Some old and new

Readers will find in this issue of the journal a revamped look that provides some old and some new. The name has returned to the New Zealand Journal of Forestry. There were a number of factors behind the name change.

Apart from the fact that many people have never really stopped calling New Zealand Institute of Forestry's journal the 'Journal' or the 'Journal of Forestry', it was becoming obvious that the forestry publications area was becoming crowded. We have New Zealand Forest Industries, New Zealand Pine and New Zealand Tree Grower as major publications in the print media. On the internet, Nielson Scott has already scooped the name 'New Zealand Forestry' making it difficult, if not impossible, to transfer the NZIF publication in the same name to this media.

What was required was a name which differentiated the NZIF's Journal in both the printed media of today and the electronic media of the future.

At the same time, it was also important to consider the role of the Institute's journal as the publication of New Zealand's forestry professionals. This meant finding something that would provide a contrast to the 'popular media' content of other forestry publications.

The search for a name which would suit both the printed media of today and the electronic media of the future, and which denoted the journal as being the publication of forestry professionals, has led us to the past – the New Zealand Journal of Forestry.

At the same time, readers will find a new look. Most will recall the long association of the Journal of Forestry with Rex Monigatti. After Rex's death last year we began the search for a new publisher. Business Media Services, based in Rotorua, will now be publishing the New Zealand Journal of Forestry. As part of the new look, 'Professional Papers' section has also been added to provide a place for article-length contributions that are not peer-reviewed.

Hugh Bigsby
Editor

New Publisher Old Supporter

First of all I would like to note with sadness the death of Rex Monigatti, the former publisher of the NZ Forestry. I have been a supporter of the publication for many years, enjoying the level of interesting and stimulating debate, as well as the more technical papers.

So when I became aware that the New Zealand Institute of Forestry was reviewing its publishing requirements, I was keen to be involved as I believed we could make immediate as well as long-term improvements which would bring benefits to the Institute and its members.

I should note that my wife, Sue Willie, and I are directors of Business Media Services Ltd, a professional editing and writing company, and Trade and Media Services Ltd, a publishing company. TMS Ltd, publishes the Southern Hemisphere Forest Industry Journal, a quarterly, subscription only publication.

We hope to achieve a balance between the professional and academic side of the publication and the commercial desire to increase more advertising revenue. In conjunction with our designer, Robyn McMillan, we have taken the first steps to achieving that balance with a readership survey supplied with this edition which will help guide future changes.

I am gratified that the Institute has taken the opportunity to choose a publisher from outside the metropolitan centres, although one at the very heart of the world of forestry. Based as we are in Rotorua, we believe we are well-placed to provide the best possible service to the forestry industry of New Zealand.

Our arrangement with the Institute is aimed at ensuring that both parties benefit from the enhanced publication. So for those members and readers who, like me, believe in what the journal stands for, we invite your commercial support. As the premier professional publication in New Zealand forestry, the Journal is the ideal vehicle.

Mike Smith
Publisher

Carter Holt

Bill Dyck
(General Manager – Forestry)
Peter Thomson
(Manager – Technical Services)

What is millennium forestry?

Carter Holt Harvey’s "Millennium Forestry" strategy was announced on 9 December 1998. Since then there have been several commentaries published in the media by business analysts, journalists, and foresters. The announcement prompts considerable interest in the fact that Carter Holt Harvey does have a forestry strategy for the next century, and is willing to communicate it to a wide audience. An important point though – it is Carter Holt Harvey's strategy and it certainly won't be appropriate for everyone.

Millennium Forestry is the product of more than 40 years of research and closer to 60 years of plantation forestry experience. Much of the research has been done at Forest Research (formerly FRRI) but also within Carter Holt Harvey, our previous NZ Forest Products. The company has a very extensive network of establishment, silvicultural, and breeding trials throughout our 330,000 ha of plantation forest, some of which are cooperative trials with Forest Research and other companies.

Millennium Forestry is not just about stopping pruning and thinning although this is certainly part of the strategy. It is really about making New Zealand radiata pine forest more profitable. Major components of the strategy are our advanced breeding programme, our ability to produce superior planting stock, practise site-specific forestry, ensure high survival rates and good growth, and the ability to add considerable value to the tree stem at the end of the rotation.

Short-rotation plantation forestry is rapidly expanding worldwide as traditional natural forest sources of wood are depleted or are reserved for their conservation values. For virtually all of the present century, New Zealand has led the world in softwood plantation forest development. Faced with inexpensive land and rapid tree growth rates in other parts of the world, New Zealand forest managers must continually reappraise the competitiveness of forestry practices and products. Forestry is not only about growing trees, it’s about developing and applying knowledge in a business environment. As a large corporation with many options for investment, Carter Holt Harvey has to examine the alternatives to investing in intensive silviculture. It has the opportunity to invest in processing and product technology as a means of adding value to the forest estate. All these decisions must be made
Harvey's Millennium Forestry

Pruning cut triggers debate

Pruning regimes have been a fundamental part of the New Zealand forestry success story. So when a company decides to go against the perceived wisdom and to stop pruning, it's taking a dramatic step. When that company is of the size and importance to New Zealand forestry providers, its reasoning for the decision is of great interest. Carter Holt Harvey Ltd, then the ripples will quickly spread beyond the immediate decision. In the following pages, a series of Comment pieces examine the issues involved. Carter Holt Harvey provides its reasoning for the decision.

Wink Sutton, who was in at the birth of the New Zealand clearwood philosophy, gives his views. Steve Crockery of Forest Enterprises Ltd discusses why silviculture regimes are important to investors. Ian Boyd of the Technical Education Board outlines changes to management strategies, and John Pearce provides a personal viewpoint.

Market considerations

Carter Holt Harvey currently has more than 20 years of pruned log supply from its own forests! A decision to stop pruning today won't affect pruned log supply for 20 years and does not affect the ongoing supply of pruned logs from other forest owners.

The New Zealand clearwood regime, pioneered by Dr Wink Sutton and others at Forest Research, has been profitable and will continue to prove to have been a wise investment decision for several years to come. However, projections suggest that as the recently pruned radiata pine stands in both New Zealand and Chile reach maturity, the current premium for pruned logs will not remain as large as it is. By 2020 there will be approximately 10 million m³ of pruned logs on the market, compared to less than 2 million m³ today.

Pruned logs produce long-length clearwood. While we expect the premium for pruned logs to decrease in 20 years time, we also expect there to be a strong market for radiata clearwood. It is currently possible to profitably manufacture high quality clearwood from short-length clear. Projections are that in 20 years time, processing technology will have further improved so that manufacturing clearwood from unpruned logs will be an even more attractive investment than today.

The role of genetics and tree breeding

Anyone who has seen radiata pine growing in its natural habitat in coastal California, or even the first rotation "old crop" radiata that was planted in New Zealand in the 1920s and 30s, will have been struck by the generally poor form and branchiness of the untended trees. Breeding, thinning and pruning were introduced to compensate for the natural coarseness of the species and to enable the final crop trees to be of superior form and volume. It is used to be said that if you didn't prune radiata pine, you would end up with only pulp.

Second-rotation plantings of radiata pine were initially made from seed sourced from the better trees. Today, after more than 40 years of tree breeding, Carter Holt Harvey is deploying our own specific crosses of elite radiata pine. Our control-pollinated seed orchards in the Awatere Valley and on Matakania Island are arguably the most advanced in the world. Here we cross selected parents of specific characteristics and produce seed that is rated by the New Zealand Radiata Pine Breed Cooperative's GF+ system and which is scored for wood quality, disease resistance, branching habit, as well as the all-important traits, form and volume growth. This seed is multiplied through vegetative propagation systems to produce planting stock that comes with a well-defined pedigree. In the nursery, stock is segregated by families, traits and physiological age.

We are applying "site-specific forestry" in order to match planting stock to site features. For example, specific families identified as exhibiting more frost tolerance can be planted in frost hollow; high performing crosses showing lower susceptibility to magnesium deficiency can be planted on sites where low magnesium is a problem; families with high resistance to *Dothistroma pini* can be deployed to areas with historically high incidence of infection; and breeds with finer branching and high stiffness can be targeted for very fertile, highly productive sites. This strategy of site specific management is becoming more and more refined as we employ sophisticated geological information systems to track soils and site information, predict crop performance and the need for management intervention.

Carter Holt Harvey's investments in embryogenesis technology, identification of elite genotypes and genetic manipulation will further enhance our ability to put the right stock on the right site for optimum performance.

Silvicultural prescriptions are a means to an end. Silviculture will always be worked out from various points of view and has an element of art as well as science. Silvicultural regimes must be based upon the diagnosis of the management unit, associated interactions with stakeholders, community and the environment, and the application of sustainable inputs, practices, and products. Over the past 20 years, planting stockings in Carter Holt Harvey's forests have fallen from over 1600 trees per hectare to sometimes less than 600 trees per hectare (Figure 1). Millennium Forestry will see CHH plant 555 trees per hectare on the majority of sites with confidence because:

![Figure 1: Change in Stocking Levels Across Carter Holt Harvey Forests Estate](image-url)

1. We are planting top quality stock. In-house research and a focus on technical standards and operational practice has lifted company owned nursery performance to the point where the consistent supply of high quality seedlings, juvenile and aged cuttings with exceptional survival and initial performance is a minimum expectation.
2. We have systems in place to monitor performance and intervene when necessary. Indicator pilots comparing best possible practice with operational practice have been used to achieve significant increases in survival and initial growth. Age 5 acceptability and survival studies help us to monitor the overall success of the establishment phase and determine appropriate establishment practice.

3. We have done it in the past. We first planted 555 stems per hectare on selected sites in 1991. Eight years on, growth and form in these stands is very good.

On some of our more problematic sites, where for example the soils are seasonally very wet and slopes are too steep to cultivate, we will plant slightly higher numbers of lower value material with the expectation of higher than usual mortality in the first year. Exceptional sites will require exceptional silvicultural practice.

While not all trees planted will be ideal, growth, form and survival levels are now so consistently good that selection thinning is being phased out.

For several years Carter Holt Harvey has limited pruning to the best performing sites in its forest. Typically 25-30% of the available age classes have met our standards for pruning. This level of pruning activity was similar to many New Zealand forestry companies.

The product of pruning is a butt-log with an outer sheath of knot-free wood where the branches have been removed. Stiffness, an important property for structural timber, is greatest in the butt-log of the tree. Turning this portion of the tree into long-length clearwood, commonly used for appearance grade and requiring little stiffness, does not make best use of the inherent properties of radiata.

Branch cluster frequency is greatest at the base of the tree. Whorl spacing increases from 0.1-0.5 metres between whorls at the base, to an average of 0.6 metres at 8-12m up the stem. Recovering clearwood by souching where it naturally occurs further up the tree is clearly an option worth considering, particularly as new developments in engineered wood products come on stream.

Pruning reduces the growth of the trees since it removes part of the growing crown. Pruning regimes also target fewer trees per hectare in the final crop in order to maximise individual tree size. These latter two factors together result in some 15% reduction in wood volume yield per hectare from a pruned stand. This volume reduction can be tolerated if the final value of the pruned wood compensates adequately. Projections indicate that it will not. We believe that in combination these factors mean that we will not receive an acceptable return in the future for the pruning investment.

It is easy to look at forest management requiring several pruning and thinning operations and call this "intensive forestry management." Carter Holt Harvey views intensive forestry management as identifying our view of the future, and developing and implementing programmes that will realise the vision. Intensive forest management requires developing and planting the best trees, understanding and improving the crop and the site, increasing productivity, creating value in the right place and time with appropriate technology. It’s about providing innovative processing partners with the specific resource they will need to produce the products their customers want so that competitive returns are earned for our investors.

Adding Value at the End of the Rotation

The annual harvest of logs from our own land is greater than 5 million m³. Implementing technology to maximise the value of the trees at the end of the rotation is extremely important, as there is a huge multiplier effect of any technology improvement. We have recently introduced the Timbertech tool to our log-making operations. This technology was developed by the URO/Interpine joint venture and is revolutionising the way we manufacture our trees into logs. While increasing the labour required to process stems at the landings, the additional revenue gained by using the tool to optimise cutting patterns more than compensates for the additional expense. Not only are we better able to match the existing resource to customer requirements, but we also gain a much more accurate understanding of the resource that we are harvesting.

Where to next?

Millennium Forestry will see several new technologies introduced prior to the start of the 21st Century. One of the more exciting technologies that we are in the process of commercialising in conjunction with a third party, is a log segregation tool. This technology will enable us to not only sort and allocate logs by structural and appearance grades, but also offers a tremendous opportunity to segregate according to fibre characteristics.

Millennium Forestry is a strategy to be more profitable and involves the application of knowledge through technology. There are many other technologies in the pipeline that promise to keep New Zealand at the front of world forestry well into the new millennium.

On Wednesday 9 December 1998 Carter Holt Harvey Forests (CHHF) announced the launch of the "Millennium Forestry" regime for its 330,000 hectares of radiata pine plantations in New Zealand. The objective is to clearwood (knot-free wood) but requires reducing pruning. Trees will be established at the final crop stocking (around 500 stems per hectare) and left until felling. The rotation age will be about 20 years (an age confirmed by Devon Mclean (Chief Executive, CHHF) in a radio interview on the day of the announcement). The company will source clearwood by the use of "sophisticated new log scanning equipment and other devices", and by post-harvest re-engineering wood processes (both will replace labour intensive forest management).

General opinion

For the current investor in Carter Holt Harvey (CHH) the shift to a lower cost forest management regime is attractive. For the next 20 years CHH Investors will continue to receive revenue from past silvicultural investments (and pre-pruning) while only making minimal investments back into current management.

Although the CHHF Milleniunm Forestry proposals may be a justifiable investment decision, the consequences for employment (and the economy) will be significant. By reducing plantation forestry to the absolute minimum, silvicultural employment will be limited to just a few tree planters in winter. Because Millennium Forestry will require very few management decisions there will be little need for managers and professional foresters. Because of the reduced need for staff at all levels there will be significant implications for all training institutions - private providers, polytechnics and universities.

The public image of plantation forestry could also suffer. Driving through kilometre after kilometre of untended and widely spaced trees will confirm for some of the public that plantation forestry is nothing more than wood fibre farming. The public perception could be that plantation forestry is an unsophisticated, low cost, and low quality industry.

Wink Sutton

Dr. W. R. J. (Wink) Sutton

The announcement

On Wednesday 9 December 1998 Carter Holt Harvey Forests (CHHF) announced the launch of 'Millennium Forestry' regime for its 330,000 hectares of radiata pine plantations in New Zealand. The objective is to clearwood (knot-free wood) but requires reducing pruning. Trees will be established at the final crop stocking (around 500 stems per hectare) and left until felling. The rotation age will be about 20 years (an age confirmed by Devon Mclean (Chief Executive, CHHF) in a radio interview on the day of the announcement). The company will source clearwood by the use of "sophisticated new log scanning equipment and other devices", and by post-harvest re-engineering wood processes (both will replace labour intensive forest management).

General opinion

For the current investor in Carter Holt Harvey (CHHF) the shift to a lower cost forest management regime is attractive. For the next 20 years CHH Investors will continue to receive revenue from past silvicultural investments (and pre-pruning) while only making minimal investments back into current management.

Although the CHHF Millennium Forestry proposals may be a justifiable investment decision, the consequences for employment (and the economy) will be significant. By reducing plantation forestry to the absolute minimum, silvicultural employment will be limited to just a few tree planters in winter. Because Millennium Forestry will require very few management decisions there will be little need for managers and professional foresters. Because of the reduced need for staff at all levels there will be significant implications for all training institutions - private providers, polytechnics and universities.

The public image of plantation forestry could also suffer. Driving through kilometre after kilometre of untended and widely spaced trees will confirm for some of the public that plantation forestry is nothing more than wood fibre farming. The public perception could be that plantation forestry is an unsophisticated, low cost, and low quality industry.

Wink Sutton, Plantation Focus Limited, 4 Kenwell Road, Rotorua, New Zealand