

## Stand Management and Silviculture

This Guidance Note is one of a series summarising information presented at a seminar on “Improved Conifer Timber Quality through Plant Selection and Silviculture”, held in February 2009 as part of FC Scotland’s [Timber Development Programme](#). It provides an overview of some of the issues involved in the management of conifer stands for the production of quality timber, based on experience from the private sector. The presentation itself, which was given by Will Anderson of [Seafield Estates](#), is available for download through the [seminar web page](#).

### Introduction

The information presented here is largely based on the forest management practices employed on Seafield Estates. There are two main holdings: Cullen Estate, in Banffshire and Strathspey Estate in Speyside. At Cullen the estate extends to 12250 ha of which 3500 ha is wooded, whilst at Strathspey the estate comprises 22000 ha, of which 8000 ha is wooded. At Cullen approximately 40% of the forest area is Sitka spruce, with a further 25% Scots pine: a good range of age classes is present. At Strathspey 70% of the forest area is Scots pine, of which 55% is in the 30-60 year age class as a result of significant post-war replanting.

### A Historical Perspective on Stand Management

An article published in the journal *Forestry* in 1933 ([Guillebaud, 1933](#)) gives readers an interesting insight into the management of Scots pine forests in Moray and Strathspey at that time, and the marketing and uses of the timber produced. The author notes that Seafield Estates provide the only example of large scale natural regeneration of Scots pine, implemented systematically over a long period of years. He describes the shelterwood system that is practised:

*“As soon as the woods have opened out sufficiently to allow grass to appear, sheep and cattle are turned in to graze; the stock keep down the heather and other ericaceous plants and churn up to some extent the needle humus with the mineral soil. When the trees are approaching maturity and the stocking has been reduced, either naturally or by thinning, to about 200 trees per acre, a seeding felling is made in which half the trees are removed, the next felling again removes 50 per cent, of the trees, leaving 50 trees per acre; after the third felling 15 trees are scheduled to remain to be removed when the area is more or less completely restocked. The length of the regeneration period depends upon local conditions, but may be almost indefinitely prolonged where new growth is slow in appearing.”*

The article goes on to describe market circumstances and logistical considerations that may not seem completely unfamiliar to the modern-day forester:

*“The thinning, and also, to some extent, the regeneration practice in Strathspey are in great measure determined by the economic conditions of the district. Distances from road and rail are often quite formidable, and cost of haulage makes the disposal of small sizes of timber virtually impossible. In consequence it has long been the practice to rely entirely on the natural thinning out of the young stands until the trees have reached about sleeper size. This means that for 60 to 80 years the trees have to fend for themselves.”*

In addition the article mentions that *“It has been predicted for the last 20 years or more that the crop would be entirely ruined unless it was immediately thinned, but the subsequent history has falsified this, as it has so many other predictions in forestry”*. From this we can see that not much has changed but it does give a perspective on the time scales required for regeneration and the likely comparisons in timber quality looking at Curr Wood today against other areas where recruitment was prolonged. This issue will be returned to later.

### **Stand Management on Seafield Estates**

In Strathspey there was considerable felling during World War II, followed by post-war replanting which is now at the mid-rotation stage. The current stand quality is largely a result of silvicultural methods used in this phase of establishment, together with some pre-war stands. Some of the changes in establishment practice that evolved in the second half of the twentieth century, such as the move to wider spacing and greater use of Sitka spruce and lodgepole pine, were not fully embraced by forest managers at Seafield Estates. As a consequence quality was maintained and there is a higher proportion of Scots pine than might otherwise be the case.

Looking at the forester's opportunities for manipulating a stand to maximise timber quality should start during the planning process. Site type and site features will influence plant spacing and ground preparation methods determining proportion of juvenile wood, branch size and branch distribution. Treatment during and immediately following establishment can have a significant impact on the potential for managing for timber quality later in the life of the stand.

Delayed fertilising or weed control can prolong time to canopy closure, again, influencing timber quality by allowing the development of larger diameter branches.

Once established, the forest manager must assess a stand's ability to produce quality timber (species, stem form, stability, site type) before deciding if silvicultural operations, such as thinning, will be cost effective. In some instances it is better to accept that some stands are beyond improvement, and to plan to harvest the timber that is there on a timescale that will maximise revenue and minimise any loss.

Marking of thinnings is generally no longer practised. Forest managers rely on the skills of harvester operators, backed up by adequate supervision to ensure that the required type and intensity of thinning is being achieved. The timing of interventions is important – for example thinning too early could prolong the growth of the live crown and lead to large knots in timber, while thinning too late may reduce stand stability. The first thinning is key in setting the baseline for subsequent stand manipulation.

Thinning and rotation length can be manipulated to influence diameter at felling, stand stability, age class diversity and timber quality. At Seafield the general following prescriptions are the norm, with variation according to location, access, markets, stability, stand growth and quality:

- Scots pine: 4 to 6 thinnings on an 8 – 10 year cycle, with a rotation length of 70-90 years
- Sitka spruce: 2 to 4 thinnings on a 6 to 8 year cycle, with a rotation length of 40 to 55 years

The objectives for thinning are to provide income earlier in the rotation, to maximise sawlog yield, to improve stand quality, to improve habitat biodiversity and to develop age class diversity. However, in trying to achieve the latter this can lead to butt diameter being over the market's preferred maximum in some later thinnings.

Some of the concerns expressed by Guillebaud in 1933 are relevant today. For example, in a first thinning of a 31-year-old, well-stocked Scots pine stand with easy access and an available market for fencing material, transport costs and distance from market are a major factor, resulting in a low average price for the sale.

In addition to the stand characteristics that result from establishment practice and subsequent silvicultural interventions, the forest manager must also contend with a range of damaging agents and environmental factors that affect timber quality. Significant amongst these may be

damage from deer and squirrels, insects and the effects of climatic factors such as wind and snow. Again, it is important to assess whether damage can be rectified by Silviculture or if it will continue to the detriment of the crop and, ultimately, timber quality requiring the deployment of time and resources to more deserving stands.

A subject for ongoing consideration, not only at Seafeld Estates, is the potential for increasing use of Less Intensive Silvicultural Systems (LISS) instead of clearfell systems. At Cullen 200 ha of Scots pine have been identified for LISS management, whilst the Sitka spruce will mainly be managed using a clearfell system for stability and quality considerations. At Strathspey 3300 ha of Scots pine in the age range 30 – 60 years are designated for LISS management, but consideration is still being given to whether natural regeneration alone will be used, or whether some enrichment planting might be preferable. The answer has to be site specific and as foresters we cannot let the drive to LISS blind us to the quality issues so well set out in the 1933 article referred to. Not every site will be suitable for natural regeneration and justified decisions will have to be taken which are influenced by site types, vegetation cover, and deer control issues. Fencing in some areas of Strathspey will be essential to ensure a replacement crop and this matter has to be addressed now to ensure compatibility with grouse and deer management. Ensuring adequate stocking is a key requirement for the production of good quality timber in the future and ensuring the maintenance of financially viable stands is the key to productive habitat management.

## **Conclusions**

- Establishment practice greatly influences the ability to produce quality through stand management;
- Forest managers should accept that not every stand will be able to produce high quality timber and target resources accordingly;
- Stand management through thinning (where possible), particularly engaging skilled contractors with good supervision is vital;
- Changing ownership patterns and job mobility will limit continuity of management in many cases;
- Environmental and silvicultural factors may reduce your ability to maximise quality;
- This does not let you off the hook! The issues faced are still those which have taxed generations of foresters;
- Grow for quality as the norm but remember you have to market the rest too;

- Our forebears were adept at maximising yield by grading. Technology has its place in assisting recovery to maximise yield from stands, hopefully recognising quality with an appropriate premium.

## **References**

Guillebaud , W.H. 1933 Scots pine in Morayshire and Strathspey. [Forestry. 7, 137 – 153.](#)

