Forestry Commission England

Forest Plan

Cardinham

2014 - 2024

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FORESTRY COMMISSION - Application for Forest Design Plan Approval

Forest District: West England Forest District (FD)
Woodland or property name: **Cardinham**
Nearest town, village or locality: **Bodmin**
OS Grid reference: **SX10396752**
Local Authority district/unitary Authority: **Cornwall Council**

1. I apply for Forest Design Plan approval for the property described above and in the enclosed Forest Design Plan.

2. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included. Where it has not been possible to resolve specific issues associated with the plan to the satisfaction of consultees, this is highlighted in the Consultation Record.

3. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.

4. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

Signed……..
(FE) Forest Management Director

Signed……
(FS) Regional Director

District……..……

Region……..

Date ……

Date of Approval ……

Date approval ends: ……

(ha)	Conifers	Broadleaves	Open / Successional
New planting	-	-	-
Felling	5.4	-	-
Restocking *	-	3.8	1.6
Managed under continuous cover	259.6		

* The area of restocking is greater than felling because there are a number of areas felled at time of writing.

Total plan area 265 hectares

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.

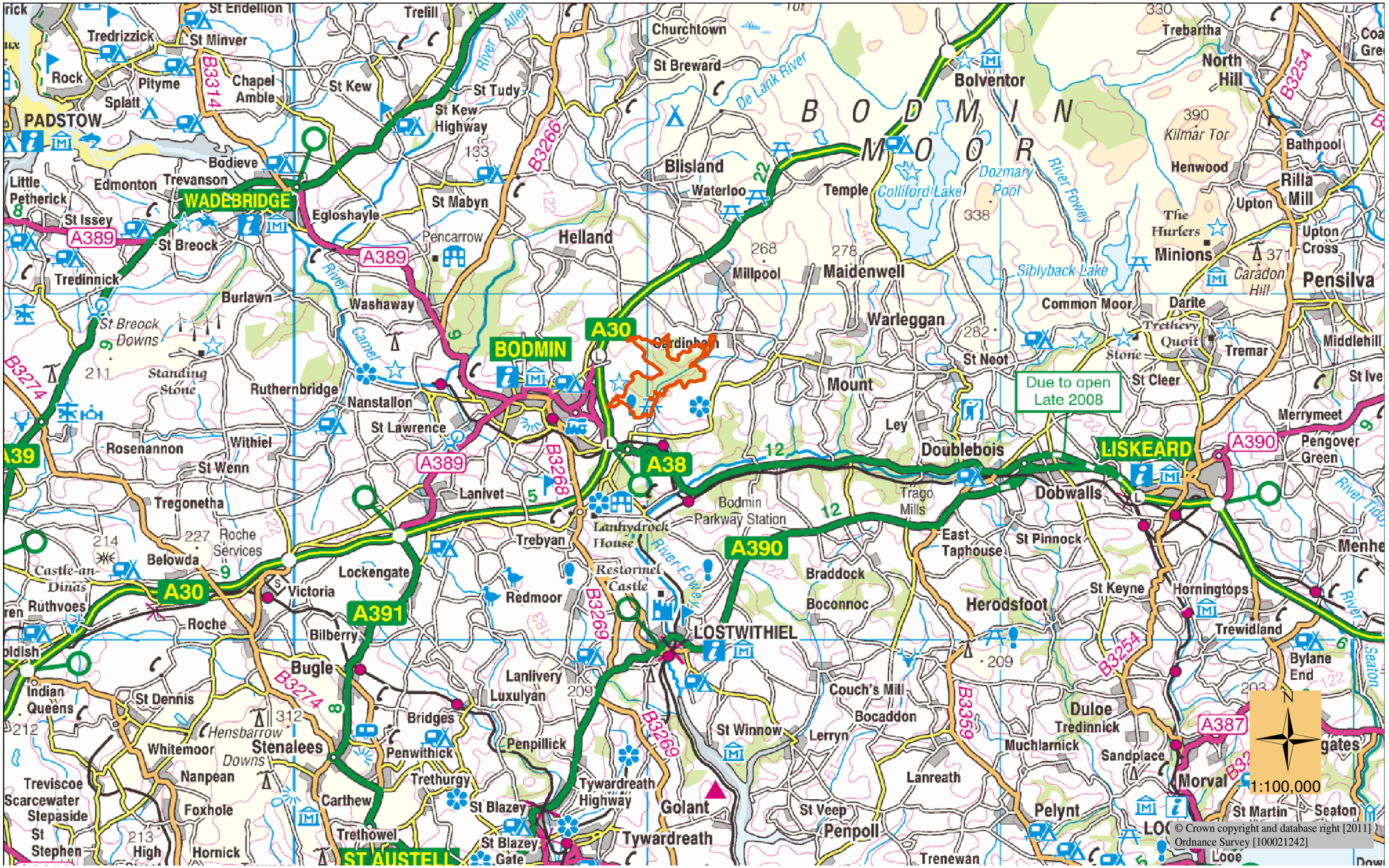
2.4 Protected Species and habitats

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



4.0 General Description

Topic	Description	Implications for Management	Proposals
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.	The present and future commercial value of the conifer crops is significant. The native broadleaf resource requires targeted management to provide the 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.	**Non PAWS areas** Continue to manage on a rotational basis but accept natural regeneration of desirable species when available. Where the opportunity for continuous cover systems is not viable schedule felling coupes to achieve greater age diversity. Assess the potential for greater species diversification on a site by site basis utilising the Forestry Commission 'Ecological Site Classification' tool and climate change model. **PAWS areas** Increase the potential for natural regeneration of native species throughout (See PAWS strategy maps). Monitor development in a representative selection of sites on a 5 year basis. Following monitoring, depending upon progress, it may be necessary to enrich some areas with native broadleaves and, or install additional deer protection measures to prevent browsing. **Open Space** Proposals for maintenance of existing and creation of new areas of open space are detailed on 'Regeneration within plan period map' on page 22. Liaise with Butterfly Conservation about populations of various butterfly species. Develop existing road, ride and water course corridors to provide additional managed open space.

Topic	Description	Implications for Management	Proposals
4.1.1 Woodland Summary (Production)	**Timber Production Forecast** **Forecast based on the existing Forest Plan:** Forecast Period / All Species / All Conifers / All Broadleaves 2013-2016: 966 / 900 / 66 2017-2021: 1622 / 1588 / 34 2022-2026: 1133 / 1083 / 50 2027-2031: 1421 / 1385 / 36 2032-2036: 1862 / 1804 / 58 2037-2041: 2143 / 2034 / 108 2042-2046: 1615 / 1359 / 256 2047-2051: 1280 / 1255 / 25 2052-2056: 2405 / 2395 / 10 2057-2099: 1646 / 1603 / 43 **Forecast based on this Forest Plan:** Forecast Period / All Species / All Conifers / All Broadleaves 2013-2016: 960 / 898 / 64 2017-2021: 1751 / 1718 / 33 2022-2026: 833 / 784 / 49 2027-2031: 1519 / 1484 / 36 2032-2036: 1319 / 1270 / 49 2037-2041: 1289 / 1196 / 93 2042-2046: 2176 / 2124 / 51 2047-2051: 2632 / 2593 / 39 2052-2056: 1216 / 1190 / 26 2057-2099: 1625 / 1555 / 70 (The figures shown represent an estimate of the average volume production per year. All figures are M3 over bark standing.)		

Topic	Description	Implications for Management	Proposals
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.	This is a good example of a multi use 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.	Maintain open access and provision for visitors including the car park and way marked trails at the current standard. Foster existing links with local councils, groups and organisations who may be potential partners for future development. Utilise the profile and popularity of Cardinham to actively promote voluntary activity to assist in the maintenance and future management of the woodland and it's resources (recreational and ecological). Carefully consider impacts of additional recreational infrastructure and usage on species and habitats.

Topic	Description	Implications for Management	Proposals
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 3rd party provider.	There are no intentions to lease any shooting rights. Engagement with other 3rd party providers may be considered.
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.	The Forestry Commission Ecological Site Classification tool (ESC) rates the main species currently on site at the present time as follows : Douglas Fir - Marginal. Limiting Factor is stability / wind firmness. Sitka Spruce - Very Suitable. Beech – Suitable Pedunculate Oak - Suitable Using the same tool the 2050 HI model which predicts impact of climate change rates the species listed above as the same with the exception of Sitka Spruce which is down graded to suitable due to soil moisture.	On the areas designated as ancient woodland sites the choice of species will be site native broadleaves. Therefore the favoured approach, in general, will be to allow areas to regenerate naturally and monitor proportions of species components. The non ancient woodland areas will be primarily restocked with productive conifer species, but any existing groups or individual broadleaves will be retained if they are stable and safe. The exact species choice for coupes beyond the next round of felling interventions will be left open to allow for more accurate matching of site type to species choice. Opportunities will be taken to diversify the range of species used.
4.5 Landscape Setting and Designations	Natural England Landscape Character Area Profile is 152 Cornish Killas. The Cardinham Forest Plan area is not within an AONB and does not contain any SSSI.	**Relevant extracts from the NE LCA:** Numerous broadleaved wooded valleys, varying greatly in size. Northern valleys generally narrow and densely wooded.	Manage the woodland to deliver economic, environmental and social benefits and ensure that future management compliments 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 quality 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.**

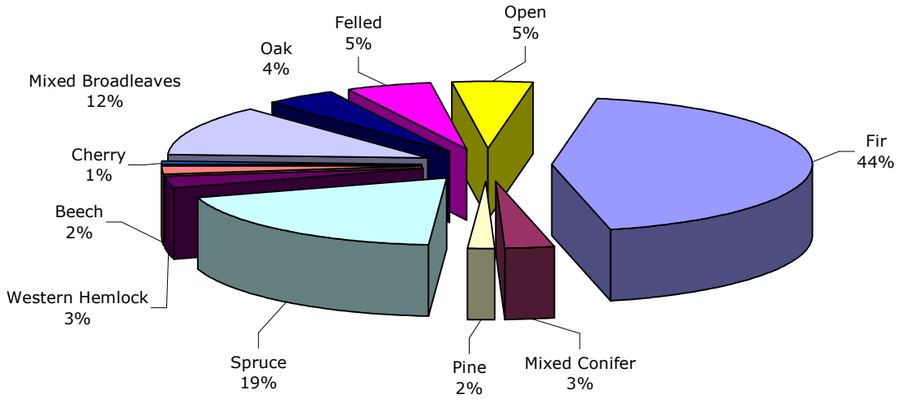
Adopt appropriate mitigation measures to avoid damage and where possible improve any issues which may increase the risk of deterioration.

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

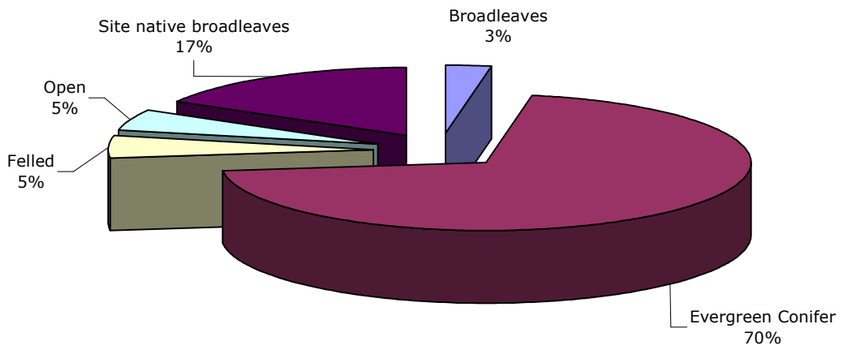
Enhance visitor experience by managing internal landscaping along existing corridors, and maintaining access points. Continue liaison with local organisations and pursue any opportunities for partnership working and external funding.

6.0 Silvicultural Management and Implementation

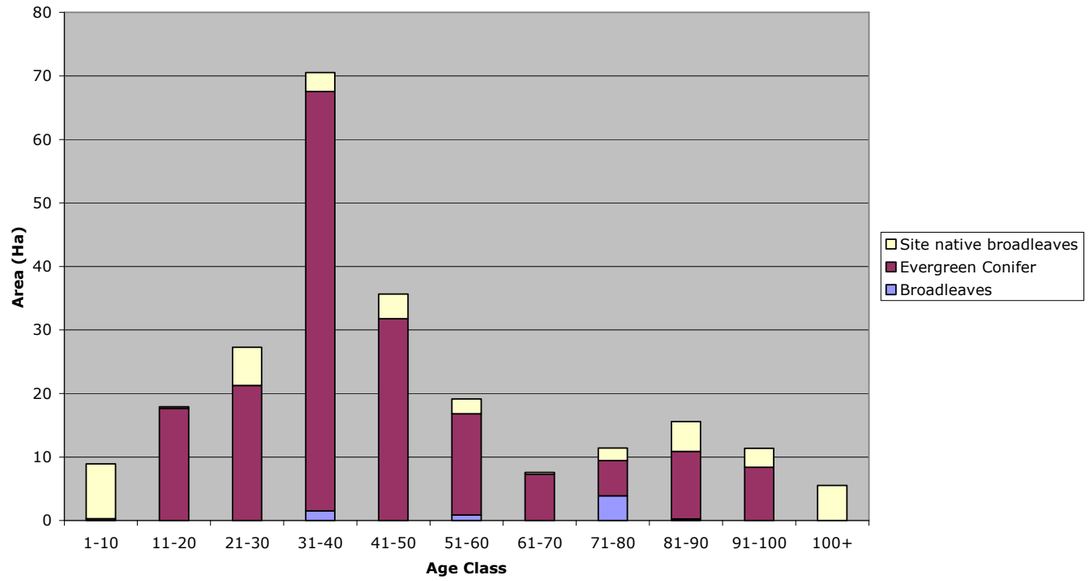
Current Land Use



Current Species Groups and Land Use (Summary)



Current Age Classes in Cardinham



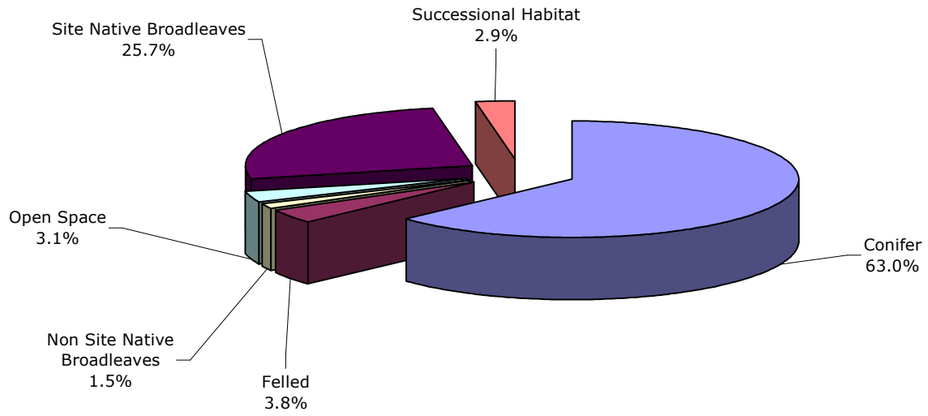
Species and Habitat Composition

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.

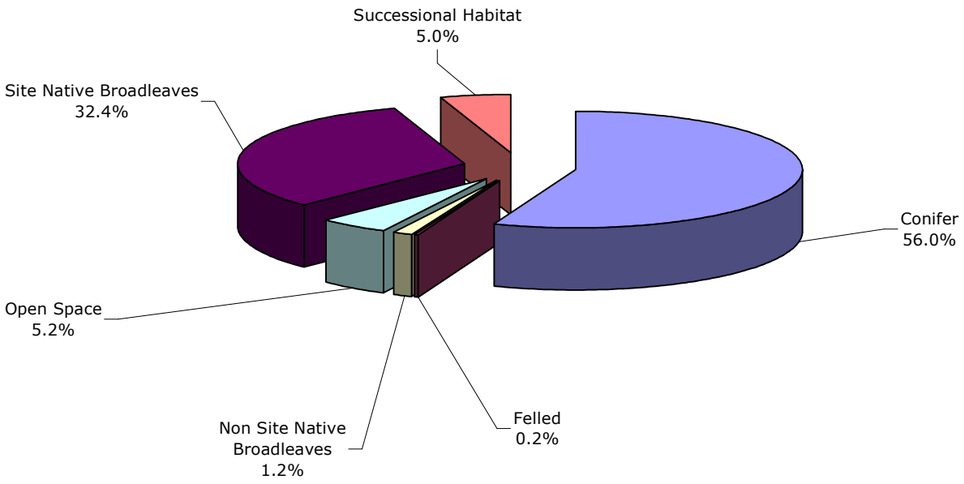
Age structure

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

Future Species groups and Land Use 2024



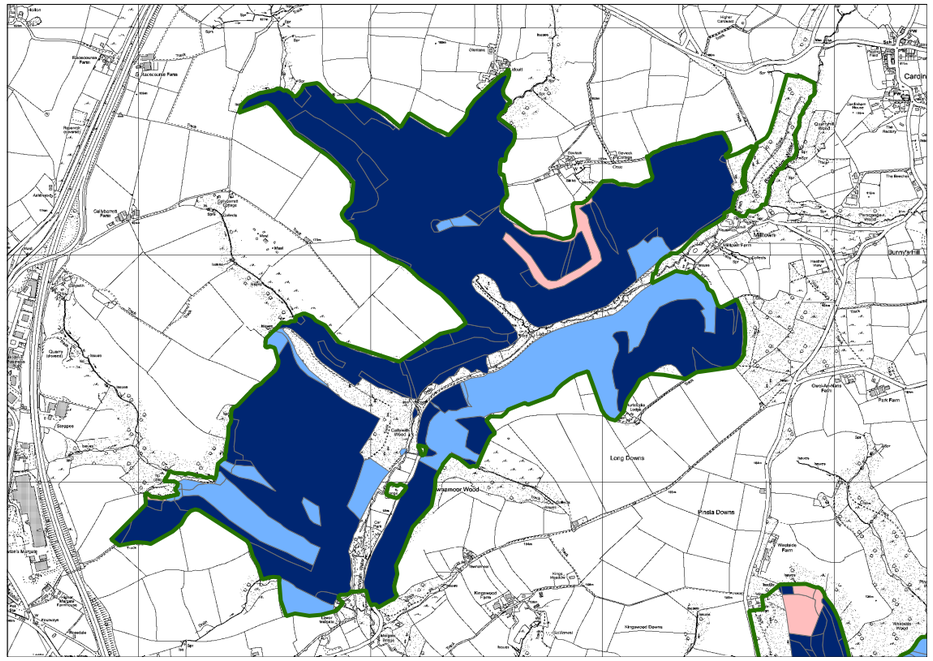
Future Species Groups and Land Use 2044



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.



NVC Classification

Community

- W4 Birch woodland with purple moor grass
- W5 Alder woodland with Greater Tussock-sedge
- W8 Lowland mixed broadleaves with dog's mercury
- W10 Lowland mixed broadleaved woodland with bluebells/wild hyacinth
- W12 Beech - Ash woodland with dog's mercury
- W14 Beech - Oak woodland with bramble
- W15 Beech - Oak woodland with wavy hair grass
- W16 Lowland Oak - Birch woodland with bilberry
- Wet Woodland
- Other

N W E S

1:12,500

Forestry Commission

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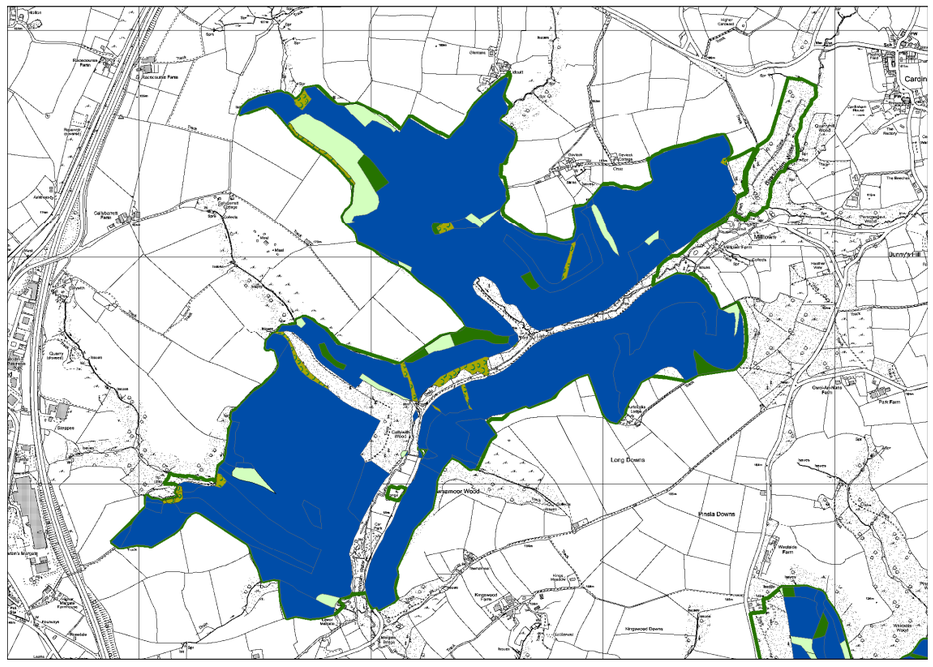
The map below shows the woodland naturalness assessed in 2013. The following table shows the change in woodland composition in percentages over time:

	% 2007	%2014
>80 Site native tree species **(SN)**	4	17
50 – 80% site native tree species **(RA)**	10	27
20 – 50 % Site native tree species **(P3)**	4	13
<20% site native tree species **(P4)**	210	171

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.



Woodland Naturalness

- Semi Natural Woodland
- Re- asserting. 50-80% native trees.
- 20 - 50% Site native tree species
- < 20% Site native tree species

N W E S

1:12,500

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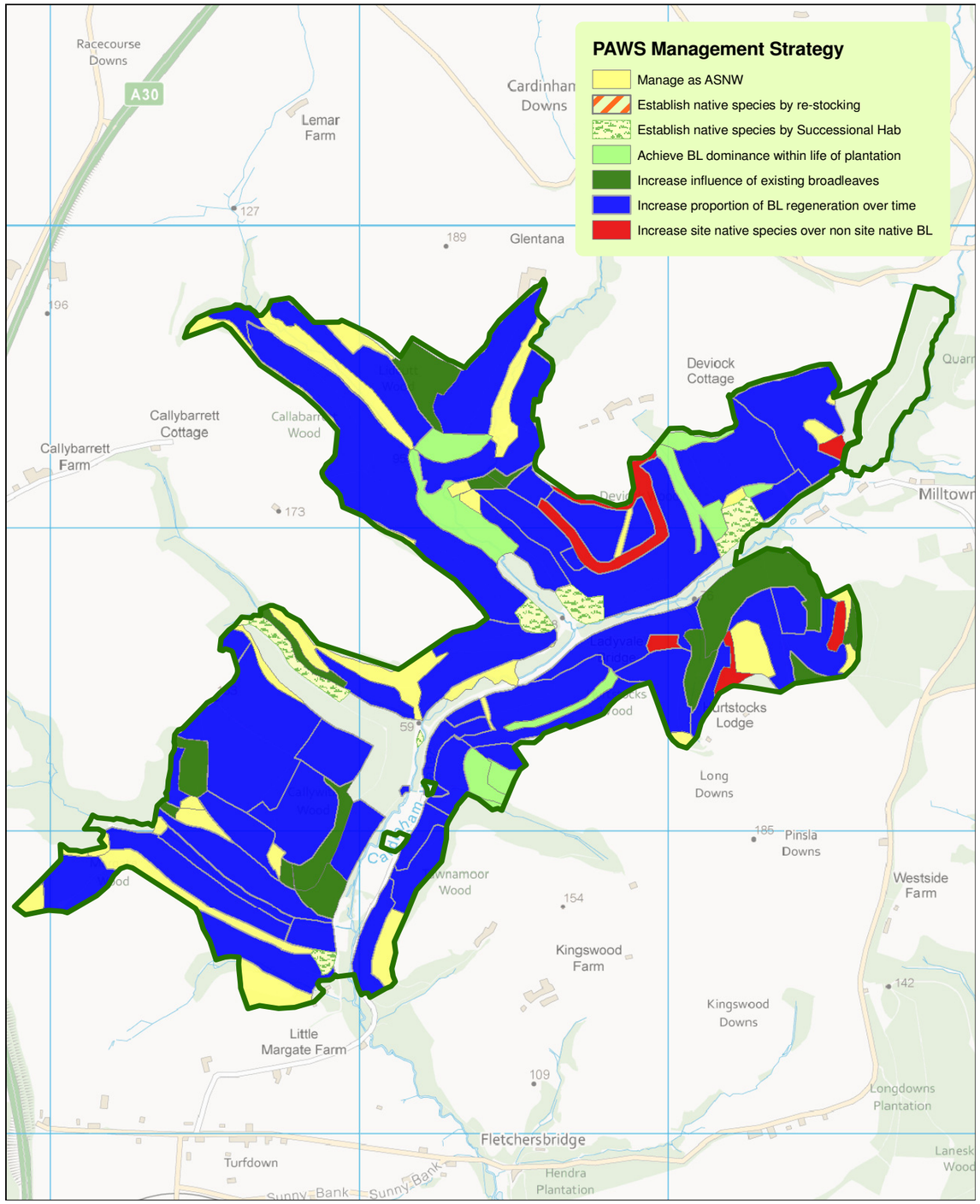

Management Strategy and Likely outcomes

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 classified 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 successional 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 the over story are removed classification of this area will be SN.
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 the over story are removed this area is likely to move into classification P3 or RA.
6	Manage to achieve a greater proportion of broadleaf regeneration within life of existing plantation.	This area has a predominantly non native conifer composition. Because of the regeneration potential and shade tolerance of many conifers and the lack of broadleaf seed source, this area will require heavy 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 native species and perhaps introduction of native species over the next rotation to progress restoration.