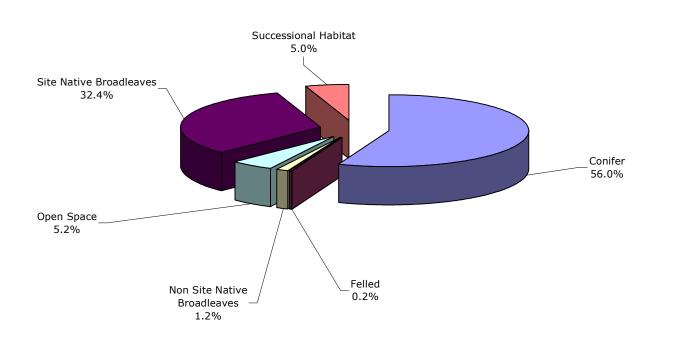
Current Age Classes in Cardinham



Future Species groups and Land Use 2024



Future Species Groups and Land Use 2044

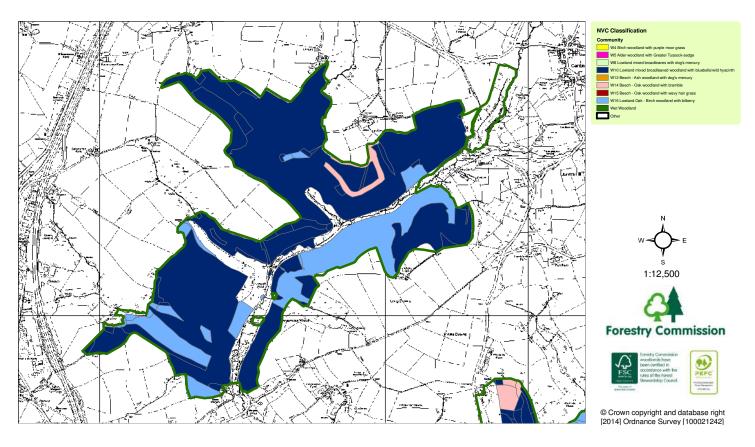


Future Species Model

There is a combination of silvicultural system in this woodland block, clearfell and restocking and continuous cover relying on natural regeneration. Because of the amount of woodland being managed under a continuous cover regime the timing of establishment and composition of species is difficult to predict accurately. The charts on this page seek to illustrate how the woodland is expected to develop over time given the management interventions (woodland thinning and felling) described in this plan.

The preferred method of regeneration, particularly in PAWS areas is to allow it to occur naturally. Major factors which will have an influence on regeneration is lack of seed source, competition from vegetation and predation from mammals. The PAWS management strategy later in this document explains in broad terms how we intend to manage these areas in order to achieve the objectives of the Forestry Commission PAWS policy.





The map below shows the woodland naturalness assessed in 2013. The following table shows the change in woodland composition in percentages over time:

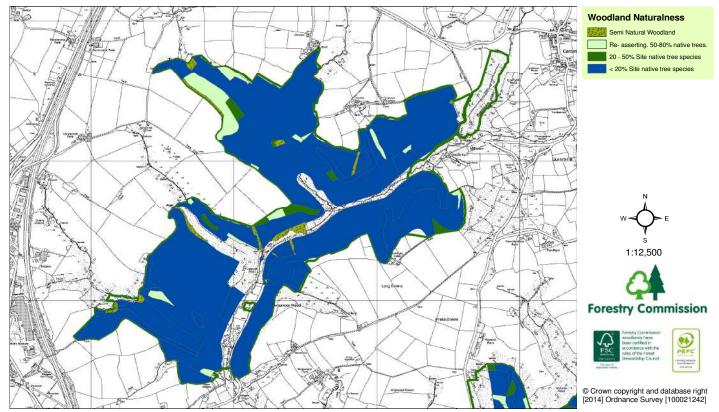
%

>80 Site native tree species (SN)

- 50 80% site native tree species (RA)
- 20 50 % Site native tree species (P3)
- <20% site native tree species (P4)

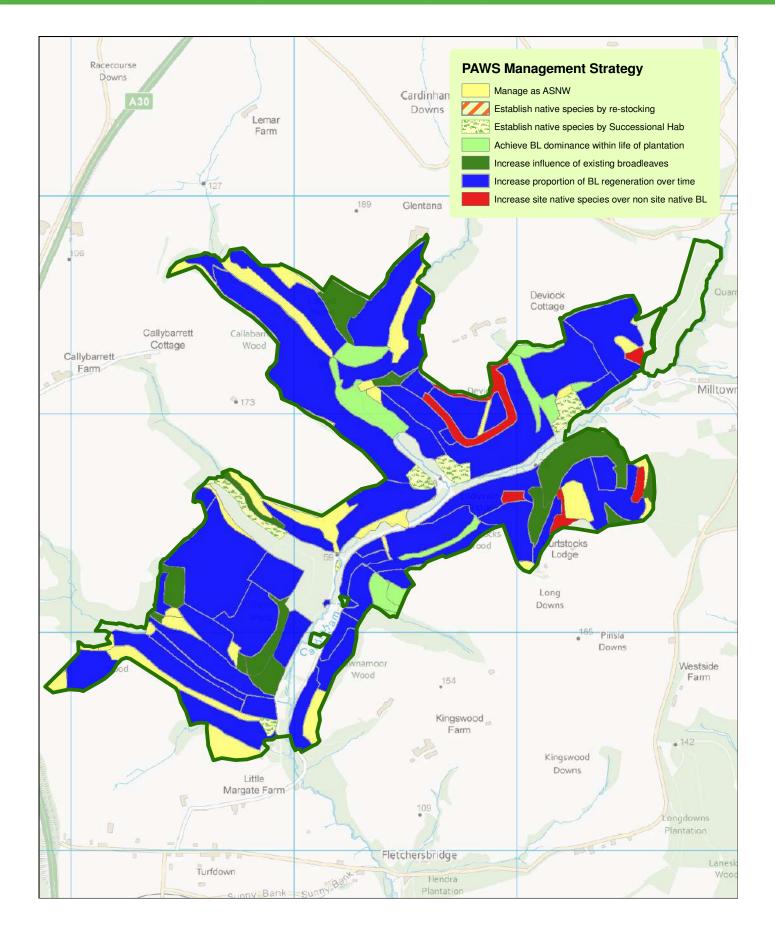
Significant progress has been made over the last 10 years in moving towards a greater proportion of site native broadleaves. A great deal of this change is due to Larch being removed under plant health notice. Some areas have been restocked with site native broadleaves and some have been left to regenerate over time through natural processes.

The maps on the following page shows how we intend to manage the PAWS area over the life of this plan and beyond. Sample areas will be monitored through site survey and fixed point photography.



2007	%2014	
4	17	
10	27	
4	13	
210	171	





Management Strategy	Management description	Likely outcome
1	Manage as ASNW	ASNW
2	Establish native broadleaf cover by restocking following the scheduled clearfell of existing crop.	When the existing non natives are removed this area will be classifie as SN.
3	Manage to achieve maximum regeneration of native tree species through natural processes, following scheduled clearfell of existing crop.	This area should fall into P3 or RA classification through successiona habitat, or enrichment planting.
4	Manage to achieve broadleaf dominance in the regenerating understory within the life of existing plantation.	When the existing non natives in to over story are removed classification of this area will be S
5	Manage to increase influence of mature / competing broadleaves in the canopy and sub canopy to encourage a greater proportion of broadleaved regeneration within life of the existing plantation.	When the existing non natives in a over story are removed this area likely to move into classification P or RA.
6	Manage to achieve a greater proportion of broadleaf regeneration within life of existing plantation.	This area has a predominantly not native conifer composition. Becau- of the regeneration potential and shade tolerance of many conifers and the lack of broadleaf seed source, this area will require heav thinning of non native species and perhaps introduction of native species over the next rotation to progress restoration.
7	Manage to achieve greater proportions of site native tree species in favour of beech.	This area has a predominantly beech over story. Because of the regeneration potential and shade tolerance of beech this area will require heavy thinning of non nati species and perhaps introduction native species over the next rotat to progress restoration.

Management Strategy and Likely outcomes

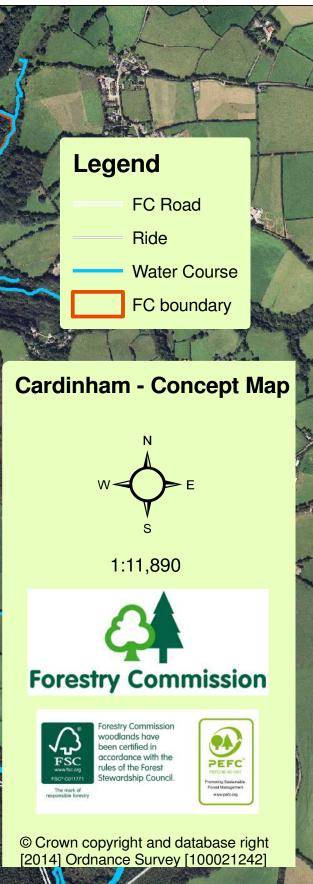


Cardinham Woods is 265ha of highly fertile valley woodland. Evergreen conifer are predominantly located on steep valley slopes with spruce being largely contained to the more exposed plateaus. Throughout the wood a scattering of broadleaves exist, but the more concentrated areas lie along the Cardinham water corridor. Main access routes follow the valley bottoms and link into the numerous footpaths, waymarked trails and bridleways. The majority of Cardinahm is classified as an Ancient Woodland Site. During this plan we will manage the woodlands to encourage a greater proportion of native broadleaves.

Implement a series of environmental corridors along roads, rides, streams and tracks.

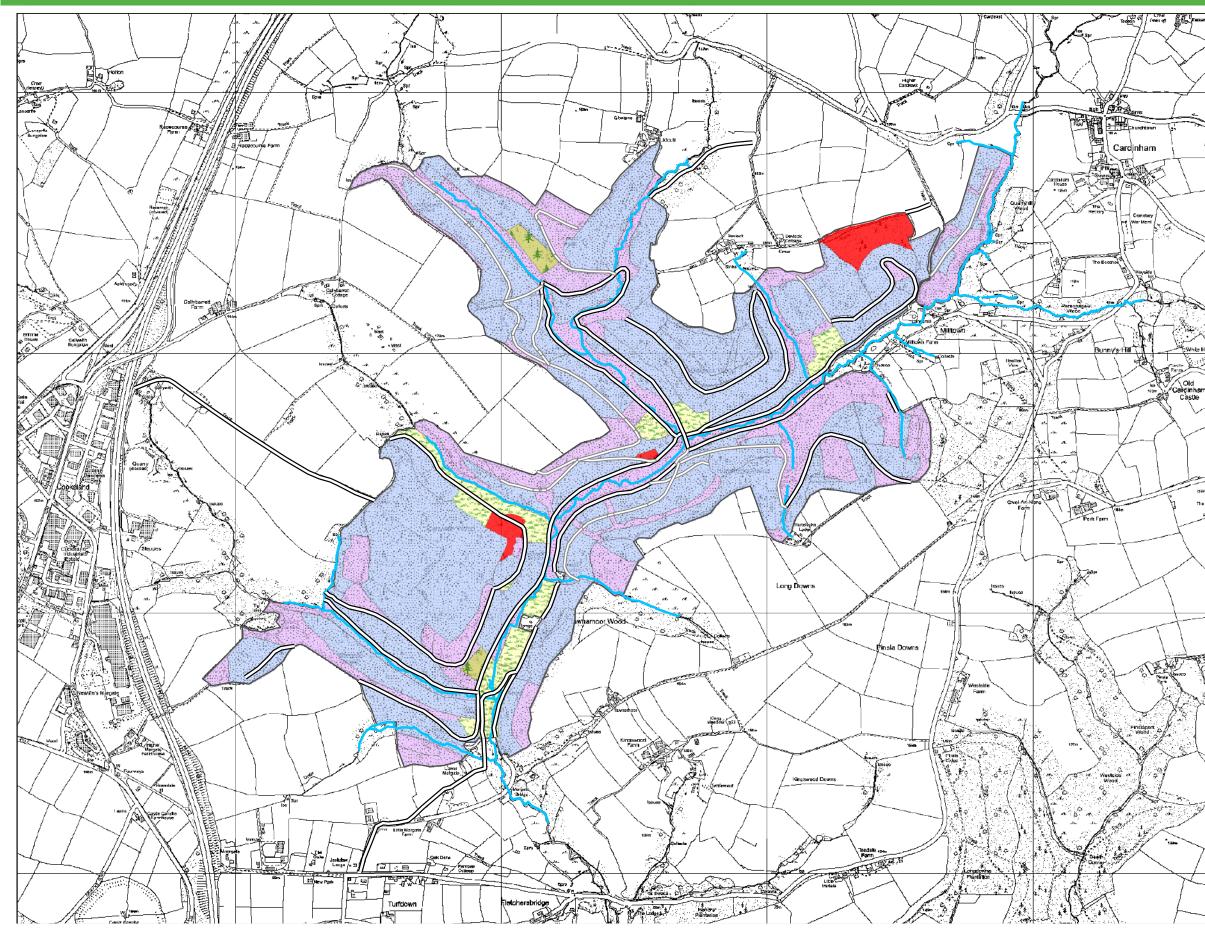
Retain waymarked trails around site

Continue to offer recreational facilities. Carpark, toilets, cafe, play area and barbecue facilities.



Forestry Commission England

Cardinham 2014-2024 West England Forest District



Summary of Silvicultural Systems

- Clearfell
- Copen / Successional Habitat
- Shelterwood system
- Selection system
- Autural Reserve
- Long Term Retention
- = FC Road
- ---- Card_-_Water_courses



1:10,000



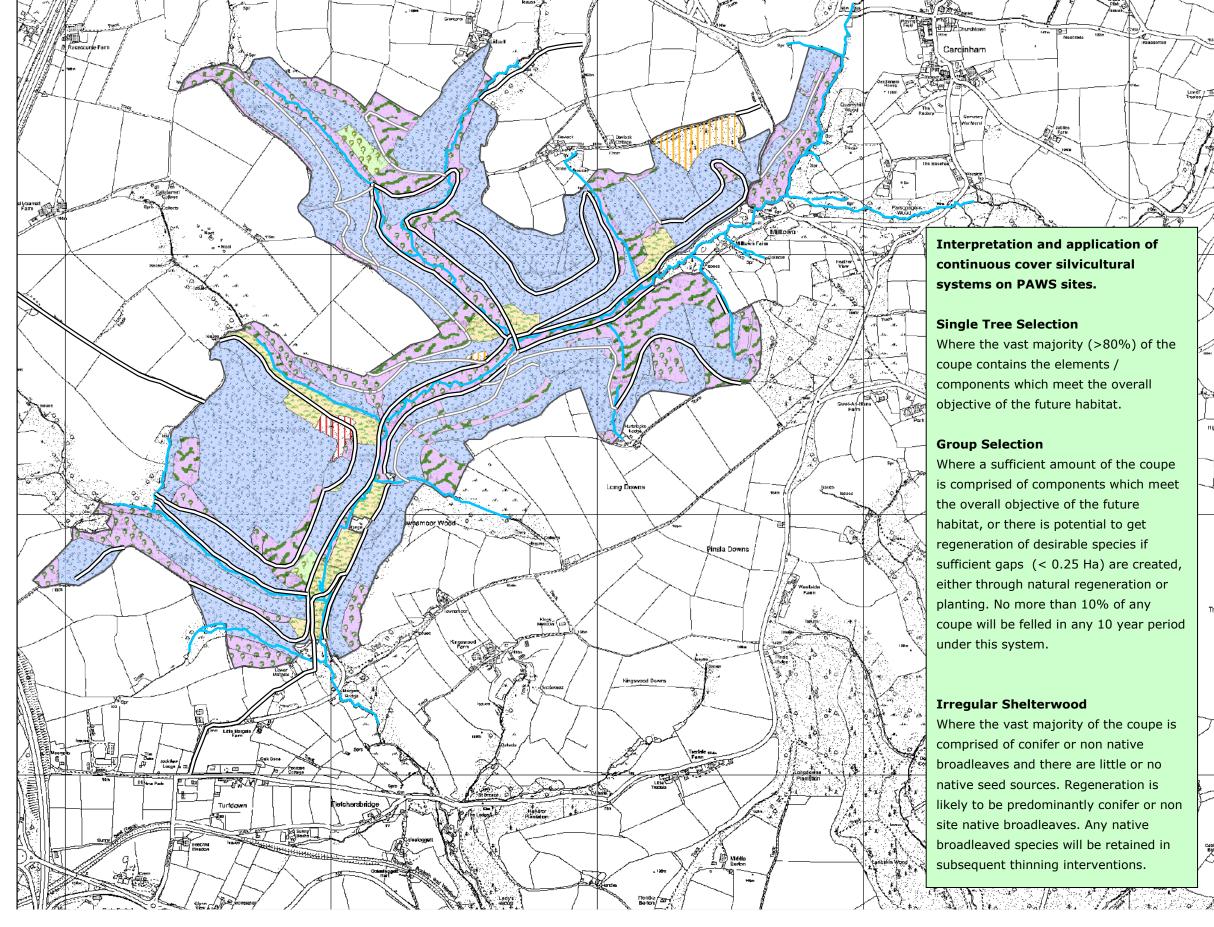


Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.



Forestry Commission England

Cardinham 2014-2024 West England Forest District



Interpretation and application of continuous cover silvicultural systems on PAWS sites.

Single Tree Selection

Where the vast majority (>80%) of the coupe contains the elements / components which meet the overall objective of the future habitat.

Group Selection

Where a sufficient amount of the coupe is comprised of components which meet the overall objective of the future habitat, or there is potential to get regeneration of desirable species if sufficient gaps (< 0.25 Ha) are created, either through natural regeneration or planting. No more than 10% of any coupe will be felled in any 10 year period under this system.

Irregular Shelterwood

Where the vast majority of the coupe is comprised of conifer or non native broadleaves and there are little or no native seed sources. Regeneration is likely to be predominantly conifer or non site native broadleaves. Any native broadleaved species will be retained in subsequent thinning interventions.

Fell Years and Management Types

Copen / Successional Habitat
Clearfell 2012 - 2016
🛄 Clearfell 2017 - 2021
🛄 Clearfell 2022 - 2026
🛄 Clearfell 2027 - 2031
🔟 Clearfell 2032 - 2036
🔟 Clearfell 2037 - 2041
🛄 Clearfell 2042 - 2046
🛄 Clearfell 2047 - 2051
Clearfell 2057 - 2061
Clearfell 2062 - 2066
Clearfell 2072 - 2076
🚬 Irregular Shelterwood
Image: Comp Selection
Single Tree Selection
Minimum Intervention
5 Long Term Retention / Research Plo
Ride



1:10,000



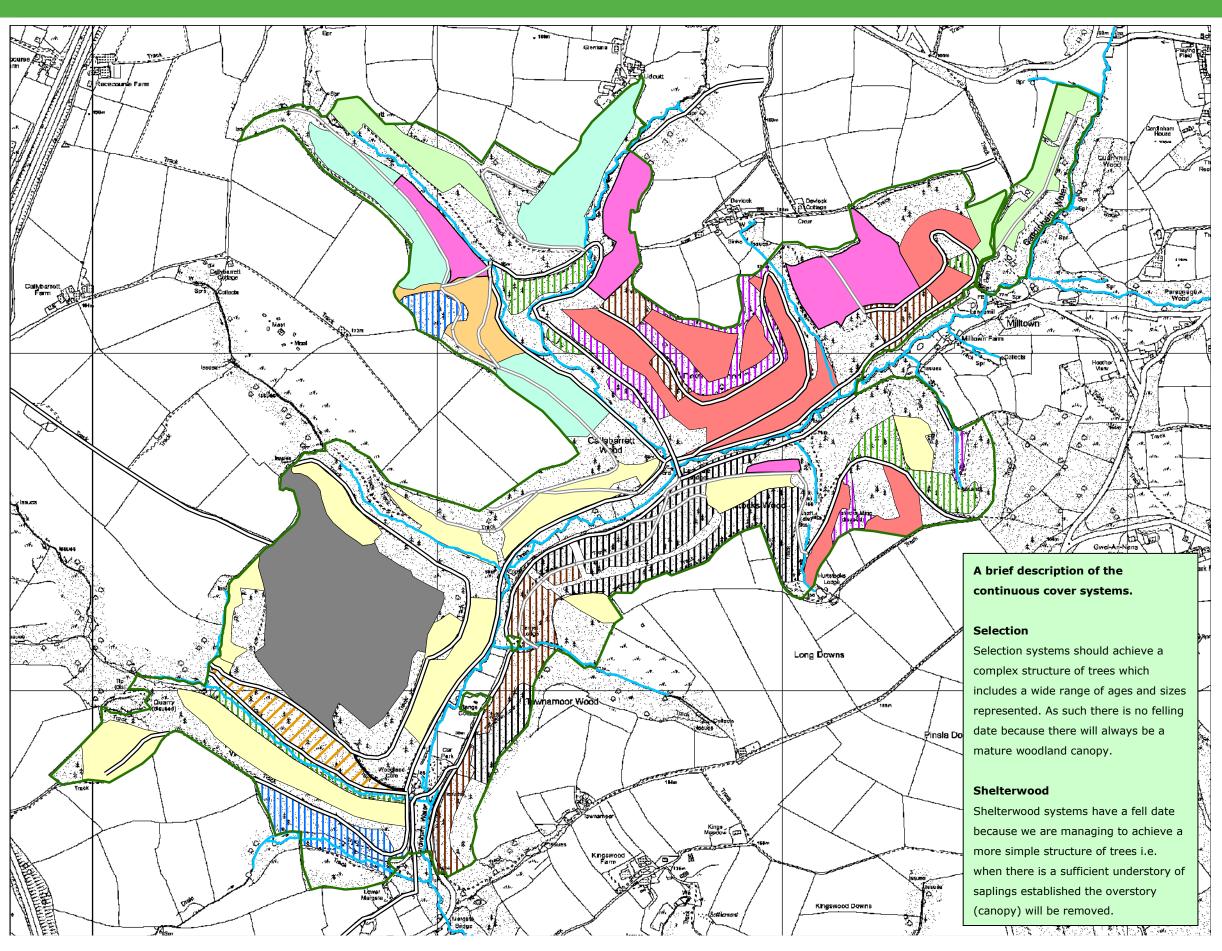


醫

orestry Commission woodlands have been certified in accordance with the rules of the Forest ewardship Council.







Estimated schedule for removal of canopy in Shelterwood areas

2022 - 2026
2027 - 2031
111 2032 - 2036
1037 - 2041
2042 - 2046
2047 - 2051
III 2052 - 2056
2057 - 2061
2062 - 2066
2067 - 2071
2072 - 2076
2077 - 2081
2082 - 2086
2087 - 2091
2092 & Beyond
FC Road
Bide



1:10,000

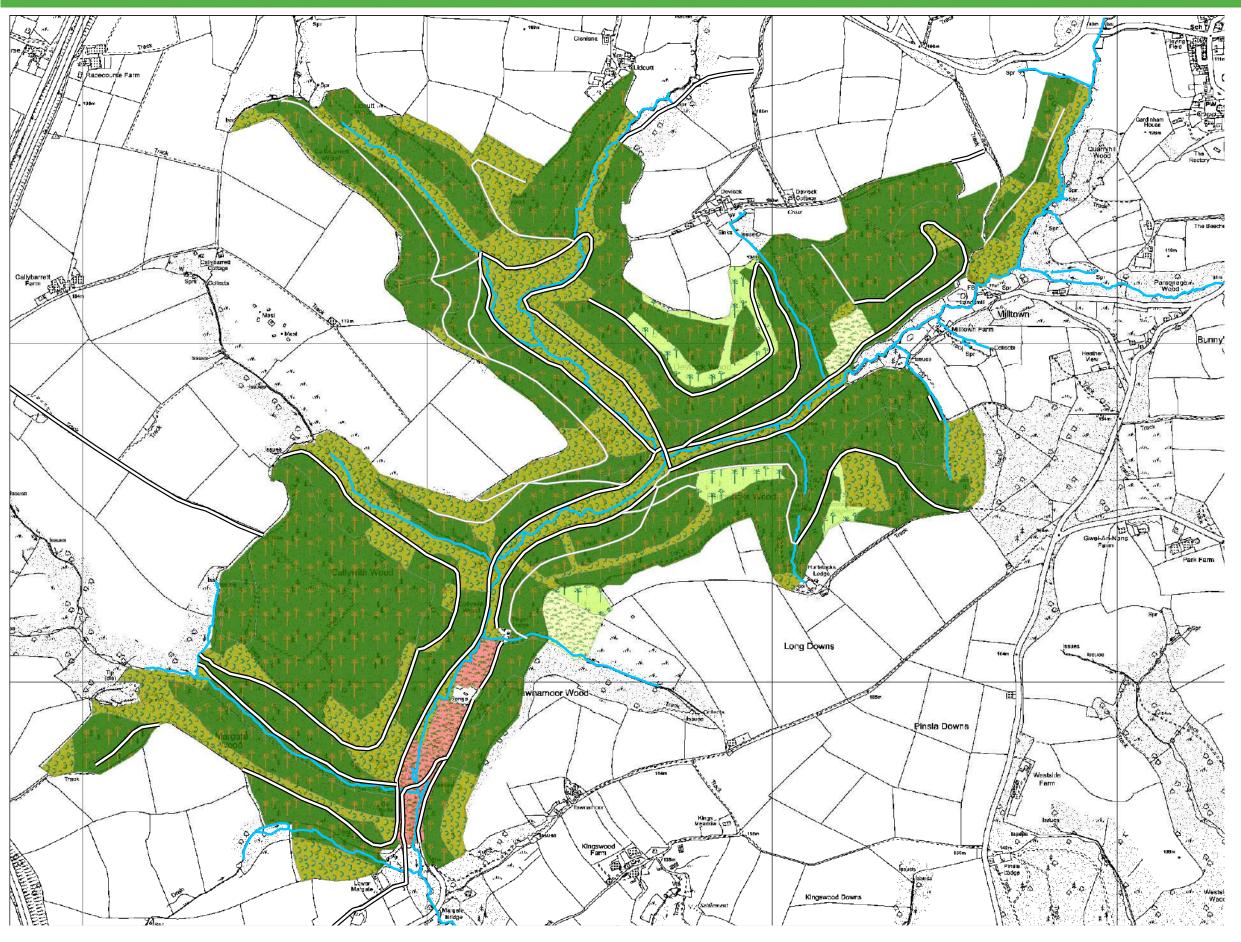




Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.







Future Species

Indicative species mix expected within the next 30 years.

—	F
	F
	۱
an cho	F
	(
₩ ¥	N
	F
1250	F

=	Road
-	Rides
_	Water Course
	Permanent Open Space
2	Open space, shrub & broadleaf mix
¥.	Mixed native and site native broadleaves
	Predominantly conifer with broadleaf element
5	Predominantly site native broadleaves



1:10,000



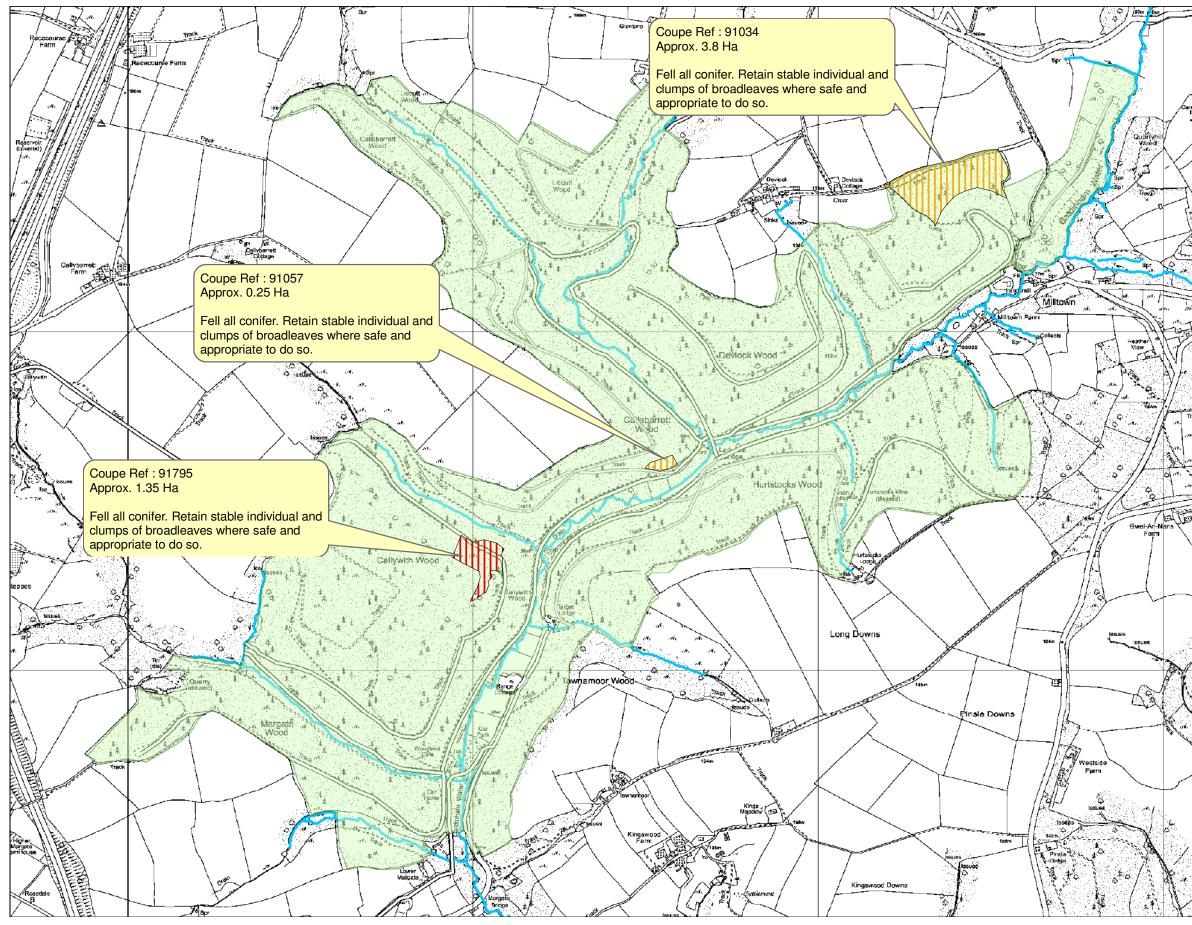


Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.



 $\ensuremath{\mathbb{C}}$ Crown copyright and database right [2014] Ordnance Survey [100021242]





dinharr House

Felling Coupes in Plan Period

- Clearfell 2017 2021
- Clearfell 2022 2026
- FC Road
- Water Courses
- Plan Area



1:10,000



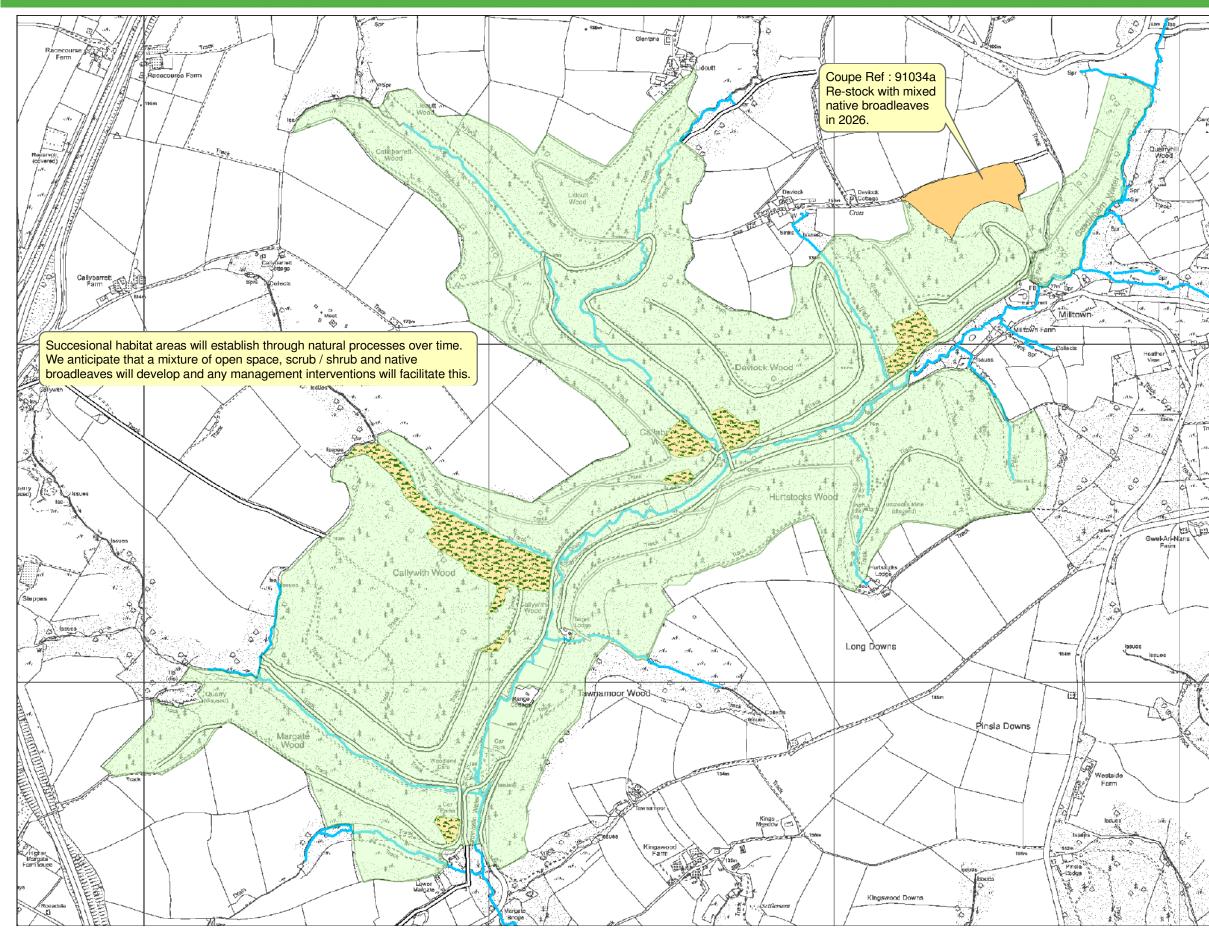


Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.



 $\ensuremath{\mathbb{C}}$ Crown copyright and database right [2014] Ordnance Survey [100021242]





Restock and regneration within plan period

Plant with mixed native broadleaves

- Successional habitat
- Plan Area
- FC Road
- Water Courses



1:10,000

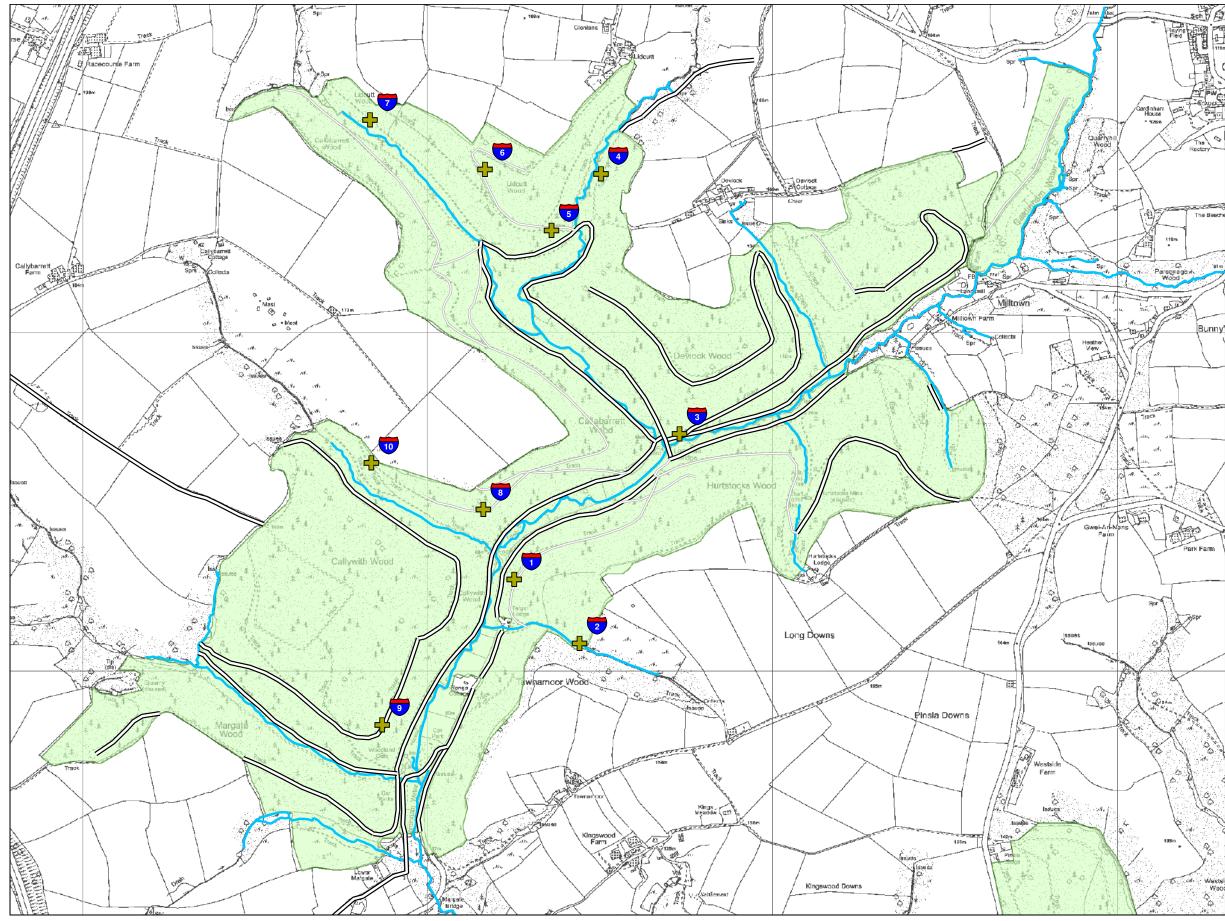




Forestry Commission woodlands have been certified in accordance with the rules of the Forest Stewardship Council.











Monitoring Points

Rides

- Water Course



1:10,000





restry Commission voodlands have been certified in accordance with the rules of the Forest ewardship Council.



© Crown copyright and database right [2014] Ordnance Survey [100021242]

The Bee

Bunny



Appendix 2 : Major policy documents and guidelines that inform our planning and operations:

A Strategy for England's Trees, Woods and Forests The UK Woodland Assurance Standard The UK Forestry Standard	
UK Forestry Standard Guidelines: Forests and biodiversity Forests and climate change Forests and historic environment Forests and Landscape Forests and people Forests and Soil Forests and water	National Policies and guidelines
Peninsula Strategic Plan Peninsula Strategic guide to Planning, Design and Management of Woodlands Design and Management of Environmental Corridors	Local Policies and Guidelines