



WOODSIDE FOREST

Woodside is a 120ha property located inland from the township of Oxford on the southern slopes of Mt Oxford. Originally it was part of what was known as the Harewood Forest – a continuous area of virgin bush which covered some 22500ha of land in the Canterbury foothills.

In the mid-1800s much of this forest was exploited for timber to provide for the growing population of Christchurch and surrounding areas. At the peak period there were about 25 sawmill sites in the Harewood forest with up to a dozen operating simultaneously. The sawmilling era was largely terminated following a series of fires which culminated in a major conflagration in 1898 which destroyed most of the remaining resource.



Young beech stems emerging through a manuka nurse crop.

These events led to the destruction of the original forest at Woodside and the vegetation was transformed to a mixture of undeveloped grassland and scrub, with only occasional remnant trees left in some protected gullies.

An occupation licence was granted over Woodside in 1914 and the property was developed, and grazed by sheep until the Great Depression of the 1930s. At that time all development ceased and the land to all intents and purposes became unoccupied. This allowed a rapid reinvasion to a predominantly black beech dominated forest.

When the property was purchased by Rosalie and John Wardle in 1973, approximately 84ha had reverted to a black beech forest, with the remainder covered in a mixture of undeveloped pasture, gorse and scrub. Of this about 27ha were planted in exotic plantations of predominantly radiata pine.

The 84ha of regrowth beech provided a challenge for developing silvicultural systems aimed at maximising growth rates while at the same time retaining good tree form. Other considerations related to impact of various stand management options on environmental factors, particularly those affecting stand stability. The black beech forests at Woodside generally regenerate prolifically after disturbance and this leads to severe intraspecific competition, and in consequence tall densely packed young stems with small root systems which are particularly vulnerable to wind and snow damage.

A number of silvicultural systems have been trialled in the Woodside beech forests over the last 40 years and there have been a number of failures as well as successes. For instance, late thinning frequently led to stand collapse, and harvesting on a group selection basis often caused instability in surrounding stands. What rapidly became apparent was that even in an area as small as Woodside, there was no universal silvicultural prescription which was appropriate for all sites. For instance, young stands on protected lower slopes required quite different treatment to those on more exposed upper slopes and ridges.



Thinned and pruned 20yr old stand of black beech originating from wind damage.

Even so, some generalised practices evolved which were able to be used throughout. For instance, first thinning is best carried out when stands are 8-9m tall, while stems are still flexible. It is usual to select between 800 to 1000 stems per ha for retention but these can later be reduced to 600 to 800. These young stems can be successfully subjected to pruning. Pruning to between 4.5 and 5m can be carried out in a single operation concurrently with thinning. Pruning scars occlude rapidly, although sometimes epicormic growth can occur on the pruned stems for a few years after thinning, but

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**THIS EDITION FEATURES NEW ZEALAND BEECH SPECIES
AND THE OPPORTUNITIES FOR MANAGEMENT**

these can be removed two or three years after the main pruning operation. Subsequent epicormic growth is minimal.

Harvest for both beech and radiata pine is based on target harvest diameter. With beech the target harvest diameter chosen is 45cm dbh while with radiata pine it is 60cm dbh. The target harvest diameter in beech has been selected to give maximum clear wood production but to avoid the level of stem defect often associated with the larger and older beech trees.

We have already harvested some of our pruned black beech trees which had reached the target harvest diameter of 45cm after 37 years and were gratified to find we were able to produce clear boards of 200 x 50mm dimensions after such a short time. However, we predict that the average age for harvest in black beech will be 60 years while with radiata pine, for comparison, it is 40 years.

The ultimate aim for both the beech forest and pine plantations is to develop mixed age stands, producing constant log volumes from year to year, mostly relying on natural regeneration for replacement. On the basis of evidence to date it is predicted that the sustained yield will be in the order of 14m³/ha/year for beech forest and 35m³/ha/year for radiata pine.

The Woodside project has now been written up under the heading 'Woodside, a small forest managed on multiple use principles'. The publication of this 130 page book has been funded by the Indigenous Section of the NZ Farm Forestry Association and the Neil Barr Foundation, with income from sales returned to these organisations.

The book covers historic perspectives and the effects of past management on the forest and the indigenous biota it supports. It discusses management objectives and potential income sources and then goes to some detail describing environmental factors and their influence in determining appropriate management practices. Management for wood production for both the natural beech forest and exotic plantations is dealt with in two chapters while a further chapter deals with harvesting and utilisation aspects, including sawing logs and seasoning timber. Further chapters discuss other

income sources from the forest such as beech honeydew honey, land use restrictions, and conservation management. The property has had more than thirty years of control on introduced pests which predate on, and compete for food with, the indigenous biota. The final chapter covers economic considerations including an analysis of ultimate costs and returns for both the beech forests and exotic plantations.



Tended mixed aged beech stand with the oldest trees around 37 years.

The options for purchase of this book are:-

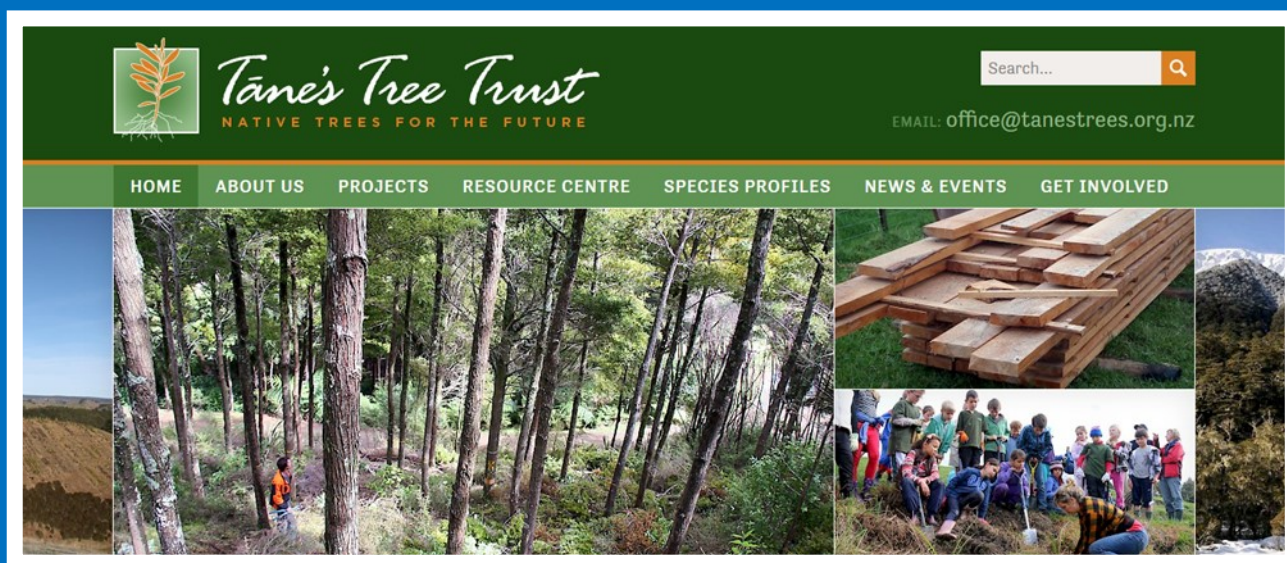
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By John Wardle

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THE NEW ZEALAND BEECHES

Mark Smale and David Bergin

The New Zealand beeches – local members of the small family of southern beeches that also occurs in other parts of the Southern Hemisphere like Australia and South America – are amongst our best-known and most important native trees. After kauri, rimu and tawa, beeches have been the most important native timber species and now comprises over half the remaining resource. Because of this and the fact that two-thirds of the remaining native forest is beech forest, they have been extensively researched and so are now better understood than most native trees.

The beech forests played a critical role in the great native forest conservation controversy of the 1970s. Opposition to an ill-considered proposal to clearfell large tracts of State Forest in north Westland eventually led to far-reaching changes in the administration of public land. With the creation of the Department of Conservation in 1987, most of the remaining beech forests on Crown land were legally removed from management for timber production. Nevertheless, substantial areas of manageable beech forest remain in private and Maori tenure.

Management

Despite the potential of beech forests for sustainable management and the proven uses of their high-quality timber for functional and decorative purposes, large-scale management for wood production has remained elusive because of perceived difficulties in both managing the forest and processing the wood. Nevertheless a sustained, albeit small integrated industry all the way from sustainable forest management to established processors and markets has developed in Southland by Lindsay and Dixon based on silver beech, in north Canterbury at Woodside based on black beech (refer to article by John Wardle in this issue), and in north Westland by New Zealand Sustainable Forest Products around mostly red beech.

Species description

There are four beech species, all of which were in the genus *Nothofagus* until recently. Alas, *Nothofagus* has now been split into several new genera and none of our beeches are still in it. The most distinctive species is silver beech (now in *Lophozonia*), the only one not to cross with others. The other three are now in *Fuscospora*. Red beech and hard beech, although 'good species' in botanist's terms, are fairly similar and hybridise when they grow together. Black beech and mountain beech have been regarded as separate species but in fact form a continuum from the lowlands (black) to the mountains (mountain), with forms in between that are neither black nor mountain beech. We don't have – but need – a common name for 'solandri beech', which sometimes crosses with red beech where they meet.

The beeches are large (red, hard, silver) or medium-sized (black, mountain) trees. Red beech is the largest, up to 40m tall and 3m in diameter on the best sites. Hard beech is more slender and smaller. Silver beech is a stouter tree that can reach 30m tall over 2m in diameter. Black beech can reach heights of over 30m and diameters of 1m. Mountain beech, the smallest species, rarely exceeds heights of 20m and diameters of 1m. Lifespans reflect dimensions - red beech and silver beech can live for up to 600 years, hard beech 500 years, and black and mountain beech 350 years.

Distribution and ecology

Broadly speaking, beeches tolerate poorer soils and harsher climates than most other native trees, which usually means land at higher elevations less suited to farming than the lowlands where other forest species grow. Thus beeches and beech forest have survived much better than other forest types, and a disproportionate area of New Zealand's remaining native forest is beech forest. Although beeches grow with a range of other native trees, they are unusual in dominating the forests to the exclusion of most other native tree species. 'Solandri beech' (mountain and black) in particular forms virtually pure forests over wide areas and in many red and silver beech forests, there are few other tree species.

Each of the beech species has its own habitat preference, reflected in its distribution across the country. In a nutshell, red beech likes reasonable rainfall and reasonably fertile soils and so occurs in many parts of New Zealand but not the eastern South Island where it is too dry. Hard beech probably does too, but can tolerate drier climates and less fertile soils. It generally needs warmer climates than red beech and so occurs all the way to the Far North but only in the northern part of the South Island. Black beech is the most drought-tolerant and not fussy when it comes to soil. Its upland version, mountain beech, tolerates poorly-drained soils (which effectively can be droughty) and, of course, cold climates. So together, black and mountain beech occur in many parts of the country but especially the eastern side of the South Island. Silver beech likes high rainfall and reasonably fertile soils, tolerates colder climates than the others, and is at its best in western Southland. Its timber was known as 'Southland beech' for a long time.

Compared with many native hardwoods, beeches have reasonable form even when grown in the open. As always, open-grown trees have shorter trunks and deeper crowns. Trees growing at higher altitudes tend to be stout. Root buttresses are a feature of large trees on sheltered lowland sites and is particularly a feature of older red beech.

Beeches start flowering from an age of about 20. The wind-pollinated flowers are followed by wind-dispersed seed shed in autumn. The beeches are famous for their 'mast' seeding – light seed crops in most years and occasional much heavier crops. In mast years in black and mountain beech forest, the whole forest canopy can turn red.

Because beeches regenerate prolifically in existing forests, relatively few plantations have been established. Nevertheless, they are amongst the fastest-growing of all planted native trees and have good prospects for plantations. A substantial number of small beech plantations have been established since 1900, mostly in urban parks and on private land. Red and black beech are the most widely planted species, silver beech less so.

More information

If you are interested, more detailed information on all aspects of this important group of native trees is available in an attractively illustrated bulletin ***The New Zealand beeches: Establishment, growth, and management*** by Mark Smale, David Bergin and Greg Steward with photography by Ian Platt, one of the New Zealand Indigenous Tree Bulletins published by Scion. The bulletin is free to members of Tāne's Tree Trust or \$20 for non-members. Request your free copy or order a copy from Tāne's Tree Trust at office@tanestrees.org.nz.



Beech dominant upland forests of the South Island.



Thinned and pruned black beech stand.

MEET OUR NEW TRUSTEES:



Jon Dronfield

Jon is a forester and production manager for New Zealand Sustainable Forest Products on the West Coast and is responsible for the management of Forever-beech products from the forest to a market ready state. Jon has 20-years' experience in managing forests under sustainable forest management legislation and remains committed to the utilization of timber resources through the application of ecologically sensitive continuous-cover forestry.

Gerard Horgan

Gerard is an economist with over 40 years' experience in research, policy, and forestry/natural resource economics. He was a research economist with NZFS/FRI/Forest Research for 23 years, and then for three years worked for APR Consultants on business and community development. For the last twelve years, until officially retiring from MPI in May 2015, he was a Senior Policy Analyst responsible for collating MPI's log price series, and worked on various other resource related issues including bioenergy, water and climate change.



STAFF CHANGES AT TTT



With the rapidly growing operation of the OFOF (Our Forests Our Future) project the office has been under increasing workload and we have taken on an assistant to help Mel with the administration. So welcome to **Keri Anderson** who is now the PA to the EO and you will be noting her name on a number of future documents. We at the TTT virtual office in Hamilton are very grateful for the excellent management of complex funding arrangements given by Mel and now assisted by Keri and we welcome the new arrangement. The picture is of Keri in her other job as Church administrator.

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