

Tay Forest District

Boreland

Forest Design Plan

Approval date: ***

Plan Reference No: ****

Plan Approval Date: *****

Plan Expiry Date: *****



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Summary of proposals

This design plan sets out the proposals for the future management of Boreland forest.

The main points of note are:

- Carry out remedial landscape plantings along roadsides and burnsidings to reduce the **blockiness of 1990's restocking**
- **Thin and reshape the 'bridge' across the upper part** of the downfall
- Soften the edges of corners of fields and power-lines above Balnearn farm
- Continue and expand conversion to Continuous Cover Forestry of conifer/broadleaf mixture on lower slopes
- Manage open space/upper forest margin to reduce impact on landscape and benefit black grouse
- Fell the mature Sitka spruce between the A827 and Loch Tay and restock with native Ash to restore ASNW

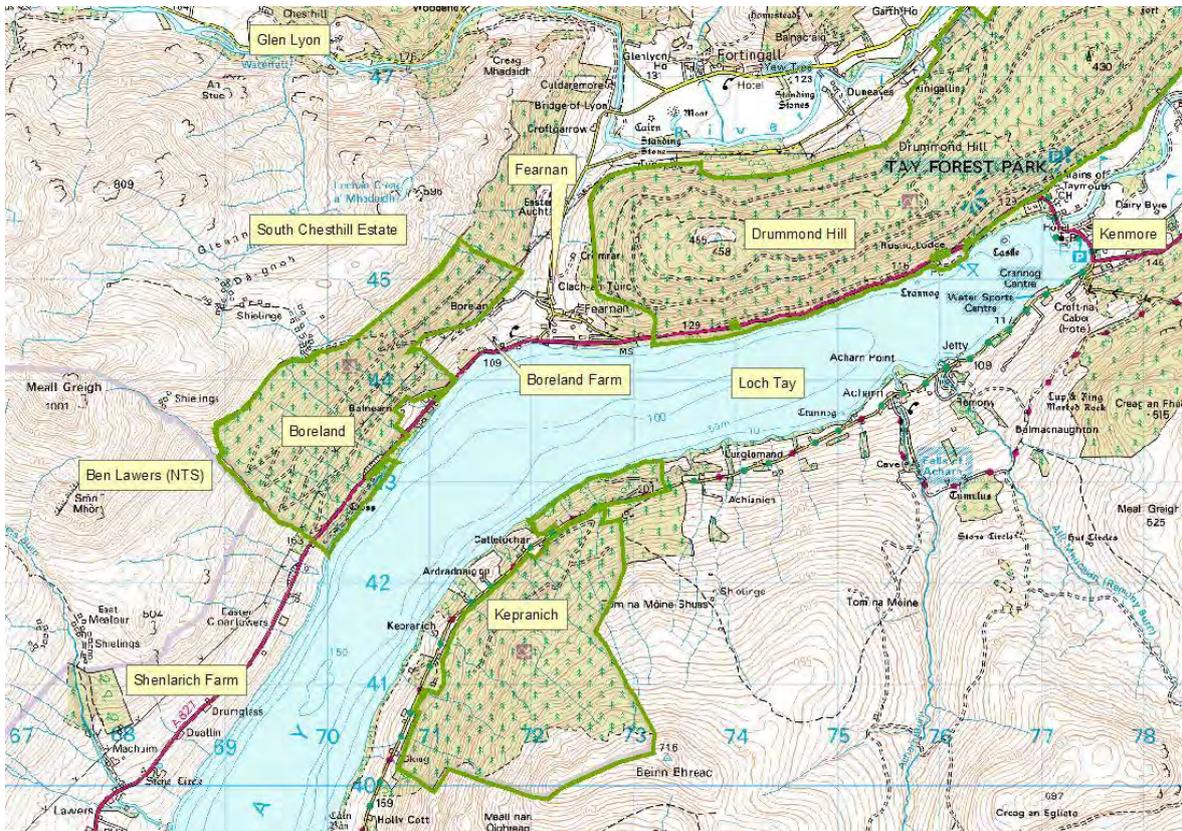
1.0 Introduction:

1.1 Setting and context

Boreland forest was purchased in 1938 as part of a larger estate, the hill ground and lower agricultural land being disposed of subsequently, and now covers an area of 343 ha. Planting began promptly after purchase with Norway spruce being the main crop species for the first rotation.

The forest is situated on the smooth lower slopes of a long ridge running north-east from the summit of Meall Greigh, part of the Ben Lawers massif. It rises from the northern shore of Loch Tay, just west of the village of Fearnan.

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Boreland: location map

1.2 History of plan

The first forest plan for Boreland was approved in 1994 with a full revision done in 2002.

1.3 Planning Context

The management of the Forestry Commission Scotland’s national forest estate is guided by Scottish Forestry Strategy (SFS) 2006, which sets out seven key themes: -

- **Climate change**
- **Timber**

- **Business development**
- **Community development**
- **Access & Health**
- **Environmental quality**
- **Biodiversity**

Table 1. Relevant issues under the SFS and Tay Forest District Key Themes

SFS Key Themes	Relevant issues identified for Boreland FDP
Climate Change	Opportunities for contributing towards national targets for renewable energy via woodfuel. Carbon sequestration increased by extending low impact silvicultural systems (continuous cover forestry).
Timber	Continue to grow quality timber sustainably. Increase the future quality broadleaved resource.
Business Development	Through timber harvesting, woodland establishment and maintenance. Continue to consider the landscape value of woodlands to tourism.
Community Development	Encourage communities who wish to become more involved in the management of, or outputs from, their local forest
Access and Health	Informal access routes.
Environmental Quality	Maintain landscape by extending low impact silvicultural systems (continuous cover forestry). Continue to work with local archaeologists and Historic Scotland to protect the ancient monuments in our care.
Biodiversity	Continue to expand the area of native woodland. Continue to work with SNH to protect and enhance the scheduled and locally important sites in our care.

Table 2. Initial brief and objectives for developing management proposals

Brief	Objectives
Minimise impact of forestry on the landscape	<ul style="list-style-type: none"> • reduce fragmented appearance of restocked areas by in-fill planting in burns and along roadsides, and reshaping some blocks by early felling • strengthen visibility of broadleaves in the landscape

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	<ul style="list-style-type: none"> by planting additional protected groups allow upper margin to regenerate to produce a natural tree line convert blown Norway spruce area to CCF
Maintain production of quality timber	<ul style="list-style-type: none"> carry out continuing programme of thinning and clearfell restock according to good silvicultural practice for species selection and planting density manage the broadleaved woodland for timber sales
Maintain and enhance existing natural habitats	<ul style="list-style-type: none"> convert plantation conifer to native woodland on PAWS sites protect statutory sites according to agreed guidelines extend locally important habitats (particularly open space and forest edges for black grouse and butterflies) as opportunity arises through other forest operations
Preserve historic features	<ul style="list-style-type: none"> protect all known features including Unscheduled Ancient Monuments

2.0 Analysis of previous plan

2.1 Analysis from previous plan

Boreland has been worked in accordance with the previous plans but some major amendments were required due to the early onset of windblow. Consequently, the previous mature crop was felled in a shorter timescale than planned which has resulted in poorer differentiation between adjacent crops than intended.

Although the coupe outlines of the restocked areas have closely followed the previous plans, a combination of scale (or lack of it), unplanted burnside corridors and the inability to plant too close to the forest roads because of cuttings or brash piles from harvesting operations has resulted in an unsightly blockiness.

3.0 Background Description

3.1 Site factors

3.1.1 Neighbouring landuse

Boreland lies to the north of Loch Tay, with the village of Fearnan to the east. Between the forest and the village is Boreland Farm, now run as a very diversified unit embracing agriculture, tourism and eco projects. West of the forest is Shenlarich Farm, run as a traditional sheep and cattle unit by the MacDiarmid family of Lawers. Also to the west but from mid-forest upwards is National Trust for Scotland ground. This is part of the Ben Lawers National Nature Reserve and is also currently grazed by the MacDiarmid family. North of the forest is the open hill ground of South Chesthill Estate. The mature conifers to the east are also part of South Chesthill Estate. Between the forest and Loch Tay is Balnearn Farm and a scatter of residential housing.

3.1.2 Statutory and legal requirements and key external policies

The River Tay Special Area of Conservation (SAC) forms the southern boundary of part of the forest. There are a number of Unscheduled Ancient Monuments, most notably the Fair Stone of Fearnan (or Fearnan Market Cross). Immediately outwith the forest to the west is the Ben Lawers National Nature Reserve which is also a National Scenic Area. This area also includes a large number of cup-marked stones, many of which were found in a RCAHMS survey a few years ago.



Fearnan Market Cross

Boreland lies within the local core capercaillie zone and is an important area **within the recently designated 'Save Scotland's Red Squirrel' project.**

3.1.3 Geology Soils and landform

Boreland is underlain by metamorphic schist- part of the large group of schists comprising the Dalradian series. These schists around Loch Tay have been recrystallised from fine sediments and show a well developed foliation of thin layers. Overlying the solid geology there are deposits of glacial till left by the receding glaciers of the last ice age.

Most of the soils in Boreland are derived from the glacial till though this is mostly the ground down debris of the local rocks. They tend to have a fairly loose structure and contain a mix of angular and smooth stones of all sizes. The more mature soils at lower elevations can be reasonably fertile. The soil moisture regime is generally fresh at best tending towards wet. Surface water gleys therefore tend to predominate.

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The forest has a south-easterly aspect, with a steady slope of 35% running between Loch Tay and the upper margin of the forest. This slope is incised by numerous straight, often deeply cut, burns.



Snow emphasising the landscape effects of unplanted burnsites

3.1.4 Water

Boreland is cut by many deep burns which run downhill with little deviation. They are subject to sudden increase in volume of water after heavy rain and have occasionally resulted in forest road washouts. Balnearn Farm and the group of houses nearby have private water supplies originating in the forest.

3.1.5 Climate

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Boreland is relatively sheltered from prevailing westerlies but is open to winds from the south and the east. The average rainfall at Dalerb, 2 miles east beside Loch Tay, has averaged 1200mm per annum over the last 14 years

Based on accumulated temperature and moisture deficit maps produced by *Pyatt et al.*, climatic conditions are described as cool wet.

Dams scores range from 10-12 for the lower and more sheltered areas of the forest to 18-20 for the upper exposed slopes.

3.1.6 Landscape value and character, visibility, recreational use, heritage, protection forestry.

Landscape value and character

Boreland Forest links Loch Tay with the high tops of the Ben Lawers chain. From the beach at Kenmore, a popular tourist spot, it lies immediately below the peak of Ben Lawers, the centre-point of the view. It is flanked by a private forest of a similar, mostly conifer, character to the east and by open hill grazing to the west.



Boreland forest from the beach at Kenmore, with Ben Lawers behind.

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Visibility (see Map 2 and Map 8)

From the east, Boreland Forest becomes visible on the A827 just south of Taymouth Castle. It remains clearly seen until beyond the beach at Kenmore. On reaching Fearnan, travelling west on the A827, Boreland is the dominant feature until passed. The forest is barely noticed when travelling eastwards on the same road. From the south Lochtayside road, the forest can be clearly seen from Kenmore to Ardeonaig, at least 10 miles.

Recreational use (see Map 2)

Boreland is used predominantly by local dog walkers. More adventurous walkers will occasionally use it to access the Munro, Meall Greigh, at the eastern end of the Ben Lawers chain. The lochside at Lower Boreland is used at times by trout fishermen. Historically, they have not been particularly responsible and campfires and litters are the usual sign of weekend use.

Heritage (see Map 2)

There are a number of Unscheduled Ancient Monuments, most notably the Fair Stone of Fearnan (or Fearnan Market Cross). Immediately outwith the forest to the west is the Ben Lawers National Nature Reserve which is also a National Scenic Area. This area also includes a large number of cup-marked stones, many of which were found in a RCAHMS survey a few years ago. There are several abandoned steadings within the forest.

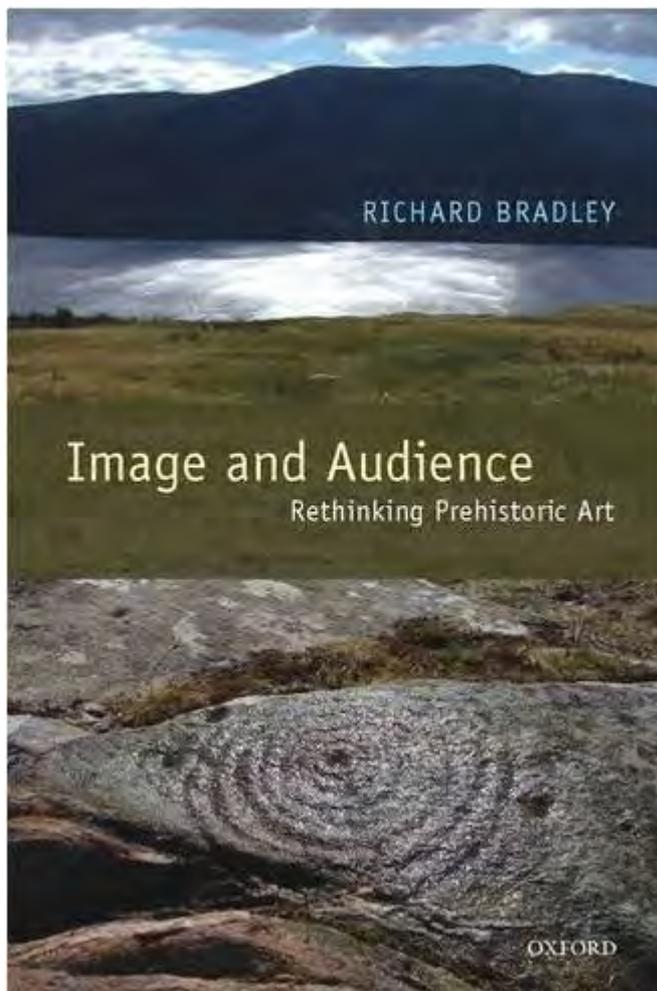
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Cup and ring marked stone, immediately west of Boreland Forest.



Photo Credit: Paul Brown, 2003



Protection Forestry

No protection forestry issues.

3.1.7 Biodiversity (woodland, open ground, lochs and rivers)

Boreland has undergone considerable re-structuring in recent years. This has increased the significance and opportunities in this wood for biodiversity and conservation.

Major watercourses are now relatively clear of encroaching conifers creating a potentially important quality habitat network. Some enrichment planting in these areas will compliment the regeneration from remnant broad-leaved species, making this network more robust. (Note that some planting of evergreen species such as holly and juniper will also improve the landscape character).

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Softer planting along the upper edge of the block will be beneficial to black grouse that are currently using restocks.

Norway spruce retention and the continuing conifer component of Boreland should help to maintain the existing population of red squirrels.

Below the public road and along the loch-shore is a long narrow strip of ASNW and PAWS. Conversion of the plantation to native species and allowing the native woodland to expand by regeneration will greatly increase the biodiversity value of this area.

It is clear that the increase in open space and native woodland species will result in habitat networks that link along the upper and lower margins and up/down the burns with similar habitat beyond the forest march. This will help to integrate Boreland with the surrounding wildlife context.

3.1.8 The existing forest: (Age structure, species and yield class, access and LISS potential)

Boreland was acquired from 1937 as a **loch to hilltop estate**. The **early 1940's** war effort saw much of the forest planted by Canadian workers. In the fifties, most of the agricultural, sporting and residential parts of the original purchase were disposed of leaving two large, angular forest blocks separated by a downfall connecting Boreland Farm with the higher hill ground. The upper part of the downfall was re-acquired in 1990.

The original forest was predominantly of Norway spruce with some Sitka spruce and a small research planting of Siberian spruce. Broadleaves, particularly beech, were planted on some of the lower slopes including adjacent to the A827.

Major fellings of the first crop began in 1989. This progressed quickly, hastened by incremental windblow. After an initial expectation of using natural regeneration to replace the felled crop (most was lost to frost heave), vegetatively propagated Sitka spruce was favoured with the ground cultivated where steep by a walking excavator. The resulting crop is still too even-aged but a number of more landscape-sympathetic permanent coupe boundaries have been left unplanted to allow more naturally shaped fellings to take place in the future whilst reducing the risk of progressive windblow. Yield class for the Sitka is likely to be YC 20-24.

The main accesses to the main block and the lower lochside block are from the A827.

The current area under continuous cover prescriptions and long term retentions is 61 hectares (18%) and is mostly Norway spruce and assorted broadleaves.

4.0 Analyses and Concept

4.1 Constraints and opportunities for each site factor.

The Analysis and Concept maps show the factors which, through our consultation and development periods, have significantly influenced the design and long term vision of this forest.

4.2 Design Concept

The design concept has been graphically presented in the site analysis and design concept maps (Map 3 and Map 4).

The intention with this plan is to produce a woodland that meets the demands of timber production, landscaping, biodiversity and recreation in a sustainable manner while retaining flexibility to adapt to priority changes in both the short and long term as well as any opportunities that present themselves.

The concept encompasses 5 core areas, each of which is briefly outlined below.

Timber production

The first rotation in Boreland was highly productive, and this is likely to be the case for subsequent rotations. Therefore, where harvesting is unrestrained by recreation, landscaping or conservation constraints, maximum returns will be sought by planting the most productive species to suit the ground conditions.

Boreland is now a predominantly second rotation forest with a consequent drop in thinning output as the young restocked crops establish. There are two large clearfells within the plan period. Thinning has significantly reduced due to clearfelling but will continue with retain first rotation crops and continuous cover forestry areas. About 10000 cubic metres will be produce from clearfells and thinnings over the five year plan period. Where broadleaves are thinned, this may be spread over a number of years to allow successful marketing of the mainly firewood product.

Landscaping

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When originally planted, Boreland was planted up to the straight fenced boundaries. The resultant angular blocks were at odds with their more rugged **and unconstrained surroundings so restructuring began in the late 1980's** to make the forest blend more naturally with the landform. However, the early fellings suffered progressive windblow which meant that the felling happened more rapidly than was desirable. Although there is a degree of differentiation between restocked coupes, the age and structural diversity is less pronounced than originally intended. There are open rides (some with natural native broadleaves) between the restocked coupes so that a more phased approach can be taken with the next clearfell sequence without the same risk of windblow to adjacent standing coupes. Apart from the coupe of large Sitka spruce below the road which is due to be felled in 2012 and restock with native Ash, the trees on the lower slopes, and adjacent to Loch Tay will be managed under Continuous Cover Forestry prescriptions minimising the impact to the landscape. The felling of this coupe will also reveal a view of Loch Tay unseen for at least fifty years. Older residents of Fearnan remember it as one of the finest views of the loch.

Major constraints to landscaping are the horizontal parallel electricity wayleaves and forest roads and similarly parallel burns that dissect the forest from top to bottom. Initial attempts to minimise the intrusiveness of these features has not been sufficiently successful so further work will have to be done to reduce the resulting blockiness.

Recreation

Boreland forest is lightly but regularly used by local dog walkers. The forest tends to be accessed from the forest roads at both upper and lower Boreland. Less frequently, munro-baggers will access Meall Greigh using the forest road to get to the upper edge. Culdees Bunkhouse, at the former Boreland Farm steading, offers opportunities for more formal recreational and educational usage but this has yet to be formally explored.

Varied structures, open space and internal as well as external views will maintain the interest of the visitor.

Conservation

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Boreland has areas of previously ancient woodland next to Loch Tay. Loch Tay is a Special Area of Conservation. All the burns in Boreland drain into the loch and it forms the southern boundary to the forest. It is reasonably well used by Black grouse, due to the scattered young trees at the upper margins, particularly for lekking. Capercaillie, probably originating from nearby Drummond Hill, are occasionally seen. The forest scored highly in the '2008 Biodiversity Action Plan for Lepidoptera On Forestry Commission Land In Scotland' with populations of Pearl Bordered Fritillary, Mountain Ringlet, Northern Brown Argus and Small Pearl Bordered Fritillary being identified. Red squirrels are resident and use the mature Norway spruce stands. Occasionally, an osprey may be sighted using a standing dead tree, retained from a previous felling operation, to eat a fish caught in Loch Tay. There is potential for siting nesting boxes for Golden-eye in the native broadleaves by the loch-shore.

Heritage

There are no Scheduled Ancient Monuments in the forest. Unscheduled features are left undisturbed where possible. The Fearnan Market cross carries an inscription on its rear cursing anyone who disturbs it. Immediately outwith the forest to the west is the Ben Lawers National Nature Reserve which is also a National Scenic Area.

5.0 Management Proposals

5.1 Future Management

Boreland is a predominantly commercially productive forest though it also has significant areas that are managed by Low Impact Silvicultural Systems (LISS). Native broadleaved woodland restoration will be undertaken next to Loch Tay when the current stand of Sitka spruce is felled. There is already a large area of open space present, particularly at the upper margins and along the power-line wayleaves, which will probably remain open at the higher levels but will eventually be colonised by native broadleaves lower down.

Commercial areas of the forest will be marketed and harvested in such a way as to maximise return on the initial investment whilst maintaining a district-wide steady rate of production.

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Restocking will be done by selecting the species that best suit the ground conditions. These are assessed after felling using a combination of plant indicator species and soil pits to gauge soil moisture and fertility.

Management prescriptions for areas of CCF are outlined in Appendix III, but detailed prescriptions form part of the Coupe Work Plans produced for internal approval two years before an operation is to take place.

5.1.2 Non-commercial areas

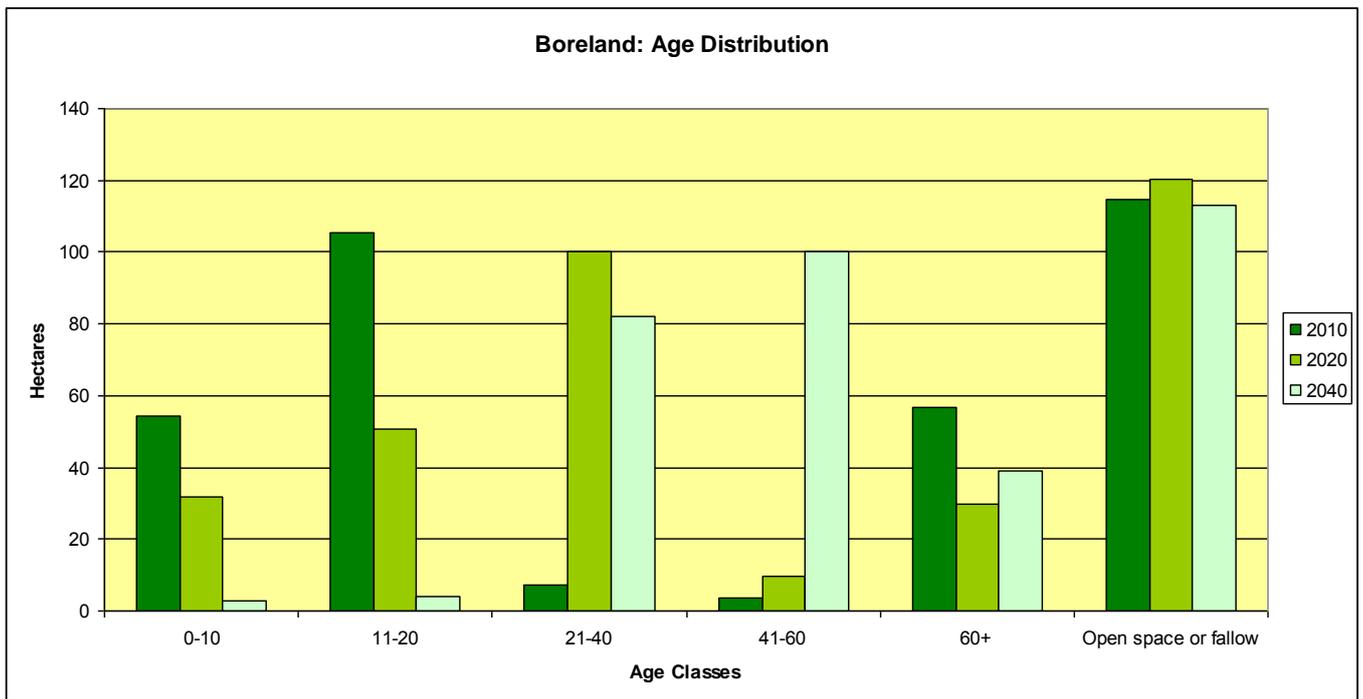
Work on the ancient and long established native restoration is outlined in the Management prescriptions for areas of CCF and more detailed prescriptions in Coupe Work Plans.

5.2 Future habitats and species (see Map 6)

Boreland was planted according to sound silvicultural principles with tree species being suited to ecological site better than was usual for the time. As a result, the next generation of trees will not alter significantly from what went before. The original crop of both Norway and Sitka spruce has been mostly restocked with high-yield vegetatively propagated (cloned) Sitka spruce of superior form and growth rates. Larch and native broadleaves will continue to be introduced as minority species to increase visual and environmental diversity. The mature Sitka spruce on the loch-shore will be replaced by native ash with the intention of producing commercial quality timber.

5.3 Restructuring (see Map 5 and Map 6)

All of Boreland is visible from a number of viewpoints along Loch Tay. Earlier forest plans have successfully produced a more natural shape in the landscape but due to windblow and a consequently accelerated felling programme, the restocked areas have less age diversity than was originally planned. Whilst the coupe structure is now in place to eventually deliver the desired coupe outlines without affecting their neighbours, the lack of structural diversity will remain until the next series of fellings commence. This is not intended to happen until the current crop begins to mature. Adjacent coupes will have a 10 year gap between restocking thus allowing sufficient height differentiation between stands. The most visible portions of the forest adjacent to the A827 will be managed as Continuous Cover Forestry.



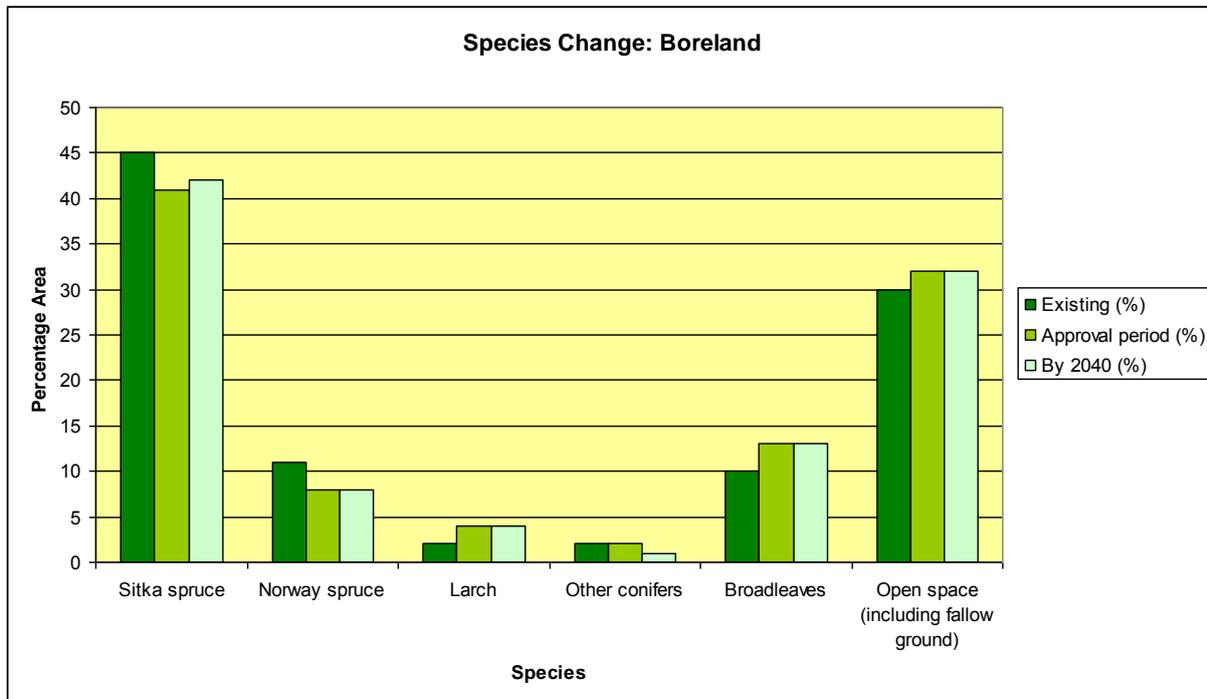
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5.4 Species tables

The tables below show the approximate changes in species that will result through the implementation of this plan.

Boreland

Species	Existing (%)	Approval period (%)	By 2040 (%)
Sitka spruce	45	41	42
Norway spruce	11	8	8
Larch	2	2	4
Other conifers	2	2	1
Broadleaves	10	13	13
Open space (including fallow)	30	32	32
Total	100	100	100



5.5 Ancient and long established native woodland restoration

The loch-shore of Boreland Forest is Ancient Woodland of semi-natural origin with an **smaller area behind of woodland old enough to be recorded on 'Roy Maps'**. The mature Sitka spruce on the ASNW will be felled in 2012 and will be restocked with Ash principally and other native broadleaves.

5.6 Deer Management

Deer numbers on the open hill ground to the north of Boreland are comparatively high and breaches in the deer fence have been used by deer in the past to give them access to winter shelter. With areas of young vulnerable trees on restock and natural regeneration sites in Boreland, it is intended to replace the march fence with South Chesthill east to the downfall in the spring of 2010 to reduce the ingress of these deer. Restriction of movement of deer from the west relies on the integrity of the deer fence between South Chesthill and the Ben Lawers National Nature reserve since there is only a stock fence between the forest and the hill grazing. To the east, the march fence between Boreland forest and Chesthill Forest has long since disappeared and given its line, would be very difficult to replace economically. The upper fences of both forests (to the east of the downfall) were repair two years ago with a view to mutual exclusion of deer.

Deer management, to aid restocking and natural regeneration, will be carried out in **accordance with the relevant sections of Tay Forest District's Protection Plan. This sets out** the desired deer densities for each species, the date that this population is to be achieved and the proposed method for achieving this.

Appendix I: Forest Design Plan Consultation Record

Public meeting held in Fearnan Hall on February 7th 2008 (note: comments are attributed to the group as a whole)

4 members of the public attended	Place barn owl boxes near clearfell areas	May be considered in the future
	Place osprey platform on topped spruce	May be considered in the future
	Site golden-eye boxes on loch-side	Under active consideration
	Fell large Sitka spruce below A827	Already planned for 2012

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Appendix II: Tolerance Table

	Adjustment to felling coupe boundaries	Timing of restocking	Change to species	Windthrow response
FC Approval not normally required	0.5 ha or 5% of coupe – whichever is less.	Variation of less than 2 planting seasons from standard restock year, 4 years post-felling.	Up to 5% species exchange	Up to 1.0 ha.
Approval by exchange of letters and map	0.5 ha to 2.0 ha or 10% of coupe – whichever is less.		>15% species change	1.0 ha to 5.0 ha – if mainly windblown trees. Between 5.0 ha to 10.0 ha in areas of low sensitivity.
Approval by formal plan amendment	Greater than 2.0 ha or 10% of coupe.	Variation of greater than 2 planting seasons from standard restock year, 4 years post-felling.	Change from broadleaf to Conifer	Greater than 5.0 ha in areas of medium to high sensitivity.
			Reduction in native broadleaves by >5%	
			Reduction of >10% of productive net area	

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Appendix III: Continuous Cover Prescriptions

Plan ref and compt range	Reason for selection	Long-term structure* or objective** and expected species	Silvicultural system	CCF: Rotation – Conversion – Return period (years)	BLVD: Target tree cover (%) – Timescale (years)	Observations (e.g. likely barriers to achieving objective)	Next treatment required	Proposed monitoring
10009 10182	Mature mixed broadleaves. Wide spacing.	Simple, Beech, Sycamore	Shelterwood	150/10/20	100			Next plan review
10012 10029 10164	Mature Norway spruce and mixed broadleaves. Retain for Red squirrel habitat and landscape value.	Simple, Norway spruce, Beech, sycamore, other broadleaves.	Shelterwood	150/5/20	100			Next plan review
10024 10033 10035	Mature mixed conifers and broadleaves	Simple, Beech, Sitka spruce, Larch, Birch,	Shelterwood	150/5/20	70			Next plan review

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	adjacent to A827. Maintain landscape value.	Sycamore, Ash						
10664	Widely spaced Norway spruce	Norway spruce, mixed broadleaves	Shelterwood	150/-/30	30	Further windblow, weeds restricting regen.		Next plan review
10732	Larch, broadleaves. Young crop between powerlines. Landscape value.	Larch, mixed broadleaves.	Shelterwood	150/5/30	30			Next plan review
10198	Young open-spaced mixed broadleaves. Landscape/ structural diversity.	Mixed broadleaves.	Shelterwood	150/-/40	80			Next plan review