

ENVIRONMENT REVIEW

of

SCOTLAND'S NATIONAL FOREST ESTATE

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Environment Review – Scotland’s National Forest Estate

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Environment Review – Scotland’s National Forest Estate

Executive Summary

The Review Group’s Terms of Reference:

To consider FC Scotland’s delivery of the Scottish Forestry Strategy’s environmental agenda on the national forest estate; to examine the effectiveness of past and current action and to make recommendations on what additional or more ambitious steps FC Scotland should be taking.

Review Group membership:

Simon Pepper (Chairman), Tim Hall (Woodland Trust Scotland), Alan Hampson (Scottish Natural Heritage), Mike Wood (RSPB), Rick Worrell (Independent Consultant), Kenny Murray (Forestry Commission Scotland, Secretary).

Section 1 INTRODUCTION

FCS should seek to **raise its game on the environment**, building on a good track record of progress to date. FCS has great potential to use its management of the national forest estate to **inspire, influence and engage** others. It can also put policies into practice in ways that complement the thrust of incentives and regulations administered by the Scottish Executive and its other agencies in the land use arena. In these ways, FCS can contribute to the **raising of standards** and the **integration** of policies, for the benefit of the whole land use sector. This is an immensely important **strategic role**.

The **purpose** of the national forest estate needs to be reviewed and articulated in up-to-date terms for the benefit of future decision-making. This should clarify the distinctive contribution made by the public sector as opposed to other sectors, justifying **public investment**, which should be judged on the basis of the **public benefits** delivered.

Section 2 ACHIEVING MORE AMBITION ON THE GROUND

NATIVE SPECIES & WOODLAND

The **expectation** should be of a national forest estate in 50 years comprising **40-60% native species** (cf. 17% now), and therefore 60-40% exotic conifers (cf. 83% now). More emphasis should be placed on the timber production (and wider economic) potential of native woodland.

Structural diversity of individual woodlands should be increased, and the concept of ‘restructuring’ extended to embrace **landscape** and **catchment scale** diversity. **Forest Habitat Networks**, developed in collaboration with other owners and managers, should become a key planning tool.

HABITAT RESTORATION

Plantations on Ancient Woodland Sites (PAWS) comprise 46% of all Scotland's ancient woodland resource, and FCS Scotland manages 53% of them. Restoration of PAWS should play a central part in expanding the area of native woodland and forming Forest Habitat Networks. Full restoration should be the aim in key areas.

Open Ground Habitats. 35% of Scotland's **raised bogs** and 13% of **blanket bogs**, much of which is on the national forest estate, are forested. FCS should play its part in restoring wetlands, bogs, riparian and other open ground habitats with the aim of creating viable habitat networks.

Development of more **natural ecological transitions** should be encouraged at the edges of forests, as the rule rather than the exception.

Designated sites such as SSSIs and Natura sites should be managed to the highest standard, contributing to Scottish Executive targets.

Forest Landscape Restorations such as Glen Affric have been spectacularly successful and have demonstrated a great array of benefits. FCS should now adopt a more **strategic approach** to such projects, committing to the development of a **suite of large-scale restorations** in representative landscapes in Scotland.

ENVIRONMENTAL SERVICES

Water environment. FCS should take a lead in demonstrating the contribution of appropriate forestry to **river catchment management** and aquatic biodiversity, in collaboration with other owners and agencies.

Climate Change mitigation.

The biggest potential of forestry to the reduction of climate change is through the development of **wood-fuel** markets for energy production and **substituting high emission products** like concrete with **timber**. **Sequestration** will make a relatively minor contribution.

Climate change adaptation through improved **landscape design** is essential to improve ecosystem function in the face of inevitable climate change.

Invasive non-native plants and animals. FCS should develop and implement specific policies on the management of non-native species.

Section 3 PLANNING

Vision and strategy. FCS should lead the preparation of a **50-year vision and strategy** for the estate. More emphasis should be given to **objectives and outcomes**, reflecting the vision and strategy.

Re-configuration of the estate is required to reflect the new vision and strategy. This should be assisted by a gradual process of **disposals** and **acquisitions**, as well as by **improvements on existing properties**.

A **revolving programme**, acquiring land and selling it on after a period of woodland development, should be established for use in circumstances where other sectors are unlikely to respond to the specific challenges arising in that place.

FCS planning should provide a **clearer steer** on environmental priorities, **linking** national with district scales, and **coordinating** actions on the national forest estate with wider land use planning policies and actions.

UKWAS compliance has led to improvements, but FCS should see this as a **minimum** acceptable standard.

Section 4 INCOME vs. DELIVERY

Financing. The net cash funding regime, within which the agency operates, tends to subordinate the delivery of public benefits to the generation of income. This trade-off between **income** and delivery of **public benefits** should be exposed to transparent debate at a **national** level and not hidden in the operational budgets of FCS.

Section 5 CAPACITY TO DELIVER

Information about current status and future trends in the resource is inadequate. More **investment** is required to provide data to inform environmental management.

Staff expertise should be developed with greater emphasis on ecological and social aspects, so that staff can manage the challenges set out in this review.

ENVIRONMENT REVIEW – SCOTLAND’S NATIONAL FOREST ESTATE

Section 1 - Introduction

1.1 Background and Remit

The Review was commissioned in May 2005 by the Chief Executive of Forest Enterprise Scotland, Dr Hugh Insley, as a result of a recommendation, accepted by Ministers, contained in the Review of Land managed by Forestry Commission Scotland (FCS) in 2004, (hereafter referred to as the Land Review). This stated:

That FCS pursues opportunities for more ambitious environmental work. This should include forest landscape restoration, re-creation of wilderness experiences, restoration of natural treelines and open ground habitats, restoration of Plantations on Ancient Woodland Sites to native woodland, in accordance with the principles set out in published FC guidance; native woodland conservation and expansion and the development of forest habitat networks and old growth forests. The Forest District Strategic Planning process should be used to assess options and consult locally on proposed projects. Working with Forest Research, FCS should develop guidance to help with this work.

The Review Group was given the following Terms of Reference:

To consider FC Scotland’s delivery of the Scottish Forestry Strategy's environmental agenda on the national forest estate¹; to examine the effectiveness of past and current action and to make recommendations on what additional or more ambitious steps FC Scotland should be taking.

1.2 Membership of Review Group

The Review Group comprised:

Simon Pepper (Chair)
Rick Worrell (Independent Consultant)
Tim Hall (Woodland Trust Scotland)
Alan Hampson (Scottish Natural Heritage)
Mike Wood (RSPB Scotland),
Kenny Murray (Forestry Commission Scotland - Secretariat)

1.3 Approach to the Remit

We have approached this task not as an audit, checking on every detail, but as a review, making broad assessments and concluding with constructive recommendations

¹ The ‘national forest estate’ is the land managed by Forestry Commission Scotland

aimed at building on what is already acknowledged as a good track record of recent progress.

1.4 'More Ambitious'

We have concentrated particularly on the Land Review's proposal 'that FCS pursues opportunities for **more ambitious** environmental work.' Proposals for greater ambition in terms of scope, scale, and quality of provision, and in the nature of relationships with neighbours and other agencies - are embedded as cross cutting themes in the recommendations which follow.

1.5 Importance of Environment

This review addresses the 'environment' in mainly ecological terms, leaving closely related social aspects of 'environment' - public enjoyment, tourism, scenery, access, recreation and education - for separate consideration. However, we do want to stress the inseparable nature of the relationship between the ecological qualities, which we discuss here, and the social and indeed economic benefits to which they contribute. The Convention on Biological Diversity is founded on this principle at a global level, and the same applies locally. An ecologically stable and thriving environment is more beautiful, rich, diverse, health-giving, resilient and productive – all attributes that manifestly contribute to social and economic benefits we expect from the national forest estate.

But the importance of FCS's performance on ecological quality **on the national forest estate** goes further than this. As the Scottish Executive's Forestry Department, it should demonstrate government policy in practice. As Scotland's largest land manager it gives a lead and sets an example to others. So the standard of environmental management on the scatter of national forest estate holdings throughout Scotland (as part of a wider land use matrix) not only contributes directly to the ecological richness and integrity of the whole landscape; it also exerts a huge influence on the wider community of owners and managers of land.

This is an important strategic role for the national forest estate. Good examples of specific practice such as deer management, restoration projects, public engagement, and contributing to the resolution of local issues of social deprivation are already well recognised. The scope for more such leadership – uniquely deliverable by the public sector - is immense.

It is with these thoughts that we endorse the idea, implied in the Land Review recommendation which underlies our remit, that FCS should seek to raise its game on the environment, building on a good track record of progress to date.

FCS has great potential to inspire, influence and engage others in ways that complement the thrust of incentives and regulations administered by the Scottish Executive and its other agencies in the land use arena. This will contribute greatly to the raising of standards and the integration of policies, for the benefit of the whole land use sector.

1.6 Public benefits and the role of the National Forest Estate

Throughout our inquiries we have returned repeatedly to the central question of the **purpose** of the national forest estate. Clarity on this issue is important as a guide to the potential for greater ambition in all its functions. But the current purpose of the national forest estate doesn't appear to be clearly articulated anywhere, despite a prompt in this direction by the Land Review (2004). Quite rightly, the balance of arguments used to justify and explain the rationale for investment in the national forest estate (as distinct from the private sector) changes with time, in response to changes in the wider policy context (See Appendix 1). These changes have been accelerating in recent years, particularly since the publication of the first Scottish Forestry Strategy in 2000. For example:

- **Shifting the balance** of emphasis between, on one hand, public investment in **timber production**, and on the other hand, a wider range of **social and environmental** functions, demonstrating **sustainable resource management**, responding to **climate change**, and **integration** with other land uses and the policy objectives of other arms of government.
- **Maintaining** background assumptions about the strategic value of **long-term, public-interest-oriented** management of land by the public sector to deliver a wide range of highly valued but non-market social and environmental goods.

We recommend that

- **1. There is a powerful justification for continued public investment in the national forest estate. However, the basis of this justification, ie the purpose of the national forest estate - vis a vis the forestry sector as a whole - needs to be reviewed, refreshed and clearly articulated in up-to-date terms for the benefit of future decision-making. The resulting statement should be used to inform actions in response to other recommendations in this review.**

1.7 Resource Implications

This review has not explored resource issues in detail. Suffice to say at this stage that 'more ambitious' inevitably means 'less income' or 'more costs' in certain situations – but not always. They may be entirely consistent with the best-income management options. In the past they attracted external funding. But the calculation should not be just in terms of cash. Value for money is the key - ie the value of public benefits delivered by 'environmental' activity may be far greater than the value of income foregone.

So, even when they do incur an increased net operational cost, consistent with Strategy objectives and priorities, there is a strong justification for such a change – especially given the very high value ascribed to these benefits by economists, and the unique locus of the national forest estate in delivering them.

We recommend that:

- **2.** An increased budget for environment-related management on the national forest estate is justified in terms of its delivery of clearly identified very high-value non-market public benefits, especially those which are difficult for the private sector to deliver (even with state support).
- **3.** This point should form part of the argumentation to support the funding of Forest Enterprise Scotland, which should be based on an analysis of its real contribution to the public good.
- **4.** Resource accounting techniques – as used elsewhere in the Scottish public sector - should be used to demonstrate the value of this contribution.

Section 2 – Achieving more ambition on the ground

2.1 Goals

The following sections make specific recommendations on the changes that FCS should make on the ground in pursuing more ambitious environmental work. All environmental work on the national forest estate should contribute to the following overall goals of benefit to society now and in the future:

- *ecological diversity*
- *the quality of ecosystem functioning*
- *ecosystem resilience* (i.e. ability to withstand pressures by adapting)

In this, there is a need to consider

- *catchment and landscape scales*

as an increasingly critical focus for planning and action.

These goals will require, at all scales:

- *better habitat continuity*
- *improved quality of environmental processes*
- *continuing emphasis on habitat diversity.*

2.1.1 Prioritisation

Effort should be targeted to the greatest strategic benefit. In most cases the **overall aim should be to improve habitat continuity through the development of forest habitat networks in the overall landscape.**

Within this strategic context, we recommend the priorities should be

A. – 5. To improve the ecological functioning of existing habitat networks by

- Maintaining areas of existing high value habitat (i.e. native woodland, particularly semi-natural woodland or valuable open ground habitats);
- restoring areas of degraded habitat (e.g. PAWS, mires etc) which would contribute to the development of such networks;
- expanding these areas and create links between them, both on and beyond the national forest estate.

B. – 6. To assist the long-term development of habitat networks where these are absent, by

- protecting and enhancing sites of such high ecological quality, or under such threat, as to merit action irrespective of their strategic position;
- establishing areas of new habitat which are large enough to be viable in their own right, where such habitats have been lost;
- protecting any small degraded areas of habitat whose restoration may be assisted by linkages with nearby habitat of higher quality.

2.2 Native Woodland Expansion

Native woodlands deliver the overall highest levels of public benefit of any woodland type. They have particularly high environmental values but can also provide significant social and economic benefits. There is considerable potential to expand the delivery of these benefits in the future.

Progress under current Management

The current FCS resource can be broken down into:

- a. Native woodland² which covers a little less than 5% of the estate, and
- b. Native species plantations, which are mainly Scots pine plus a little oak and ash, covering a further 12% of area.

Both these figures vary greatly across the country, with the bulk in the Highlands and very little in central and southern Scotland (see table1). The total native species element in FCS forest (17% of woodland area) compares poorly with that in the private sector (currently about 30%).

Table 1. The proportions by area of the FCS resource according to species; currently and in the future as recorded by Forest Districts (FDs).

	More diverse regions (i.e. most of Highland, Tay and Trossachs)		Core spruce regions (i.e. South Scotland, most of Argyll)		All Scotland	
	Current	Future	Current	Future	Current	Future
Total native species*	25-50	30-57	5-10	9-26	17	28
Spruce	22-71	22-55	70-86	62-81	60	56
Other conifer	4-29	15-21	7-20	7-29	23	16

* Loosely defined as all Scots pine and broadleaves (and including native woodlands)

Values for FCS's projected future species composition show that the **total** native species element (i.e. native woodland plus native species plantations) nationally is scheduled to rise to 28%; with levels of 30-57% of area within more diverse FDs and

² Figure derived from the Scottish Semi-Natural Woodland Inventory. Native woodland is defined here as woodland with at least 80% native species in the canopy and exhibiting a reasonable level of variation in the canopy structure. This would comprise mainly semi-natural woodland plus a small area of planted new native woodland.

9-26% in less diverse areas in South Scotland and Argyll (see table 1).

Whilst both native and non-native species provide ecological benefits, both the current balance and the FD's predicted future scenario are still strongly in favour of non-native species. This seriously limits the delivery of ecological benefits and fails to reflect either the Scottish Forestry Strategy or wider public sentiment about the value of native woodland. It is also noteworthy that the significant changes in species composition towards native species, which have occurred in the last decade, have largely been restricted to the private sector.

FC Scotland's publication 'Realising the Vision – Native Woodland on the Forestry Commission Estate in Scotland' (2003) reported progress on a 10 year old commitment to maintain 10,000ha of existing native woodland and develop a further 20,000ha of Caledonian Forest Reserves. This was ambitious for its time, but to be 'more ambitious', it now requires overhauling.

Adoption of Alternatives to Clearfell (ATC) management in Scots pine plantations is moving the plantation resource towards semi-natural structures and this has good potential to create essentially new native pine woodland.

“More Ambitious” – Species Composition

Bearing in mind the purpose of the national forest estate (see S. 1.6 above), as against private forestry, we argue here that there is a strong case for a substantial increase in the proportion of native species on the public forest estate, so as to achieve a more suitable balance of native and non-native trees. For Scotland as a whole, a species mix needs to be created which delivers a satisfactory balance between of ecological benefits and those benefits (including environmental ones³) associated with domestic timber production. The current differences in species composition between the public and private sectors suggest that a period is needed where the public forest estate delivers the main expansion in native species, rather than the private sector.

Looking at this issue from first principles, and the arguments deployed above - it seems realistic to anticipate a public expectation of a national forest estate in, say, 50 years' time comprising 40 – 60% native species (cf. 17% now and 28% in the future). This suggests that the average FD in fifty years time would have a species complement similar to the “best” at present. Some of the changes would be delivered by transfers of non-native plantations to the private sector and acquisition of existing native woodland (including PAWS) in need of management input, plus establishment of new native woodlands (see section 3.3).

Native woodland expansion on the public forests would deliver the core woodland of a Forest Habitat Network (FHN), improved biodiversity and improved adaptation to climatic change. In the future we see native species plantations being more mixed age and diverse in structure; thus having some semi-natural characteristics whilst retaining a timber production role (as in some oakwoods and Caledonian pine forests at present).

³ The environmental benefits of domestic timber production occur when imported timber is from non-sustainable sources or has higher energy costs associated with its transport than domestic timber.

Whilst softwood timber production would be reduced on the national forest estate, there would be greater emphasis on timber production from quality Scots pine and hardwoods. There would be a number of wider socio-economic advantages associated with this more diverse resource, generating economic activity in the rural economy principally via tourism and recreation. We believe that Scotland can fulfil its obligations to the economic aspects of sustainable development with this changed FCS resource.

Whilst this presents a very different picture from today's situation, such a vision is based more on meeting future needs than a continuation of past assumptions, and is entirely consistent with trends in public policy, especially taking account of the distinctive role of the national forest estate within the forestry sector as a whole. Indeed current trends in attitudes and awareness suggest that long term public support for state forestry will require a radical vision of this kind, which still allows Scotland to fulfil its commitments to the economic aspects of sustainable development within the wider forestry sector.

We recommend that:

- **7.** FCS should establish a broad vision of the future species mix and management regimes of its forests at both national and FD level.
- **8.** This vision should assume a public expectation of a national forest estate in 50 years time comprising perhaps 40-60% native species (a substantial part of which would be available for low impact timber production). Accordingly, the remainder (60- 40%) would be non-native species.
- **9.** The following measures should be considered in moving towards this target:
 - restoration of PAWS,
 - ATC management of native species plantations,
 - conversion of some non-native conifer plantations (in line with broad proportions outlined above),
 - new native regeneration on currently non-forested land, and
 - a gradual acquisition and disposal programme (see S3.3 below) which would have a considerable impact on these proportions over time.
- **10.** In order to guide development of the expanded native woodland area, FCS should identify exemplar forests areas in the Highlands to guide action in other regions, especially in Argyll, central and southern Scotland (see also Forest Landscape Restoration S2.5).
- **11.** These changes in species composition should be linked into the HAP process.
- **12.** FCS should become one of the main players in developing and demonstrating production of quality hardwood on re-stock sites, new planting on agricultural land and, where appropriate, in semi-natural woodland.

It is recognised that the appropriate targets will vary greatly between regions depending on the state of the existing resource and opportunities that may arise.

2.3 Structural Diversity

Structure: *“the arrangement of, and relations between, the parts of something complex”*

Despite recent progress, there is currently a lack of structural diversity in FCS forests which limits the delivery of environmental benefits. This has been addressed by “restructuring” and ATC, both of which focus mainly on forest-block and stand scale working. Some Forest Districts have initiated the use of Forest Habitat Network (FHN) principles to improve structures at regional and landscape scales. A “more ambitious” approach would involve 3 strands:

1. Paying greater attention to structure at landscape and catchment scales.
2. Expanding the current concept of “restructuring” (which has driven planning and practice to date) to capture wider aspects of managing forest structure.
3. Extending the scope of ATC and other management regimes.

2.3.1 Structure at Landscape or Catchment Scale

Considering forest habitat quality only at forest and stand scale leads to important opportunities being missed. This is because habitat quality for most woodland species depends on the distribution of forest habitat patches in the wider landscape and the connections between them.

To date, landscape scale issues have been dominated by visual landscape quality, with environmental quality only starting to make a significant appearance very recently via Forest Habitat Networks.

The key structural attributes of FCS forests at landscape scale are:

- a. Their distribution reflects socio-economic factors rather than ecological ones.
- b. They tend to be large and span a range of site types, so they are potentially very important.
- c. Connections between them and nearby forests are highly variable in extent and quality, and cooperative action is required to improve them.
- d. They have relatively little native woodland, but an increasingly significant component of valuable older coniferous woodland in the form of plantations being converted to ATC.
- e. They are starting to provide a valuable, if rather narrow, network of riparian habitat via restructuring along watercourses.
- f. Where forests adjoin neighbouring non-wooded land, there are often hard boundaries. This could be improved to provide biodiversity benefits for species such as black grouse.

We recommend that:

- **13.** One of the fundamental top-level functions of FCS forests in the future should be to help form the “core” of forest habitat networks by providing a large component of high quality, well connected habitat. This should be formed primarily of native woodland and both conifers and broadleaves managed to provide continuity of habitat, using approaches such as ATC.
- **14.** More use should be made of planning at catchment and landscape scales to enhance the capture of environmental benefits. This should include improving:
 - a) evaluation of ecological contributions of FCS forests at catchment scale to assist the strategic delivery of environmental benefits;
 - b) connectivity between FCS forests and neighbouring forests and unwooded ground to provide biodiversity benefits; and
 - c) co-operative working with adjacent land owners.
- **15.** FCS should set a good practice example to the whole forestry sector in its use of models such as the Biological and Environmental Evaluation Tools for Landscape Ecology (BEETLE⁴) to translate the principle of FHN into practice. Primary aims should be:
 - to identify those woodland areas that are strategically important parts of forest habitat networks. Such areas should be identified in design plans and restructured accordingly within the next 10 years;
 - to ensure the spatial distribution of different habitats *within* forests (e.g. old trees/stands, mire) are attributed greater importance in planning.
- **16.** The redesign of riparian areas should be expanded in scale to provide more substantial areas of high quality habitat linking with surrounding land. This needs to be done in addition to basic riparian work of improving stream sides (widening, appropriate species planting and post-felling work) in accordance with FC Forest & Water Guidelines (see also S 2.7.1.).

2.3.2 A new concept of Restructuring

“Restructuring” (at the stand level) has been the core approach to forest management in FCS during the last two decades. This has delivered improved environmental standards, but in too many cases the effect has simply been to enhance conifer-dominated forests, and opportunities for more fundamental changes have been

⁴ BEETLE: Biological and Environmental Evaluation Tools for Landscape Ecology developed by Forest Research for evaluating forest habitat networks (see Watt et al. 2005 Evaluating biodiversity in fragmented landscapes: principles. FC Information Note September 2005)

missed. At the same time a few large-scale projects have been developed by FCS which go beyond traditional “restructuring”.

We recommend that:

- **17.** The concept of ‘restructuring’ should be expanded to capture opportunities for developing:
 - a large-scale core of strategically located native and ATC woodland;
 - change at both large scale (e.g. landscape, catchment) as well as more conventional scales and
 - the inclusion of open ground habitats and their management as a legitimate part of forest landscapes, rather than as separate entities.

2.3.3 Stand Structure/Management Approach

The current structure of FC forests generally reflects felling/restocking decisions driven by landscape and rotation length, rather than by ecological concerns. Designing forest structure to increase environmental benefits is usually limited to a) restoration of riparian areas under Forests & Water Guidelines, b) opening vistas and widening rides for landscape work to the Forest Landscape Design Guidelines c) diversifying age classes of conifers or d) instituting ATC management.

Environmental benefits would be increased with greater diversity of management approaches. Currently about 85% of the conifer resource is managed by clearfelling, with the remaining area under ATC management, long term retentions (LTR) and natural reserves (NR). ATC management is being developed for conifers, but not for broadleaves. The majority of the woodland area is planted post 1960 and older stands are poorly represented. There are very few areas where a shrub layer exists in FCS woodlands.

We recommend that:

- **18.** There should be an explicit aim to achieve greater diversity of woodland structures and management regimes. This should comprise:
 - continued increase of ATC, LTRs and NRs;
 - development of Continuous Cover Forestry (CCF) *broadleaves* and *broadleaf/conifer* mixtures;
 - more diversity of structures (e.g. wood pasture).
- **19.** The fact that an area is suitable for CCF conifers should not automatically exempt it from conversion to native woodland or CCF broadleaves.
- **20.** Improving the mix of woodland types on lower ground needs special attention because competition amongst objectives is often strongest here.

- **21.** FCS should deliver more varied structures for example by having more retentions, especially of Scots pine and larch; and encouraging shrub layers (i.e. hazel, holly, hawthorn and bird cherry on appropriate sites).

2.4 Habitat Restoration

FCS has already set in motion habitat restoration on a wide range of scales, focusing on PAWS and open ground habitats within forests.

2.4.1 Plantations on Ancient Woodland Sites (PAWS)

46% of Scotland's ancient woodland (AW) resource consists of 'Plantations on Ancient Woodland Sites (PAWS)'⁵. PAWS in Scotland – of which FCS manages 53% - offer a vital basis for increasing the biodiversity value and extent of Scotland's ancient woodland with semi-natural characteristics.

FCS has been involved with PAWS restoration since the early 1990s and has made considerable progress. Its PAWS policy has been developing from relatively informal arrangements implemented at FD level to more formal policies in recent years, aimed at delivering UKWAS requirements. Fulfilling UKWAS requirements appear to be the current endpoint of FCS PAWS policy on the national forest estate, and opportunities to exceed UKWAS should be sought.

The current FC methodology to determine restoration potential needs to be expanded to consider level of threat and therefore urgency of action. The approach to PAWS restoration should initially focus on reducing threats to the AW communities and features followed by conversion to a predominantly semi-natural canopy⁶. The first stage should be carried out for all PAWS sites, with the second subject to prioritisation. The approach to restoration at individual site level should ideally be gradual, because sudden dramatic action, such as clearfell and re-stock, may be damaging to surviving AW communities.

Ancient Woodland (including PAWS areas) occurs on sites not recorded on the Ancient Woodland Inventory (AWI). Equally, other sites are incorrectly identified on the AWI as AW. These occurrences highlight the fact that the AWI should only be used as starting point for helping to identify PAWS sites and not as a definitive list. Action should be based on evidence of current condition and potential. Thus some sites not recorded on the AWI should also be considered, especially where they are important in creating a Forest Habitat Network. Appendix 4 contains future scenarios for PAWS restoration.

We recommend that:

- **22.** Full restoration of all PAWS sites should be aimed for at 'forest' scale in some areas e.g. in key locations where high concentrations of Ancient Semi

⁵ Scotland's total ancient woodland = 119,295 ha; of which 54,725 ha is PAWS.

⁶ Once canopy composition has reached 80% native species the site is said to have been 'fully restored', so restoration does not necessarily entail removal of all non-native trees.

Natural Woodlands (ASNW), native woodlands, other semi-natural habitats exist; e.g. in National Parks and forest landscape restoration areas.

- **23.** Where existing AW (PAWS and ASNW) is fragmented, priority should be given to buffering and expanding these areas.
- **24.** All PAWS should be surveyed within the next 5 years according to best current practice. This should involve re-surveying those PAWS surveyed before current practice was developed. Guidance should be modified in order to fully address the question of urgency of restoration
- **25.** FCS guidance on PAWS should make clear the criteria for not fully restoring a PAWS site in terms of type and scale of losses of other public benefits. High value woodland types such as CCF conifers may, on some sites, tip the balance of priorities away from PAWS restoration, but this should only be allowable in special circumstances, should not become a general policy and should not detract from the need to secure and enhance AW communities.
- **26.** Greater emphasis should be placed on gradual conversion rather than clearfell and restock
- **27.** FCS prepares an estimate of AW and PAWS on its holdings that are not listed on the AW inventory. This should then be incorporated into PAWS plans at Forest District and forest level.

2.4.2 Restoring Open Ground Habitats

Approximately 35% of Scotland's raised bog and 13% of blanket bogs⁷, much of which is on the national forest estate, is forested. Restoration action is needed because of continual habitat degradation as the initial forest plantations develop. This is exacerbated in successive felling/replanting cycles and many of these overplanted habitats are now facing the threat of irreversible damage in forthcoming second rotations.

FCS has restored some open ground habitats as part forest mosaics, but has still important areas of priority habitat under trees. There is a need for a more strategic and ambitious approach to restoring these priority habitats, consistent with the Scottish Biodiversity Strategy.

Criteria for prioritising open-ground sites & habitats for restoration need to be developed and should include:

⁷ Including plantation, closed canopy woodland, private and state sector.

- a. Listed as a UK Biodiversity Action Plan priority open-ground habitat with restoration targets;
- b. Direct benefit to Scottish Biodiversity List species and habitats, UK BAP priority species, or be a key UK Biodiversity Action Plan (UK BAP) or Priority/Annex 1 habitats under the EU Habitats Directive;
- c. Will enhance the biological condition of designated sites, and adjacent areas⁸ – SSSI, NNR, SAC, SPA, Ramsar;
- d. Restoration potential – presence of key remnant features, and technical ability to improve condition;
- e. Scale of restoration must be adequate and produce viable habitat linkages to existing areas/networks of target habitats;

We recommend that:

- **28. FCS should develop a national action plan for open-ground habitat restoration to meet UK BAP, Scottish Biodiversity Strategy, EU Habitats & Birds Directives, and Ramsar commitments. This should include:**
 - identifying key sites in accordance with the criteria above.
 - ‘opportunity mapping’ across the whole of the state forest to determine the extent of important open ground habitats
 - ensuring that active deep peats or other priority open-ground habitats are not restocked.
 - clarification of the FC peatland policy, to ensure that open-ground restoration opportunities meet new strategic targets through Forest District Strategic Plans and Forest Design Plans. (FCS needs to ensure that there is a uniform public and private sector approach to areas of restored forest. Currently FCS will approve felling of a forest but outside the national forest estate this will only be funded through the Scottish Forestry Grants Scheme to 20% of the forest area. The national forest estate could be an exemplar in this respect.
 - outcome targets for priority open-ground habitats, species and designated sites should be incorporated into FCS biodiversity programme.

2.4.3 Transitions, including Treelines

More natural ecological transitions – ‘ecotones’ - from upper, lower and lateral forest edges into non-plantation and non-woodland habitats should be developed. Particularly on the upper margins, the expansion of ‘treeline’ ecotones should include feathering of forest edge and the expansion of zonal habitats beyond the treeline, such as high altitude montane scrub.

We welcome the fact that FCS is already involved in the development of number of projects (for example in partnership with the Montane Scrub Action Group). However there is the potential to do a great deal more. There is no specific requirement under

⁸ This includes for ‘woodland’ & ‘non-woodland’ designated sites, species & habitats; such as improving botanical SACs & SSSIs that are surrounded by forestry, e.g. by pulling back forest edges to expand species rich grassland.

UKWAS to address transitional habitats and there is thus the potential for FCS to go, and be seen to go, beyond UKWAS, setting the standard in this element of sustainable forestry.

We recommend that:

- **29.** Wherever closed canopy forest on the national forest estate borders semi-natural open ground habitats (both within and outwith the estate) consideration needs to be given to the development of transitional and/or edge habitats. This should become standard practice in all FDPs.

2.4.4 Other Habitat Restoration

We recommend that:

- **30. forest wetlands:** restoration should include drained, afforested wet flushes and topographic hollows within large conifer plantations; to create a strategic network of forest wetlands.
- **31. afforested floodplains:** restoration should include wetland habitats as part of floodplain wetland network – developing opportunities through Water Framework Directive catchment management plans. The removal/conversion of plantations should aim to meet UK BAP Wet Woodland priority habitat targets.

2.4.5 Designated Sites

We understand that all *Natura* sites and SSSIs are managed to plans agreed with SNH, and that in many areas work has been undertaken to restore both open and wooded habitats as part of ongoing management. These sites, which as a representative sample of Scotland's biodiversity, form the basis of the system that safeguards Scotland's rich natural heritage. Their importance is highlighted by the Scottish Executive's high level targets for bringing them into favourable condition and the specific duty which the Nature Conservation (Scotland) Act places on public bodies, such as FCS, to conserve and enhance SSSIs.

As part of a 'more ambitious approach to the environment', we recommend that:

- **32.** FCS should bring all designated sites into favourable condition in line with Scottish Executive targets and set exemplary standards in the management of SSSIs and *Natura* sites to conserve and enhance their natural features.

While there are situations where the trees planted on these sites help to maintain their interest, and in some cases have led to their development, in many others they are a legacy of past policy delivering no benefit or even detriment. FCS should aim to restore both wooded and non-wooded habitats as the basis for enhancing not just the sites themselves but also their surroundings. Where possible, these measures should form

part of wider initiatives to create better continuity of semi-natural habitat across the FCS holding and out onto non-FCS land.

2.5 Forest Landscape Restoration

FCS has made spectacular progress in large-scale restoration in sites such as Glen Affric, Glengarry and Sunart. By applying an intelligent and versatile approach, FCS has developed the social and economic as well as the environmental potential of such projects, greatly expanding their contribution to the public good. This has successfully demonstrated the extra value for money which operations on such a scale can achieve in one area. This includes the promotional benefits of media attention, which reflect positively on forestry generally, and on Forestry Commission Scotland, as well as boosting the projects themselves.

The more ambitious examples of such activity qualify well as Forest Landscape Restoration (FLR) in the internationally accepted definition of the term (see Appendix 2). To date, however, this experience has been largely opportunistic, taking advantage of new policy directions and new funding sources to deliver a fresh package of public benefits on existing parts of the estate. Forest Landscape Restoration has yet to take its place as a clearly identified, formal component of FCS's strategy.

We recommend that:

- **33.** FCS should now adopt a more strategic approach to Forest Landscape Restoration projects, committing to the development of a suite of such projects in a representative series of landscapes in Scotland, fully in line with the principles of the Global Partnership on FLR, to which FC (GB) is a major contributor.
- **34.** FLR projects should be used especially to demonstrate the extra level of environmental, social and economic benefits which can be achieved by forestry in a land use mix at that scale, and the potential of integrated approaches with other agencies and neighbours in enhancing this pattern of benefits.
- **35.** Special consideration should be given to FLR projects in the heavily forested landscapes of Argyll and SW Scotland, where more diversity would improve value to the public interest, and to those parts of Scotland with especially low woodland cover, where forestry could add a valuable element to the ecological and productive diversity of the landscape.

2.6 Environmental Services

The resources of the national forest estate play an important role in the provision of environmental services, through the quality of management in key areas. This section of the review considers three aspects - water environment, climate change, and protection forestry.

2.6.1 Water Environment

As manager of nearly 10% of Scotland's land area, FCS has a major role to play in the management of catchments and aquatic habitats in delivering wider water management benefits. These would include enhancing aquatic biodiversity, flood management (more tree cover targeted in floodplains and headwaters), mitigating diffuse pollution (tree cover targeted at intercepting diffuse pollutants) and wilder, self-sustaining fisheries and other water recreational experiences.

We recommend that:

- **36.** Through the managements of its holding and by developing its role in catchment management initiatives, FCS should demonstrate and promote the potential of increased tree cover, of an appropriate nature, in catchments and near the water's edge.
- **37.** As part of its wider contribution to delivering the Scottish Biodiversity Strategy and UK Biodiversity Action Plan, FCS should make specific commitments to helping implement BAPs and SAPs related to aquatic habitats covering fish, amphibians, invertebrates (including freshwater mussels), birds (eg dippers) and aquatic plants

2.6.2 Climate Change

Climate change has been described as the greatest environmental and economic challenge of the 21st century. There are two potential strategic approaches that need to be followed in order to attempt to meet this challenge:

2.6.2.1 Mitigation

We note that FCS's commitments on carbon sequestration are a matter of active negotiation with the Executive. Whilst all accept that sequestration is a positive contribution, we advise against over-emphasis on this approach for several reasons:

1. Formula and methods currently used to calculate rates of carbon sequestration are subject to unresolved scientific debate. Tree planting can only sequester a very small proportion of current CO₂ emissions and there is certainly a risk that sequestration could be discredited in the future as a significant part of any credible strategy.

2. Achieving so called “carbon neutral” status by industry and even individual actions through tree planting is very much in vogue at present. Even the most carefully worded messages regarding carbon off-set are easily misinterpreted by the public and policy makers to infer that they can continue with ‘business as usual’
3. Any woodland expansion for sequestration purposes should seek to optimise other environmental, social and economic benefits. Otherwise it may have a net negative impact on the public interest.

We recommend that:

- **38.** FCS should ensure it gives a consistent message that sequestration is only one of a wide range of benefits that trees and forests can deliver and that it should not be a primary driver for future management and expansion.

Whilst contributing to these mitigation strategies, FCS should apply the same principles to its internal operations, minimising its own emissions.

We recommend that:

- **39.** FCS should carry out a ‘green audit’ of all its operations and internal processes and develop a strategy to minimise emissions from its own activities as far as is practicable. This should include any operations associated with soil disturbance, timber transport and operational activities such as staff transport policies.
- **40.** FCS to ensure that all new buildings on its own estate use high proportion of sustainably produced timber in construction, wood fuel systems and other low emission technologies.

2.6.2.1.1 Woodfuel

There is a widespread awareness of Scotland’s potential to generate a great deal of energy from wind. But a range of biomass technologies (including wood fuel heating) can be at least as significant in energy generation terms and has significantly less impact on the visual landscape. The biggest potential for forestry to contribute to a reduction in CO2 emissions is through the development of wood-fuel markets for energy production and substituting high emission products like concrete with timber.

We recommend that:

- **41.** FCS should continue to build confidence in the wood fuel supply chain (including use of forest residues) – thus stimulating potential biomass heat customers to make capital investment in wood fuel heating systems.

2.6.2.2 Adaptation

We have to recognise that, in the face of climate change that is already underway, adaptation strategies will be essential to benefit ecosystem function and human society.

Chance dispersal may be the only means by which many less mobile species will be able to survive a changing climate. It is therefore important that, as far as possible, Scotland has an ecologically functional landscape. As the organisation with responsibility for the management of 10% of Scotland's land area, FCS has a big potential role in the delivery of this.

We recommend that:

- **42.** FCS should commit to the restoration of a significant proportion of semi-natural habitats (including native woodland, open ground and transitional habitats - see S 2.4) to better enable species movement and gene flow through chance dispersal events. This should be particularly targeted where there are greatest concentrations of semi-natural habitats, increasing core areas and buffering semi-natural habitats from intensive land-use.
- **43.** FCS should ensure that there is a much greater mix of species than at present for new planting and re-stocking of commercial stands, so as to ensure they are more robust in the face of climate change (see S 2.2).
- **44.** FCS should request that Forest Research carries out/supports research to better understand climate change impacts relating to woods and forests and to develop thinking on adaptation strategies and action. These strategies should encompass how FCS can contribute to adaptation at a Scotland wide level and not just within the national forest estate.

2.6.2.2.1 Protection Forestry

Forests also have big potential to contribute to flood management, slope stabilisation and other forms of protection forestry. Such protection forestry (such as sensitive afforestation of floodplains) could bring significant environmental benefits as well as to human society.

We recommend that:

- **45.** FCS should give greater attention to protection forestry and wider use of low impact silvicultural systems.

2.7 Specific forest practice Issues

2.7.1 Thinning in relation to Watercourses

Thinning operations frequently stop short of treating trees immediately adjacent to watercourses. This can lead to a loss of conservation value as conifer trees, especially

spruces and firs, extend their canopy over riparian areas. This is particularly a problem of smaller watercourses.

We recommend that:

- **46.** Greater effort be made during thinning to thin up to the edges of watercourses, and where necessary, to take forest cover back from watercourses during early thinnings.

2.7.2 Missing species in native woodland and PAWS Sites

Later successional species are sometimes entirely missing from upland native woods and PAWS sites in some catchments due to past land use pressures, limiting their potential to develop naturally. Where seed sources of species such as oak, hazel and ash are absent over large areas, and there is little realistic chance of colonisation even over large times scales, seed sources of these trees could be established by planting, using appropriate seed sources (i.e. from the same general region).

We recommend that:

- **47** Guidelines are drawn up on the establishment of seed sources of later successional species, describing the circumstances where this practice would benefit conservation of native woodlands, specifying appropriate origin.

2.7.3 Invasive Exotic Plants and Animals

Non-native plants and animals can pose significant threats to indigenous biodiversity. Key threats include:

- damage to woodland ecosystems and hardwood timber crops by grey squirrel, including displacement of red squirrel;
- colonisation of native woods by rhododendron;
- spread of invasive ground vegetation through riparian woodland (Japanese knotweed, Himalayan balsam, sweet cicely, ground elder etc);
- potential for regeneration of non-native conifers into native woodland and non-wooded habitats .

We recommend that:

- **48.** FCS develops and implements policies on the management of non-native plants with the aim of preventing their spread to areas where they would be undesirable and to contain and, where feasible, remove them from areas where they are already detrimental to conservation objectives.
- **49.** FCS should carry out concerted and consistent control of grey squirrel in areas where there is existing or potential damage to woodland ecosystems.

2.7.4 Grazing Management

Grazing is an important ecological factor in landscape management, requiring careful adjustment according to objectives. FCS has made excellent progress in deer control for the protection of woodlands. However, elsewhere in this review (S 2.4.2) we recommend more attention to open ground habitats, which may require higher levels of grazing in certain areas than would be ideal for woodlands. There is scope here for a more subtle approach to deer management, with a clear rationale and objectives in each area. Deer management activity should take account of the dynamic nature of habitat development, particularly with regard to the juxtaposition of open ground and woodland development, and of changes in this dynamic through time.

We recommend that:

- **50.** Decisions on deer management should be made on the basis of impacts, relating to habitat management objectives, rather than on deer numbers alone.
- **51.** Deer management plans should be prepared and regularly reviewed on this basis, area by area.

Section 3 - Planning

3.1 Vision and Strategy

The Land Review (2004) recommended a new vision for the national forest estate:

“Scotland’s National Forests will benefit everyone in Scotland, promoting vibrant and healthy communities, enriching natural environments and our cultural heritage; and creating wide-ranging opportunities for economic development.”

In effect, this is a very brief vision of what the estate will **do**, but not what it will **be**. Some enlargement on both themes have been suggested by others, including FC GB and WWF-UK in “Forest Renaissance” (2003) which presented a 50 year vision highlighting diversity, large native forests, greater engagement, more products, more continuous cover, more emphasis on hardwoods, some truly wild forest areas, networks, old growth, a renewed role for wood in energy, more forests near urban areas.

Also, Scottish Natural Heritage (Natural Heritage Futures, 2002) offered a 25-year vision based on public support, funding, education, diverse benefits, integration with other sectors, access, expanded cover, more native component, contiguous networks, broader age structure, ecologically robust, large forest areas with balanced woodland and open ground, well managed deer, diversity of forest products, landscape and tourism.

The preparation of a long term vision for what the national forest estate will **do and be**, drawing from a new articulation of the purpose of the estate (see S1.6 above), and from the new Scottish Forestry Strategy, would help greatly to focus the efforts and imaginations of Scottish Executive and FC Scotland policy makers, FCS front-line staff and the public on the direction ahead. It would also help to inform a wider approach to the size and distribution of the estate (see section on re-configuration below) as well as the management of its resources.

Further, the consultants’ report to the Land Review (2004) recommended the preparation of a new **strategy** for the national forest estate to ‘define its role in taking forward the Scottish Forestry Strategy. With the context of existing commitments to sustainable forest management, this should focus on delivery of environmental and social outputs, including the development of recreation, biodiversity and forestry in peri-urban areas.’ This need is emphasised by current interest in Woods in and Around Towns (WIAT) and climate change, as well as by this review of environmental potential.

We recommend that:

- **52.** FCS should lead the preparation of a 50-year **vision and strategy** for the estate. This should emphasise the content, as well as the function of the public forest in contributing to the Scottish Forestry Strategy by delivering certain public benefits more effectively and reliably in the long term than can be achieved by other sectors. This will require inter alia a

clear articulation of the distinctive role of state forests vs. the private sector.

- **53.** Between them, these documents should outline where we are starting from (i.e. the current make-up of the estate), where we want to go, how we propose to get there, and what the scheduled milestones will be.
- **54.** This national vision/strategy should act as a steer for the planning process at national and Forest District scale and ultimately for informing forest design plans.

3.2 Outcomes

Current approaches to environmental management are based largely on process issues (UKWAS compliance, etc) rather than the achievement of agreed outcomes in terms of results on the ground.

We recommend that:

- **55.** There should be clearer setting of outcome targets at a national level, reflecting the vision statement and strategy. Suggestions for more ambitious targets on a number of practical issues are given in section 2 of this Review and future scenarios are explored in Appendix 3..
- **56.** The objectives and priorities should cover all the key aspects of environmental provision covered in this review, as well as other social and economic factors.

3.3 Re-configuration of the Estate

The national forest estate, which has been built up over 86 years, inevitably reflects the history of acquisition, planting and management policies over the history of this period more than the aspirations of the current Scottish Forestry Strategy. This leaves a gap between expectation and reality. Although good work is going on to close the gap, it is widening more quickly as policy develops. What is more, perceptions of this mismatch tend to be growing as the awareness of stakeholders increases with their greater levels of engagement in forestry issues.

In considering our 'more ambitious' remit, we observe that some targeted re-modelling of the estate through gradual, opportunistic disposal and acquisition could achieve major improvements in the value of social and environmental benefits delivered for every unit of public investment. We agree with the Land Review that the potential of this approach should be explored more actively; it could be an effective means of responding to changing priorities, and securing noticeably more ambitious delivery of the kind of benefits distinctively suited to the public sector.

The Land Review recommended criteria for disposals. More importantly, criteria are also needed for an acquisition programme – the positive dimension to re-configuration. A cumulative assessment could be based on a range of social and economic criteria

(see the WIAT acquisition criteria in preparation), as well as a range of strictly environmental criteria such as:

- a. Biodiversity value (existing and potential)
- b. Filling gaps in habitat networks
- c. Climate change adaptation (eg new floodplain forest)
- d. Climate change mitigation (eg new fuel wood plantation)

These criteria could then be used to guide a process of assessment of potential acquisitions, identifying broad landscape types and geographical locations where the public benefit potential is sufficiently high to suggest that a search should be concentrated with a view to acquisition of land (or engagement with suitable partners) if the opportunity arises.

The further option of a revolving programme – acquiring land and selling it on after a period of woodland development - is also worth considering.

We recommend that:

- **57.** As well as restructuring of the existing national forest estate, higher priority should be given to a gradual process of disposals and acquisitions as a key means of re-configuring the estate to reflect the vision and strategy proposed above.
- **58.** A system of scoring criteria for both acquisitions and disposals should be developed to assist this re-configuration process
- **59.** These criteria should be used in an exercise to identify potential ‘areas of strategic opportunity’, alongside an assessment of the value of current holdings in terms of their contribution to the Scottish Forestry Strategy objectives.
- **60.** The outcomes of this exercise should be used to inform a programme of gradual but decisive re-configuration in response to the new directions of policy. This should include a shift of FCS’s traditional strategic role, of ensuring softwood timber supplies, progressively to the private sector.
- **61.** FCS should clarify the expected scale and pace of its ambition in this area, in the vision and strategy proposed above (S3.1)
- **62.** Consideration should be given also to establishment of a revolving fund for acquisition of sites for sustainable forestry development on sites where later transfer to the private, voluntary or local authority sector may be appropriate.

3.4 Strategies and Planning

The above recommendations have implications for the planning process.

Planning is facilitated at national scale through what seems a cumbersome system of processes and documents. Internal references include the Scottish Forestry Strategy,

FCS Corporate Plan, Forest Enterprise Scotland Agency Framework Document, the Business Planning process, plus the Forest District Strategic Planning and Forest Design Plan processes. External references include overarching Scottish Executive documents and Strategies – e.g. the Partnership for a Better Scotland, the Scottish Biodiversity Strategy, in addition to the UK Woodland Assurance Scheme and the UK Biodiversity Action Plan.

These need to be distilled into a clear set of environmental priorities. From our limited analysis, there also appears to be something of a “disconnection” between national and FD scale planning. The overall impression is that environmental matters are rather less well embedded in planning than for example timber production, with less clear guidance, less available information and standards which vary across the organisation.

The current situation where FDs are given considerable autonomy in developing plans to deliver environmental benefits has certain advantages, but can lead to some confusion and inconsistency between districts in terms of standards of provision, data collection etc.

We recommend that:

- **63.** a more coherent statement of environmental priorities is required at national level to help address the apparent gap between national and FD level planning. It would be easier to present this if it were possible to rationalise the different national-scale planning layers. This should comprise a strong national framework (linked to Scottish Forestry Strategy) with good regional flexibility.
- **64.** plans at all levels should have more robust coverage of environmental priorities. These should consistently provide descriptions of the current status and future plans (short, medium and long term) under the following main headings:
 - forest habitat networks
 - forest structure / management regimes
 - species composition
 - native woodland restoration
 - restoration /appropriate management of non-wooded land
 - forest landscape restoration projects
 - climate change and other environmental services.
- **65.** there is a need to ensure that priorities for, and standards of, delivery of environmental benefits are agreed between headquarters and FDs; and that this is issued as basic guidance. This guidance should be applied consistently by all the districts, but each FD should then go onto develop the detail in ways which suits particular circumstances.
- **66.** opportunities should be taken to strengthen the contribution of forests in wider land use planning in cooperation with neighbouring owners and other agencies (e.g. catchment planning see S2.3.1 above).

3.5 United Kingdom Woodland Assurance Standard (UKWAS)

UKWAS provisions have to some extent stepped in to fill the gap in guidance between national scale and forest level planning. This has led to improved environmental provision, but UKWAS provisions alone would be inadequate to deliver FCS's "more ambitious" aspirations.

We recommend that:

- **67.** FCS should not seek simply to deliver UKWAS and UK Forestry Standard commitments, but should see these standards as minimum acceptable levels.

3.6 Oversight of Forest Design Plans (FDPs)

Internal monitoring of the quality of FDPs would benefit from a stronger environmental input and FCS is not currently well positioned to carry out such assessments.

We recommend that:

- **68.** Internal auditing of FDP's should give more attention to environmental aspects. Additional capacity could be sought externally, until such time as the organisation develops its own capacity.

Section 4 - Income vs. Delivery

4.1 Clearly income and delivery are closely interdependent, but we detected a tension between the national and the Forest District approach. The impression given in the Scottish Forestry Strategy is that delivery of benefits is the priority, and home-generated income will assist if consistent with delivery. Current emphasis on the ground appears to be the other way around - delivery depends on home-generated income, and levels of ambition are dictated by income generation locally. This tension suggests that, nationally, strategic directions are made up of local decisions, all dependent on timber production.

In light of new directions in policy on the justification for public investment, we recommend that:

- **69.** FCS should review the emphasis given to income generation at FD level
- **70.** The trade-off between income generation and delivery of public benefits should be exposed to transparent debate at a national level rather than hidden in the operational budgets of FCS.

Section 5 - Capacity to Deliver

The recommendations in this report raise important issues for the development of FCS's capacities.

5.1 Information

The debate about trends and progress in delivering environmental benefits is limited by access to information about current status and future trends in the resource. FCS has major responsibilities and potential for the delivery of government biodiversity commitments, but its performance in this respect is difficult to assess, due to incomplete knowledge of the presence and condition of species and habitats of the state forest.

This lack of data is likely to impede positive management planning decisions for targeted biodiversity work and effective reporting for the UK Biodiversity Action Plan (UK BAP) and Scottish Biodiversity Strategy. This data issue relates to the collection, storage and use of biodiversity information in forest planning and operations.

We recommend that:

- **71.** FCS should complete the woodland and non-woodland habitat and species baseline and condition monitoring of the national forest estate, against UK BAP habitat and species type. This is to inform management-planning decisions and enable effective reporting for UKBAP and Scottish Biodiversity Strategy.
- **72.** FCS should make inventory and database provision to allow it to describe accurately the current and future status of the national forest estate in terms of species composition, woodland type (e.g. National Vegetation Classification and UK BAP habitat and species type) and management approach.
- **73.** FCS should conduct research into the biodiversity impacts, both negative and positive, of proposed changes to its silvicultural practice, for example alternative silvicultural systems to clear-fell and for biomass/energy forestry and carbon sequestration.

5.2 Skills, Training & Recruitment

The potential for FCS to achieve a more ambitious environmental performance is entirely dependent on the capacities of its staff. Notwithstanding the high level of skill, commitment and professionalism of the current workforce, staff expertise is an important issue deserving review in the light of any changes in policy. Relevant issues include not just the availability of specialist ecological advice, but also ensuring appropriate levels of competence of staff in the environmental aspects of forestry and estate management at all levels.

We recommend that:

- **74.** FCS develops its staff expertise and capacity to deliver on all aspects of this review which are adopted for implementation. A key component will be developing ecological skills, expertise and roles across FCS. This should be by appropriate adjustments to recruitment criteria and by training programmes reflecting the shift in emphasis on the delivery of an increasingly wide suite of public benefits.

Acknowledgements:

The Review Group has had the benefit of generous assistance and enthusiastic co-operation from all staff encountered in this review. We thank them and hope that the report does justice to their input. Special thanks go also to Kenny Murray who has provided excellent Secretariat support throughout this review.

The Purpose of the National Forest Estate

The **rationale for public ownership** was considered in a major review of the GB FC estate in 93/4. This acknowledged that Forest Enterprise was created to manage the forest estate on a multi-benefit basis:

- Offering wide-scale and varied opportunities for countryside recreation;
- Contributing to nature conservation landscape and cultural heritage;
- Supplying raw material to the wood processing industries;

Since then, other issues have come onto the agenda as essential components of sustainable forest management, including –

- community involvement;
- a broader recognition of forestry's contribution to sustainable rural development;
- the role of forests in helping to combat climate change.

SFS (2000) said that public sector ownership of forests is important where it can bring public benefits which would otherwise be lost, including –

- Development of the market for round timber
- Development and demonstration of good forest practice
- Setting an example in sustainable forestry
- Community engagement
- Access and recreation
- Forest-related green tourism and implementation of BAPs
- Regeneration of derelict land
- Creation of woodland on the urban fringe
- Support of fragile communities

The Review of Land managed by Forestry Commission Scotland (2004) referred to a suite of other Scottish Executive priorities which the national forest estate can help to deliver:

- Promotion of sustainable development
- Closing the opportunity gap
- Well being and health improvement
- Environmental justice
- Biodiversity and cultural heritage protection
- Economic development
- Strengthening communities
- Education and Life-Long Learning
- Land Reform

Meanwhile, an economic analysis of forestry in England (2003) argued that the dominant rationale for public sector intervention in forestry (by ownership or subsidy) is market failure. It argued that the benefits of intervention are likely to be greatest where the main woodland benefits are

- Improved visual amenity in and around towns
- Additional local access/recreation
- Improved biodiversity/conservation

Forest Landscape Restoration

The formal concept of **Forest Landscape Restoration (FLR)**, championed by IUCN and WWF, is now promoted by a Global Partnership of 23 nations and international organisations, in which FC GB is a principal player. The concept is fundamentally based on a 'bottom-up' approach, preferably actually driven by the local community. The Global Partnership website explains:

Forest landscape restoration **brings people together** to identify and put in place a mix of land use practices that will help restore the functions of forests across a whole landscape, such as a water catchment. The aim of this approach is to benefit both communities and the natural world.

Forest landscape restoration seeks to **strengthen the relationship between rural development, forestry and other natural resource management and conservation** approaches. It shifts the emphasis away from simply maximising tree cover on individual forest sites to optimising the supply of forest benefits such as clean water, timber production and nature conservation within the broader landscape. It does not try to re-establish the pristine forests of the past.

IUCN also emphasises human well-being and the functionality of forests:

Forest Landscape Restoration (FLR) is a planned process that aims to regain ecological integrity and enhance human well-being in degraded or deforested forest landscapes.

FLR is rapidly emerging as pragmatic and forward looking approach to deal with forest loss and degradation worldwide. Recognizing that tree cover no longer dominates many forest landscapes, and that local land use patterns have led to a dramatic and detrimental reduction in the availability of forest goods and services both locally and beyond, FLR focuses on restoring *forest functionality*: that is the goods, services and ecological processes that forests can provide at the broader landscape level rather than solely promoting increased tree cover at a particular location.

Future Scenarios

The following tables set out the projected outcomes of three scenarios (current policy, more ambitious and much more ambitious) in 5 and 20 years, according to the recommendations in the main text.

Native Species

Current resource	Rate of change	2010 resource	2025 resource
17% total area of native species ⁹ (of which ca. 5% is native woodland i.e. semi-natural)	Current rate of progress - <i>aiming for 28% native species by approx 2035</i>	18-19 % by area is native species (see bullet point 3 below).	23 % by area is native species
	More ambitious - <i>aiming for 40% native species by approx 2050</i>	19-20% by area is native species	28% by area is native species
	Much more ambitious - <i>aiming for 60% native species by approx 2050</i>	23% by area is native species	37% by area is native species

- Assumes FDM's current estimate for future species composition (28% native species) is reached by approx. 2035
- Under the "more ambitious" scenario FCS resource still fails to reach **current** private sector levels (ca. 30%) by 2025. This suggests a need to move towards "much more ambitious" scenario, at least for a period.
- It is difficult to give realistic scenarios for proportion of the future resource that could be classed as "native woodland" (i.e. with semi-natural characteristics). However it can safely be assumed that:
 - most of the current areas of Scots pine plantation will be restructured to resemble semi-natural woodland more closely;
 - most of the area of native species recruited in the future will have semi-natural characteristics.

A proportion of native species woodland will retain a timber production role on sites where this is realistic.

⁹ Estimates for native species area are based on the areas of Scots pine plus all broadleaves and are therefore generous

Restoring PAWS

Current resource	Rate of change	2010 resource	2025 resource
31,151ha; 2577 sites; average size 12ha. Unclear what % in management, but of which 44% in restoration; 29% being enhanced; 28% being maintained 52% surveyed for ancient woodland features	Current rate of progress	36% of PAWS under restoration management,	N/A
	More ambitious	75% of PAWS under restoration management,	100% of PAWS under restoration management,
	Much more ambitious	100% PAWS under restoration management,	100% PAWS under restoration management,

- NB. We define a PAWS as ‘fully restored’ when all threats to Ancient Woodland communities have been removed and conditions are such that those communities are likely to expand. This implies at least 80% native species in the canopy and understorey. Full restoration may take many decades. By far the highest priority is to ensure that restoration management commences; indeed an attempt to achieve full restoration too quickly may be detrimental to the survival of Ancient Woodland communities

Restoring open-ground habitats

Current resource	Rate of change	2010 resource	2025 resource
<p>195,157ha – 29.6% of forest (“Open space” is mixed non-wooded land – not all high biodiversity value open ground habitats)</p>	<p>Current rate of progress</p>	<p>N/A</p>	<p>208,832ha open space¹⁰ (31.7% of forest area – not all high biodiversity value open ground habitats) 3 FDs have a projected reduction in open space</p>
	<p>More ambitious</p>	<p>Half of the projected open space is open ground habitat of high biodiversity value (in accordance with criteria given in S2.4.2 above).</p> <p>No loss of high biodiversity open space in any FD</p>	<p>Three quarters of the projected open space is open ground habitat of high biodiversity value (in accordance with criteria given in S2.4.2 above).</p> <p>No loss of high biodiversity value open space in any FD</p>
	<p>Much more ambitious</p>	<p>A third of the national forest estate is open space. Three quarters of this is open ground habitat of biodiversity value (in accordance with criteria given in S 2.4.2 above).</p> <p>No loss of open space in any FD</p>	<p>A third of national forest estate is open space, 100% of which is open ground habitat of biodiversity value (in accordance with criteria given in S 2.4.2 above).</p> <p>No loss of high biodiversity value open space in any FD</p>

¹⁰ Three FDs project a reduction in their open space.

- Current open-ground is not all high biodiversity value – challenge is to reconfigure ‘open space’ to deliver for priority habitats and species.
- ‘Restructuring’ quality and location the open space of the national forest estate – data issue on what priority open ground habitats are present and currently forested/planned to remain forested.
- These figures could be adjusted to take account of certain beneficial conversions of open space to wooded habitats – e.g. treelines

Restoring Forest Landscapes.

Current resource	Rate of change	2010 resource	2025 resource
Glen Affric Glen Garry Loch Sunart Total 3 sites conforming to international standard	Current rate of progress	Existing 3 + 2 more sites likely: eg Loch Katrine Dalriada project Total 5 sites	Existing 5 + 6 more sites Total 11 sites
	More ambitious	Existing 3 + 3 more sites eg Loch Katrine Dalriada project SW Scotland total 6 sites	Existing 6 + 9 more sites total 15 sites
	Much more ambitious	Existing 3 + 6 more sites eg Loch Katrine Dalriada project SW Scotland Borders W Cairngorms Buchan total 9 sites	Existing 9 + 18 more sites ie a strong and more or less universal component of rural land use picture total 21 sites

- Good value for money
- Strong consistency with current policy
- Key strategic strength of public forestry agency, leading integration
- Urgent need for FLR principles to be applied in less diverse/fortunate areas
- ‘demonstration’ status should give way to common practice in 20 years

We therefore propose the ‘more ambitious’ option now, possibly moving to ‘much more ambitious’ in 5 years time.

Restoring Transitions, including Treelines and restoring other Habitats

Due to the lack of data on the existing resource it is not possible to assign 'current rate of change', 'more ambitious' and 'much more ambitious' targets, beyond what is contained in Sections 2.4.3 and 2.4.4. This emphasises the need for improved data.