West Argyll Forest District

South Knapdale

Forest Design Plan

Plan Reference No: 033/W/S/12(4)

Plan Approval Date: 20/08/2012

Plan Expiry Date: 20/08/2022

South Knapdale Forest Design Plan 2012-21

Contents

Summary of proposals

The following outcomes are required and the following issues have been addressed in the plan revision:-

Economic context

- Approval for 924.6ha of felling and 838.0ha of restocking is being sought, for completion within the first 10 years of the plan.
- Timber production from felling and thinning operations is estimated at 30Km3/annum.
- Reassessment of economic felling dates takes into account changes to yield classes based on new Attribute survey data and new aerial photography.
- New roading requires EIA approval for 7.15Km of new roading and felling approval for 21.4ha of associated roadline felling within the first 5 years of the plan. A further 6.3Km of new roading and felling approval for 18.9ha of associated roadline felling in the last 5 years of the plan.

Environmental context

- Full restoration of PAWS sites is incorporated, in line with current policy, where practical.
- Implementation of requirements in management plans for designated sites.

Social context

- Increased conifer tree species diversification for landscape improvement, with particular focus on the views across West Loch Tarbert, public roadside views and recreation routes.
- New footpath construction to Dun a' Choin Dubh.

1.0 Introduction:

1.1 Setting and context

The plan for South Knapdale combines existing approved plans for Inverneil, Coulaghailtro, Torinturk and Meall Mhor. Combining the plans is part of a wider strategy of efficiency savings, linking areas where there are shared values, including timber haulage and adopting a more strategic view of forest management. The plans for Coulaghailtro and Torinturk expired during 2011 and were subsequently extended until 31st March 2012. The new FDP area is 5064.6ha. The forest blocks all lie within South Knapdale, with its associated Community Council. Inverneil lies between the open hill land of the Ellary Estate and the commercial forestry in Brenfield. It lies north of the B8024 Kilberry Road, to the south of which is an area of commercial forestry originally part of Inverneil but sold off in 1990. Ashfield Forest, a private commercial woodland lies to the north, along with a short section marching with the FC's Knapdale Forest. Several private properties with some associated open land are present along the B8024. A significant area of land on the Ellary march lies outwith the march fence due to difficulties in fencing what is a very steep and rocky piece of ground. Coulaghailtro lies to the east of Kilberry and the B8024 and south of open land that is part of the Ormsary Estate. To the east is commercial forestry of the Carse Estate. To the south is further open land, including Largnahunsion and Tiretigan. The forest area also includes an agricultural lease at Keppoch. Torinturk straddles the B8024, with West Loch Tarbert forming the southern boundary. Agricultural grazing land is also present lying adjacent to parts of the lower edges of the forest. These include Achaglachgach House, who also own Lochan Liath, Creag fields which is in FC ownership and land around Creag Farm. Private commercial forestry surrounds nearly all the remaining boundaries. The former FC village of Torinturk is within the forest area. Meall Mhor lies west of the private estates of Meall Mhor and Erines, with associated areas of woodland and land infested with rhododendron. To the south and south-west are private commercial woodlands. To the west is Meall Mhor hill, an open hill top partly in FC ownership and used for communications masts. Beyond this is open hill land associated with the Ormsary Estate. To the north is the Stronahullin Estate, which has a native woodland scheme bordering on the FC woodland. The Meall Mhor Estate also has ownership of Meall Mhor loch which is within the forest area.

Torinturk and Coulaghailtro are linked by a timber haul route, which is also shared with the Carse Estate. The route also now sees some recreational usage. All four forest blocks are primarily commercial plantations, with little recreational usage or community interest. Tarbert and Ardrishaig are the nearest towns, but have little connection with the forest areas. Meall Mhor and Inverneil have important native woodland SSSI's and Torinturk has a significant area classed as Ancient Woodland sites. Meall Mhor and Inverneil have important former mine workings, whilst Torinturk has several townships and two scheduled monuments.

Coulaghailtro and Meall Mhor have recently been considered for disposal, with Meall Mhor going forward to the 2013/14 programme.

Key plan objectives from the design brief can be summarised as follows: -

Timber production
PAWS restoration
Development of habitat networks
UKWAS certification

1.2 History of forests

Inverneil was mostly acquired in 1970. The lower areas were then planted. The southern part had to be replanted following a fire which spread in off the Ellary Estate in 1983. The higher areas were planted in the late 1970's. A long-running boundary dispute with the Ellary Estate was settled in 1987 resulting in the acquisition of the younger western section, planted in 1990. Felling commenced in 2005. Road construction started to be introduced at the same time, but has not progressed very far as yet. The mine shafts were fenced off in the 1980's on safety grounds and to prevent disturbance to bat populations within them.

Coulaghailtro was planted in two main phases, the northern half around 1965 and the southern half around 1979. Much of the northern half has been felled. Road infrastructure here is almost complete, but there are no roads as yet in the southern section, where no harvesting has yet taken place. Keppoch grazings is on a 99 year lease. Attempts in the 1990's to persuade the farmer to surrender the lease in order to allow the area to be planted were unsuccessful. Much of the area is marginal or unsuitable for forestry anyway due to rank heather on skeletal soils. Discussions with the owner of Crear to improve their view through amended species choice at restocking were only partially implemented due to difficulties with species choice on wet Blanket bog. A further request to develop a sculpture trail has not been pursued.

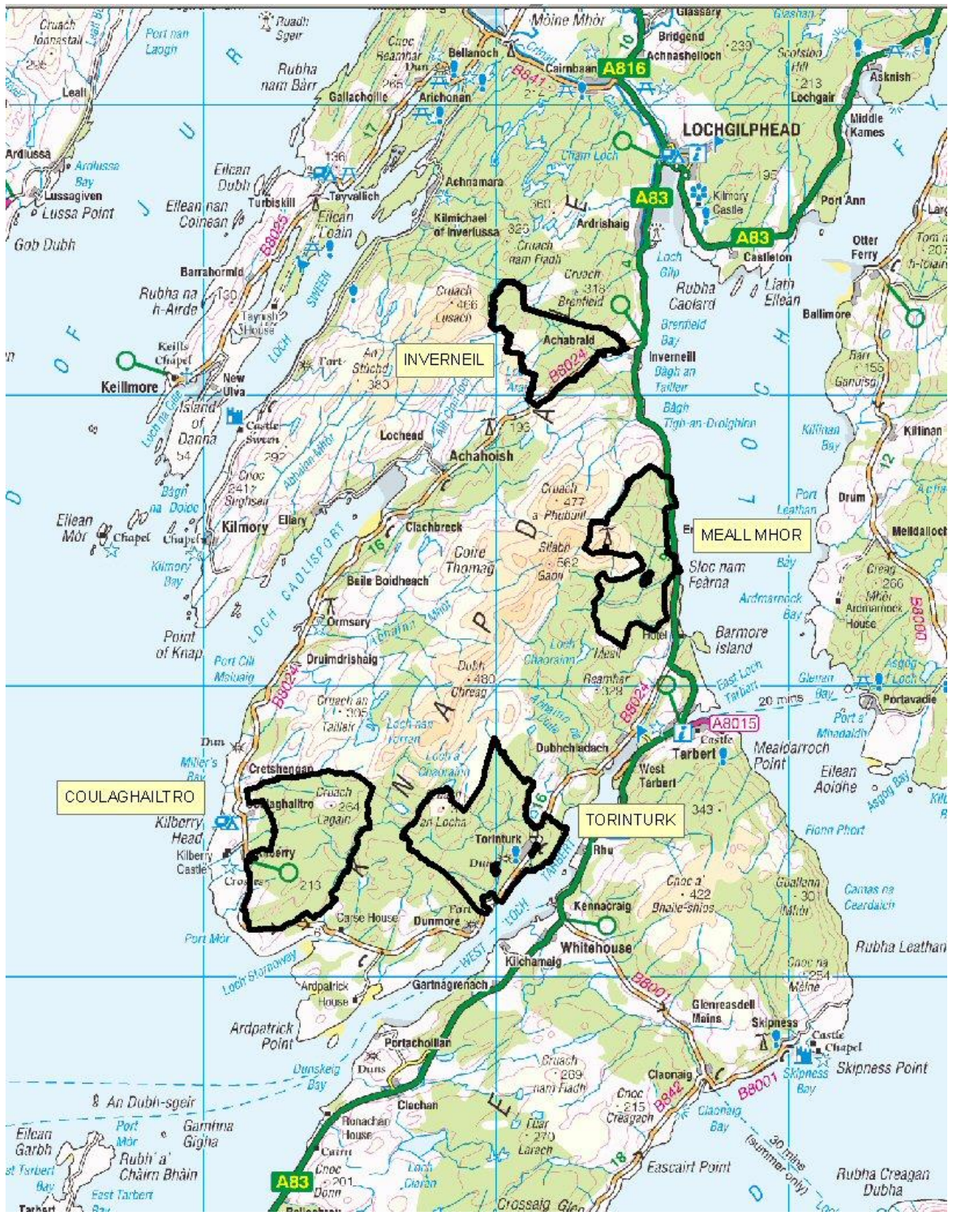
Torinturk was acquired in various parts, 1930, 1936, 1957 and 1976. The lower areas were planted in the 1930's, with more sections planted in the 1940's and 1950's and early 1960's. The areas purchased in 1976 were planted after that date, with the northern end being planted as late as 1986. Felling started in the late 1980's. Most of the oldest plantations have now been felled and replanted. Creag fields were proposed for broadleaved planting in the 1990's, but the scheme dropped in favour of leaving it as managed open space. Following the construction of the haul route, the road infrastructure is now largely complete. Forestry houses and the old office were sold off in the 1980's. Western hemlock regeneration is prolific in some parts of the forest.

Meall Mhor was acquired in stages, the central area in 1958 and 1968, the southern area (Ashens) in 1976 and the northern area (Erines) in 1979. Planting commenced after each area was acquired. However, the eastern part of Ashens has proved difficult to establish due to soils, exposure and deer browsing, resulting in a significant programme of felling to waste and replanting in recent years and which is still ongoing. Growth has been slow in much of the central area, again due to soils. Felling commenced in this part in 2005. Road infrastructure is largely complete in all but the northern area. Rhododendron control has been ongoing since the 1980's, focusing on the SSSI's and now latterly on the surrounding areas.

As originally planted, apart from the oldest plantings in Torinturk, Sitka spruce was planted and little else. Mixtures with Lodgepole pine were also used in places. Most of the poor provenance SLP that had been subject to collapse and windblow in Coulaghailtro has now been felled. Minor species used in restocking have however been subject to deer browsing. This was also historically a problem in first rotation crops in Inverneil. A variety of minor conifer species were planted in the 1930's in Torinturk, including Western hemlock, causing prolific regeneration of this species in places. Native woodland regeneration is also abundant on the Ancient Woodland sites in Torinturk. No fallow policy has been in operation.

Crop resurvey has been completed ahead of the new design plan for the southern part of Coulaghailtro and Inverneil. Aerial photography was renewed in 2006.

Location Map



2.0 Analysis of previous plan

The previous plans had adopted a format of objectives and goals to focus on key aspects of the plan. A summary table is reproduced below with comments on subsequent implementation/success:-

Objective	Goal	Implementation?
1. Landscape enhancement.	Landscape enhancement when seen from B8024, Cowal peninsular, A83, Loch Fyne, & Kennacraig ferry terminal.	Ongoing, but deer browsing posing a threat to diversification in places.
2. Maximise timber production whilst achieving non-market benefits.	Only generic goals for two plans and no specific goals in other two.	
3. Protect archaeological features.	Only generic goals for two plans and no specific goals in other two.	Implemented. Relevant SAM's plans followed.
4. Protect conservation areas.	Mainly generic goals, but also:- • Eradicate WH and rhododendron from Meall Mhor • Manage designated sites in accordance with plans agreed with SNH. • Habitat maintenance and improvement for Red squirrels, badgers, Black grouse, Wood ants, bats, Barn owls, where they occur and specifically; develop a forest edge structure west of Cruach Lagain (Coulaghailtro) to benefit Black grouse; • Link up existing fragments of Ancient Woodland (Torinturk). • Protect watercourses including; Improve Abhainn Learg an Uinnsinn (Coulaghailtro) for salmonids. • Protect private water supplies	Ongoing. Implemented. Ongoing. Abandoned in favour of Upland Heathland restoration and lack of grouse. Design was limited – did not attempt to restore all PAWS areas in line with current policy. Ongoing – buffers being established. Required discussion with neighbours when operations due in catchment – implemented.

3.0 Background Description

3.1 Site factors

(Specific policies related to the FD Strategic Plan Section 5 National themes and Key Local Issues headings are listed under relevant background information sections below. Policies covered are; climate change, timber issues, business and community development, access and health, and environmental quality).

3.1.1 Geology, soils and landform

The underlying geology is predominantly metamorphic, but with intruded bands of Basalt, Dolerite and Camptonite in Coulaghailtro. Metamorphic rocks in Inverneil and the west side of Coulaghailtro are slates, phyllites and mica-schists, with some bands of Epidiorite and Hornblende schist. The remainder of the forest area is underlain by Quartzite and Quartzite mica-schists. The alignment is typically south-west north-east, but this is not reflected in the landform so strongly as in north Knapdale. Examples of where landform does reflect the geology include; steep faces in Torinturk and Inverneil, plus orientation of watercourses in Coulaghailtro. Landform typically comprises rounded hills, poorly drained plateau and incised valleys.

Soils comprise mainly of peaty gleys and flushed Blanket bogs. There are some smaller pockets of Brown earths, Surface-water gleys, Ironpans and unflushed Blanket bogs. Brown earths tend to predominate in the lower areas of Torinturk. Rankers occur in higher parts of Inverneil, Meall Mhor and south Coulaghailtro.

(Strategic Plan Policy Response WA7.15: Identify important geodiversity sites on the National Forest estate and maintain and enhance through the FDP process).

3.1.2 Water

Under Strategic Plan Key Theme six; Environmental Quality**:-**

- **Soil, water and air quality**

Under the Water Framework Directive, the assessment for The Lussa burn (Inverneil) and the Abhainn Learg an Uinnsinn (Coulaghailtro/Torinturk) were classed as Risk Category 1a (definitely at risk) from conifer planting. The latter was given a rating of 'bad'. Meetings with SEPA in 2007 outlined harvesting plans and progress to date made to reduce threats to this water body. Forest restructuring has been assessed as likely to address the concerns and significant progress has been made in Coulaghailtro. Lack of access to the Inverneil section and Torinturk were issues, but

plans are well advanced to create access to the north end of Inverneil, whilst the timber haul route through Torinturk has now opened this area up for restructuring. However, both watercourses are also affected by private forestry, particularly on the Carse Estate. The Inverneil burn and Eas Torrintuirc were classed as 'moderate'.

Most properties are served by private water supplies. Kilberry is served by a Public Water supply using the Allt Dail a' Chairn within the forest area. Achbraad (Inverneil) is on the mains.

There is a fish farm on West Loch Tarbert, close to the shoreline and a fish farm offshore below Meall Mhor in Loch Fyne. There was a land-based hatchery utilising the Eas Torrintuirc in Torinturk village, which is sensitive to water quality. This facility is not currently operational. There is another similar hatchery at Meall Mhor utilising the Abhainn Strathain which is also thought to be non-operational at present.

Cases of soil erosion/landslip occur occasionally in the ravines of Inverneil and Meall Mhor and may be expected to occur naturally over time. Spoil heaps and areas of slag are associated with the mines.

Policy - Liaison with private water supply owners and Scottish Water will be entered into if operations are likely to affect them. All operations will conform to the Forests and Water guidelines.
(Strategic Plan Policy Response WA6.01: Use detailed site planning and consultation with key stakeholders, particularly SEPA and fisheries groups to identify site and downstream issues for inclusion in subsequent operations. A summary of consultation will be filed in association with each Forest Plan).
(Strategic Plan Policy Response WA6.02: Work with SEPA and SNH on the delivery of the EU Water Framework Directive and SAC's on rivers and their tributaries. We will draw up a programme of prioritised improvements to engineering structures in relation to the Water Framework Directive by 2011).
(Strategic Plan Policy Response WA6.03: Areas of unstable ground or with slope stability issues will be treated especially sensitively and will receive additional monitoring to make sure that all guidelines are adhered to or exceeded).

3.1.3 Climate

Under Strategic Plan Key Theme one; Climate change**:-**

- **Adapting to climate change**

Continentality is low (4 to 5), as is relatively close to the sea. The climatic region is described as 'cool, wet' for all but the lowest areas. Windblow was been very limited, although some parts of Coulaghailtro have been affected by windblown pockets or instability caused by restructuring. Soils are somewhat limiting on species choice. Habitat networks were non-existent in the first rotation, apart from linking adjoining blocks of coniferous woodland. Native woodland and open habitats exist outside the forest.

(Strategic Plan Policy Response WA1.05: Utilise ESC combined with site survey and climate change species trend predictions to make sure we plant resilient species on suitable sites to provide adaptability for the future. This will be reflected in forest plans and detailed site/work plans, supported by local guidance on species selection).
(Strategic Plan Policy Response WA1.06: Continue to identify opportunities in existing forests for improving habitat networks. Widen this to take a wider scale approach working with SNH and adjacent landowners and include as a key component of FDP process).

- **Flood and Catchment Management**

No incidents of flooding are known. There is a weir on the Allt an Nathair (Inverneil), associated with the private water supply. There is a weir on the Abhainn Strathain associated with the old fish farm. There is a weir associated with the Kilberry Public Water supply on the Allt Dail a' Chairn.

(Strategic Plan Policy Response WA1.08: Comply with the latest FC Forests and Water guidelines in a competent and effective manner).
(Strategic Plan Policy Response WA1.09: Work with neighbours, water body management groups and other agencies to implement appropriate catchment management plans).

- **Renewable Energy**

Potential exists for small hydro-electric schemes. A private scheme exists on the Lussa Burn on the neighbouring Ashfield Estate. There are windfarm proposals being considered for Torinturk and Inverneil. Coulaghailtro was recently considered but not pursued.

(Strategic Plan Policy Response WA1.01: Maximise the potential for wind farms on or adjacent to the national forest estate with due regard to community, planning and environmental concerns in order to help deliver government targets for renewable energy.
(Strategic Plan Policy Response WA1.03: The wood fuel/biomass market is growing. Where existing commitments allow, we should build on and help facilitate market growth and emerging wood fuel enterprises).

3.2 Biodiversity and environmental designations

Under Strategic Plan Key Theme seven; Biodiversity**:-**

- **Designated sites**

Natura sites and SSSI's

The Inverneil Burn SSSI consists of a deep, wooded gorge with ash/elm woodland on steep, base-rich slopes which grades into well-established birch and oak on the more level ground above the ravine. Hazel, rowan and alder are locally common throughout the woodland. There are also several exotic broad-leaved species present including beech, sycamore and sweet chestnut. The site includes a small area of grassland and base-rich wetland at the western end where the burn passes over an abrupt step down into the gorge. The gorge provides a range of moist, shaded habitats that support rich assemblages of lichens and bryophytes. The highly humid conditions also support a number of fern species including the oak fern and Wilson's filmy fern. There is an abundance of standing and fallen deadwood throughout the site. This provides an important habitat for lichens, bryophytes, fungi and a rich invertebrate fauna. A number of unscheduled lead mineshafts can also be found along the riparian corridor. These provide hibernation sites for Pipistrelle, Brown long- eared and Daubenton's bats. Work over the past few years has focused on rhododendron control and removal of exotics, with a target date of 2019 for complete eradication of rhododendron. In 2007, the condition, which had been described as 'unfavourable', was revised to 'unfavourable, recovering', following efforts to remove rhododendron and beech.

The Abhainn Strathain and Artilligan SSSI's comprise deeply cut wooded gorges, with coastal oak and birch woodlands with a well-developed hazel and holly under-storey. The woodland canopy varies across the site with oak dominating the lower slopes and birch increasing upslope. Alder and willow are found on the lowland marshy ground adjacent to the burns. Ash and elm are locally dominant in the base-rich areas of the site. The woodland supports a rich ground flora including an abundance of mosses, liverworts and ferns. Notable species of fern include hay scented buckler fern, filmy fern and beech fern. The boulder-strewn, bryophyte-rich lower slopes of the Artilligan section grades into heathland on the upper slopes. Bracken has dominated some of the glades and open areas. Other glades and open areas include species-rich bog in which pale butterwort occurs. The abundance of both standing and fallen deadwood on the site creates an important invertebrate habitat. There were several wood ant nests throughout the woodland aswell. Work over the past few years has focused on rhododendron control and removal of exotics, with a target date of eradication by 2021, apart from on the inaccessible sides of the gorge. The condition was described as 'unfavourable, declining' in May 2001, due to the presence of rhododendron, plus some Japanese knotweed and beech, bracken, high deer numbers, lack of regeneration and poor structural diversity. When reviewed in 2008, management input was moving the woodland towards 'favourable' condition, so a revised condition of 'unfavourable – recovering' was given. Rhododendron control was the main reason for the change. Condition is also partly dependant upon works being undertaken on that part of the SSSI on the Stronahullin Estate. The woods formed part of the proposed Tarbert Woods SAC, initiated in 2005.

(Strategic Plan Policy Response WA7.06: Assess the potential impact of management proposals on Natura sites – either on or adjacent to, the National Forest estate – using the appropriate assessment process to avoid impacting on these sites).
(Strategic Plan Policy Response WA7.11: Make sure that 95% of features will be in 'favourable' or 'unfavourable recovering' condition classes by 2010, using management plans agreed with SNH).
(Strategic Plan Policy Response WA7.12: Continue to take account of neighbouring designated sites in FDP's and operational plans with the aim of protecting and, where appropriate, enhancing their status).

Ancient Woodland sites:

Most of the Inverneil Burn SSSI is classed as an Ancient Woodland site. Further small areas in Inverneil exist along the lower margins and gullies. These link into other Ancient Woodland sites along Loch Fyne that connect with Meall Mhor and Torinturk. Most of the area within Meall Mhor is existing mature native woodland and within the SSSI's. The lower third of Torinturk is largely Ancient Woodland sites, although existing mature native woodland is restricted to the coastal fringe now. Apart from one or two small pockets along watercourses, Ancient Woodland sites in Coulaghailtro are confined to the hillside and riparian corridor around Largnahunsion and southern edge of the block. Ancient Woodland sites between Largnahunsion and Torinturk are more fragmented.

(Strategic Plan Policy Response WA7.01: Restore all plantations on Ancient Woodland sites, wherever this is a practical proposition. In the longer term we expect to reach over 90% restoration).

Partnerships

There are no partnerships or associated community groups within the forest.

• Species and habitats

Birds:

- Black grouse numbers are low. There are leks either in or close to all the blocks.
- Open hill-tops are used by raptors, including Golden eagles.
- Barn owl barrels are sited in various places. Other owl species have also been seen.
- Divers are known to use Meall Mhor loch, on which there was a diver raft.
- Little Grebes are thought to nest on Lochan Laiogh, Torinturk.

Other wildlife:

- Red squirrels are seen in the lower areas of all the woodlands.
- Scottish Wood ant colonies are present in Meall Mhor and Torinturk.
- Bats use the old mine shafts.
- Badgers have been seen in Inverneil and Torinturk.
- Otters have been seen along the Inverneil burn.

Policy - Timings of operations and buffer zones will follow specified guidance for key species.

(Strategic Plan Policy Response WA7.03: The future forest structure and management practices will be strongly influenced by the need to enhance the prospects our SC species and other important species. These can also be used as barometers for a whole host of other species).

Open land:

High tops are present in all the woodlands, where tree cover is other sparse and checked, or absent. These areas offer potential for Black grouse management. Conifer regeneration on Cruach Lagain, Coulaghailtro, was cleared in 2009, for open habitat restoration. Keppoch grazings is an agricultural lease. Wildlife rangers have recently mown some of the heather to assist with deer control. Ownership of a small field behind Achabraad has been in dispute for some time with the owner of Barnakill Farm by Cairnbaan. 13ha of lost land south of Loch a' Mhadaidh, Inverneil, proved too difficult to enclose due to the terrain, so remains grazed by Ellary Estate.

Meall Mhor hilltop is used by a number of public and private organisations who have telecommunications masts and ancillary buildings on the hilltop. Some of the land is not owned by the FC.

(Strategic Plan Policy Response WA7.09: Manage open space in a more pro-active and targeted way in some areas and produce a plan outlining these areas and our plan of action by 2011).

Open Water:

There are several small lochans in the forest area. Most have limited buffers. Lochan Dubh in Coulaghailtro is particularly badly affected by conifers. The coastal section of Torinturk includes some intertidal mudflats.

Meall Mhor loch is owned by Meall Mhor estate. It is dammed, but recently water levels have dropped considerably due to the failure of the dam above the outlet.

Native Woodlands:

The primary native woodland areas are contained in the three SSSI's. Additional areas are found up some of the gullies and riparian corridors. A significant habitat network contributor runs along the entire coastal section of Torinturk. This is slowly being expanded with PAWS restoration.

(Strategic Plan Policy Response WA7.02: Continue to expand the area of native woodland (current Strategic Plan target is over 10%, but the Scottish Forestry Strategy target for the second half of the 21st century is about 35% native tree species in a network of functioning woodland and non-woodland habitats that span valley bottoms to natural tree lines – this target will be applied nationally, but will vary between districts – it is anticipated that the target for West Argyll will be somewhat lower).

Invasive Exotic Species:

Rhododendron infestation affects the SSSI's. Control measures have been ongoing since the mid 1980's. Apart from inaccessible cliffs, rhododendron has almost been eliminated from these areas. Surrounding areas are also being worked on, although there are considerable areas of dense rhododendron on the neighbouring Meall Mhor and Erines estates.

Western hemlock is a problem in parts of Meall Mhor and especially in Torinturk. Regeneration is a problem along the Eas Torrantuirc above the village and also regeneration above the Allt Doire na h-Airigh, where there are still some mature trees. The current policy is one of containment.

Some beech regeneration is present in the south-eastern corner of Inverneil, associated with the stand of mature trees there. This area is planned for PAWS restoration.

(Strategic Plan Policy Response WA7.04: Produce a plan for prioritised control of invasive exotic species by 2011 and implement as resources permit in association with other partners).

Deer Management:

Red, sika and roe deer are all present in the forest. There is an adequate network of ranger tracks. Deer numbers have been historically high in Inverneil, coming off the Ellary estate. Opportunities for control are limited here by stand structure. There is a deer fence along the Brenfield march, but it is not deer proof. Vulnerable species have been affected by deer browsing.

Deer numbers in Coulaghailtro, Torinturk and Meall Mhor are also too high, with deer coming in off the Ormsary Estate. The deer fence between the Ormsary Estate, Scottish Woodlands managed forest and Meall Mhor is also thought to be no longer

deer proof. Deer numbers in the lower part of Torinturk are not, however, currently affecting broadleaved regeneration. Deer control is leased in Meall Mhor.

(Strategic Plan Policy Response WA7.05: Continue to monitor deer numbers and damage levels on an annual basis to make sure that our deer management keeps deer populations and damage in balance with sensitive habitat requirements).
(Strategic Plan Policy Response WA7.10: Work with local deer management groups to foster a responsible attitude towards fencing issues and co-operative management of population levels in association with the Deer Commission Scotland. In open deer range, ring deer fences will be maintained where necessary and an appropriate contribution will be sought from neighbours).

Under Strategic Plan Key Theme one; Climate change**:-**

Broadleaved regeneration:

There is a general policy for the removal of birch where productive forestry is desired. Natural regeneration of broadleaves is occurring on most Ancient Woodland sites. A couple of enclosures were erected in Artilligan SSSI in the 1980's to monitor regeneration success if deer were excluded.

(Strategic Plan Policy Response WA1.10: Encourage natural regeneration in areas identified though the FDP process and manage these under a CCF type regime. We will introduce a more robust monitoring regime by 2011 and will tabulate areas of successful regeneration on an annual basis).

- **Landscapes and Ecosystems**

Habitat networks were largely non-existent in the forest prior to the commencement of restructuring. The only network that did exist was a narrow coastal strip of native woodland in Torinturk. This is important as it links with the Glen Ralloch to Baravalla Woods SSSI to the north-east and the Ardpatrick and Dunmore Woods SSSI to the south-west. A weaker link exists from the latter SSSI through the Carse woodlands and into the native woodlands running up the Abhainn Learg an Uinnsinn (Coulaghailtro). Some areas of native woodland do link with adjacent private woodlands, including lower sections of the Inverneil burn, the Stronahullin estate and Artilligan. The Allt nan Nathair (Inverneil) also links into the Inverneil Burn. Its native woodland results largely from conifer removal in the mid-1980's and a combination of broadleaved planting and natural regeneration thereafter. Riparian corridors in the southern part of Coulaghailtro were improved by conifer removal and scalloping of edges during the late 1980's.

Open land in Inverneil generally links with the Ellary Estate. Meall Mhor hill connects with the Ormsary Estate. Other open areas are somewhat isolated.

(Strategic Plan Policy Response WA1.06: Continue to identify opportunities in existing forests for improving habitat networks. Widen this to take a wider scale approach working with SNH and adjacent landowners and include as a key component of the forest plan process. Complexes of forest blocks will be targeted for this work as plans are updated).

Under Strategic Plan Key Theme seven; Biodiversity**:-**

(Strategic Plan Policy Response WA7.07: Collaborate, on at least a 5-yearly basis, with neighbouring landowners, colleagues in Perth and Argyll Conservancy and SNH, and in association with FDP revision, to create functioning landscape-scale habitat networks).

3.3 The existing forest

3.31 Age class, species and yield class

Under Strategic Plan Key Theme one; Climate change**:-**

- **Species Choice**

There are social, landscape and biodiversity grounds for increasing diversity, along with possible benefits for countering possible effects of climate change. However, the primary objective for the forest blocks is as a commercial conifer plantation, with Sitka spruce being the only species suited to much of the area, especially the significant areas of flushed Blanket bog and peaty gleys. Brown earths are mostly restricted to PAWS sites and areas of existing native woodland.

(Strategic Plan Policy Response WA1.05: Utilise ESC combined with site survey and climate change species trend predictions to make sure we plant resilient species on suitable sites to provide adaptability for the future. This will be reflected in forest plans and detailed site/work plans, supported by local guidance on species selection).

Under Strategic Plan Key Theme two; Timber **:-**

- **Timber supply**

High yield classes are achievable in lower areas for spruce. The higher areas with deep peats, skeletal soils and heather are less productive. A sustainable output of timber is potentially achievable within one rotation. Thinning opportunities are limited by exposure, with only the lower parts of Torinturk being particularly suitable. No suitable stands of commercial broadleaves are available.

(Strategic Plan Policy Response WA2.01: Produce a sustainable forecast of timber production and smooth our production to match those predictions in subsequent marketing plans. We will maintain our compliance with UKWAS, which will allow our customers to gain certification for their products).
(Strategic Plan Policy Response WA2.02: We will revise our thinning plan in 2011 with a view to expanding programmed thinnable area).

- **Timber Quality**

Most of the forest will grow good quality spruce. No thinning was undertaken in the first rotation crops other than in Torinturk. Stocking densities are generally good, apart from higher areas with skeletal soils, where a high proportion of red logs are likely due to increased number of edge trees. Some historical problems with deer browsing are thought to have reduced quality in Inverneil. Lodgepole pine in Coulaghailtro is generally of poor form. Presence of *Dothistroma* on pine is thought to be low. Recent storm damaged areas will mostly be picked up in Phase 1 coupes, but not all, so some degradation is likely.

(Strategic Plan Policy Response WA2.03: Site selection for species and origins (including improved stock) will follow sound silvicultural practice to create a quality growing stock at the approved density to take advantage of our favourable site/climatic conditions. We will implement and monitor the stocking density assessment process to make sure that we continue to reach these standards).
(Strategic Plan Policy Response WA2.05: Maintain the thinning programme at least at current levels, review it annually and seek opportunities to expand it, whilst observing sensible constraints to make sure that all suitable areas are thinned).

3.32 Access

- **Timber transport**

New roading is required in much of Inverneil, the southern part of Coulaghailtro and the northern part of Meall Mhor. Spur roads are required in other places. Access to lower coupes beside the Allt nan Nathair has been and will continue to be via temporary log bridges across the burn to the spur road off the public road at NR82778080. The timber haul route from Coulaghailtro through Torinturk was constructed to take timber lorries off the fragile B8024, avoid the weak bridge at Largnahunsion and by-pass the village of Torinturk. The private Kilberry Forest has also started using the route for timber transport during the latter part of 2011. In addition, the B8024 public road through Glen Ralloch was upgraded to make it suitable for timber lorries, allowing Tarbert village to be by-passed.

Access to Meall Mhor hilltop and its telecommunications masts is shared between a number of public and private organisations. They each maintain their own padlock on the access routes. There have been issues in the past with FC padlock removal on the FC's right of access through the Meall Mhor estate, although there is no need to use this access. The upper section is partially tarred, with access to a Scottish-hydro-electric building on the route. The existing access to the public water supply at Kilberry will not be used as a harvesting access. No new access points will be created for timber haulage onto the B8O24 in Coulaghailtro due to the fragility of the road.

(Strategic Plan Policy Response WA2.07: Continue partnership working with the Argyll Timber Transport Group with particular emphasis on appropriate community consultation).

3.33 LISS Potential

DAMS scores (see map) indicate little potential for thinning and continuous cover silviculture apart from in Torinturk. Much of the suitable area within Torinturk is planned for Ancient Woodland restoration. However, some of the sites are steep and awkward to thin, so restoration using LISS will be limited.

(Strategic Plan Policy Response WA2.02: Improve thinning forecasts, continuous cover plans and planning processes. We will revise our thinning plan in 2009 and 2011 with a view to expanding the programmed thinnable area).
(Strategic Plan Policy Response WA6.05: Continue to increase the area managed under LISS).

3.34 Current and potential markets

- **Hardwood timber**

Existing hardwoods are of high conservation value, with associated lichen communities and within the SSSI's. PAWS restoration in Torinturk may allow some areas to be planted with commercial broadleaves, although this is still some way off and will take time to become productive once established. Some material may be available to the woodfuel market, particularly where there is abundant regeneration. Some stands of beech have been considered for thinning or may have been thinned to waste in the past.

(Strategic Plan Policy Response WA2.09: We will maximise our use of this timber in our own construction and recreational work and monitor usage on an annual basis.
(Strategic Plan Policy Response WA2.10: Increase the future broadleaved resource by identifying opportunities at the time of work plan preparation, restocking, and regeneration opportunity).

- **Timber in construction**

Markets exist for spruce and small quantities of minor conifer species. No specialist markets have been established. Large diameter material is more difficult to sell.

(Strategic Plan Policy Response WA2.11: Continue to seek opportunities to demonstrate the use of Scottish timber in construction and repair work, maximising the use of local timber).

3.4 Landscape and landuse

3.4.1 Landscape character and value

Under Strategic Plan Key Theme six; Environmental Quality**:-**

- **Landscape**

SNH's Landscape Character Assessment for the area describes the landform as 'Upland Forest-Moor Mosaic'. Detailed descriptions of land types for 'Upland Forest-Moor Mosaic' include:-

- Upland plateau with rounded ridges, craggy outcrops and an irregular slope profile.
- Upland lochs.
- Winding narrow glens and wider river valleys.
- Extensive, large-scale mosaic of forestry plantations and smaller areas of open moorland.
- No field boundaries
- Very few buildings; occasional isolated dwellings on edges of moor.
- Little access; roads typically follow shorelines.
- Derelict, isolated cottages and farm buildings.
- Conservation of distinctive, small-scale landscape features.

Analysis of the area suggests it fits reasonably well into the definition. The landform is largely made up of rounded, sometimes craggy hills and large areas of flatter plateaux, combing to give varied slope profiles. The B8024 and A83 largely follow the coast. The forest areas are part of a larger mosaic of forestry plantations with smaller internal areas of open moorland, but bordering large open estates. All the blocks have one or more lochans within them. Field boundaries, although present, are uncommon and often only apparent in lower areas. There are few buildings within the forest area. No part of the forest area falls within the Knapdale NSA.

(Strategic Plan Policy Response WA6.04: Continue to include landscape as a major consideration in long-term forest planning and gradually work at resolving issues such as hard edges and masked views, and make balanced decisions on the way forward taking into account other issues; such as economics and biodiversity value).

3.4.2 Visibility

- **Landscape Quality**

Landscape quality and landscape visibility are somewhat different, with most of the woodland area starting out a blocks of even-aged conifer forest but with little of it visible in the landscape. The most important areas tend to be the outer edges of the forest. Apart from the oldest planting in Torinturk, very little species diversity was introduced in the first rotation. Much of the existing diversity results from second rotation planting.

The elbow in the B8024 opposite Gleann Beag was cleared of trees to re-establish the impressive view of Loch Fyne, following an approach by a neighbour. Native woodland regeneration and planting along the Allt nan Nathair is helping to provide an attractive lower edge to the forest. The long, straight boundary between Brenfield and Inverneil is not apparent in the landscape. This division will be further reduced as restructuring between the tow forest areas progresses. Attempts to diversify the species choice in the view from Crear were hampered by unsuitable soils. Views from Gigha, the A83 at Ronachan and the Islay ferry routes are distant views and where seascapes dominate. Felling in Torinturk started before the concept of forest restructuring was developed, resulting in much of the lower second rotation crops being relatively even-aged Sitka spruce monoculture. This is particularly apparent from Kennacraig, although the varied topography and fringe of native woodland do add character. Restoration of Ancient Woodland sites over the whole face will create a more natural woodland character in the future, linking in with adjoining areas of native woodland, and end the process of sudden change through clearfelling. Screening of the forest road on this face is important as it visually cuts the face in two. This was far more apparent before the current tree crop became established. In the past, villagers in Torinturk raised the issue of restoring a view of the loch from the village, which had become lost by coniferous tree growth. Following felling, the area was left open. However, it has since regenerated with native woodland and the view is disappearing again. The SSSI's in Meall Mhor add sizable areas of native woodland to the view and particularly to the A83 roadside edge. Upper edges around Meall Mhor hill are sensitive, are currently acceptable and have yet to be felled. The powerline corridor stands out because of its linear form, size and white grassy rides. However, the edges are irregular and link with other areas of open space, so little adjustment is required.

(Strategic Plan Policy Response WA6.05: Continue to increase the area managed under LISS).

- **Sensitivity Classification**

Scores help determine the extent to which people, landscape and conservation issues affect the Forest Design Plan. The scores for Inverneil are; 1/5 for people, 2/5 for landscape, and 5/5 for conservation (scores as of 1999), the latter score reflecting the presence of the SSSI. The scores for Coulaghailtro are; 1/5 for people, 2/5 for landscape, and 2/5 for conservation (scores as of 1999). The scores for Torinturk are; 2/5 for people, 2/5 for landscape, and 5/5 for conservation (scores as of 1999), the latter score reflecting the presence of two SAM's. The scores for Meall Mhor are; 1/5 for people, 2/5 for landscape, and 5/5 for conservation (scores as of 1999), the latter score reflecting the presence of the SSSI's.

3.4.3 Neighbouring landuse

Private commercial forestry borders on all four woodlands. The Carse Woodlands and Kilberry Forest share the Coulaghailtro – Torinturk timber haul route. The Ellary Estate borders on Inverneil. The adjoining moorland is used for rough grazing and has been subject to muir burning in the past. Coulaghailtro is bordered by the Ormsary Estate to the north, with a mixture of improved and rough pasture adjoining. There are also two small native woodland schemes along the burnside march. There are several small farms to the west, including Kilberry, Keppoch and Tiretigan. Other native woodland schemes include Largnahunsion, Achaglachgach House and a sizable scheme on the Stronahullin Estate, immediately north of Meall Mhor.

3.5 Social Factors

3.5.1 Recreation

Under Strategic Plan Key Theme three; Business Development**:-**

- **Tourism**

The A83 provides at important tourist link down the Kintyre peninsular. It also connects with a various ferry services, including the Islay ferry terminal at Kennacraig. This ferry route and terminal is an important vantage point affecting Torinturk. More minor tourist routes follow the B8024 to Kilberry, serving various holiday developments on the Ormsary Estate and Port Ban caravan park. The Tarbert to Portavadie ferry serves the B8000 Tighnabruaich to Strachur road, with views to Meall Mhor.

(Strategic Plan Policy Response WA3.07: Make special efforts to build on our contribution to the wildlife viewing facilities to improve the current service, and work closely with partners who offer this service).

(Strategic Plan Policy Response WA3.09: Continue to consider the landscape value of woodlands to tourism during the Forest Plan process with particular regard to views to and from the forest).

Under Strategic Plan Key Theme five; Access and health**:-**

- **Making access easier**

A Sustrans cycle route makes use of the B8024, turning off before the A83 is reached via a built path through the south-eastern corner of Inverneil Forest and on into the Brenfield Estate. The forest road network here is also used by horse riders from the Brenfield stables. The Sustrans route has been unofficially supplemented by an alternative using the Coulaghailtro – Torinturk timber haul route, which is proving increasingly popular as it offers shorter, albeit less scenic route and the option of a circular route from either Torinturk village or Port Ban caravan park.

The forest walk up to Dun a' Choin Duibh has become dangerously slippy and is considered too steep to effectively upgrade. Consequently a new line will be explored.

Further access opportunities may develop as the forest road network is completed.

(Strategic Plan Policy Response WA5.03: Work with local access officers to help maintain and manage those routes on the national forest estate that form part of the Core Path Network).
(Strategic Plan Policy Response WA5.04: Continue to address the Disability Discrimination Act in a prioritised and proactive way using the Countryside for all Good Practice Guide.
(Strategic Plan Policy Response WA5.06: Protect Public Rights of Way through woodlands and take them into account in Forest Plans and management).

- **Recreation**

Few facilities are provided given the low recreation pressure on the area. The only provision is the forest walk to Dun a' Choin Duibh and the Giant's Grave in Torinturk. However, informal use of the forest road to the hilltop viewpoint of Meall Mhor is quite popular. An interpretation panel is provided at the lay-by below the Artilligan SSSI. There is an informal path from Torinturk village following the burn down to the shore. The district's Recreation Plan contains further information.

(Strategic Plan Policy Response WA5.01: Seek further investment to maintain and enhance current facilities and to increase their usage by local people consistent with the prioritisations arising from revision of the Recreation Plan. We will co-ordinate a programme of visitor number monitoring covering key sites to allow better prioritisation of future resources.

(Strategic Plan Policy Response WA5.02: Continue to update our key interpretative facilities and work with other partners to provide coherent, flexible and stimulating interpretative opportunities).

3.5.2 Community

Under Strategic Plan Key Theme four; Community Development**:-**

- **Community Engagement – Neighbours**

These comprise; isolated dwellings, forestry neighbours, private estates and farmland. South Knapdale Community Council covers the forest area.

Discussions took place several years ago with a neighbour interested in leasing land at Torinturk for horse grazing. However, the land proved unsuitable.

Discussions with owners of Crear, an arts centre, to create a sculpture trail in the forest have not been pursued by them. The site was not particularly suitable for planting a variety of species, especially broadleaves.

Discussions have recently taken place regarding shared timber haulage out of Kilberry Forest with Robin Dixon. Agreement was reached to allow use of the timber haul route.

- **Partnerships**

There are no existing partnerships or community groups associated with the block.

(Strategic Plan Policy Response WA4.02: Encourage communities that wish to become more involved in the management of, or outputs from, their local forest).
(Strategic Plan Policy Response WA4.10: We will continue to contribute to a range of current partnerships and will actively consider new proposals where appropriate).

- **Community Ownership and management**

There are no current proposals within the area.

(Strategic Plan Policy Response WA4.05: Receive community approaches on purchase positively and process applications that fit the National Forest Land Scheme criteria as quickly as possible).

3.5.3 Heritage

Under Strategic Plan Key Theme six; Environmental Quality**:-**

- **Cultural Heritage**

There are two scheduled sites in the plan area, both in Torinturk – Dun a' Choin Duibhe and the Giant's Grave, chambered cairns. Both have access and interpretation provision. Inverneil lead mines have been suggested as a possible scheduling candidate. There are numerous levels and shafts, mine buildings and spoil heaps. The mine entrances have been fenced off for safety, to prevent disturbance of bats and to discourage pot-holers.

Elsewhere in Inverneil, there are several rock shelters, all in existing open space. One or two shielings have been found, along with later agricultural enclosures. An old railway in the south-eastern corner of Inverneil, associated with timber extraction to Ardrishaig during WW1, has been reported but no evidence found on the ground. There are further shielings and old settlements in Coulaghailtro, of which Muilichinn has upstanding buildings. There are also a number of enclosures, springs and marker cairns. There are several townships in Torinturk, Achelach being the best preserved and easily accessible from the village. There is one other chambered cairn in the forest, plus a number of crofts and sheepfolds, some well preserved. The lead-copper Mines in Meall Mhor also retain some interesting features. The principal area has been fenced off. Again there are several shielings, crofts and sheepfolds. The longhouse at Larach Bhord is particularly well preserved.

Policy - Archaeological features will be protected in accordance with the Forestry Commission's Archaeological Guidelines and the district's own archaeological guidance paper. Standard prescriptions from the West of Scotland Archaeology Service include; leaving 5 meters either side of walls and linear features unplanted and 20 meter buffers around localized sites. Breaches in linear features will be kept to an absolute minimum. Other buffer zone widths are defined for each monument on the conservation plan and against the overlay key.

(Strategic Plan Policy Response WA6.06: We will continue to work with local archaeologists and Historic Scotland to protect ancient monuments in our care and to make sure that cultural heritage issues are adequately addressed in any development proposals (including acquisition of bare land). We incorporate the recommendations of Historic Scotland site inspections into SAM's plans within three months of each inspection).
(Strategic Plan Policy Response WA6.07: Improving access to and expanding interpretation in association with the important cultural heritage in the district area is seen as a priority and will be addressed through design plans, the recreational plan and work plans as appropriate).

3.6 Statutory requirements and key external policies

The following official designations exist in the plan area:-

- Wayleaves – lines to various private dwellings and villages
- Ancient woodland sites
- Scheduled Ancient Monuments
- Inverneil Burn SSSI
- Artilligan and Abhainn Strathain SSSI’s
- Tarbert Woods SAC
- Public Water supplies (Kilberry)(fringe of Tarbert catchment)

4.0 Analysis and Concepts for each site factor

4.1 Analysis

4.1.1 Physical site factors

4.1.1.1 Geology, soils and landform

Species choice is limited by soils. This includes; lack of rooting depth on skeletal soils, waterlogging on deep peats and fertility issues in some areas, particularly Meall Mhor. However, some increased diversity is possible in most areas by utilising steeper, drier banks/slopes and knolls. Soil data exists for some areas. These indicate flushed Blanket bogs and peaty gleys predominate. Significant areas of Brown earth and ironpan soils are present in Torinturk, mostly associated with Ancient Woodland sites.

Landform was analyzed and a design concept created in the previous plans. Increased availability of GIS resources has improved analysis and interpretation of features in the landscape. UKWAS policy on coupe size reduction and increased requirement for smaller coupes in association with public access routes requires further refinement of the coupe structure. Larger scale landform in higher areas requires larger coupes to fit the topographic features. Steep sites are constrained by winch extraction distances. Where ridged landform occurs it should ideally be reflected in the orientation and shape of felling coupes. Varying the objectives for each coupe will help enhance coupe shapes that reflect the landform. Matching of shapes to landform is part of the overall design objectives under landscape improvements. Existing open hilltops are generally unplantable due to soil depth and exposure.

Increased use of continuous cover in Torinturk may produce a more uniform forest in the future, which may conceal the underlying topography to a greater extent. This may be alleviated by management interventions, such as thinning or planting to control species mixes and canopy structure.

4.1.1.2 Water

Adherence to the Forests and Water guidelines is essential where public and private water supplies utilize forest burns for water. Liaison will continue where these may be affected by forest operations and safeguards agreed. There are plenty of opportunities within the longer term to develop robust riparian corridors. These will contribute to habitat network development (an FDP objective), protection of burns feeding fish farms and angling interests. Issues regarding conifer planting beside the Risk Category 1a watercourse, The Lussa burn and the Abhainn Learg an Uinnsinn, under the Water Framework Directive initiative will be addressed over time through implementation of appropriate design. Sea trout are known to run up the Abhainn Learg an Uinnsinn. Creation of open buffers around lochans will benefit divers and other wildlife.

Slope instability in the gorges is largely a natural phenomenon. However, care is needed not to increase water flows down existing watercourses feeding into these areas or changing drainage patterns that direct water towards the top edges of the gullies during mounding operations. Establishing adequate buffers will help avoid problems in the future.

4.1.1.3 Climate

Windiness is the main climatic factor affecting the forest. Critical decisions on when and whether to thin, and whether stands can be converted to continuous cover are all dependent on accurate assessment of windthrow risk. DAMS is the best method of assessment available, using maximum scores to guide thinning decisions. Increased use of broadleaves will reduce the incidence of windthrow events. Standard open coupe buffers will apply, except where broadleaves or permanent woodland cover is present. Proposed development of native woodland habitat networks, primarily through implementation of PAWS restoration will strengthen resilience of existing isolated species and fragmented habitats to climate change.

4.1.2 Biodiversity and environmental designations

<u>Birds</u>

Black grouse are seen in and around the forest, associated with open hilltops, including on adjoining estates. Various proposals have been suggested for modifying the forest to increase suitable Black grouse habitat, including a management plan for Meall Mhor in 2007. However, a district approach has been adopted to target limited resources where maximum benefit can be gained. Consequently, no work has been done in any of the blocks, although future design has built in increased amounts of larch around edges. Feathering of forest edges is also standard good practice. Work in east Knapdale has been ongoing for several years, being seen as part of a wider habitat linkage for Black grouse populations that might otherwise become isolated. Consequently, this work may be extended into the top of Inverneil, where there are similar areas of open ground and poorly stocked conifers that could be managed for Black grouse. Further opportunities may be identified if funding becomes available.

Divers are known to use Meall Mhor loch. Reasons for its apparent loss of water will be investigated. There was a raft on the loch, but has apparently been removed. Conifer removal around Loch a' Mhadaidh (Inverneil) could also be undertaken in conjunction with Black grouse work, to benefit diver access.

Other wildlife

Habitat management improvements for Red squirrels will be focused on those parts of the forest which are suitable for enhancement. Increase in native woodland cover will generally favour Red Squirrels. Recommendations included in the Knapdale Habitats Partnership Red squirrel project report of February 2006 were; retain or plant small blocks of favoured conifers, retain stands of beech, coppice hazel to reinvigorate it, maintain connectivity of mature woodland, inspect conifers in broadleaved areas known for Red squirrels for presence of dreys and retain, and erect squirrel nest boxes.

Scottish Wood Ant colonies are present in east Meall Mhor and Torinturk. Colonies in Torinturk have been impacted by removal of mature conifers and combined with lack of restructuring. A key stand of Norway spruce above the Allt Doire na h-Airigh is being managed under LISS to benefit them.

Brown long-eared, Pipistrelle and Daubenton's bats hibernate in the Inverneil lead mines up Inverneil Burn. The mines on the southern side have not been surveyed. Some of the workings are in a dangerous condition, so can no longer be safely surveyed. Most of the mine entrances are in existing open space and fenced, so are unlikely to be affected by forest operations. No maternity roosts are known.

Deer numbers are not fully under control within the woodlands. Increased planting of minor species will require regular monitoring for damage. Deer fencing will be needed for minor conifer species and broadleaves in some areas. Track construction will focus on restock sites.

Inverneil Burn SSSI

Rhododendron control and eradication is the main focus. However, a number of coupes are due to be felled around the periphery over the next 10 years. Although the adjoining areas are distinctly different in soil and landform, and lack native woodland remnants, there are advantages in buffering the SSSI, particularly against seed rain from exotic conifers. An expanded buffer of native woodland is envisaged. In addition, the Inverneil Burn will be developed into a riparian habitat corridor above the SSSI, linking through to larger open space that connects with the Ellary Estate. Broadleaved growth may be limited by soils along the burn. Broadleaved planting in the open space further up has failed.

Artilligan and Abhainn Strathain SSSI's

Again, rhododendron control is the main objective. Work is now directed against rhododendron control in adjoining areas. Control will always be necessary so long as there remain sizeable tracts of rhododendron on adjoining private estates. SNH have made approaches to Meall Mhor Estate regarding controlling rhododendron on their property, but no agreement has yet been reached. Control of rhododendron on the cliff faces in the gullies has been limited to cutting using operators with climbing skills, but the control measure has failed to stop regrowth. SNH had previously objected to the use of chemical treatment but have now conceded that this will be necessary.

Invasive species

Rhododendron poses a minor threat to PAWS restoration in Meall Mhor. There is also a scattering of bushes throughout the block. These will be eradicated as part of the national rhododendron control policy.

Western hemlock in Torinturk seriously affects localised areas in Torinturk. There is currently a containment policy in place. Most areas will be cleared in conjunction with harvesting of surrounding crops. It is not currently spreading.

Sitka spruce regeneration was recently cleared off Cruach Lagain in Coulaghailtro. No other incidents of SS regeneration in planned open space are known.

4.1.3 The existing forest

4.1.3.1 Age class, species and yield class

The lower areas are suited to species diversification, but options are limited on the higher ground and wetter, peaty and heather dominated sites. There are social, landscape and biodiversity grounds for increasing diversity, along with possible benefits for countering possible effects of climate change. Opportunities for restructuring even-aged plantations exist through exploiting differences in yield class and windthrow risk. Crop surveys have kept the forest data reasonably up-to-date.

YC12 is achievable for Sitka spruce in most areas. Lower areas typically produce yield classes in excess of 20 for SS. Conversely, soil nutrient deficiency, shallow soils, exposure and heather have caused yield classes of 10 and under in many higher areas, with expected second rotation yield classes no better. Ashens (Meall Mhor) has been particularly affected by poor growth, resulting in felling and replanting of the existing crop, which itself had been replanted or beaten up several times in the past. Opportunities for retaining or modifying low yield crops for wildlife cover and mitigation against climate change may be preferable to deforestation and subsequent heathland restoration. Improved aerial photography has given assistance in analysing crop growth patterns and potential for retentions.

4.1.3.2 Access

Financial constraints will dictate a phased construction programme with possible delays to the felling programme. Road construction is unlikely to have any great impact on landscape sensitivities.

The new forest road around the southern side of Inverneil already has approval. Road extension to the eastern road has approval but has run into problems crossing an area of deep wet peat. Consequently, provision must be made to come in from Gleann Beag instead. A link connecting to the approved forest road coming in from Knapdale is required to provide an alternative haul route out of Knapdale, should problems with the canal bridge at Cairnbaan arise. Such a route might also have recreation potential, possibly as a cycle route. Terrain may be an issue at the north end of the Inverneil block, which will require further Civil Engineering input.

New roads in the other woodlands are likely to be distant in the view and potentially hidden by landform and trees. Environmental sensitivities are low. The main southern route through Coulaghailtro will need to be built in phases due to its length and started within the plan period to reach coupes due for felling in 2022 (Approval for these coupes will be applied for when the plan is next revised). More detailed assessment of routes to overcome issues caused by steep gradients in Torinturk will be required nearer to the time of construction. Several routes are designed to facilitate access to potential winch only ground.

The secondary access through Meall Mhor House is now overgrown. Any organisations with rights to use this road to reach the masts on Meall Mhor have evidently been using the existing main access, even though they may not have authority to do so. The FC have no current requirement to re-open this route.

4.1.3.3 LISS Potential

Opportunities exist in lower elevation, younger conifer crops and potentially some older crops to adopt LISS in Torinturk. Many of these sites are planned for conversion to native woodland. Thinning choices are often restricted by terrain, where steep slopes and lack of machine or winch access render coupes unsuitable for thinning. In the future, some hardwood areas will also be available, particularly those intended for commercial planting.

Opening of the proposed biofuel plant will create increased demand for low value and small roundwood products from the forest, encouraging thinning.

4.1.3.4 Current and potential markets

Markets are located outwith of the district. Road and sea transport are the main options. Ardrishaig pier is relatively accessible from these woodlands. The consented construction of a biofuel power plant at Achnabreck will, when built, create a huge demand for small roundwood and possibly other low value wood products. Expansion of the native woodland area may offer future potential for hardwood timber production. AGWA may also use small quantities of hardwood timber.

4.1.4 Landscape and landuse

4.1.4.1 Landscape character and value

SNH's Landscape Character Assessment puts the area within the 'Upland Forest-Moor Mosaic landscape type and gives specific landscape guidelines including:-

- Identify and conserve contrasts in landscape pattern between large-scale mosaic of moorland and conifer plantations and the more diverse, small-scale landscape on the fringes of the moorland. There is scope for more extensive broadleaf woodland planting in these areas to create a more distinctive, diverse transition.
- The overall balance between plantations and areas of open moorland is sensitive – ensure that plantations do not completely dominate the landscape and that a characteristic mosaic of woodland and open land is retained. There is considerable scope for improving the diversity and form of the landscape pattern.
- Identify areas with relatively rich ecological interest, such as wet flushes, loch margins or upland pastures and design conifer plantations to create and maintain viable wildlife corridors.
- Give special consideration to views from roads in designing the form, structure and phasing of conifer plantations.
- This is a large-scale landscape, with relatively few distinctive features, so it is particularly important to conserve the setting of small lochs, striking rocky outcrops or attractive groups of buildings.

The existing plans addressed a number of the above points. Commitment to full PAWS restoration will give a significant positive visual gain for Torinturk. Options for native woodland expansion elsewhere are very limited, partly because the woodlands do not occupy the lowest parts of the landscape, where native woodland would be more appropriate and viable. Restructuring and conifer species diversity will help improve the landscape value of the forest. Some large areas of relatively even-aged conifer thicket remain, with little species diversity in the original design. Increased use of minor conifer species, broadleaves, and feathered edges will be employed throughout, though restricted by soils and exposure. Similar treatments may be appropriate around recreation facilities and along trails. These will be managed and designed at Work Plan level. Building in habitat corridors will improve the unity of the forest in the landscape. Views from public roads are however often limited to edges. Settings of lochans can be enhanced as harvesting and restocking progress. Orientation of coupes to the grain of the landform is more important than size of coupes. Larger coupes may be more appropriate to cover whole ridges. Coupe size selection was pre-UKWAS and a smaller scale of felling is desirable. Steep ground working is a constraint.

Forest cover reduction would be economically sound in poor yield areas. However, this would conflict with current policy on deforestation. There are however, some

more sensitive ridge tops and open habitat linkages requiring conifer removal. Most of this can be accomplished during normal coupe felling.

Issues in the landscape in the Torinturk block, noted in the previous plan from views above Kennacraig, have largely dissipated as crops have either been felled or matured. These included straight edges inherited from the old ride structure, retained checked conifers sitting awkwardly in clearfell sites and skyline fringes, when seen from Spion Kop (B8001). However, distances are typically around 5Km, so only features with sufficient scale will have any impact on the landscape. Coupe size, shapes and edges are particularly important. Scale requires larger sizes to avoid the forest structure appearing bitty. Issues reported from lower views, such as the ferry terminal, identified more skyline issues, including natural regeneration on an open hilltop deer lawn (Creag Mhor NR794637) and birch ontop of Barr Mor (NR818649). Both have now become integrated into the forest as surrounding crops have grown up. The former will be clearfelled with the adjacent coupe, whilst the latter will eventually become part of a larger native woodland habitat network.

4.1.4.2 Visibility

Key sensitive areas are public roadside edges, recreation routes and the view from Kennacraig. These areas are the focus for native woodland expansion. New trails, tracks and roads should avoid prominent faces where scars would be visible for long distances. Care is needed not to leave inaccessible clumps of trees on skylines.

4.1.4.3 Neighbouring landuse

Water quality is a key sensitivity, requiring adherence to the Forests and Water guidelines within the forest area. Harvesting adjacent to riparian areas must also avoid woody debris being deposited in watercourses. Debris from any whole-tree winching must be dispersed to avoid seepage of toxins from decaying woody material. Private water supplies and fish farms are priorities for protection. Establishment of robust riparian networks will help protect water quality.

Adjacency issues will be taken into account in relation to neighbouring FC forest blocks. Although a number of commercial coniferous private woodlands march with the forest, crop age differences are generally significant. Consultation will take place where adjacency issues arise.

Private estate boundaries with FE land are mostly stock fenced. Where deer fences exist they are not now generally maintained as such. A link deer fence between Ashfield and Brenfield closes off Knapdale from deer pressure to the south. Some discrepancies in the fence position have either excluded FE land or taken in extra bits. This could be altered at fence renewal. However, one or two have been planted up by private forestry companies.

4.1.5 Social Factors

4.1.5.1 Recreation

The path to Dun a' Choin Duibhe is now considered too slippery and steep, so will be replaced by a brashed path approaching the site from the west. No track construction is currently envisaged. Interpretation exists at the car park to the walk, but has been removed from the dun as part of a rationalisation of district recreation and interpretation provision. No new facilities are planned.

4.1.5.2 Community

The local community make use the forest area for walking, cycling and fishing. The by-passing of Torinturk village by the timber haul route resulted from concerns of villagers about increased timber traffic, requiring investment in a bridge plus extra roading. Port Ban caravan park have expressed interest in seeing more recreation opportunities in Coulaghailtro that could add value to their business. There are no plans to add any new recreation facilities due to budgetary constraints and other priorities.

4.1.5.3 Heritage

Scheduled Ancient Monuments in Torinturk are managed in accordance with plans agreed with Historic Scotland. There are no current issues and both sites are linked by a forest walk.

The district's Cultural Heritage Strategy details working methods around archaeological sites, which is sufficient for all sites within the plan. Few unscheduled archaeological sites are currently accessible and none have interpretation. Scope exists to improve the setting of a number of archaeological sites, in line with SNH's Landscape Character Assessment, through improved planting design.

The district's heritage records have been consulted, which include data from searches of the RCAHMS inventories, WOSaS online data and NMRS. Old one-inch Ordnance Survey maps have also been checked for sites.

4.1.6 Statutory requirements and key external policies

Ancient Woodland sites occupy much of the lower third of Torinturk, the SSSI's and various riparian corridors. Current policy is full PAWS restoration.

Two scheduled monuments are located in the plan area. Approved monument plans with Historic Scotland are in place.

Powerline corridors are routinely widened to 20m either side of the lines after harvesting. There are no current issues.

Inverneil Burn SSSI and Artilligan and Abhainn Strathain SSSI's have agreed management plans with SNH.

The public water supply at Kilberry taps a burn which already has a reasonable open buffer. The surrounding area is dominated by coniferous woodland. Access is provided off the public road. Harvesting is due to commence in the catchment in Phase 2.

4.2 Plan Concepts (See Concept Map)

4.2.1 Physical site factors

4.2.1.1 Geology, soils and landform

Limited soils data in some areas requires a more flexible approach to species specification. There is a presumption against planting open hill ground where Blanket Bog and Upland Heathland vegetation types and soils are present. No options for new planting are currently available. Open hilltops will be conserved or expanded where there are benefits to landscape. Areas where stocking densities are low and can not be improved due to poor or skeletal soils will either be considered for retention or removal depending on the potential conservation gains of each option. Fertility in most places should be sufficient for second rotation crops to be economically productive without the need to apply fertiliser. Coupe shapes reflect landform where possible. Rides will be created where it is desirable to split first rotation coupes in the next rotation either to meet UKWAS requirements and/or to improve coupe shapes.

4.2.1.2 Water

Enhancement of riparian corridors will have benefits for water users, and woodland and open habitat networks. Where suitable for broadleaved woodland, this will be favoured, either by planting or preferably by natural regeneration. Creation of partially shaded riparian corridors will benefit fish populations. Key riparian habitat corridors will be given wider buffers (30 - 40m) and joined to form a network. Settings of lochs will be improved, primarily through increased edge open space, but also through the establishment of native woodland where conditions permit and do not conflict with other conservation goals such as increasing open access for divers. The Forests and Water guidelines will be adhered to and should afford sufficient protection for water supplies. Liaison with owners of private water supplies and fish farms will be part of the normal Work Plan process. The failure of the dam for Meall Mhor loch will be discussed with the owner in the near future.

4.2.1.3 Climate

Coupe structure follows windfirm boundaries where possible to alleviate windblow risk. Mounding rather than ploughing will be preferred for cultivation, to minimize runoff and erosion risk. Retention of naturally regenerated broadleaves along coupe buffers will be encouraged to aid formation of windfirm edges. Species diversification has benefits for offsetting the effects of climate change and will be undertaken by introducing a percentage of minor conifer species in mixture with Sitka spruce where conditions permit.

4.2.2 Biodiversity and environmental designations

Agreed management plans with SNH are in place for the SSSI's. Detailed work plans and full consultation will be undertaken with SNH. Rhododendron control will be the main focus for expenditure. Further discussions with the owner of Meall Mhor Estate for rhododendron control are planned in conjunction with this.

Full PAWS restoration is an FD policy. Native woodland networks will benefit from this, particularly through Torinturk. PAWS areas and existing native woodlands form a basis for creating a native woodland habitat network. Native woodland areas comprising Ancient Woodland sites and Native Woodland plan areas will be afforded a 20m buffer to help protect them from invasive conifer seeding into the area. This is likely where Sitka spruce is the planned adjoining crop. Thinning of native woodland will be undertaken where there are no overriding environmental constraints and where there is either a perceived environmental benefit or economic gain.

Feathering of edges and respacing of checked spruce crops along upper margins are options for Black grouse habitat enhancement. Increased predator control is another option. Cost, loss of timber quality and future landscape issues must be taken into account before adopting these polices for any upper margin coupes. Addition of larch to upper margin crops will also have benefit. Further felling of scattered trees, isolated stands of poor growth and ribbons hindering wildlife movement will be targeted for removal.

Opportunities to improve Red squirrel habitat have been identified in the lower areas by planting species favoured by them. Furthermore, increased use of LISS management systems in Torinturk will cause less disturbance to their habitat, and retain woodland connectivity, encouraging safe movement. Conversion of clearfell areas in the future, that are not currently suitable for LISS management at this time, will complete the joining up process. Tree species favourable to Grey squirrels will not be removed or discouraged, unless Grey's become an issue in the forests. Existing beech stands add to the landscape quality and will be managed and retained in most cases, but removed from designated and Ancient Woodland sites over time.

4.2.3 The existing forest

4.2.3.1 Age class, species and yield class

Where YC 12 is not achievable for SS, there is a general presumption against restocking. However, deforestation is generally not favoured under the Climate Change agenda. Consequently, these sites will be replanted, so long as there are no overriding environmental gains from adopting a different policy. There will be a presumption against the use of fertilisers. LP self-thinning mixtures may be used where appropriate. Upper planting margins are also subject to conservation and landscape constraints, which have been worked in to the final landuse proposals.

4.2.3.2 Access

A considerable amount of new roading is required. This will need to be phased. A link with the road network in Knapdale will be established to allow an alternative timber haulage route out of Knapdale. Existing road networks will be maintained where there is a requirement for future access. Access agreements with neighbouring owners of commercial woodland will be looked on favourably.

4.2.3.3 LISS Potential

DAMS and WHC maps, thinning coupe layers, soil and topography data and crop data have been assessed in order to identify additional coupes suitable for conversion to LISS. Steep and difficult working sites are generally excluded. Torinturk will be the main target for adopting LISS, in conjunction with PAWS restoration.

4.2.3.4 Current and potential markets

No major drivers, but national work on hardwood marketing may realize opportunities for small hardwood parcels from Torinturk. Some commercial broadleaved planting may be possible on suitable sites. Opening of the Achnabreck biofuel plant will provide a significant market for small roundwood and low value wood products, which may create increased pressure on the forest areas to deliver these.

4.2.4 Landscape and landuse

4.2.4.1 Landscape character and value

Variation between coupes will help define the coupe shapes in the landscape and diversity incorporated on prominent faces and corridors. Landscape flow is weakly north-east, south-west, which will be reflected in the shapes adopted and where coupe size is secondary to shape. Restructuring will be the single most important contributor to landscape enhancement in even-aged first rotation crops. PAWS restoration in Torinturk will have the greatest positive impact on the most sensitive view from Kennacraig.

4.2.4.2 Visibility

Enhancement of forest edges will have various benefits, either for amenity, landscape or wildlife, or a combination of these. Feathering of edges will be anticipated as best practice, rather than represented at design plan level. Specific viewpoints and focal points in the landscape have been identified for detailed assessment and design at site plan level. Diversifying species choice, coupe size reduction and creation of habitat networks are all options used in the plan.

4.2.4.3 Neighbouring landuse

Black grouse work in conjunction with East Knapdale will be undertaken in the near future in north Inverneil. Rhododendron control will be discussed with Meall Mhor House Estate. Deer control will continue to be discussed where there is damage resulting from deer incursions from neighbouring estates.

4.2.5 Social Factors

4.2.5.1 Recreation

PAWS restoration will improve the setting of the forest walk in Torinturk in the longer term. A new path will be brashed from the existing forest track to the dun in the near future.

4.2.5.2 Community

No major drivers.

4.2.5.3 Heritage

The settings of the two scheduled sites in Torinturk will be improved through PAWS restoration over time. Due to financial constraints, interpretation will be withdrawn from these sites. These sites will be managed in accordance with the agreed management plans with Historic Scotland. The settings of archaeological features in general will be improved through increased open buffers and species diversification around the sites. Access rides will be created to key sites at the next rotation.

4.2.6 Statutory and legal requirements and key external policies

Restoration of PAWS is covered under biodiversity above. Approved SAMs and SSSI plans are in place. No other major drivers.

Table Analysis of Opportunities and Constraints

Factor	Opportunities	Constraints	Concept development
Water quality	Forest restructuring and establishment of a riparian habitat network with increased buffers can help protect water quality.	Fisheries, private water supplies, Kilberry public catchment, fish farms and sea lochs present physical constraints on forest operations.	Creation of riparian habitat corridors and expanding buffers around lochs. Adherence to Forest and Water guidelines.
Ancient Woodland Sites	Forest redesign to protect woodlands and restore sites. Use of natural regeneration and protection of ecosystem through use of LISS. Creation of buffers around AW sites. New biomass plant could provide an outlet for otherwise unmarketable produce on AW sites.	Timescales for restoration are long using LISS systems. Some areas have significant problems with invasive species. Red squirrel habitat to consider, discouraging large-seeded broadleaves. Loss of productive commercial forest area.	District policy is full restoration. Natural regeneration is the preferred method of establishment for Ancient Woodland sites.
Species choice	Forest redesign to increase species diversity for landscape, climate change agenda and conservation.	Choice limited by soils, partial soil map coverage, deer browsing and possible cost of fencing, exposure and markets/economic requirements.	Increase diversity where conditions permit. Focus on high amenity areas and Red squirrel habitat.
Coupe size	Forest redesign to bring more into line with UKWAS guidance.	Larger coupe size fits large-scale landscape. Natural windfirm edges may not be present in first rotation crops.	Focus on smaller coupe size where associated with trails/public roadside/recreation facilities and views. Fit size to scale elsewhere. Build in future windfirm boundaries to reduce coupe size in future rotations.
Thinning	Benefits for AW restoration, amenity and landscape. Increase in timber outturns and quality.	Steep slopes are not ideal for thinning by winch, with access issues in some places. Wetter hollows have stability issues. DAMS scores suggest only the lower part of Torinturk is suitable.	Increased use of continuous cover requires implementation of timely thinning programme, with benefits for landscape, amenity and wildlife.
Key species	Forest redesign can enhance habitats for key species such as Red squirrel and Black grouse	Costs involved may be prohibitive.	Edge management for Black grouse, sympathetic stand management/species choice for Red squirrels and sensitive riparian management to protect fisheries, fish farms and otter habitat are examples of proactive measures to be taken.
Roading	New roading can give greater public access to the forest. May create opportunities for shared access with neighbours.	Negative effects of shared use of roads by haulage vehicles and the public. Increased vehicular movements within the forest may disturb wildlife.	Ensure road and access proposals are fit for purpose and available for use.
Open land	Existing open land is valuable for deer control, raptors and landscape/amenity.	Increasing open space is a cost to commercial forestry. Keppoch grazing subject to a long-term lease.	Maintain and enhance areas of existing open space.
Low YC crops and low stocking	High elevation crops can be enhanced for Black grouse cover. Open UKBAP habitat restoration is another possibility. Could fertilize to improve 1st and 2nd rotation crops.	Deforestation goes against climate change agenda. Costly to fell. Costs restrict use of fertilizers.	Poorer areas will be left as Minimum Intervention areas or subject to edge management practices to benefit Black grouse.

5.0 Management Proposals

5.1 Forest stand management (see map)

5.1.1 Commercial areas

• Clearfelling

New areas are coming into production within the next ten years, where restructuring is the principal requirement, along with roading. Most areas can be worked by wheeled machinery, with few areas requiring winch working. Stacking areas generally have to cope with stockpiling for boats and potentially for future woodfuel markets. No cases of *Phytophthora ramorum or Dothistroma* are currently known in the forests that might require enforced clearfelling at short notice. Although windblow has impacted on forest restructuring in parts of Coulaghailtro, there are no current areas of windblow requiring attention. Delays in clearfelling some coupes in Meall Mhor, due to slower than anticipated growth rates, have been accommodated within the plan because they have proved sufficiently stable to be left standing longer.

Coupe shape is matched to the landform. Coupes will generally encompass individual ridges/hills and pick out areas of uniform growth. Coupe size is relatively large throughout the upper areas to fit the landscape scale and landform, but smaller coupes are used in sensitive locations associated with views from the public roads, recreation routes and viewpoints. Apart from the southern parts of Inverneil and Torinturk, proposed felling coupes are nearly all hidden or distant in the view from public roads and viewpoints. Felling dates generally follow economic felling dates that are then amended to incorporate restructuring. No deforestation is currently envisaged within the plan area, although there will be minor adjustments to upper edges and some consolidation of open space.

Felling Areas Analysis (Conifers)

	PHASE										
	1	2	3	4	5	6	7	8+	ATC	Other	**SUM**
AREA	397.7	526.9	571.2	466.6	265.2	489.7	296.9	477.5	282.8	1290.1	5064.6
%	7.8	10.4	11.3	9.2	5.2	9.7	5.9	9.4	5.6	25.5	100

No more than 25% shall be felled in any 5 - year period (See UKWAS 3.4.2).

Felling and thinning volumes (Conifers)

Average Annual Felling volumes by phase	Clearfelling (Km3)	Thinning (Km3)
2012-2016	30.7	-
2017-2021	37.1	-
2022-2026	34.4	-
2027-2031	31.0	-

Forest Operations Area Statements:-

Productive Forest Area (Phase 1 felling)

FELLING COUPE AREA (HA)		**RESTOCK AREA (HA)**	
Conifer	= 397.7	Conifer	= 332.5
Open space	= 53.8	Open space	= 88.2
		Broadleaves by natural regeneration (net area)	= 25.3
		Broadleaves by planting (net area)	= 5.5
Broadleaves (not to be felled but within coupe area)	= 4.6	Existing Broadleaves	= 4.6
TOTAL	**= 456.1**	**TOTAL**	**= 456.1**

Productive Forest Area (Phase 2 felling)

FELLING COUPE AREA (HA)		**RESTOCK AREA (HA)**	
Conifer	= 526.9	Conifer	= 460.3
Open space	= 73.4	Open space	= 125.6
		Broadleaves by natural regeneration (net area)	= 13.3
		Broadleaves by planting (net area)	= 1.1
Broadleaves (not to be felled but within coupe area)	= 5.3	Existing Broadleaves	= 5.3
TOTAL	**= 605.6**	**TOTAL**	**= 605.6**

Conifers will be planted to achieve a minimum stocking density of 2500/ha. Broadleaves will be established through natural regeneration to achieve a minimum stocking of 1650/ha over a 7 to 10 year period, and 1100/ha where planted. Assessment of regeneration areas in this plan will be made 5 years after felling. Full stocking will be achieved by year 10, planting when necessary. Broadleaved areas

outwith of current felling proposals will also meet minimum stocking densities within 10 years of the original FDP approval date. Discontinuous mounding will be the preferred method of cultivation.

♦ **Thinning**

Thinning is restricted by exposure in most places and by terrain in some places. Current experience favours late thinning as this seems to stand better. Some sites may require subsequent drains maintenance. Thinning options are now largely restricted to second rotation crops in Torinturk.

♦ **Continuous cover stands**

Few areas are suitable for continuous cover due to exposure. Most of these areas are PAWS sites in Torinturk. Here, gradual conversion to native woodland is the preferred method of restoration. This will reduce the impact of change on Ancient Woodland remnant plant and wildlife communities, although there are few, if any, remnants left that would benefit from halo thinning. Natural regeneration will be the preferred method of establishment to maintain genetic continuity. Irregular shelterwoods will predominate, but most will become Natural Reserves once native woodland has become established.

♦ **Long-term Retentions**

These mainly comprise of selected stands which either break up the forest structure or add to the amenity of the forest, but do not lend themselves to continuous cover. Felling is typically delayed between 15 and 20 years. There are also a few remnants from older crops, now imbedded in newer restocking, which will be felled with the surrounding crop. Further stands may be added to assist with restructuring where stability permits.

The stand of Norway spruce in Gleann Beag (Inverneil) was previously heavily browsed by deer. It will benefit Red squirrels in the future and may be kept longer as long as it remains stable.

5.1.2 Non-commercial areas

♦ **Natural Reserves**

These comprise native woodland areas or areas where there is an existing high proportion of native woodland. These are core areas and will be added to as Ancient Woodland restoration and habitat network development progresses.

• **Minimum Intervention Areas**

These are typically areas of checked, poorly stocked Sitka spruce or Lodgepole pine, often at high elevations and lie adjacent to or partially surrounded by much larger open areas. There is benefit in them being respaced for Black grouse cover, hence will not be felled as per the previous plan designs.

Area Summary – Low Impact Systems (Conifers)

TYPE	AREA (HA)	%
Continuous Cover Areas	74.1	1.5
Natural Reserves	173.2	3.4
Minimum Intervention Areas	60.5	1.2
Long Term Retentions	44.0	0.9

5.2 Future habitats and species (see map)

Species rationale

Conifer species choice is orientated towards SS in low sensitivity areas. SS is likely to outperform LP on most sites. Corsican pine can not be planted due to *Dothistroma*. Larch is used for texture, contrast and amenity. Planting of larch will be kept under review whilst there is a threat from *Phytophthora ramorum.* Mixed conifers refer to any minor conifer species including larch, but generally excluding SS, that are suitable for the site, giving some flexibility to foresters to choose on silvicultural grounds. Mixed evergreen conifers are used to contrast with larch mixtures, not having larch or SS. European Silver fir is used on brown gleys, where DF is unsuitable, although plant availability may require use of other firs. Other minor conifer species where specified are used in small amounts for amenity. Fertilizing is not currently prescribed for second rotation crops. Growth rates will be monitored.

Small-scale public roadside views have a bearing on edge treatments. Retaining or developing amenity groups of trees on prominent knolls or where existing species were of aesthetic quality will help develop the edge diversity. Current FD practice of feathering roadside edges and mowing grassy areas at key locations will continue.

More prominent ridges in the landscape are emphasized with a proportion of larch. Species boundaries, roads, tracks and coupe boundaries should ideally not cut across these features, but skirt round them. The inner parts of the forest are generally not visible from the principal external viewpoints chosen, but are visible from internal recreation routes and forest roads. However, internal views can be quite restricted

by topography. Again, edge treatments will be important, with small-scale variations adopted at Work Plan level where appropriate.

The figures below show an increase in broadleaves, reflecting the restoration of Ancient Woodland sites and improvements in native woodland habitat network connectivity. Open space typically increases with the insertion of the final road network and increased coupe buffer widths. Sitka spruce decreases as open space, native woodland and minor conifer species increase. Minor conifer species increase to benefit amenity and climate change agenda considerations. Soils and exposure limit the choice of minor species available.

No new planting is currently proposed within the plan area.

FDP Species Distribution

SPECIES	2001		2011		2099	
	AREA (ha)	%	AREA (ha)	%	AREA (ha)	%
Sitka Spruce	3519.9	69.6	3284.3	64.8	2582.8	51.0
Norway Spruce	30.2	0.5	22.9	0.5	94.2	1.9
Larch	68.7	1.4	83.4	1.6	180.3	3.5
Douglas fir	17.4	0.3	29.1	0.6	5.0	0.1
Lodgepole Pine	32.8	0.6	57.2	1.1	-	-
Mixed/Other Conifers	75.7	1.5	5.4	0.1	131.7	2.6
Western hemlock	-	-	20.2	0.4	-	-
Water	3.7	0.1	3.7	0.1	3.7	0.1
Broadleaves	169.7	3.4	249.2	4.9	652.3	12.9
Open Area	1019.3	20.2	1036.3	20.5	1327.0	26.2
Agricultural	87.6	1.7	87.6	1.7	87.6	1.7
Failed/Felled	34.0	0.7	185.3	3.7	-	-
TOTALS	**5059.0**	**100**	**5064.6**	**100**	**5064.6**	**100**

SS is the only conifer matched to the commercial objectives within the planned conifer areas (See UKWAS 3.3.2). Open and broadleaved areas contribute more than the UKWAS target of 15% of the woodland area being managed with conservation and biodiversity objectives. Table III lists other woodland areas contributing to the area (See UKWAS 6.3.1). Species distribution will move towards the future goal in 3001 in one rotation for clearfell coupes, but much more slowly where continuous cover management is undertaken. However, most changes should be in place within 150 years.

Red squirrel habitat

Species diversification for Red squirrels will enhance the visual quality of the most prominent areas in the future. Increased use of continuous cover forestry will help reduce major site disturbance episodes and loss of forest networks. Increased use of minor conifers in networks will help ensure a broader food supply. Use of large-seeded broadleaves will be restricted. There are no plans to remove the beech at Inverneil or Torinturk. Habitat improvement will be largely confined to the lower, more suitable areas. None of the forest blocks are classed as Red squirrel strongholds.

Moorland habitats

Open hilltop upland heathland and blanket bog habitats will continue to be protected with their associated wildlife values. Open hilltops will be managed for the benefit of raptors and Black grouse, retaining and thinning checked conifers for Black grouse cover and removing others to consolidate the open habitat. Feathered edges will be developed at restocking along moorland edges, following recommended guidance. Larch has been added around the top edges for Black grouse. Management will be subject to funding being available. The Keppoch grazings will be retained as open space for the time being. Most of the upper part is unsuitable for forestry, although the lower areas could make a useful contribution to native woodland habitat in the area.

Habitat networks

The restock plan identifies main habitat networks, both open, native woodland and riparian. Buffer zones along main burnside corridors go beyond the Forest and Water guidelines, typically 40m for major burns. PAWS restoration will strengthen the native woodland linkages, particularly along the West Loch Tarbert coast.

5.3 Restructuring

Apart from issues caused by windblow, restructuring will be largely achievable in one rotation, despite some areas with uniformity of age classes. This is achievable due to differences in yield class being picked out in coupe felling dates. Development of a balanced age structure will take several rotations (see section 5.5). No fallow

management is currently planned within the block. The process of restructuring has a cost implication in terms of forgone revenue through not adopting economic rotation lengths, particularly resulting from increased adoption of LISS management systems.

Restructuring in south Inverneil has been compromised by windblow, change to a roadline and deer browsing. However, the situation is still recoverable through some delays to felling, altered coupe structure and deer fencing of vulnerable crops. Clearance of large areas of windblow in north-west Coulaghailtro has created a significant area of even-aged restocking. Variation in growth rates is likely to aid restructuring proposals in the future. This is also the case in second rotation crops in Torinturk. Restructuring in Meall Mhor has progressed less quickly due to slower growth rates on restock sites. This was not unexpected due to the low soil nutrient status of much of the area.

5.4 Future management

Invasive species

Significant areas of rhododendron have been eradicated in Meall Mhor over the last 25 years. Small amounts of rhododendron exist throughout much of Meall Mhor, plus a few areas of dense infestation bordering Erines and Meall Mhor estates, where the main seed sources exist. Core areas in Inverneil have been eradicated, but scattered bushes remain. FC policy is to eradicate it.

Japanese knotweed occasionally seeds in from private land below the A83 at Artilligan. This is dealt with at the same time as rhododendron control is undertaken.

Western hemlock regeneration in parts of Torinturk has been prolific in areas where mature seed bearing trees had been left. Some will be removed through thinnings, the rest when surrounding crops are felled. Spread is restricted by a containment policy.

There is no evidence of beech regeneration. Sitka spruce regeneration on Cruach Lagain has been cleared. SS regeneration in planned open space, notably some roadsides in Torinturk, will be dealt with either during roads maintenance or when adjacent crops are felled or thinned. Some regeneration exists in areas cleared of conifers for native woodland regeneration, again mainly in Torinturk. These will be removed as part of the Ancient Woodland restoration strategy.

Heritage

Scheduled monuments will be managed in accordance with the agreed SAM plans. All other monuments will be protected as per guidance in the district's Cultural Heritage Strategy document. Some sites are singled out for further enhancement, notably certain townships and farmsteads that are of potential community interest or are easily accessible or visible. Settings of key sites is improved within the plan. Improved access will be subject to funding being available.

Recreation

The existing structure will be maintained, including re-routing of the path to the dun. Interpretation will be withdrawn when the existing panels reach the end of their life. No new facilities are planned.

5.5 Age structure

Age of Trees (Years)	**Successional Stage**	**Percentage of Forest over Year**			
		2000	**2011**	**2021**	**2031**
0 - 10	Establishment	8.5	12.7	24.0	27.8
11 - 20	Scrub & Early Thicket	7	7.6	12.7	24.0
21 - 40	Thicket & Pole Stage	84.5	63.4	8.2	20.9
41 - 60	Mature High Forest	-	13.3	51.5	22.3
61+	Old Forest	-	3.0	3.6	5.0
	TOTALS	**100**	**100**	**100**	**100**

The process of restructuring shall continue through successive rotations to achieve a minimum 2m height growth difference between adjacent coupes, based on a minimum of 7 years between felling dates, as per the UK Forestry Standard.

With 15 – 20% of the productive area being felled every 10 years, the forest is progressively restructured, with a more diverse and evenly spread range of age-classes represented. The percentage of old forest increases slowly as native woodland area increases, this figure reaching around 20% by 2099. Exposure limits the retention of older conifers, but lower yield classes lengthen rotations, with 45 years typically being the age of felling.

5.6 PAWS restoration

All the areas on the NCCS inventory that are classed as 'Ancient Woodland Sites' or 'Long-Established Semi-natural origin' will be restored to native woodland in the future. Some of this will be through LISS management, selectively favouring broadleaved regeneration. Clearfelling with be employed elsewhere, with natural regeneration be the preferred method of broadleaved establishment. Broadleaved linkages between these areas have been strengthened in the restocking framework. Exotic regeneration will be controlled in line with the relevant management plan.

5.7 Deer Management

Deer fencing will be the norm on sites with particularly vulnerable crops, such as European Silver fir. Deer stalking will be the preferred method of deer control, in line with the FD's Deer Management Strategy. Additional ranger tracks will be applied for separately, when needs are identified. The focus for ranger access and activity will be new restock sites. The need for external deer fences will be kept under review.

5.8 Access

Proposed roads - None of the proposed roads have any significant impact on the landscape or environmental sensitivities. All roads will be built from material won from local borrow pits and quarries. No quarry is expected to exceed the 1ha threshold for EIA threshold for non-sensitive areas. None are in sensitive locations. Stone for Inverneil is likely to come from the quarry on the lower road. Top dressing material may come from the Oakfield quarry, which is of similar colour. The lower road at Inverneil may not be built right through if boggy ground proves too difficult and expensive to cross, so a link from the south will replace it.

The lower access spur at Craig Farm is unlikely to be used for timber haulage due to gradient issues and cost to realign the Craig Farm access road, but may be useful for light vehicle and winch access. In the unlikely event that timber haulage becomes a necessity, then further Civil Engineering work will be needed on the main access route and discussions with the owners of Craig Farm undertaken. Stone for Torinturk will come from the existing quarry on the lower road or more likely the new quarry on the haul route. This will serve Coulaghailtro aswell. Stone for Meall Mhor will either come from the small quarry at the road junction before Meall Mhor loch or from Oakfield. Some problems have arisen with the stone from the former, due to its extreme hardness.

Phase 1 roads are:-

Inverneil:

Lower road, if fully built – 1.25Km

Southern link – 0.8Km

Coulaghailtro:

Northern spur (extension to existing approval) – 0.95Km
Kilberry main route and north spur – 1.5Km (will probably be built in two stages)

Torinturk:

Cruach Chao spur – 0.85Km
Cruach Lagain spur (first part) – 1.1Km

Meall Mhor

Ashens spur – 0.7Km

Phase 2 roads are:-

Inverneil:

Western route and link into Knapdale – 3.3Km

Coulaghailtro:

Main southern route (4.8Km) (Will be applied for separately following survey)

Torinturk:

Craig Farm (Lower access) – 0.1Km
Craig Farm (Upper access) – 0.3Km
(Lagan-dair Mor – 0.15Km (NR801675) - Probably not required as existing road already reaches coupe)

Meall Mhor

Erines extension – 1.6Km
Erines House spur – 0.5Km
Meall Mhor loch spur – 0.35Km (NB. The first 0.2Km are already built as an old estate track to the loch and will need widening and upgrading).

The total amount of additional felling not otherwise approved under the plan amounts to 54.7ha. In addition to the above, ongoing upgrading of existing roading is required.

5.9 Critical success factors

In the first 10 years of the plan, the following outcomes are required:-

- Restructuring – requires completion of felling (924.6ha) and restocking (838.0ha) programs (see section 5.1 Forest Operations area statements)
- Roading – construction of 7.15Km required to facilitate the first 5-years harvesting program and 6.3Km in Phase 2.
- Timber production (30Km/annum) - requires completion of felling and thinning programs.
- Expansion of continuous cover management - requires thinning interventions at planned timings.
- Landscape design from key viewpoints - requires coupes to be felled as per the management map to deliver planned landscape enhancements.
- Creation of habitat networks will be an ongoing process, beyond the next 10 years of the plan. Success depends on ongoing commitment to implementing the felling and restocking elements of the design.
- Full PAWS restoration requires conifer removal, not replanting with conifers and control exotic regeneration to achieve satisfactory habitat restoration. Timescales for completion go well beyond the plan approval period.
- Restoration of native woodland within the SSSI's requires removal of exotic regeneration to achieve satisfactory habitat restoration. Timescales for completion are detailed in the relevant management plans.

Appendix I: Forest Design Plan Consultation Record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
SNH	26/1/2012	29/02/2012	Native woodland – more linkages along riparian corridors. Other comments were either supportive or looking for more Black grouse work and rhododendron removal.	Replied saying deep peats prevented further expansion of native woodland commitment along corridors. Other items more dependant on funding – FD has strategies in place for Black grouse and National rhododendron strategy is 100% removal, as stated in the plan.
Argyll & Bute Council	26/1/2012	31/01/2012	Want all four blocks split up into separate plans.	Seeking clarification and compromise. Response was that policy had more to do with housing, so unlikely to be an issue.
Neighbours				
Kilberry Forest – Robin Dixon	Replying to their consultation on their management plan.	By phone, November	Use of haul route for their timber, windblow said to be caused by clearfelling on FC land. Deer numbers and deer fencing to protect FC restocking.	Use of haul route agreed. No requirement for deer fencing as no issues in their forest.
Scottish Woodlands Ltd -	November 2011			
Robin Dixon & Son Ltd	June 2012	June 2012	E-mail correspondence relating to Inverneil/Brenfield – Robin requested a copy of felling map so he can update his plan for brenfield to avoid any adjacency issues	Map sent.
Community Groups				
South Knapdale Community Council	12/4/2012			
Others				

Appendix II: Tolerance Table

Tolerance Table for West Argyll Forest District

Area or Zone	Action required	Adjustment to coupe boundaries (to a limit of 20% of coupe area)	Timing of restocking (years after felling)	Changes to species (in excess of 25% change)	Windblow clearance (ha>40% blown)	Changes to roadlines (m from centre line)
Native woodland areas	Exchange of letters	1.5ha	5 yrs	No threshold	0.5ha native species. 5ha conifer	50m*
	Plan amendment	3.0ha	10yrs**	No threshold	10ha conifer	100m
Landscape sensitive areas***	Exchange of letters	0.5ha	3 yrs	Between evergreen and deciduous conifer species. No threshold for native species.	2ha conifer	50m
	Plan amendment	1.5ha	5 yrs	Between evergreen and deciduous conifer species. No threshold for native species.	5ha conifer	100m
Low sensitivity areas****	Exchange of letters	3.0ha	4 yrs	Between evergreen and deciduous conifer species. No threshold for native species.	5ha conifer	200m
	Plan amendment	5.0ha	7 yrs	Between evergreen and deciduous conifer species. No threshold for native species.	10ha conifer	400m

* Any impact on existing ancient woodland will be agreed with no threshold

** Due to preference for natural regeneration

*** Includes all landscape designation areas, e.g. NSA's, designed landscapes, plus WIAT, community woodlands and FD Strategic Planning Landscape Zone

**** All other areas not included in other zones. Localised environmental sensitivities within the zone will be covered under existing management plans. Consultation on these sites will be undertaken as part of the normal approval process and methods detailed in work plans.

Note: Any increase in open space will be subject to EIA thresholds for deforestation unless part of normal process of forest restructuring

Appendix III: FDP Brief

Progress

South Knapdale comprises four previously separate plans of Inverneil, Coulaghailtro, Torinturk and Meall Mhor. Combining the plans is part of a wider strategy of efficiency savings, linking areas where there are shared values and adopting a more strategic view of forest management. The plans for Coulaghailtro and Torinturk expired earlier in 2011 and have subsequently been extended to 31st March 2012. The plan for Meall Mhor expires on 29th March 2012 and the plan for Inverneil on 31st March 2013.

All Phase 1 felling is complete. Phase 2 felling in Inverneil has been delayed by road construction requirements. No roading existed here in 2002. An aborted roadline was cut into Glen Beag, before a higher line was deemed necessary. This had an impact on coupe access and structure, plus windblow associated with the first line. Felling is almost complete in Coulaghailtro. Phase 2 felling and restocking is complete in Torinturk. Delayed felling due to difficulties with powerline shut-offs at Meall Mhor have delayed the felling of one Phase 2 coupe, whilst another has been delayed due to poorer growth than expected. A timber haul route now links Coulaghailtro and Torinturk. This route by-passes Torinturk village. The managers of the Kilberry Forest private woodland have recently requested use of this route for their own timber haulage. The B8024 through Glen Ralloch has also been improved to allow timber lorries to by-pass Tarbert. Restocking has been damaged by deer browsing. All species are affected. No deer fencing has been undertaken. Existing deer fences are either suspect or known to be ineffective. No thinning has been undertaken. Felling of low stocked areas of Ashens and replanting is ongoing.

Rhododendron control is ongoing in and around the SSSI's in Meall Mhor and Inverneil. Conifers amongst the rhododendron in Meall Mhor have been left for Red squirrel habitat. Black grouse work in Inverneil – respacing along the Ellary march and low density planting along the western side of Cruach Lagain, Coulaghailtro, did not happen. Upland heathland restoration by conifer regeneration removal on Cruach Lagain has been completed. Conifer removal and buffer establishment along the Abhainn Learg an Uinnsinn is ongoing. Additional survey work for bats in the mines was to have taken place.

Native woodland and mixed conifer woodland establishment opposite Crear to enhance the setting of the forest from the property, possibly in advance of a private sculpture trail by Crear, has only been partially implemented. Species choice was severely limited on the site. No further word on the sculpture trail has been forthcoming for some years now. The setting has greatly improved following the felling of the SS backcloth.

Some limited use is made of the haul route for cycling. A Sustrans route now passes through the south-eastern corner of the Inverneil block.

Meall Mhor has been included in the disposal programme for FY13/14, in preference to Coulaghailtro. Reasons include; poor growth, access and lack of community/recreation interests. However, sale of the SSSI's was raised as a concern.

Issues

1. Roading –
   - The previous plan for Inverneil included provision for a link with Knapdale, to provide a southern exit in case there were issues with the canal bridge at Cairnbaan. Do we need to make provision for this still or has the idea been scrapped?
   - The proposed roadline above the mines at Inverneil has been marked out too high and does not follow the approved line, hence does not connect with the felling coupes below it. The roadline needs to be realigned – requested. A couple of other roadlines will need checking by Civil Engineers.
2. Deer damage is a problem. Deer control on some adjoining estates is inadequate, with deer coming in from these areas. Further consideration should be given to deer fencing minor species in key visual areas.
3. Black grouse habitat work – any proposals? Respacing mentioned in Inverneil plan along Ellary march but never happened. Some potential at north end of Meall Mhor. Env. Team to look at Ashens, though not necessarily for BG work. Active leks to the north of Coulaghailtro and Torinturk. No evidence of BG using Cruach Lagain. Creag a' Mhadaidh at the top of Inverneil offers similar opportunities to Brenfield in Knapdale for respacing for improving Black grouse habitat. Conifer clearance work done beside Meall Mhor mines
4. Does the proposed disposal of Meall Mhor have any bearing on the plan design?
5. Western hemlock is abundant in some parts of Torinturk, in association with Ancient Woodland sites and riparian areas. Previous plan talked about producing a control strategy, but this does not appear to have happened?
6. Thinning and continuous cover options are very limited apart from in Torinturk. Here most of the sites are PAWS, but are also winch ground, so may not be suitable?
7. Any proposals for wood ants?

8. Currently, the prescription for all PAWS sites is native woodland establishment by natural regeneration. Are there sites where this is unlikely or where planting productive broadleaves would be preferable? (See perspective for some suggestions).

Objectives

- Commercial timber production at 32Km3/annum.
- Construct 4.63Km of new roads to access Phase 1 coupes and 2.75Km for Phase 2.
- Conifer species diversification for landscape/amenity where appropriate and climate change agenda.
- Implementation of management proposals in SSSI management plans, notably rhododendron control.
- Rhododendron control, in line with national strategy, primarily in Meall Mhor.
- PAWS restoration, primarily in Torinturk.
- Black grouse work prioritised in accordance to FD strategy. Agreed that work in Inverneil important as links in with Knapdale.
- Improve riparian corridor associated with the Abhainn Learg an Uinnsinn to benefit fish populations and to improve status.
- Protect wood ant colonies
- Red squirrels - Mid-term review had as an objective for Meall Mhor with associated planting of Norway spruce.
- Protect archaeological features, notably 2 scheduled monuments (Dun a Choin Dubh and the Giant's Grave cairns) in Torinturk and mine workings in Inverneil (potential SAM).

Appendix IV: Glossary

AGWA	Argyll Green Woodworkers Association
ASNW	Ancient Semi-natural Woodland
ATC	Alternative to clearfell management
BAP	Biodiversity action plan
CFR	Caledonian Forest Reserve
FCS	Forestry Commission Scotland
FD	Forest District
FDP	Forest design plan
FE	Forest Enterprise
HAP	Habitat action plan
HS	Historic Scotland
LAIA	Loch Awe Improvement Association
LISS	Low Impact Silvicultural System
MFST	Millennium Forest for Scotland Trust
NNR	National Nature Reserve
NSA	National Scenic Area
PAWS	Plantation on Ancient Woodland Sites
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SAM	Scheduled Ancient Monument
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SWT	Scottish Wildlife Trust
WAFD	West Argyll Forest District
WoSAS	West of Scotland Archaeology Service
YC	Yield Class

Appendix V: Supplementary Information

Available for inspection at:

West Argyll Forest District
Whitegates
Lochgilphead
Argyll
PA31 8RS Tel: 01546 - 602518

Documentation includes:-

- Roadline surveys
- Production Forecast 2009
- Sub-compartment database
- Conservation plan
- Landscape Character Assessment by SNH
- Aerial photos
- Forestry Guidelines
- Recreation Plan
- Strategic Forest Design Plan
- Forestry Commission approval procedures
- Scheduled Ancient Monument Plans
- Inventory of Ancient, long-established and semi-natural woodland, Argyll & Bute District (NCCS)
- Economic felling ages
- ESC assessments (local)
- Soil surveys (K.Fryer 1965, W.Rayner 1996, J.Gissop 1976)
- Crop surveys (TSU 2004)