

**Application for Forest Design Plan Approval**

Forest District:	West England
Woodland or property name:	Nagshead and Russells
Nearest town, village or locality:	Coleford
OS Grid reference:	Nagshead: SO 600 100 Russells: SO 614 100
Local Authority district/unitary	Gloucestershire CC, Forest of Dean

Plan area	Total Plan area: 1070 Ha - SSSI area: 130 Ha - Non SSSI area: 940 Ha
Conifer Felling	31.3 Ha
Broadleaf Felling	

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 that 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.....  
Deputy Surveyor

Signed.....  
Regional Director

Date.....

Date of Approval.....

Date Approval Ends.....



# **WEST ENGLAND FOREST DISTRICT**

## **Forest of Dean**

### **Forest Plan**

# **Nagshead and Russells**

**Plan period 2014 – 2024**

**File Ref OP10/41 & 42**

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December 2013

## Forest Plan Plan Period 2013 – 2023

<b>Contents</b>	<b>Page</b>	<b>2</b>
<b>General Description</b>		<b>3-6</b>
Location		3
Tenure & management agreements		3-4
Physical environment		4-5
Landscape setting		5-6
Woodland structure		7
<b>Objectives of Management</b>		<b>7</b>
<b>Explanation behind Plan proposals</b>		<b>8-9</b>
<b>Silviculture</b>		<b>9-30</b>
Species choice		9-14
Current landuse and species		15
Current species inside and outside of the SSSI		16
Age-class structure and distribution		12-13
Thinning & felling		18-21
Woodland naturalness		22-24
Woodland structure		25
Conservation		225-28
Archaeology		28-29
Landscaping		29-30
<b>Meeting Objectives</b>		<b>31-35</b>
<b>Option Testing</b>		<b>36-38</b>
<b>Appendix 1:</b> Nagshead SSSI management plan		40-51
<b>Appendix 2:</b> Extract from RSPB reserve plan		52-87
<b>Maps</b>		
Location		
Geology and soils		
Landform		
Current species		
Age-class		
Woodland naturalness		
NVC Communities		
Archaeology		
Conservation features, conservation areas		
Other constraints, utilities, mines and quarries		
Public access		
Site analysis		
Design concept		
Silvicultural systems		
Felling coupes 2013 – 2023		
Felling coupes 2020 – 2051 inc. felling coupes in adjoining FP areas		
Current stock maps		
Indicative future species		
Native woodland restoration		

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## **GENERAL DESCRIPTION**

<b>Topic</b>	<b>Description</b>	<b>Implications for Management</b>	<b>Proposals</b>
<b>Location</b>	<p>Nagshead and Russells consists of 1070Ha of mixed woodland in the heart of the Forest of Dean, with extensive areas of woodland lying to the north, south and east.</p> <p>The Town of Coleford and satellite villages lie to the west, with the village of Parkend lying on the southern boundary with other small settlements close by.</p>	<p>The boundaries of this plan area are clearly defined by public roads. Views of the woodland edge are common but long range external views are few.</p> <p>The woodland is often accessed informally by local people and formally by visitors using the cycle trail and range of way-marked trails that are provided. The RSPB nature reserve also draws in many visitors from further afield.</p>	
<b>Tenure &amp; Management Agreements</b>	<p>The area is Freehold and part of the Statutory Forest of Dean.</p> <p>An area of 305 Ha in the south of the woodland that straddles Nagshead and Russells is let to the RSPB on lease as a Nature reserve. 145Ha of this reserve is a SSSI.</p> <p>Several working quarries and numerous mines with their associated surface</p>	<p>Much of the plan area forms part of an area that has been Inclosed for the past 20 years, with areas outside the Inclosure being subject to grazing by sheep.</p> <p>Nature Conservation is the primary objective within this area.</p> <p>Whilst occupying considerable areas of land the working area is</p>	<p>Under planting, group planting and Natural regeneration will be used alongside clearfelling. Additional fencing maybe needed for establishment purposes.</p> <p>The SSSI plan can be found in appendix 1 and relevant extracts from the RSPB management plan found in appendix 2, whose objectives will be consistent with those of the Forest Plan within the affected area.</p> <p>Existing quarrying activity fits comfortably with management</p>

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**December 2013**

<b>Tenure &amp; Management Agreements (cont)</b>	<p>leases exist within the area and include the extensive Bixhead Quarry in the west of the woodland along with Cannop Stone Firm who operate in the centre of the area just south of Cannop Ponds.</p> <p>Spion Kop and Cannop Bridge Marsh are two reserves managed by GWT covered by the 2012-2022 concordat with GWT.</p> <p>There are several privately owned properties within the woodland.</p>	<p>relatively small and many areas now have geological and ecological value.</p> <p>Spion Kop is noted for its geological exposures, plant and bird life whilst Cannop is valued for its marshy wet woodland habitat, plant, bird, Lepidoptera and Odonata interest.</p> <p>These are relatively few and scattered across the whole area.</p>	<p>objectives.</p> <p>Forest operations must recognise the value of these habitats and refer to the respective GWT management plans when preparing work in these areas.</p> <p>Take into account when drawing up plans for forest operations.</p>
<b>Physical Environment</b>	<p>The northern end and western side of Nagshead sit on a plateau at an altitude of 200m tailing off to 100m in the south and is punctuated by 2 steep sided valleys. One valley runs from Hopewell colliery in the north to Bostonbury Hill in the south the other starts at Cannop Stone Firms and runs northeast to the Bixhead quarries. Russells is situated to the east of Nagshead and sits comparatively lower at an average altitude of 100m. The eastern boundary sits at 165m with the ground gently sloping westward into the Cannop Valley at an altitude of 65m.</p> <p>Running from Parkend in the south to Cannop cross-roads in the north, Cannop Valley divides the two</p>	<p>Some parts of Nagshead are more exposed than others, especially the higher ground in the north and northwest. These areas have a DAMS* score of 16, although the DAM score for the lower and more sheltered eastern side of Nagshead drops to 7.</p> <p>Russells is generally more sheltered than Nagshead, with a DAMS score of 13 along the eastern edge, dropping to 9 in the Cannop Valley, exposure should be less of an issue.</p> <p>Potential for contamination of ground water by insensitive forestry operations.</p>	<p>Ensure that coupe boundaries are wind-firm in most sensitive areas. Natural regeneration and establishment of any under/group planting will be aided by the shelter afforded by the overstorey.</p> <p>*DAMS is a method for measuring levels of exposure and the likelihood of wind damage.</p> <p>Forest operations should adhere to Landscape, Forest and Water Guidelines to</p>

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**December 2013**

<b>Physical Environment (cont.)</b>	<p>areas of woodland and contains a complex of ponds at its northern end fed by Cannop Brook, whose catchment area covers the whole of Nagshead and Russells.</p> <p>Soils in Nagshead are predominantly brown earths with some surface water gleys toward the Cannop Valley that continue easterly into Russells with fresh to very moist Soil Moisture Regimes, with drainage improving slightly on the higher ground on the east side of Russells, giving way to some areas of brown earths.</p> <p>Mining and quarrying activities across a large area of Nagshead has produced some areas of skeletal soils poor in nutrients.</p>	<p>Nagshead enjoys good fertile soils on the slopes and plateau with heavier soils in the Cannop Valley, that also cover most of Russells; where these heavy wet soils become a major limiting factor to the tree and woodland types that can be established here. Crop stability can also be local problem.</p> <p>Poor soils are localised, but are unlikely to be suitable for productive woodland.</p>	<p>avoid contamination.</p> <p>There are opportunities to grow high quality conifers and broadleaves on the better soils although on the wetter heavier soils that predominantly occur in Russells, drainage will be critical for effective establishment and should increase the range of species available both in terms of restocking and the suitability of ground for natural regeneration.</p> <p>These areas are best left to encroachment by natural successional vegetation.</p>
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<b>Landscape Setting</b>	<p>The landscape is physically diverse consisting of a high plateau to the west in Nagshead falling easterly down into the Cannop Valley – that runs north to south – before gently rising again in a easterly direction through Russells joining the Speech House to New Fancy road. A number of minor valley systems run easterly into the Cannop Valley that drain into the Severn basin and produce a very</p>	<p>Due to the topographical nature the only views over Russells are from the higher ground in Nagshead, but reveal little of the character of the woodland, due to the views being generally semi-oblique in nature. Whilst the viewpoint above Beechenhurst Lodge is still a significant vantage point over the Nagshead landscape, it is now somewhat filtered due</p>	<p>Internal and External landscaping will need consideration. For Nagshead external landscaping will be more important with lowland landscape design principals to apply on the plateau. In Russells internal landscaping will play a much more significant part.</p>
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<b>Landscape Setting (cont.)</b>	<p>diverse, highly conspicuous topography.</p> <p><b>Landscape Character Assessment &amp; National Character Area Assessment</b></p> <p>Geology consisting of Old Red Sandstones from the Devonian is responsible for the areas characteristic red soils. The underlying geology also contains other Carboniferous rocks of sandstones, mudstones and limestones and has majorly influenced the landscape and landforms in the area, giving rise to the varied soils associated with them. This has led to a development of wide ranging habitat along with their characteristic flora and fauna.</p> <p>The varied nature of the woodland and management regimes along with small clearings adjacent to residential areas to the west such as those at Jugshole Pool or Purples Tump add to the visual diversity of the forest, with the other three sides of the area surrounded by contiguous woodland separated only by public roads.</p> <p>The woodlands cloak former industrial sites, quarries and mines that may sometimes be identified by birch copses that have colonised former workings and spoil tips.</p>	<p>to the crop of young p87 DF just in front of the viewpoint. Other views over Nagshead are few.</p> <p>The variety of topography, aspects, associated geology and soils should favour a wider species choice in future plantings.</p> <p>Some of these areas such as Spion Kop Quarry and the disused quarries west of Bixhead now provide valuable habitat for a range of flora, Lepidoptera, bats and birds.</p>	<p>Diversity of the plan area will be broadened by introducing new species and utilising a range of management techniques other than clearfelling that should enrich existing habitats.</p> <p>Manage these areas in line with any specific management plans relating to these areas ensuring other guidance or best practice is accounted for in the planning of forestry operations through the site planning process.</p>
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<b>Woodland Structure</b>	Woodland structure is diverse with a roughly even split between conifer and broadleaf, but with a 10% bias towards broadleaf.	A diverse woodland structure with many mixed species crops. Broadleaves are predominantly concentrated in the Cannop Valley and the south of the area.	To some degree broadleaves will continue to regenerate naturally, and together with planting, the broadleaf cover is likely to increase by around 20% over the next 40 years.
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<b>Management Objectives</b>	<ul style="list-style-type: none"> <li>❖ <b>Management of the woodland will be to the standards required to maintain FSC and PEFC accreditation.</b></li> <li>❖ <b>Continued production of sustainable marketable woodland products that also allows delivery of a range of other public benefits whilst providing future opportunities for the substitution of wood products for fossil fuels and other energy intensive materials.</b></li> <li>❖ <b>Undertake management in line with Biodiversity 2020 and other nature conservation policies that protect and enhance both woodland and open habitats and their associated species fostering and facilitating their resilience and adaptation to projected climate change and disease threats.</b></li> <li>❖ <b>To retain Nagshead SSSI in favourable condition, whilst maintaining and enhancing biodiversity values in and around the RSPB reserve (with particular reference to management of birds), GWT Reserves and the wider plan area.</b></li> <li>❖ <b>The enhancement of internal landscape through diversification of age class structure, integrated with nature conservation projects that will provide further conservation benefits.</b></li> <li>❖ <b>Conservation and protection of heritage features through identification, and recording.</b></li> <li>❖ <b>To maintain recreational usage of the woodland in keeping with FC policies.</b></li> </ul>
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### **AN EXPLANATION BEHIND PLAN PROPOSALS 2013-2023**

<b>PAST</b>	<b>Background</b>	Older FPs in the District dating from the late 1990s through to 2000 tended to concentrate on restructuring the age class distribution of the forest, using clearfelling and restocking as the primary method of management. This helped to ensure a more sustainable and even flow of timber available into the future.
<b>PRESENT</b>	<b>Challenges</b>	With the restructuring process pretty well under way within Nagshead and the wider forest, woodlands now face a different set of challenges; that of climate change and the constant threat of pests and diseases. In recent years we have had to deal with several new diseases:
	<b>Diseases</b> Dothistroma Needle Blight (DBN)	Often referred to as Red Band Needle Blight (RBN). This disease attacks <b>pine</b> species and first appeared in the Dean in the 1990s with the effect of reducing the growth rates of the pine trees by upto anywhere between 60 and 80% and is managed through thinning the wood more heavily than you would normally to introduce higher levels of air flow through the crop.
	Phytophthora ramorum (PR)	Found originally in Cornwall in 2009, attacking Oak, it is a notifiable disease and is dealt with by statutory plant health notices (SPHN) issued by DEFRA. At present there is no PR in Oak in the Forest of Dean, however, in 2012 Phytophthora was found to of infected <b>Larch</b> crops and again use of SPHN was used eradicate the disease, which is proving difficult; so regular aerial flyovers are helping keep track of the latest hot spots and are dealt with swiftly by informing the land owner and issuing of SPHN for felling of infected areas. Felling of infected larch crops within the Dean was completed in March 2012 and luckily recent flyovers in 2013 have shown no reinfection, although unfortunately other parts of the country have not been so lucky with further felling pending. This is not to say there will not be a need for further fellings of infected larch required in the future.
	Chalara fraxinea	The most recent disease showed up in 2012, and affects <b>Ash</b> . To date no infection has been found within the forest and let us hope it stays that way!
	Other	There are other diseases that may pose a threat in the future but the Forestry Commission Research Department is working hard both in this country and on the continent to ensure future risk to our woods is minimised.
	<b>Climate Change</b>	Climate change research tends to suggest the climate is going to get warmer. It is likely that some tree species may become less well suited to future changes in climate. Therefore it is

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<b>FUTURE</b>	<b>Proposals</b>	<p>important that the range of species planted in our forests is increased making them more resilient and by doing this now will hopefully make them more adaptable to future threats posed by pests and disease too.</p> <p>The primary restructuring process of clearfelling from the previous plan has served its purpose. With these new challenges, the proposals put forward will continue the process of diversifying the wood and you will notice more of an emphasis placed on “Alternatives To Clearfelling” (ATC) as opposed to the more conventional clearfell and restocking methods used previously. This will make the woodland more resilient to future demands. ATC methods minimise the need to clearfell; instead, in some areas micro-climates will be created by felling smaller groups of around 0.5Ha. This enables the planting of a much wider selection of species, increasing diversity within the wood. ATC methods achieve a slower rate of change in how the wood is structured, so that the future age class structure will be more diverse too. At the same time ATC can help protect both habitats and flora as they are less harsh by comparison. Over all the plan proposes an increase in broadleaf cover by upto around 20% and conversely a reduction in conifer cover by around the same amount.</p> <p>The Site Analysis map and Design Concept map will enable you to get a quick over view of what is proposed.</p>
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## **SILVICULTURE**

<b>Topic</b>	<b>Description</b>	<b>Implications for Management</b>	<b>Proposals</b>
<b>Silviculture: Species Choice (Figs. 1 - 1.2)</b>	<b>Broadleaves</b> Oak (OK) Pedunculate oak (POK) Sessile oak (SOK)	A strong cultural and ecological association with oak exists in this part of the Dean. Occurs mainly in the south of the plan area, within the RSPB Nature Reserve and to the north along the lower slopes of the Cannop Valley. Many mature stands of oak also remain around the peripheral edges to the east and west. The entire area has an NVC type of W10 & W16. It grows well on the heavier soils here.	Oak will be one of the main planted species used on suitable sites, supplemented by minor species and incorporate the inevitable birch regeneration. Both POK and SOK oak are suitable for the site. POK should be used on heavier wetter areas with SOK better suited for the drier sites, having a higher tolerance of drier soils /drought, renders it

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 December 2013



<p><b>Silviculture: Species Choice (cont.)</b></p>	<p>Birch (BI)</p> <p>Cherry (P.avium) (WCH)</p> <p>Hazel/Hornbeam (HAZ/HBM)</p> <p><b>Conifers</b> Douglas Fir (DF)</p>	<p>Birch naturally regenerates pretty well throughout Nagshead and Russells. Timber is typically used as firewood/wood fuel.</p> <p>There is consistent demand for good quality cherry. Very little exists within the plan area. Cherry prefers fertile soils that are fresh, well drained and reasonably sheltered.</p> <p>Both minor species of little commercial value occurring very rarely within the plan area. Use of these species should be encouraged to increase habitat diversity and can be included as a mixture along with other minor species.</p> <p>A commercially valuable timber appropriate for the free draining brown earths and suited to extended</p>	<p>monitored for <i>C.fraxinae</i>. Planting of ash might continue, albeit in smaller quantities and only with trees grown from seed sources where a possible genetic resistance has been found.</p> <p>Birch is likely to form a component of most sites managed on either extended rotation or clearfell areas restocked with broadleaves, and on some sites (e.g. declining NS) Birch will act as a soil improver.</p> <p>Cherry may be planted in mixture with other broadleaves when restocking or carrying out enrichment planting where shelter can be afforded.</p> <p>These species will contribute to the 'minor species' percentage component of future crops across Nagshead and Russells. If specimens are present within crops they should be retained and their regeneration promoted to add diversity.</p> <p>To aid establishment of new crops areas of DF will be retained on an extended rotation.</p>
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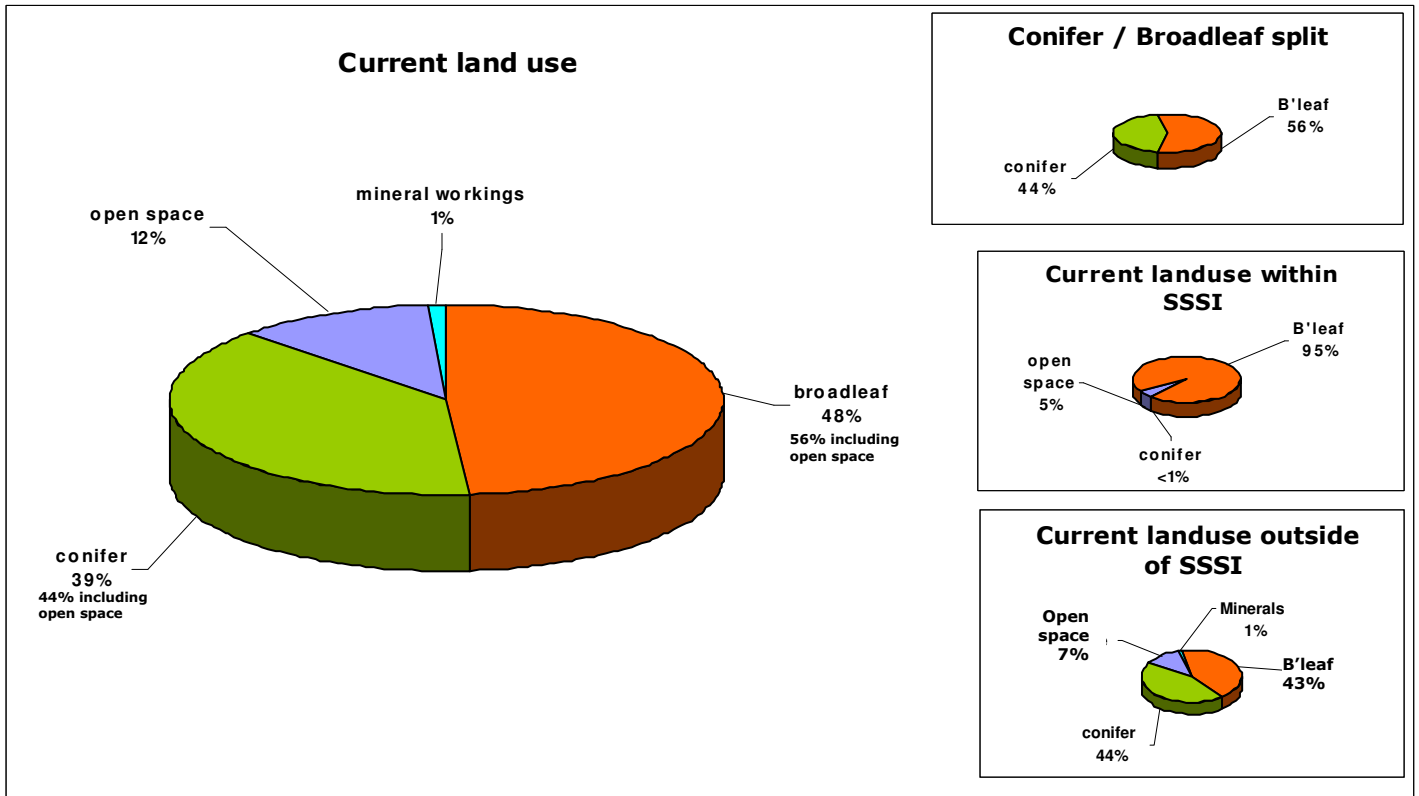


<p><b>Silviculture: Species Choice (cont.)</b></p> <p><b>Future alternative species for consideration</b></p>	<p><b>Conifer:</b> Douglas Fir (DF)</p> <p>Western Red Cedar (RC)</p> <p>European Silver Fir (ESF) and Coastal Redwood (RSQ)</p>	<p>in mind. Presence of <i>PR</i> has meant the felling of around 8 Ha and a further thinning out of 8-9Ha of larch within Nagshead, (some of which were younger crops that had been subject to squirrel damage too.) replacement species are likely to come from those conifer listed below, whilst page 11 mentions some suggestions for broadleaf alternatives.</p> <p>A commercially valuable timber appropriate for the free draining brown earths and suited to extended rotation and continuous cover. Found extensively throughout Nagshead and Russells.</p> <p>There is a modestly small amount of RC in the plan area with principal coverage of RC occurring in the south of Nagshead, some in mix with NS. Along with DF, RC too is a species suited to extended rotation and continuous cover. Research tools suggest RC would be well suited for consideration in increasing future resilience to a predicted warmer climate.</p> <p>Two Species that currently do not feature in the species composition of Nagshead or Russells, except in small quantities on 2 recent restock sites. Considered currently as minor species, both ESF and RSQ share the same soil requirements needing moderately fertile soil with a fresh to moist soil conditions. Both are also shade tolerant,</p>	<p>existing coppice areas, will help to diversify woodland structure.</p> <p>To aid establishment of new crops areas of DF will be retained on an extended rotation. Thinning is likely to encourage natural regeneration.</p> <p>Extended rotation enables the thinning of RC crops to develop an understorey of natural regeneration. Any OK or BI regeneration would be accepted.</p> <p>ESF and RSQ would lend themselves well to being considered as a component for under-planting where the overstorey affords the shelter required for successful establishment.</p>
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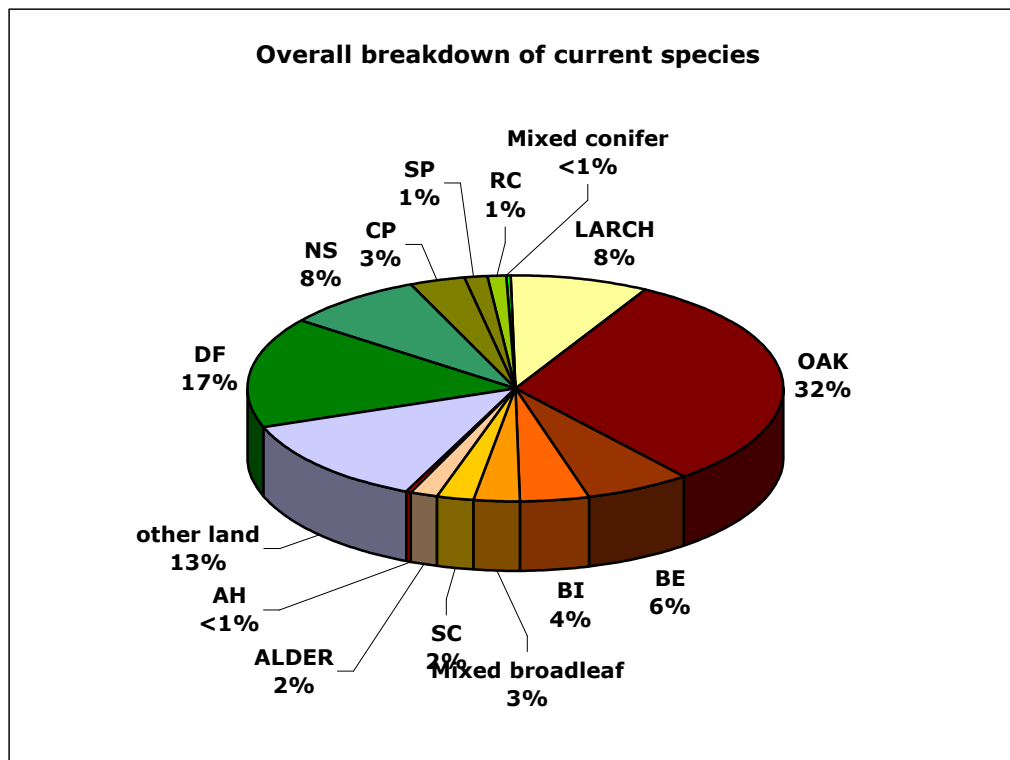
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<p><b>Silviculture: Species Choice (cont.)</b></p>	<p>Weymouth Pine (WEP)</p> <p>Scots Pine (SP)</p> <p>Pacific Silver Fir (ESF)</p> <p><b>Broadleaves:</b></p> <ul style="list-style-type: none"> <li>• Oaks (POK / SOK &amp; ROK)</li> <li>• Beech (BE)</li> <li>• Hornbeam (HBM)</li> <li>• Birch (BI)</li> <li>• Hazel (HAZ)</li> <li>• Cherry (WCH)</li> </ul>	<p>but frost sensitive. Research suggests their suitability for a warming climate within this plan area.</p> <p>Not currently present within Nagshead and Russells. Although species does suffer from white blister rust, can be used in mixtures with SP and broadleaves and is moderately resistant to DNB.</p> <p>Use of SP should continue. Little effect of DNB showing at present. Frost hardy and wind-firm and will do well on the drier more fertile sites. Good in later years for visual aesthetics, structural diversity and conservation value.</p> <p>A shade tolerant species that can be vulnerable to late frosts. Avoid exposed sites with drier soils. Prefers more fertile sites with ample but not excessive soil moisture.</p> <p>See page 9 to page 11</p>	<p>Use in small quantities and in mixture with SP and is a good alternative for CP in terms of resistance to DNB.</p> <p>Where maturer stands exist, retain some SP for visual aesthetics, structural diversity and conservation value.</p> <p>Research tools show ESF as being suitable for the southern areas of Nagshead and the drier parts of Russells. These areas are generally less exposed, and ESF will be used for under-planting which will provide the required shelter needed for establishment.</p> <p>See page 9 to page 11</p>
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**Figure 1: Current Landuse within Nagshead and Russells**



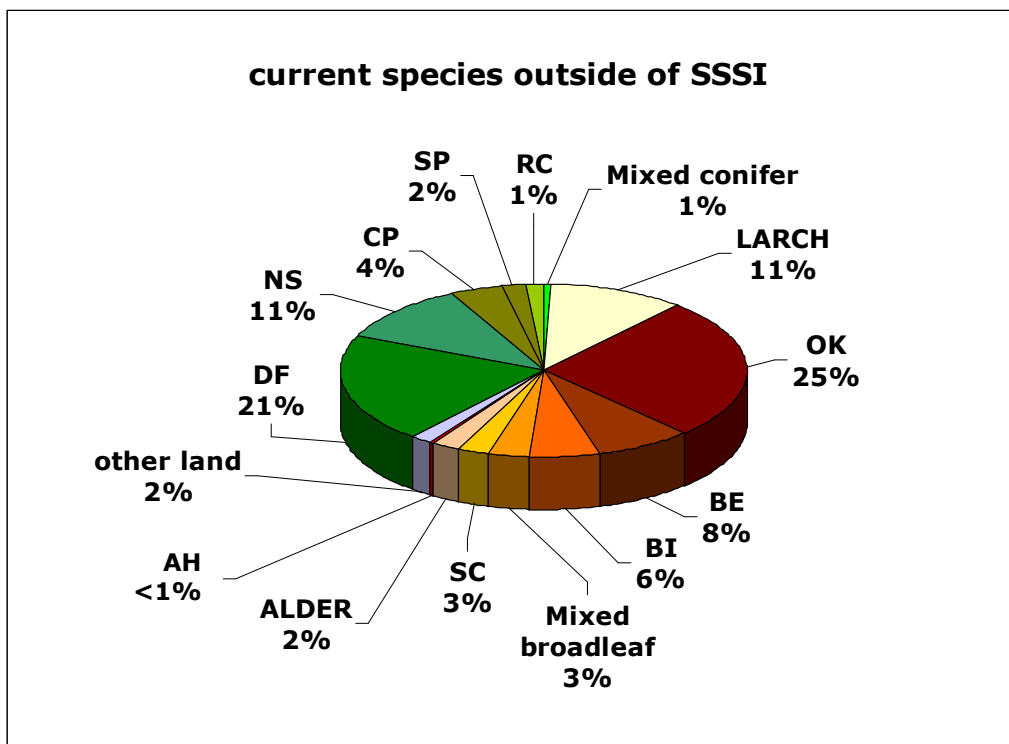
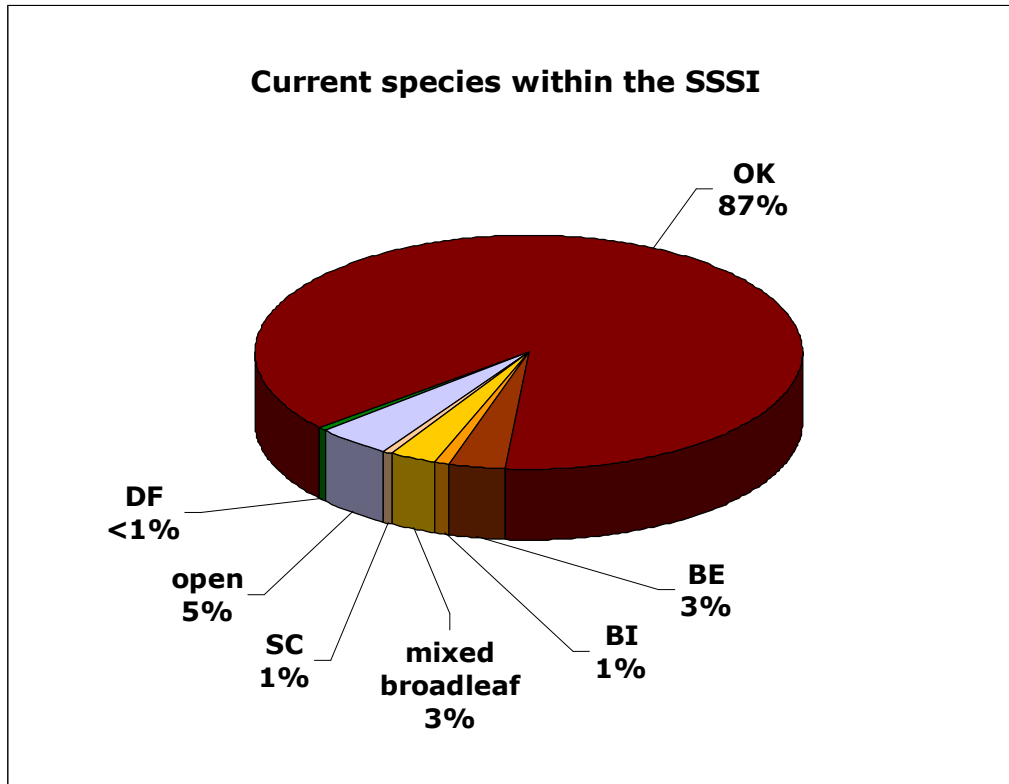
**Figure 1.1: Nagshead & Russells Current Species**



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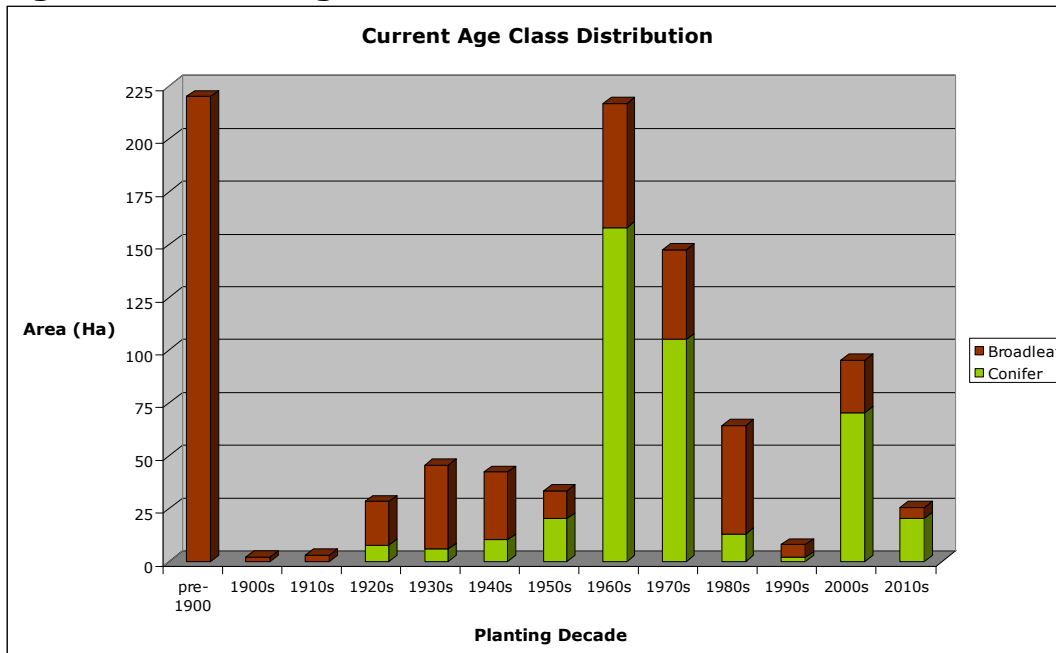
**Figure 1.2: Comparison of current species composition inside and outside of Nagshead SSSI**



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Topic	Description	Implications for Management	Proposals
<b>Silviculture: Age Class Structure (Fig. 2)</b>	<p>Figure 2 shows that although the restructuring process has begun, there is still a peak present from the 1960s and '70s and the age class structure is still skewed.</p> <p>Older stands of oak are concentrated around the RSPB reserve, Nagshead SSSI, the Cannop Valley and the area of Minimum Intervention along Fetter Hill to Palmers Flat.</p>	<p>Conifer is prevalent in the west and north of the plan area. Recent onset of new diseases and predictions on climate change has put more of an emphasis on the use of Alternative To Clearfell (ATC) systems. This does not preclude the use of clearfelling that will be used, for example, where wind throw could be an issue on some of the wetter more gleyed sites.</p> <p>These tend to date from the early 19<sup>th</sup> Century.</p>	<p>Use of ATC will afford shelter that enables selection from a wider choice of species when under / group-planting, or enrichment planting. This approach will help foster species diversification and woodland resilience to a warming climate as well as enriching structural diversity.</p> <p>Some previous work on the regeneration of oak in Russells has had partial success. This work should continue as silvicultural conditions allow, based on survey of existing stands and in consultation with RSPB for those areas on the reserve. Although enrichment planting using minor species would benefit habitat diversity and may reduce the risk of squirrel damage. A proportion of the older age classes will be maintained as described in the Broadleaf Management Plan.</p>

**Figure 2: Current age class distribution**





<p><b>Silviculture: Thinning &amp; Felling (Fig.3)</b></p>	<p>Conifer clearfelling</p>	<p>The process of age class restructuring has begun breaking up the more extensive areas of even aged conifer and removal of conifer from areas subject to windblow along with areas badly affected by squirrel damage. More recently Statutory Plant Health Notices issued by Forest Services (FS) in response to new diseases such as <i>P.ramorum</i> has meant an increase in felling programmes. This has led to re-prioritising felling coupes so as to remain compliant with UKWAS in terms of contributing to a sustainable supply of marketable woodland products.</p>	<p>Some areas of DF and RC that were down for felling have now been moved to an extended rotation. Both DF and RC are prime components of continuous cover forestry and due to the shelter from frost and exposure that the overstorey affords and enables a broader choice of species when under / group planting – helping to ensure future woodland resilience from the threat of a warming climate.</p>
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<b>Silviculture: Thinning &amp; Felling (cont.)</b>	Broadleaf clearfelling	With the exception of any coppicing, no clearfelling is planned. Broadleaved stands will be maintained as shelterwood. However, SC is vulnerable to <i>P.ramorum</i> and areas of SC may need clearing should future infections occur.	Some areas of SC may be diversified with other broadleaves by enrichment planting, strengthening future resilience against disease issues and a warming climate.
	Mixed plantations of conifers with broadleaves.	These crops will generally be managed on extended rotations.	Broadleaf components will be halo thinned to aid crown development. With conifer components thinned to favour DF, SP and RC. Both conifer and broadleaf natural regeneration will be accepted. Some crops may have group fellings taking place, giving the opportunity to increase species diversity and adaptability to climate change, as well as contributing to a sustainable supply of marketable woodland products.
	Conifer thinning	Conifer stands will be assessed for thinning every 5 years.	Thinning will be to promote good form and vigour. Some areas of conifer will managed using group felling and be felled over the next 20-30 years or so to facilitate diversification of species for the next rotation through under / group planting. In other areas where ATC systems are specified, (see silvicultural systems map) frame trees will be retained following final overstorey removal, adding structural diversity. These are likely to be DF, RC or SP. The remaining crops will be thinned conventionally.

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Planning Forester (WE north)  
December 2013

<p><b>Silviculture: Thinning &amp; Felling (cont.)</b></p>	<p>Broadleaves</p> <p> See Map 18b "Native wood Management Intentions"</p> <p> See Map 18b</p>	<p>Conifer thinning within the RSPB reserve. – The RSPB has an ideal of 10% (30Ha) as being non-native species.</p> <p><b>Oaks predominantly in the SSSI and RSPB reserve</b></p> <p>19<sup>th</sup> Century stands. Some regeneration work under the Uniform shelterwood system has taken place over the last 20 years with some success.</p> <p>Assessment for thinning intervention does NOT automatically qualify an area for thinning as thinning will be carried out based on silvicultural need</p> <p><b>Existing areas under natural regeneration.</b> Significant areas throughout the southern</p>	<p>Within the RSPB reserve, non-native (conifer) species are acceptable and currently stands at 14%. There is an assumption for thinning of conifer rather than removal of conifer. This helps maintain favourable habitat for bird species such as Firecrests, Goldcrests, Crossbills, Siskins and Coal tits, all highlighted by RSPB as important species meaning reduction of non-native species is not a priority for RSPB; although Larch being a deciduous conifer means the non-native percentage would drop to 11% if the larch component of the reserve were to be excluded.</p> <p>To be managed on a long rotation of around 400 years and with continued use of the uniform shelterwood system, diversification of structure through this method will occur; acting on existing advance regeneration of oak where apparent. Older stands of broadleaves will be thinned in order to establish a crop density likely to promote better chances for regeneration as prescribed in the FOD Broadleaved Management Plan. In the reserve, enrichment planting may be used to diversify species composition - but only outside of the SSSI area and in consultation / agreement from RSPB. .</p> <p>Natural regeneration should be surveyed to assess the structure and species composition of the stand.</p>
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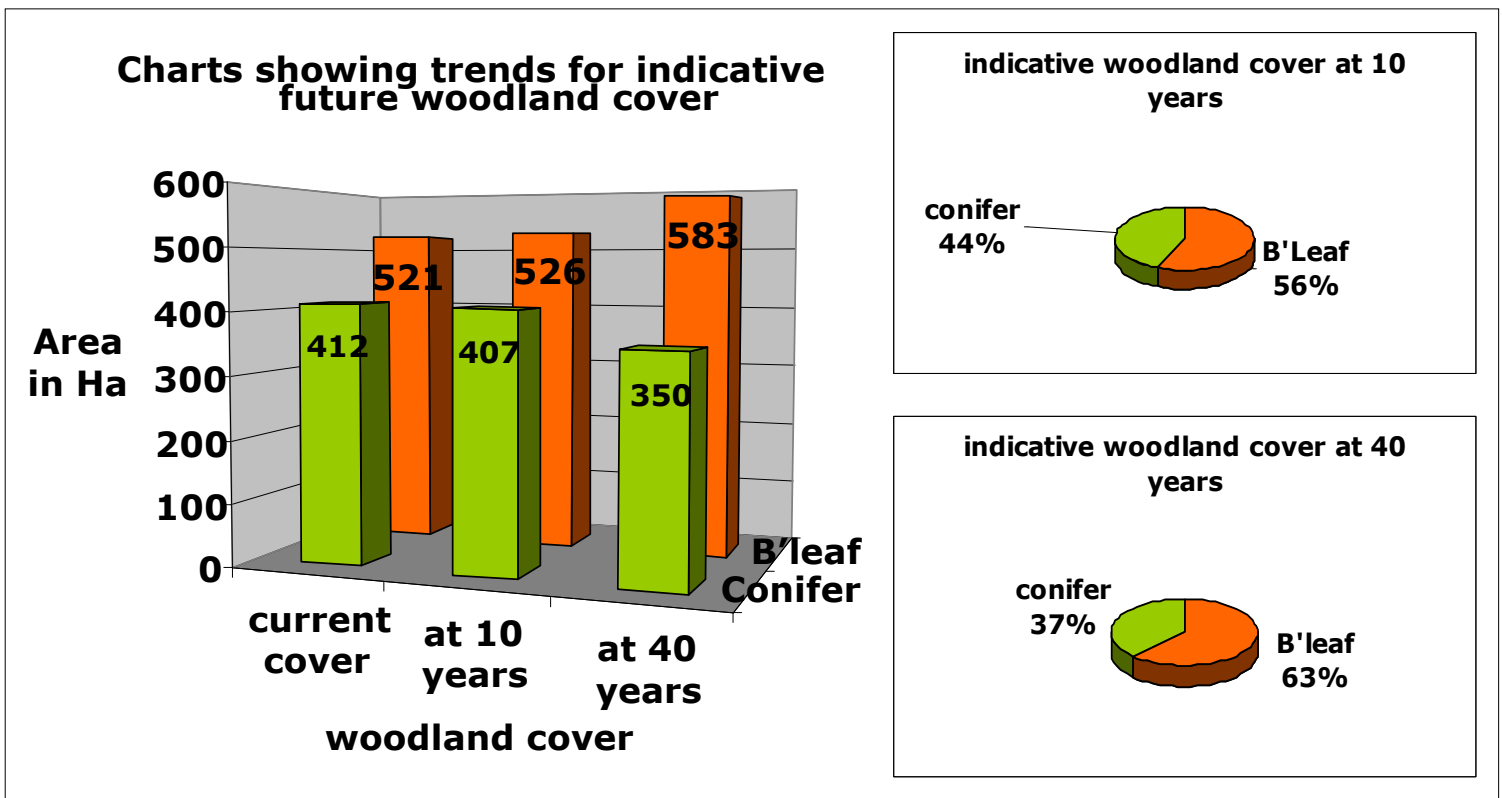
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Planning Forester (WE north)  
December 2013

<p><b>Silviculture: Thinning &amp; Felling (cont.)</b></p>	<p> See Map 18b For areas of SC and BE</p> <p> See Map 18b For areas with a site naturalness score of 2</p> <p> See Map 18b For areas of conifer &amp; mixed Broadleaf intended for restoration</p>	<p>part of Russells have been subject to management under the uniform shelterwood system. Seed fellings date from 1988 and regeneration has been prolific, if patchy in places.</p> <p><b>Stands of BE and SC</b> in the western part of Nagshead within the RSPB reserve are showing significant signs of group regeneration dating from the early 1990s. The older storey dates from the 1920s and '30s.</p> <p><b>Mixed conifer and broadleaf crops that contain 50-80% site native species (Site Naturalness (SN) class 2)</b> Natural Regeneration of native species will be acceptable in areas of SN class 2. Existing areas of conifer being restored to native woodland cover will aim to establish a minimum of 2500 stems per hectare. With natural regeneration being variable across this area, enrichment planting maybe required to achieve full stocking.</p> <p>The majority of crops fall</p>	<p>(See prescription under “Age Class Structure”). All subsequent operations in these areas of the reserve will be carried out in consultation with RSPB.</p> <p>Manage as group shelterwood by relieving shade around patches of regeneration. Surrounding trees will be assessed every 10 yrs with the aim of gradually removing them to encourage an expanding cone of regeneration. A proportion of overstorey trees should be retained to retain structural diversity. Although BE is the dominant species in these stands, later respacing and thinning should seek to recognise other species such as SC and OK.</p> <p>In the first ten years of the plan, conifer removal will be carried out through thinning. It is expected that broadleaf cover will rise by 2-5%. Over 40 years it is hoped through further thinning, under-planting or group planting that broadleaf cover will have risen by a further 15-18%, achieving a total increase of native broadleaf cover of around 20%. Conversely it will see a reduction in conifer by a similar amount. Where conversion is possible through thinning this will be the preferred method. Where clearfelling takes place any broadleaves of good form will be retained for inclusion with the future broadleaved crop.</p>
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Planning Forester (WE north)  
December 2013

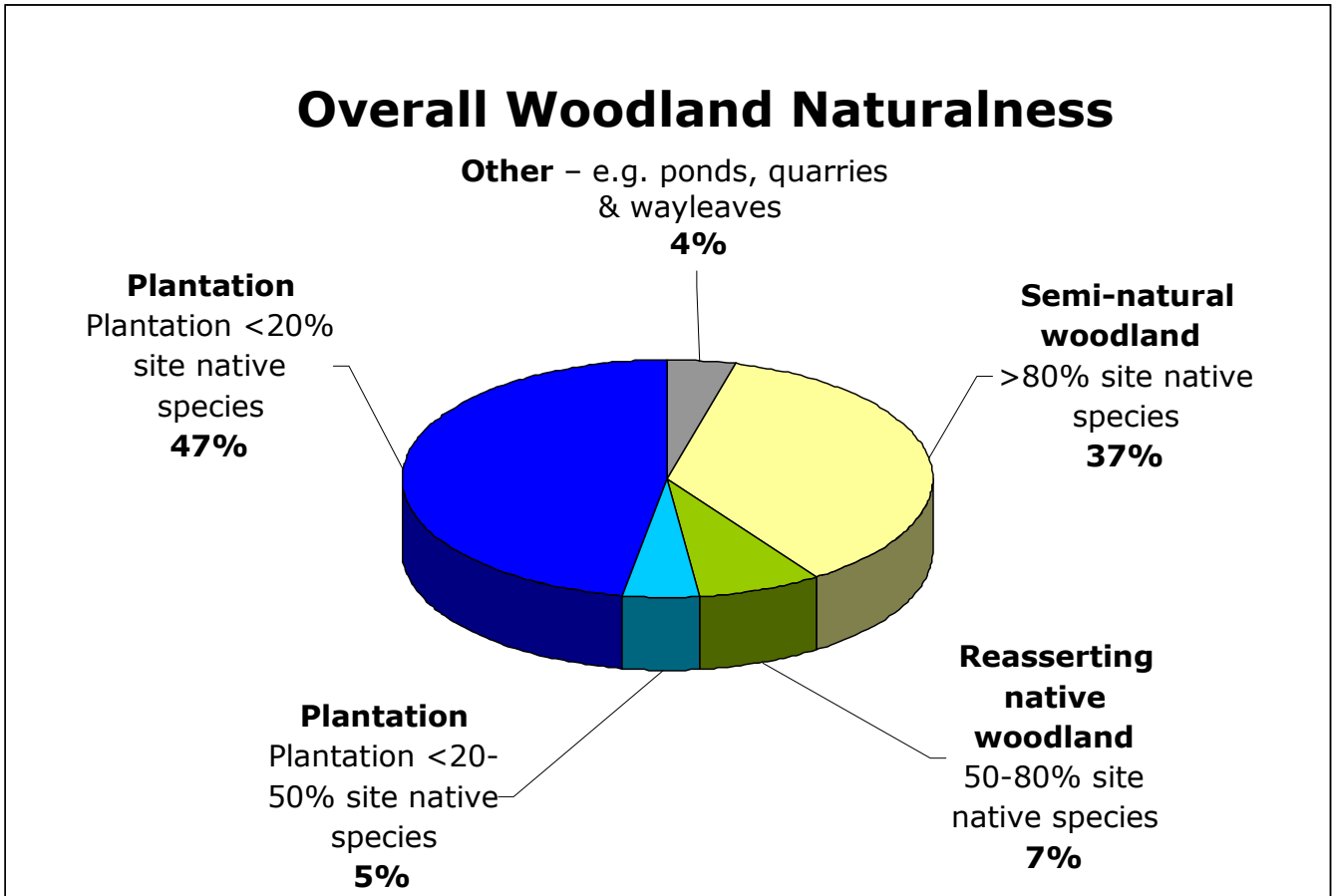
<p><b>Silviculture: Woodland Naturalness (Fig. 4 to 4.1)</b></p>	<p>Composition</p>	<p>into to the two extreme categories site nativeness of either &gt;80% site native species or plantation with very few stands in between.</p>	<p>During the next 40 years woodland naturalness scores should reveal a more tangible shift in distribution of woodland structure in a direction towards sites containing 20-50% and 50-80% site native species. (classes 2 and 3) Although open to the vagaries of natural regeneration, there is scope for proactive intervention by means of group felling and replanting / enrichment planting following thinning operations. Some sites that show high levels of Axiophyte species e.g. those in the valley bottom of Cannop Valley but have little or no broadleaf components to act as parent trees are better suited to conversion by clearfelling and restocking.</p>
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**Figure 3: Future composition of woodland cover**



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December 2013

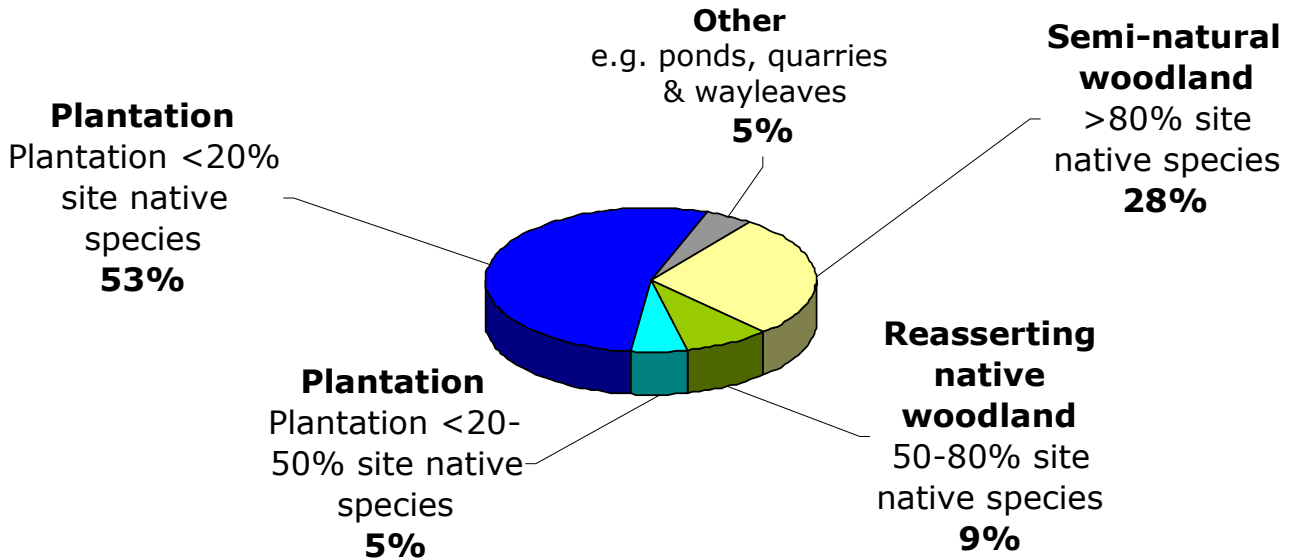
**Figure 4: Nagshead and Russells Woodland Naturalness**



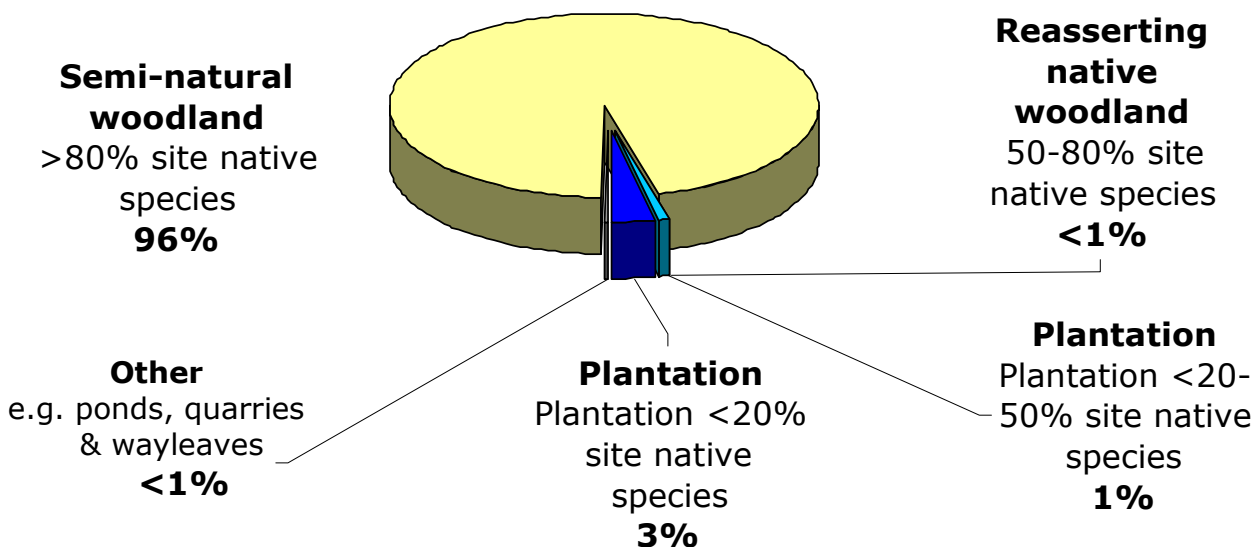


**Figure 4.1: Comparison of Nagshead and Russells Woodland Naturalness inside and outside of Nagshead SSSI**

## Naturalness scores outside of the SSSI



## Naturalness scores within the SSSI



<b>Silviculture: Woodland Structure (Fig 3)</b>	<p>Conifers currently account for 44% of the area. Douglas fir alone accounts for 17%. The proportion of broadleaves is currently 56%.</p> <p>The proportion of open space is currently 12%.</p> <p>Coupe restructuring</p>	<p>Where appropriate the proportion of conifer will reduce through progressive thinning and felling interventions on sites to be converted to site native broadleaves, whilst on other sites a mixed crop of conifer/ broadleaf will develop.</p> <p>Open space will not change significantly during the plan period.</p> <p>The programme of clearfelling and group fellings within ATC coupes will create areas of temporary open space from the date of felling to the time of establishment of restocked / naturally regenerated species.</p>	<p>Proportions will not change significantly in the first 10 years of the plan, but over the following 30 years removal of conifers from mixed stands and the conversion of conifer stands to site native broadleaves will see a reduction in conifer by around 20% and conversely a 20% increase in broadleaves.</p> <p>Open space will be built into some areas where characteristics are typical of heathland vegetation. The “Linking the Pearls” project will contribute to temporary open habitat on a cyclical basis of coppicing, shrub clearance that will help in promoting structural diversity within the woodland.</p> <p>Thinning will seek to diversify species and structure. In some areas where ATC systems have been indicated some over storey will be retained, scattered as frame trees or in groups adding structural diversity to future crops (Especially DF, SP or RC, OK, SC). Where needed woodland structure along ride sides will be diversified through heavy and variable thinning and subsequent mosaic coppicing.</p>
<b>Conservation</b>	<p>Nagshead SSSI and RSPB Reserve (see Appendix 1 for SSSI plan)</p>	<p>Nationally important site managed by the RSPB in conjunction with the Forestry Commission. The reserve covers 305Ha of</p>	<p>The SSSI will be managed under the FP acting as the SSSI plan (appendix 1), signed off by Natural England. No clearfell is due</p>

<p><b>Silviculture: Conservation (cont.)</b></p>	<p>Speech House Oaks SSSI</p> <p><u>Nature Reserves And Key Wildlife sites (KWS)</u></p> <ul style="list-style-type: none"> <li>• GWT Small Biological sites at Lower Whitelea Green.</li> <li>• Cannop Bridge Marsh GWT Reserve and a KWS</li> <li>• Cannop Ponds car park</li> </ul> <p>Spion Kop Quarry KWS</p> <p>Bixslade Quarry Natural Reserve (minimum Intervention area near Fetter Hill)</p>	<p>which 145Ha lies within the SSSI. The SSSI only includes areas of old oak, where as the RSPB reserve extends both to the east and west to include some conifer.</p> <p>Area of old oak wood pasture of national importance for its lichen interest.</p> <p>Areas of botanical interest.</p> <p>Important for its assemblage of wetland species.</p> <p>Part of SSSI and the ponds and adjacent woodland are also a KWS</p> <p>Small quarry just north of SSSI in Nagshead</p> <p>Just north of Spion Kop Area north of the Parkend to Coleford road has been extensively mined and replanted at various points in time. The area is diverse with some veteran trees and undulating ground with naturalised vegetation composition.</p>	<p>in the SSSI within the plan period. Thinning operations will be carried for silvicultural benefit and in conjunction with the RSPB management plan for the reserve. Some non standard thinning detailed in the silviculture section will be used to encourage regeneration.</p> <p>The FP has been formulated to take into account the objectives of the Speech House Oaks SSSI plan. (see appendix).</p> <p>Lower Whitelea Green part of SSSI. Manage as broadleaved high forest.</p> <p>Managed under agreement with GWT. Management plan to be drawn up by GWT.</p> <p>Managed in partnership with GWT</p> <p>Retain area as minimum intervention. The Martin &amp; Taylor Quarry is small and will not significantly impact on the quality of the surrounding area. Some intervention will be required along the length of the cycle track for the purpose of public safety.</p>
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<b>Archaeology</b>	Features	Mainly from mining and quarrying, some platforms earthworks and stones recorded. An old well and site of an old lime kiln is also recorded.	Any new findings need to be recorded in GIS and together with existing ones noted down in operational site plans so they can be protected when operations are carried out.
	Areas	Mainly a result of previous mining and quarrying activity. Quite a few require consultation with the County Archaeologist, whilst others need to be retained in their current form.	Where these areas occur, consult with County Archaeologist.
	Lineal features	Mainly old tramways associated with coal workings or post-medieval foundries. Also old earth embankments present.	Any new findings need to be recorded in GIS and together with existing ones noted down in operational site plans so they can be protected when operations are carried out.
<b>Landscaping</b>	In Russells topography is relatively flat falling gently to the Cannop Brook in the west.	Due to the topography here landscaping presents few external landscaping concerns. Issues are more related to internal landscaping as several recreational rights of way cross this area and thus internal landscape design is an important feature of the coupe layout and future age class structure.	Lowland landscape design techniques have been used in the design of the felling coupes.
	Travelling west into Nagshead topography rises comparatively steeply from the Cannop Valley up onto the plateau running back to Broadwell and Coalway.	To the north this area is dominated by conifers, with broadleaves increasing to the south (into the SSSI) whilst the plateau is still predominantly even aged conifer with small stands of broadleaves scattered around the edges, recently bolstered by the fellings and replanting of	Restructuring of age classes on the plateau will be a more gradual process than previously envisaged due to higher percentages of crops under extended rotation. Changes in structure will change as the crops respond to thinnings and under/group plantings.

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**December 2013**

<p><b>Silviculture: Landscaping (cont.)</b></p>	<p>Yet despite its bold and diverse landform of Nagshead forming part of the Cannop Valley views to this area are infrequent.</p> <p>The main viewpoint into Nagshead remains the view from 'Place' above Beechenhurst Lodge.</p>	<p>broadleaves around Broadwell and Coalway as prescribed in the previous plan.</p> <p>In spite of its relative lack of prominence, temporary views of the Nagshead area have appeared from other felled areas across the valley.</p> <p>This is a prominent and sensitive view-shed, frequently seen by visitors to the Forest.</p>	<p>These views will gradually either disappear or become more filtered as the young restock areas within Russells become older. Design of felling coupes has not changed from the previous plan so remain complimentary to landform. Change in landscape views will be less dramatic and more gradual with the higher percentages of crops under extended rotation.</p> <p>Views from 'Place' are becoming more filtered as the young DF crops below 'Place' grow. Views from here are likely to be managed but remain filtered for the time being. – This may change as 'Place' may be replaced within the plan period but with crops under extended rotation and coupe shapes remaining unchanged the quality of the view should not be compromised.</p>
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## Meeting Objectives

Objective	Description	Proposals & Monitoring
<p>❖ <b>Management of the woodland will be to the standards required to maintain FSC and PEFC accreditation.</b></p>	<p>Management of the district's woodlands is undertaken to the standards required under UKWAS as endorsed and certified by the Forest Stewardship Council</p>	<p>Compliance to these standards is monitored through various national and district policies, guidance, field surveys, use of GIS and other IT software, internal support audits and external audits carried out by SGS (Société Générale de Surveillance) which is an independent auditing company.</p>
<p>❖ <b>Continued production of sustainable marketable woodland products that also allows delivery of a range of other public benefits whilst providing future opportunities for the substitution of wood products for fossil fuels and other energy intensive materials.</b></p>	<p>Management of the district's woodlands is undertaken to the standards required under UKWAS as endorsed and certified by the Forest Stewardship Council as well as to maintain PEFC accreditation.</p> <p>As part of the forest district's business plan and the organisation's customers' charter, the forest district is committed to financial and sustainable timber marketing targets. Growing quality timber in so far as this is consistent with other objectives.</p> <p>Giving local companies the opportunity to purchase timber through open competitive sales.</p> <p>Providing future opportunities for the substitution of wood products for fossil fuels and other materials</p>	<p>Sustainable production will be monitored as part of the forest district's marketing plan, five year production forecast and at the Forest Plan (FP) five-year review. This process is audited as part of the FSC forest certification process.</p> <p>Annual pre-thinning survey.</p> <p>Production forecast comparison with actual output to assess accuracy of forecast.</p> <p>Annual Customer Liaison meetings.</p> <p>The Forestry Commission is already committed to making available supplies of timber for the wood-fuel market and this will be monitored as part of the district's marketing plan.</p>

**Author:**  
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Planning Forester (WE north)  
December 2013



<p>❖ <b>Undertake management in line with Biodiversity 2020 and other nature conservation policies that protect and enhance both woodland and open habitats and their associated species fostering and facilitating their resilience and adaptation to projected climate change and disease threats.</b></p>	<p>Forestry Commission England is committed to managing the public forest estate to deliver a range of woodland benefits including working towards meeting bio-diversity targets for a wide range of species and habitats. In addition a number of species found in woodland are afforded protection under either British or European legislation.</p> <p>Promoting resilience</p> <p>Develop structural mosaic of woodland types and open space.</p> <p>Retention of scattered individual trees or groups of trees beyond their usual felling age to become large mature trees. (DF, RC, SP)</p> <p>Landscape scale habitat management and improvement of edge habitats by track and ride edge enhancements.</p> <p>Monitoring</p>	<p>Protection of existing native woodland and the conversion from conifer woodland will be monitored through the sub-compartment database.</p> <p>To ensure the protection, enhancement and expansion of woodland habitats and associated species, individual coupes will also be monitored as part of the five-year and ten FP review processes.</p> <p>Species used for planting should be mixed in species and proportions and will be filtered against Forest Research climate change models. Such calculated diversity will assist in making the woodland more robust in light of projected changes in climate.</p> <p>The plan identifies suitable strategies for encouraging natural regeneration of both broadleaf and conifer, that will be achieved through a mixture of clearfell and thinning systems followed by a combination of natural regeneration recruitment, restocking and or under/group/enrichment plantings designed to be consistent with the scale and topography of the landform. All the above methods can be used to manipulate edge habitat and structure to protect, improve or expand them.</p> <p>Nature conservation projects can either be free</p>
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December 2013

	<p>Protect veteran trees and retain a proportion of standing and fallen dead wood.</p> <p>Note that <b>all</b> work in and around areas where veteran trees are present should adhere to the 2013 guidelines for Trees of Special Interest that are laid out in FC operational guidance OPS 31 "Ancient and Veteran Trees"</p>	<p>standing or can be integrated along side routine forest operations.</p> <p>When operations are undertaken, their impact on the landscape can be assessed as the operation progresses. If required, small amendments can be incorporated at the time of the operation providing that the changes are not in excess of the thresholds detailed in the tolerance table in CSM 6.</p> <p>Ongoing formal and informal monitoring of habitats and species by FC staff, other stakeholder organisations and recording by individuals will help to maintain up to date data sets and will provide feedback on the impact of woodland management and how certain habitats have changed.</p> <p>The plan identifies suitable strategies for increasing the number and variety of deadwood habitats. These can be monitored through the site planning process for forest operations or conservation, and recreation. The district also has a robust survey and inspection system in place for the monitoring of such older trees, where tree surgery is used in preference to felling that is used as a last resort.</p>
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December 2013

<p>❖ <b>To retain Nagshead SSSI in favourable condition, whilst maintaining and enhancing biodiversity values in and around the RSPB reserve (with particular reference to management of birds), GWT Reserves.</b></p>	<p>Manage the SSSI in accordance with the SSSI plan (appendix 1) that forms a part of this Forest Plan. Both sit together and in conjunction with the RSPB management plan will be used to inform decisions on woodland management within the SSSI and reserve areas.</p> <p>Use of volunteer groups such as RSPB or GWT volunteer groups and The Dean Green Team.</p> <p>Monitoring</p>	<p>Work inside the reserve and SSSI will be done with reference to the SSSI plan in Appendix 1 and RSPB management plan and in consultation with the RSPB.</p> <p>Work inside GWT reserves will be done in consultation with the reserves manager.</p> <p>The operational site planning system will highlight opportunities where conservation benefits can be delivered. Whilst contract special conditions, ongoing contract management &amp; supervision and the contract closure review system ensure that operations can be undertaken smoothly minimising risk of any adverse impact resulting from forest operations.</p> <p>Nature conservation projects can either be free standing and carried out by volunteers or can be integrated along side routine forest operations or carried out as separate specialist contracts.</p> <p>The SSSI and reserve is routinely surveyed by RSPB staff and its volunteers, giving a good handle on the dynamics of habitats and species. The information gathered can be used to inform any changes and improvements to management methods.</p> <p>GWT sites are often surveyed by GWT</p>
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**December 2013**

		volunteers or individuals and results used to up date data sets to inform future planning.
❖ <b>The enhancement of internal landscape through diversification of age class structure, integrated with nature conservation projects that will provide further conservation benefits.</b>	<p>Develop a variety of age/ habitat types and open spaces particularly along access routes.</p> <p>Nature conservation projects can either be free standing or can be integrated along side routine forest operations.</p>	<p>The sustainable programme of thinning and felling will continue to diversify stand and age structure, enhance the landscape and benefit a wide range of species. Whilst the site planning of harvesting operations should account for landscape enhancements where appropriate.</p> <p>The operational site planning system will minimise the risk of adverse impact resulting from forest operations and will also highlight opportunities where conservation benefits can be delivered.</p> <p>Appropriate reinstatement works will be carried out once operations have been concluded.</p>
❖ <b>Conservation and protection of heritage features through identification, and recording.</b>	<p>Work in the area will be undertaken to take into account the various heritage features of interest within the plan area.</p> <p>Areas of archaeological sensitivities</p> <p>Maintain a record of any unscheduled features and ensure their protection and possible enhancement, seeking advice if required, prior to work when appropriate.</p>	<p>Liaison with the County Archaeologist to help Maintain GIS records and provide on site advice on working in and around sensitive areas.</p> <p>The site planning system, use of contract special conditions, ongoing contract management &amp; supervision and the contract closure review system ensure that operations can be undertaken without adverse impact.</p>

**Option Testing**

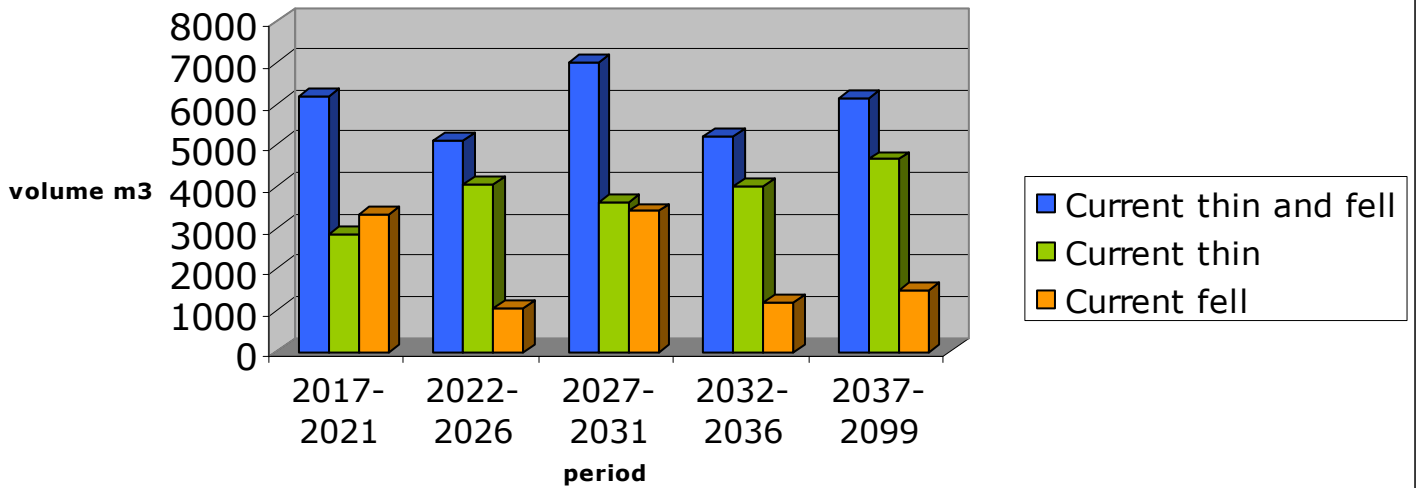
<b>Objective</b>	
<b>Option 1 - (Current FDP)</b>	<b>Option 2 - (Proposed FDP)</b>
<p>❖ <b>Management of the woodland will be to the standards required to maintain FSC and PEFC accreditation.</b></p>	
<p>Felling coupes are primarily aimed at restructuring the age class distribution at a landscape scale whilst being sensitive to landform, but with a limited number of restocking species.</p>	<p>The sensitivity of the landscape in option 2 is recognised by retaining the coupe design from option 1, whilst expanding the number of species suited for restocking by adopting ATC systems.</p>
<p>❖ <b>Continued production of sustainable marketable woodland products that also allows delivery of a range of other public benefits whilst providing future opportunities for the substitution of wood products for fossil fuels and other energy intensive materials.</b></p>	
<p>The silvicultural system used as the primary means of achieving the establishment of future crops is clearfelling. It does not take into account the impact of new diseases and the implications for management of timber sales.</p>	<p>The issue of restructuring is still recognised with the retention of clearfell systems, but uses ATC systems to help keep sales plans within tolerance, whilst still providing an even flow of timber coming to market.</p>
<p>❖ <b>Undertake management in line with Biodiversity 2020 and other nature conservation policies that protect and enhance both woodland and open habitats and their associated species fostering and facilitating their resilience and adaptation to projected climate change and disease threats.</b></p>	
<p>Heavy emphasis on clearfelling provides a mosaic of transient open habitat at various stages of successional development from open space to high forest; although the chosen restock species are limited and this perpetuates a practice of monoculture, making the forest more vulnerable to the threat of disease and changes in climate.</p>	<p>Raising the percentage of coupes managed by ATC does reduce the hectareage of woodland in transition from open space to high forest, but group fellings will still provide this habitat through nature conservation projects such as 'linking the pearls' and some of these groups will be broadleaf meaning a slower rate of transience to woodland so the open habitat value remains for longer. With this method there is also a temporary increase in edge habitat during establishment periods. Link group planting techniques with natural regeneration and the diversity of tree species, structure and therefore habitat type will increase whilst at the same time provide an increased resilience to the threat of disease and changes in climate.</p>

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December 2013

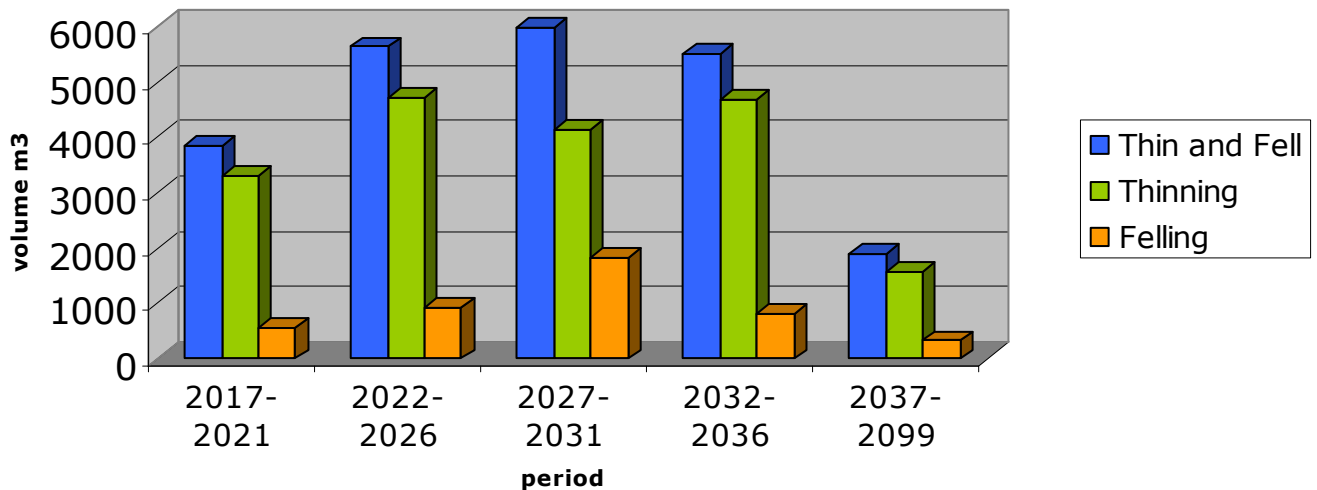
<p>❖ <b>To retain Nagshead SSSI in favourable condition, whilst maintaining and enhancing biodiversity values in and around the RSPB reserve (with particular reference to management of birds), GWT Reserves and the wider plan area.</b></p>	
<p>The plan initiated work in consultation with RSPB to ensure the SSSI remained in favourable condition. Work with GWT and volunteer groups ensured nature reserves also remained in favourable condition.</p>	<p>Work will continue to be carried out in partnership with RSPB to ensure favourable status is retained for Nagshead SSSI. Work with GWT and volunteer groups will continue to help nature reserves remain in favourable condition.</p>
<p>❖ <b>The enhancement of internal landscape through diversification of age class structure, integrated with nature conservation projects that will provide further conservation benefits.</b></p>	
<p>Heavy emphasis on clearfelling provides a mosaic of transient open habitat at various stages of successional development, giving temporary views across the valley and a varied internal landscape.</p>	<p>The woodland structure is going to alter more gradually if option 2 is used. However, the diversity and quality of internal landscape should be improved over time with well thinned crops of DF, RC, SP and OK, a mosaic of developing understorey at different ages and retention of scattered overstorey trees will all add to the visual appeal and conservation value of the woodland.</p>
<p>❖ <b>Conservation and protection of heritage features through identification, and recording.</b></p>	
<p>Sites identified and protected with consultation with County Archaeologists.</p>	<p>Sites identified and protected. Operational site planning and consultation with County Archaeologists will continue to improve the quality of recorded heritage datasets to safeguard heritage features.</p>
<p><b>Option 2 more fully addresses the current management priorities is the preferred option.</b></p>	

**Option testing - Comparison of current vs Scenario production forecast**

**Production forecast for Nagshead FP  
CURRENT 2014-2036**



**Production forecast for Nagshead FP  
SCENARIO 2014-2036**



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December 2013