

# CCF is 'economically viable option'

Owen Davies and Gary Kerr report that transformation to continuous cover forestry can be a good economic option compared with clearfell and replant

A recent study by Forest Research has shown that transformation to continuous cover forestry (CCF) can be a good economic option compared with clearfell and replant. It is hoped the findings of the work will alleviate concerns that transformation to CCF is a costly option.

The study examined the costs and revenues associated with three transformation scenarios for a stand of Sitka spruce (GYC14) and compared them with conventional clearfell and replant. The management options investigated were:

- 1 Clearfell and replant.
- 2 Transformation to a simple structure using natural regeneration.
- 3 Transformation to a simple structure using under-planting after the failure of natural regeneration.
- 4 Transformation to a complex structure.

The M1 yield model, which is more flexible than the Booklet 48 yield tables, was used to predict growing stock and harvesting yields for programmes of thinnings which follow current guidance on transformation in FC Information Notes 40 and 45.

Detailed information on the costs of operations in all four scenarios was collected from work study reports, English Woodland Grant Scheme standard costs and FC staff. Cost and revenue assumptions are given in full in the report. These include higher overhead costs of management for transformation to a simple structure (150 %) and to a complex structure (200 %) relative to clearfell and replant, to reflect most managers' relative inexperience of these approaches to management.

The economic comparisons begin at a stand age of 25 years, when management begins to diverge. They cover three time periods: 20 years, 100 years, and the infinite series of rotations typically used in economic comparisons to account for the effects of, for example, different rotation lengths. The results in the table below are presented in terms of net present values (NPVs) at a declining discount rate starting at 3.5 %.

Management options	Net present value per hectare considering cash flows...		
	to 20 years	to 100 years	In perpetuity
Option 1	-£724	£3 790	£4 689
Option 2	-£600	£3 611	£5 621
Option 3	-£600	£1 653	£2 802
Option 4	-£651	£1 465	£4 293



Transformation (options 2-4) is less costly than conventional management (option 1) over a 20-year period because of high initial thinning returns. Over 100 years scenario, option 2 has a similar NPV to conventional practice (option 1), and it has the highest NPV in perpetuity because, even with respacing costs, natural regeneration is cheaper than artificial regeneration, and the establishment of each successor crop under an existing stand shortens the delay before thinning and felling revenues are realised relative to clear-felling and replanting (option 1). In this respect, conventional practice is disadvantaged by a fallow period between crops. Even with unfavourable management cost assumptions, the NPV in perpetuity for transformation to a complex structure (option 4) is close to that for conventional practice (option 1). The importance of obtaining successful natural regeneration during transformation is emphasised by the relatively poor performance of option 3, which involves a costly series of scarification operations to try to

encourage natural regeneration and a lengthening of the rotation as well as under-planting costs. However, this option is disadvantaged in the longer term comparisons, as hopefully forest managers would not repeat the same mistakes!

The results were examined for their sensitivity to changes in the level of management overheads, product prices and discount rate. The changes investigated have relatively little effect on the ranking of scenarios in terms of NPV, although low discount rates favour options 2 and 4 and high rates favour option 1.

An important outcome of the study is the creation of an analysis spreadsheet used to calculate the NPVs for each scenario. This is available to practitioners and policy-makers to allow them to investigate the effects of local conditions on results. While users cannot change the schedule of operations in each scenario, they do have complete freedom to change all inputs in terms of costs, product specifications, roadside prices and the discount rate, which will immediately update the NPV outputs.

Forest managers face many uncertainties when they embark upon the transformation of even-aged stands to continuous cover forestry. It is hoped that, by quantifying the possible cost and revenue implications, this report may help to relieve concerns that transformation is a costly option compared with conventional practice of clearfell and replant.

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