

DEVELOPING THE SCOTS PINE RESOURCE



Scots Pine Forest Management Case Study 3: Inshriach Forest, Scotland

Introduction

Inshriach Forest is located in the Cairngorm National Park in the Highlands of Scotland (Figure 1). The property covers an area of approximately 10,000 Ha of which 3,082 Ha is forest. The forest has been owned and managed by Forestry Commission Scotland since 1954.

The main aim, with respect to forest management, is to protect and enhance biodiversity, whilst balancing the needs for timber production and recreation. This case study aims to describe how this is achieved.

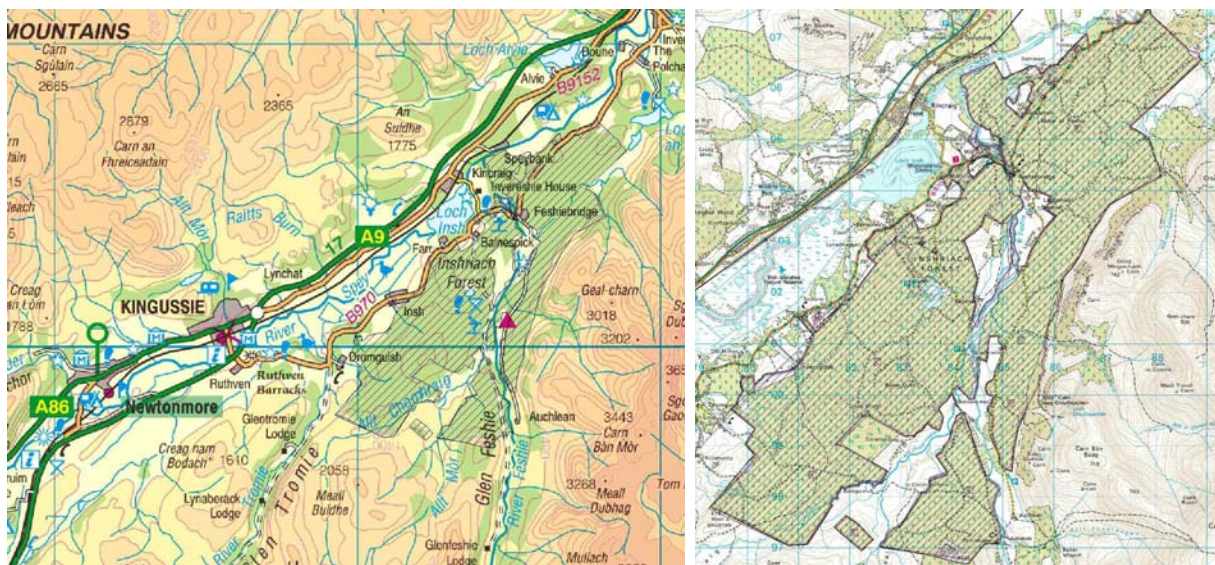


Figure 1: Location maps of Inshriach Forest (Thanks to Steve Smith, Forestry Commission Scotland)

History of Forest Management at Rothiemurchus

Inshriach forest aims to deliver multiple benefits in terms of biodiversity, recreation and timber production, with the protection and improvement of biodiversity being the primary objective.

There are many social, environmental and economic factors influencing the management of Inshriach Forest.

Social factors include:

- *Recreational use of the forest*
- *Provision of land for affordable housing*

Environmental factors:

- *Inshriach provides habitat for many rare and protected plant and animal species and includes habitats of European and national importance*
- *Part of the forest lies within the **Invereshie and Inshriach National Nature Reserve (NNR)***

- The forest is situated within the **Cairngorms National Park** which contains the largest remnants of **Caledonian pinewood** in Scotland.

Economic influences include:

- The move from non-native to native species,
- Increasing use of low Impact harvesting systems
- Road infrastructure

Policy influences

The **Scottish Forestry Strategy** (SFS) outlines the key visions for the National Forest Estate in Scotland; the management of Inshriach is guided by this.

The **Highland Forest and Woodland Strategy** (HFWS) guides the development and management of forests and woodlands in the Highlands to ensure that they integrate well with other interests and deliver maximum benefit for the local community, economy and environment.

Forest composition and structure

Scots pine is the main tree species in Inshriach, comprising 2,472 ha of the total 3,082 ha forest area. Lodgepole (313 ha) and larch (81 ha) are the next main conifer species.

Inshriach has been managed as commercial clear-fell and as a result has an even-aged stand structure, with the majority of the forest (81 %) being planted during the 1950's, 60's and 70's. Efforts are being made to diversify age structure through Low Impact Silvicultural Systems (LISS). Natural regeneration is being encouraged using thinning and group shelterwood systems, which also allow the retention of older trees. The group shelterwood system is generally practised within the areas dominated by, or comprising only, Scots pine. This involves felling small areas (<0.5 ha) of forest to encourage natural regeneration of Scots pine and native broadleaves (Fig 2a). These sites are surveyed after five years determine whether supplementary planting is required. The group shelter-wood system should result in a more diverse forest structure with a wider variety of habitat for wildlife.



Figure 2 (a) Natural regeneration of Scots pine



(b) An example of replanting

Establishment and harvesting

Commercial clear-fell sites are mostly restocked using bare rooted planting material planted on mounds. These sites have tended to be on fertile soils where natural regeneration would be more difficult to achieve because of competition. Natural regeneration is being attempted on less fertile sites; small openings are created in the forest and the ground scarified to encourage seeding. Supplementary planting is carried out on sites where natural regeneration levels are poor.

Over the past 5 to 10 years areas of lodgepole pine have been felled and left unplanted to improve diversity within the forest. These areas have been colonised by Scots pine and birch, albeit at sub-commercial spacing. However, within the context of the forest design plan the level of regeneration was considered adequate and achieved with no ground preparation.

There are supplies of large dimension Douglas fir, which is sold for construction; it regenerates naturally in the Scots pine zone. Non-native timber species are only removed from designated sites or managed habitats.

Thinning operations are carried out to improve the timber quality of the forest. Thinning rotations are generally 10 to 20 years depending on Yield Class (YC), with lower yield class crops such Scots pine (YC 6) tending towards 20 year rotations.

Timber production and markets

The main objective in terms of timber production is to provide a sustainable supply of timber by continued silvicultural thinning, clear-felling and replanting.

Inshriach Forest yields approximately 14,000 m³ of timber per year (4,000 m³ from thinning and 10,000m³ from clearfell). Production from clearfell is expected to fall in the medium term as a programme to remove of non-native trees species from Scots pine forest areas nears completion.

Timber harvested from Inshriach is mostly sold to local markets: small round wood going to the Norbord OSB panel plant at Dalcross, near Inverness; short logs for conversion to fencing slats go to Munro Sawmills in Dingwall; general fencing material go to several local saw mills; and sawlogs go to John Gordon & Son Ltd of Nairn.

Timber quality

Table 1 shows the results from a timber quality assessment at Inshriach, carried out by Forest Research as part of a wider survey of Scots pine timber quality in northern Scotland (Macdonald et al., 2010). Visual assessments of stem straightness and of the height of the lowest dead branch in a stem can be used to estimate the out-turn of higher value green logs, whilst stress wave velocity measurements, made using portable acoustic tools, are good predictors of the mechanical properties of sawn timber

(Macdonald et al., 2009). Analysis of results from the overall north Scotland survey showed that log quality could be predicted from models that use age and stocking density as inputs, with older stands with lower stocking density producing a higher proportion of better quality logs, reflecting the outcome of selective thinning. The three stands assessed at Inshriach (Figure 3) broadly reflect this result.

Table 1: Summary of timber quality data for 3 stands in Inshriach Forest

Stand (grid ref.)	Planting Year	Yield Class	Stocking (stems/ha)	Standmean DBH(cm)	Mean height of lowest dead branch (m)	Median Stand Stem Straightness Score ¹ (and Stem Straightness Grade ²)	Stress Wave Velocity	DAMS Score	Elevation (m)	AT5 (degree days above 5°C)
1 (NN806977)	1958	8	1160	20	0.6	4 (B)	3.74	15	370	877
2 (NH843003)	1964	10	1820	19.1	0.3	3 (C)	3.38	12	290	984
3 (NH849016)	1961	8	713	22.9	0.5	4 (B)	3.61	13	270	996

¹ Based on a visual assessment of stem straightness in the lower 6m of the stem, from 1 (worst) to 7 (best).

² Based on distribution of straightness scores in a stand, A (best) – E (worst).



Figure 3 - Photos showing the quality of stands surveyed as part of the study to assess Scots pine quality in northern Scotland. Stand 1, 2 (top left and right respectively) and stand 3 (bottom)

Biodiversity

With 82% of the forest area being managed for biodiversity in the period from 2008 – 2017 it can be seen just how important an area this is for the flora and fauna of the region. Much of the forest area is covered by designations, including the declaration in 2007 of part of the forest being within the Invereshie and Inshriach NNR. The forest also includes or is adjacent to a number of **Sites of Special Scientific Interest** (SSSI), **Special Areas of Conservation** (SAC) and **Special Protection Areas** (SPA) (Cairngorms, River Feshie, River Spey, Insh Marshes). There are also significant areas of priority habitat and a wide range of priority species such as red squirrel and capercaillie.

The expansion, improvement and protection of the native pinewood areas, the planted pinewood and other priority habitat are currently the main focus. Along with this the creation of some missing and under-represented key habitats will contribute greatly to the protection of many priority species including juniper and pinewood flora.

The proposed expansion of areas of LISS is likely to enhance the extent and quality of suitable pinewood habitat for capercaillie and other pinewood species such as wood ants, pine martens and red squirrel. Another management action for Inshriach is to create a more natural forest edge using broadleaves and areas of open space – this will also enhance habitat for black grouse.

Recreation

Inshriach offers a quieter alternative for recreational activities than the neighbouring Rothiemurchus Estate with the main sites for recreation being the Feshie bridge car park, Frank Bruce sculpture trail and the Uath Lochans car park and forest walk. There are also numerous public rights of way and access is possible to the new Invereshie and Inshriach NNR via the forest and various informal car parks.

The nearby mountains of the Cairngorm range can also be accessed from these car parks. The forest itself is generally used by walkers, cyclists and in the winter, if conditions allow, for cross-country skiing (Figure 4). The main recreation aspects that will be delivered through the Forest Plan are participation in the **Core Paths** initiative, improved interpretation for the NNR, improvements to the car parking and maintenance of paths and tracks, and provision of ranger-led activities.



Figure 4: Cyclist and cross country skiing tracks through an area of Inshriach Forest

Conclusions

Inshriach Forest is a good example of a state-run forest estate which has moved from purely commercial forestry towards a more multi-purpose forestry approach, delivering benefits in terms of biodiversity, recreation and timber production. As in many forest estates with multiple objectives Inshriach forest is less productive than forests with a more commercial focus. However, in stands where timber production is a priority silviculture practices aim to encourage the production of high quality stems.

Acknowledgements

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