Productive Woodland Creation on Better Land

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Case Study

Introduction

This case study covers the afforestation of a 48ha woodland scheme on arable land in Aberdeenshire in 2017, owned by Aylsa Leslie and her family.

In 2003 her father planted 91 ha of productive conifer woodland under the Grampian Forest Challenge Fund. This was on the poorer land on the farm, mainly grade 4.1. This woodland established well with high growth rates and the family were delighted with the results.

The better land was left in agriculture; mainly cereals.

Planting underway by machine

In 2016 the owners investigated planting up the remainder of the land which was being farmed under a limited partnership. The benefits sought were to generate a significant capital sum and regular income for six years, reduce the scale of the farming operation and in the longer term generate regular tax free income from the sale of thinnings.

They approached a forestry agent who produced an indicative budget for the work. This showed a healthy positive cash flow from the start. This site comprised mainly large arable fields which would allow most of the initial planting and subsequent maintenance to be done by machine. The local forestry strategy map showed the farm as being in a preferred area for productive woodlands so the scheme would benefit from a higher rate of grant.

The Forestry Commission's woodland officer indicated that they would support a well designed application for woodland creation.

The owners decided to proceed and the forestry agent surveyed the site in more detail. This revealed the following features that would influence the design of the woodland;

- presence of rabbits, hares and roe deer;
- a burn along the edges of one of the three fields;
- powerlines and a small wind turbine;
- the water supply for the farm;
- two fields that were entirely arable and a third that had substantial areas of permanent grass on steeper ground on the banks of the burn;
- a requirement to keep some land in agriculture so the owners would remain eligible for Basic Payment;
- good access onto a public road and an internal farm track suitable for future harvesting operations.

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Design

The scheme divided into three separate blocks of land.

1 The largest field was suitable for productive conifers and open ground would be left for the powerline wayleave, around the well and water supply and for the construction of a future loading area. It was thought that with good wildlife control that this block should not need a deer and rabbit fence.

2 A smaller arable field was also suitable for productive conifers and again open ground would be left for the wind turbine and to create open ground closer to the house. This was fringed with smaller broadleaved species for visual amenity. This had the best soils and higher yielding Douglas fir and vegetatively propagated 'super Sitka' were chosen for here. The field had mature forestry on three sides so it was decided from the outset that this would need a deer and rabbit fence for protection.

Native broadleaved planting on steep ground beside the burn

3 The area in front of the house consisted of arable land and steep banks with permanent grassland on two sides and wet ground on the flood plain. The owner and agent decided that it was most appropriate to keep all of this remaining arable land in agricultural use to meet the qualification requirements for being an active farmer, and to fence off the wet ground and the permanent grass.

This land was unsuitable for productive conifers and better suited for native broadleaved woodland protected by a new stock fence with all the trees in 1.2m shelters. This provides a substantial block of riparian woodland with considerable conservation and amenity benefits. The remaining farmland was reseeded and the grazing is now let out. This layout protects the open views from the house.

Table 1. Species composition

Species	%
Sitka spruce, includes scattered larch	65%
Norway spruce	6%
Scots pine	7%
Douglas Fir	2%
Native broadleaves	10%
Open ground	10%

As a contingency the agent included a deer/rabbit fence around the big field just in case it proved necessary. The grant application was approved within twelve weeks.

The final composition of the scheme is shown in Table 1 and the grants paid for the various operations are shown in Table 2.

Table 2. Forestry Grants paid

Initial planting grant	£2,120/ha
Maintenance	Five payments of £220/ha
Stock fence	£4.40/m
Deer fence	£6.80/m
Gate for stock fence	£136.00
1.2m tree shelters	£2.00 each
Vole guards	19p each

In addition the owner was able to sell carbon credits through a specialist broker for a little over £500 per hectare. He estimated that the scheme will sequester just over 10,000 tonnes of CO_2 over forty years.

Planting and maintenance

The agent obtained quotes for the trees and engaged local contractors.

A contractor with a tree planting machine was engaged for the planting and initial spraying. He planted the 100,000 conifers over a six day period in March, band spraying with a mixture of systemic and residual herbicide at the same time. Planting was at 2,700 per ha which is above the grant contract minimum of 2,500 per ha. Machine planting (suitable on good soils) is cheaper than hand planting and initial planting at a higher density can eliminate the need for replacement of losses if these are low and scattered.

Another contractor was used for hand-planting and maintaining all the broadleaves. 5,400 trees were planted in tubes in autumn 2016, protecting the trees from deer browsing, and were all spot weeded with systemic herbicide during the following spring.

A stalker was engaged for the wildlife control – no rent was charged as the agreement was for crop protection. Despite shooting 15 deer, after he reported seeing over a dozen deer in the big field it was decided to erect the deer fence around this after all. This was done several months after the planting and the grant more than covered the cost.

In the first year the trees grew well. Some hand-weeding was needed around conifers in the smaller field due to localised areas of creeping weeds

In autumn 2017 all the conifers were band sprayed with a mixture of systemic and residual herbicide and this gave good weed control in spring 2018. Unlike the first year there was considerable weed growth with many, mainly broadleaved, weed species, and the agent arranged for inter-row mowing to be carried out to prevent the weeds from seeding.

Broadleaved losses over two years were 8% and these were all replaced. Conifer losses were negligible and there was no replacement planting.

In 2018 the Sitka spruce grew very well and band weeding in the autumn was only carried to the secondary conifer species.

Further inter-row mowing will be carried out in summer 2019. After thirty months the woodland will be sufficiently established that little further maintenance will be required. The owner may consider removing and recycling the tree shelters once the trees are fully established.

Deer and rabbit fencing protects all the conifer crops

Band spraying was carried out by quad bike to reduce costs

Sitka spruce after two years

Costs and income.

In the first year income exceeded costs by over £71,000 and the scheme is projected to deliver a net cumulative income of £125,000 by the end of the first six years.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Total costs: planting, fencing, maintenance and management	£96,227	£6,513	£3,100	-	-	-
Total income: FGS grants & carbon sales, excluding Basic Payment	£167,444	£11,330	£11,330	£11,330	£11,330	£18,327
Net Income	£71,217	£4,817	£8,230	£11,330	£11,330	£18,327
Cumulative income	£71,217	£76,034	£84,264	££95,594	£106,924	£125,251

Note - Figures are known for years 1 & 2 and estimated for the remaining years.

There has been an intensive breeding programme for Sitka spruce over the last twenty years and all the spruce on the scheme was 'improved'. The agent estimates that the growth rate should average at least Yield Class 20, i.e. a maximum average annual growth rate of 20m3 per hectare per annum.

This should provide a harvest of at least 2,000 tonnes at first thinning at 19 years old with a net return at current prices of £20,000 or more. There would normally be three further thinnings. Clear felling at about 45 years of age should yield at least 17,000 tonnes and £578,000 at current prices.

Older woodlands on the farm are growing very well

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