New Zealand

Tree Grower

Official journal of the New Zealand Farm Forestry Association

November 2016

Forestry and transmission lines

Harvesting small woodlots

Insuring some forestry risks

Fencing around woodlots

Steady prices for your logs

New Zealand Tree Grower
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From the President

Dean Satchell

As always, a hectic but interesting quarter has passed, with time somehow found for renovations to my family home and a beautiful eucalyptus floor.

At the Hokitika conference the NZFFA Council decided on a full day's meeting in Wellington, midway between conferences. I have responded by calling a meeting in November. My expectation is that such a Council meeting will become a regular event, with this meeting offering Councillors the time to discuss the nitty gritty of governing our organisation, with so little time available at the conference for robust discussion. I envisage the conference offering the opportunity to briefly and formally pass what was discussed at an annual mid-year Council meeting. I would personally like to see less discussion at formal conference sessions and instead a brief process of decision making, followed by more time for informative presentations.

I am shortly off to Tasmania for the Australian Forest Growers conference. I will be speaking there on my research into processing *Eucalyptus nitens* solid timber products. I note the large amount of technical content being presented at the Australian Forest Growers conference, which I really look forward to, along with being part of a New Zealand contingent flying our flag.

Revisions of three standards that support the use of wood in the NZ building code are underway. If it is not bust it is boom. I have been waiting for these revisions for several years and your Executive have supported me in covering costs representing farm forestry in all three standards committees (NZS 3603, 3602 and 3640). Our hope is to re-introduce specialty timber species back into common building practice in New Zealand. Neither the specialty woods partnership nor any marketing initiatives we take will have any real market impact unless we can achieve code-compliance for specialty timbers as building construction materials without major hurdles, as are currently in place.

The NZFFA are supporting the NZ Timber Design Awards by sponsoring the NZ Specialty Timber Award: 'The use of specialty timber in a manner that best highlights its unique characteristics'. This category is open to entries using New Zealand grown timber, from furniture to buildings, facilities to objets d'art. I look forward to the gala evening and a worthy winner for our award.

The newest joint NZFFA/FOA committee, the Small and Medium Enterprises (SME) committee has been very busy and submitted three sustainable farming fund applications to MPI, which will also be considered in due course by the Levy Secretariat and Forest Owners Association board, on which I sit. The SME committee held its first meeting and have lots on the agenda to improve the lot of the small grower. If you have issues you would like us to consider, or have skills to offer regarding issues unique to the small grower, please get in touch with me. We are also overseeing a levy-funded technology transfer package, beginning with an upcoming information resource on small scale harvesting.

A further project has gained executive support, namely the Developing Partnerships project, which aims to encourage planting and otherwise promote forestry. This project, if supported by the Forest Growers Levy, aims to increase the level of tree planting by forming partnerships between NZFFA and other primary sector organisations representing landowners.

The levy-funded research conference was held recently in Hawkes Bay, outlining some of the many areas levy-funded research is taking the forest industry forward. This was well notified to members and I have had reports back on how well received it was by participants. There really are lots of good things happening in the levy space, we just need to make sure we are proactive in the joint NZFFA/FOA committees regarding small grower issues that levy funding can address.

The joint NZFFA/FOA Promotions committee on which I sit is currently considering communication priorities around social licence to operate, industry profile and where the forest industry is positioned within the primary sector. I have confidence that our story and message will set forestry up for a bright future. This positive story might be in contrast to other primary sectors that appear to be struggling to adapt to a future where sustainability and the environment are becoming more and more important.

Forestry management around transmission lines

Avoid the shock with prudent planning

Geoff Wishart

For small-scale forest owners, nothing eats into profit more than special felling requirements at harvest time or having to fell mature edge trees. This could be in a hard to access mountain block or a plantation close to road, rail or electricity infrastructure. For the last of these, such as power lines, there can be a bit of a sting in the tail for forest owners, but a little prudent planning beforehand can go a long way to minimise that sting.

Transpower is the owner and operator of the National Grid – the network of high voltage transmission lines and substations that transport bulk electricity from areas of generation to towns and cities across New Zealand. Transpower is a State Owned Enterprise, owned by the government on behalf of New Zealand. There are no large batteries on the network, so the transmission lines are there to continuously take power to where it is needed 24 hours a day, seven days a week.

The core grid

The largest lines in the network, often called the core grid, operate at 220,000 volts, compared to your basic household power socket of 240 volts. The core grid use the big lines which are built through the middle of both islands. Many were built in the 1950s and 1960s as part of the large generation projects of the day. Branching off these and supporting smaller regional areas are the 110,000 volt lines – the remnant of New Zealand's first generation transmission network from the 1920s and 1930s.

Transmission lines are a little like George Washington's proverbial axe. Over their lifetime, some of which are already well into their seventh and eighth decades, you can replace the steel, wires, foundations, and in some cases the complete tower, but it still remains part of the same transmission line.

The wire space

While the line remains the same, something that does change daily depending on electrical current and environmental conditions, is the location of the wire in the space above the land. Greater electrical current will tend to make the conductor sag more, as will hotter days, and wind can cause the wire to blow out horizontally. As an example, a 600 metre span on a breezy day might see the wire blow out 22 metres in horizontal distance, and in that span the amount of sag could be as much as 35 metres from a theoretical straight line between the supporting towers.

Obviously, when you provide New Zealand's electricity there is an expectation that you keep the supply going, and Transpower has some statutory rights to allow it to undertake its work unimpeded. This includes provisions under the Electricity Act 1992 to enter land to access works on its lines and, in the case of an emergency, without the usual notice period to landowners and occupiers beforehand.

Keeping lines and trees apart

So where do trees come in? As anyone with any understanding of electricity would appreciate, electricity and trees do not play nicely together, which is why Transpower has a legal requirement to maintain lines to prevent any tree-related interruptions to supply.

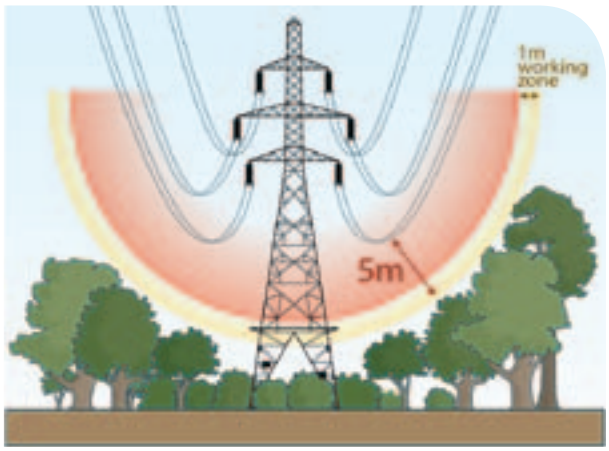
The Electricity (Hazards from Trees) Regulations 2003 set out the need to keep trees from growing into the transmission lines by –

- Defining safe separation distances between trees and overhead lines
- Specifying who is responsible for ensuring separation distances are maintained
- Placing potential liability on tree owners if the regulations are breached
- Providing an arbitration system to resolve disputes relating to tree trimming.

Like a lot of regulations, the devil is in the detail. They are not always easy to read, but there are some simple rules.

- Trees must not grow closer than four metres to an overhead conductor's lowest possible position including its blow out or high wind position – for safety. These are high voltage lines and you do not have to actually touch them to get an electric shock because a flashover can occur within four metres.
- Given that four metres is the minimum distance, and a competent person still needs to get close enough to trim or fell them, the regulations specify a five metre distance which incorporates a one metre notice zone.
- When Transpower's routine patrols notice a tree growing within five metres of a line they will get in touch with the tree owner.

A forestry crop is devalued if someone comes along at mid-rotation cutting a swathe through it, but that is what will happen if your trees get within the notice zone of five metres from a transmission line. Do not think this might not be noticed. Transpower's lines are patrolled at least once every year by its regional service providers Northpower, Electrix, Broad Spectrum, and Electronet, and tree violations are routinely assessed and managed.



If you want to avoid upsetting the regional service providers and having some of your trees cut down, think about what you are putting under the lines in the first place, and perhaps even consult with Transpower on what might be possible. They can provide advice on safe setback distances from their lines.

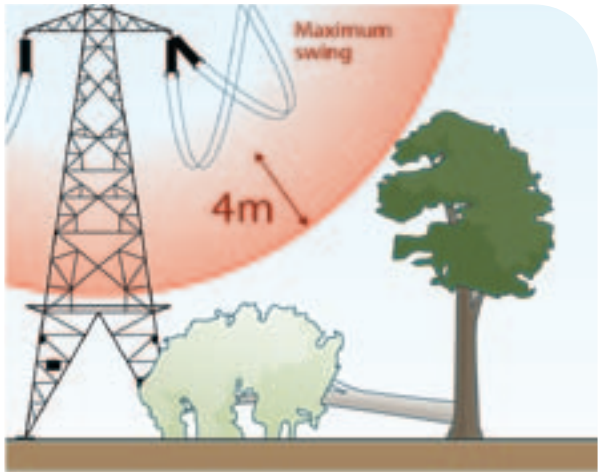
Falling trees

Trees growing into transmission lines are just one of the hazards, the other is the potential for trees to fall or

be blown into lines. Given the average height of New Zealand's commercial plantations at harvest is about 35 metres, compared to an average height of transmission wires at 15 to 20 metres depending on topography, no rocket science is needed to see that trees have the potential to take a power supply out if they are too close. While that might not worry you initially, just remember that the act of the tree fall itself could cause a flashover where the electricity arc from the line ignites the tree and also potentially the rest of your forestry block.

Additionally, if your trees are within the fall distance of a transmission line, you will not be able to remove them safely at harvest time without talking to Transpower on how and when to do it. The Health and Safety at Work Act has really tightened the obligations to manage risk of activities within your domain. While there is a question over definitions applicable to working forests under the Act, it would be a brave forest owner who allowed anyone to remove trees near transmission lines without getting the consent and cooperation of Transpower. Industry guidance supports this with the forestry Approved Code of Practice requiring foresters to reach agreement with the asset owner when harvesting within two tree lengths.

Sometimes the line might even have to be taken out of service just to ensure the risk is mitigated effectively.



This all comes with a cost such as –

- Likely work scheduling changes which might mean mobilising a crew more than once
- Engaging competent people to oversee the electrical safety aspect of harvesting remembering that they have to be competent with high voltage transmission
- Hiring specialised equipment that might be needed to undertake the harvest.

Plan ahead

It all comes back to prudent planning at the outset to prevent these problems. Transpower encourages all forest owners to talk to them about harvesting and replanting. It is always better to avoid the problem than having to solve it at harvest time, or after planting and before maturity. Transpower can supply electrical safety supervisors and advice on harvest plans.

New Zealand's terrain is varied, and there may be opportunities to grow trees closer to power lines than you think. For example, in valleys spanned by a transmission line where clearances are in excess of 40 metres. Transpower has some methods including a Lidar derived digital terrain model which can help identify the conductor heights and distances from ground along line spans. These will help forest owners understand where it is acceptable to plant and where to avoid.

Geoff Wishart works in Transpower's Customers, Stakeholders and Environment team, and has recently been involved in updating Transpower's land owner guides, including on managing vegetation near transmission lines.

For more information

In the first instance contact Transpower's service providers for your region:

North Auckland and Northland
» Ox Wightman 029 771 1825

Auckland
» Howard Warren 021 546 628

Waikato
» Les McKenzie 021 945 284

Bay of Plenty
» Carey Sutton 027 600 537

Taranaki and Central North Island
» Andy Ward 021 357 935

Wellington, Manawatu, Wairarapa and Hawkes Bay
» Stephen Howard 027 490 9464

West Coast Nelson/Marlborough
» Isaac Hurst 027 535 5255

Canterbury
» Myles Stichman 027 477 9693

Otago/Southland
» Jimmy Cormack 021 357 996

Harvesting a small woodlot Trials, tribulations and lessons

Gavin Adlam

In 2015 we engaged a contractor to harvest our small block of pines – approximately 2.5 hectares – on our six hectare block. The trees were planted in about 1994 and 1996 before we bought the block in 2003. Our vision was for this to be carried out over a short period and with a minimum of disruption to our lives and property. The hope was to earn enough money to pay for restoring fences and for cultivating or planting the harvested area.

In fact, the project fell short of our expectations in several respects, although we eventually managed to get a reasonable result. This is a brief account of our experiences and some of the lessons which can be taken from them.

The older crop had been pruned and thinned in about 2001. Apart from that, we knew very little. With some guidance from Hamish Levack, and in making our own plans for the land, we decided to remove some of the trees to make way for orchard and amenity plantings. We retained the rest of the trees and arranged for them to be thinned and pruned, with the idea that we would keep our options open. We also joined the Wellington Branch of the NZFFA with a view to learning more about pine trees and how they could be dealt with.

As we learned more, and as the pine trees grew, we came to realise that there were some constraints on our options for harvesting. Some of those constraints were self-imposed – we were developing our property with pasture, livestock, fences and other plantings. We did not want it compromised by logging operations.

Access to our property is constrained for the last kilometre by a one-lane bridge with a 20 tonne weight limit followed by 500 metres of gravelled, shared driveway. From the driveway to the skid sites was about 200 metres over a low ridge and across our best hay paddock.

The trees themselves were reasonably accessible for harvesting. About a quarter was growing on flat areas, suitable for skid sites. Another quarter was growing on easy ground adjacent to the skid sites and about half was on the banks of a steepish gully, interspersed with native remnants and other regrowth.

Background research

We thought about various ways of dealing with the trees. We visited several other sites on Wellington Branch field days, and we hosted a Wellington Branch visit, to show what we had and to pick the brains of experienced NZFFA members for ideas about how to deal with our crop. Several particular points came out of all this, including –

- The amount and quality of the crop was good enough to justify seeking a buyer
- We did not want a gravelled logging road built across our flat pasture, but it was adequate for trucks to drive over during dry weather;
- The weight limit on the bridge would be a severe and costly limitation, unless some way could be found to aggregate the logs on the other side into full truck and trailer loads.

One of the turning points was a Wellington Branch field trip in September 2014, hosted by Peter van Gosliga, demonstrating his techniques for harvesting a small woodlot. Peter's system was to use a large tracked excavator with a grapple and other log handling machinery, including an onsite de-limber, and to coordinate the sale of timber by a variety of channels including local sawmills, export and firewood.

We were still reflecting on this a few months later when we discovered that the pine trees on a neighbour's property were being felled and harvested using a similar system. We spoke to the operator, who explained that he had secured the use of some land immediately across our weight-limited bridge. This meant that logs could be carried across the bridge in permissible single truck loads, then sorted and aggregated on the other side for consignment of truck and trailer loads to the final destinations. After site visits and further discussions, the operator expressed a keen interest in harvesting our logs immediately he finished at the neighbour's property.

Managing the problems

We could see that there were some uncertainties and risks which we hoped to avoid or manage. As it happened, most of those risks became areality and they


The first of the trees being harvested


Part of the way through harvesting


The bridge with the 20 tonne limit


One of the trucks leaving to cross the bridge

turned out to be more difficult to manage than we had envisaged. Some old lessons were reinforced, and there were some new lessons for us.

We were assured that the whole job should take no more than a couple of months. This seemed reasonable as the ground was already dry and we were expecting a dry summer. However, we insisted on a sequence of harvesting which allowed for the creation of skid sites, followed by harvesting the trees from the steep gully area before the remaining less difficult area was harvested. In addition, we incorporated the remains of an old shelterbelt on the boundary with a neighbour at the top of our section. The trees – about 40 in total – could be extracted through the neighbour's property with close access to the gravel road. If work had to be suspended or terminated for weather or any other reason, we wanted to ensure that the trees still standing were the easiest for us to deal with later.

As each area was harvested it would be tidied, the slash either pushed over the bank where it could be left to rot or on the flat, stacked in burn piles to dry. Slash would be removed from the creeks. We got agreement from the contractor on what fences we would have to dismantle, and when. Fence lines would be left graded reasonably level and clear of logs or slash, so that we could reinstate the fences.

Discussions with contractors

The contractor offered a price of a few dollars per tonne of logs as removed from the property. The amount was not large, but definitely worth having and enough to cover the costs we expected to incur in reinstating fences and pasture and in planting the harvested areas. It was also enough to justify proper record keeping.

The operator explained that the work would be undertaken by a company for which he was, in effect, the operations manager, and he put us in touch with the managing director to discuss contract terms. In speaking to the managing director, I got confirmation of the company name and he promised to forward to us a form of contract.

We had a couple of follow-up visits during January 2015 which was fine and dry and would have been wonderful weather for harvesting. Although we had several contacts during that month, the start date was always about a week or so away. This was an indication that the contractor might have problems keeping to timetables.

Preparing the contract

I did make some progress on preparing a contract – which highlighted for us some additional risks. I searched the company details on the public register and

discovered that it had been formed only a few months previously. It meant that this was a new business, without a track record and no indication of how long it might continue in business.

The draft contract which the managing director sent to me was a template for harvesting, but did not provide for the sale of logs. Therefore, it seemed that the contractor was not very diligent about recording the proposed contract terms. Fortunately, that was a task in which I could claim some experience, and I was able to submit a fairly simple contract which, I believed, reflected all the matters which we had been discussing.

It is an old lesson, which served us well in this case, which is to insist on some form of written contract, and be involved in the preparation of it. The contractor's template may not be suitable, without amendment. In my view, the contract should at least serve as an operating manual for the project – set out the expectations which each side has of the other, the timelines and steps to be taken if things do not go as planned.

The process of discussing what should be in the contract is often an extremely valuable aid to everyone in clarifying their expectations of each other. In addition, where there are several people with an interest in the trees – such as in a family block, a trust, a company or partnership – the process of getting their agreement to the contract can be invaluable. It should ensure that their preferences are included and that if things do not go as expected, there is less likelihood of an internal dispute.

One area of risk which concerned the contractor and ourselves was health and safety. We pointed out that we had no expertise in the proposed operations and expected them to take responsibility for health and safety on the site. We identified any hazards which we knew of. They provided hi-vis vests to use if we wished to go on site, and emphasised the need to see and be seen. They also explained that the workforce had to be qualified for various tasks. This was all done by word of mouth – we did not insist on seeing any paperwork and they did not explicitly offer it.

Counting the loads

In our case, as we had no means of measuring the weight of logs taken, we agreed that the dockets for onward cartage would provide a record and be used as a basis for invoicing. The contractor would provide a buyer generated invoice for GST purposes.

In fact, the contractor's record keeping was reasonable for the first two months, but after that degenerated to the point where it was impossible to reconcile the logs taken with the payments. As it happened, principally out of curiosity and a certain obsession with counting things, we counted the loads taken off the property. This turned out to be very useful to us in the latter stages as it prevented the contractor disputing the quantities taken. The result may not have been more money for us, but it certainly reduced the likelihood of a messy and possibly expensive dispute.

The harvesting begins

The contractor's equipment came on site in late January, and at the beginning of February it rained. The crew consisted of the digger operator who was also the site manager along with one or two chainsaw operators and occasionally, a specialist tree feller.

From the outset the project did not go as quickly as we had hoped. The two months extended into a fifth month and eventually we agreed to terminate the project in late June. In the early period time was lost due to a series of machinery breakdowns and various reasons for personnel being off site. As the months passed, shorter days and more rain meant more time lost waiting for better weather and from dealing with broken-down or bogged vehicles. A considerable part of our pasture was churned into mud, and they managed to roll three or four logs through a fence around our native plantings, despite earlier discussions and our contract.

The contractor had an arrangement with a transport company to collect the logs from the skid site with a single truck and take them over the river to the temporary storage. From there, the same driver was able to take a fully laden truck and trailer to the destinations agreed with the ultimate purchaser – the port in Wellington or one of the local sawmills.

The first truckloads went out on 20 February, but there seemed to be difficulties in scheduling the trucks and by early April arrangements with the transport operator had apparently been terminated. Various ad hoc arrangements were made for transporting the logs to the assembly site across the river, all of which were erratic and time-consuming.

The contractor was highly incentivised to clear all stockpiles before the end of each month in order to get them delivered to their final destination and get paid. Because of the amount of lost time, this inevitably meant a big rush to extract logs whenever possible, and less attention was paid to cleaning up.

The end in sight

By early June the contractors had taken out the most valuable logs from the original skid sites and established a metalled skid site on the neighbour's property to take out the remaining logs through that route. This entailed a lot more travel with the digger over the already wet ground, pulling logs up to the access point and taking the slash down the hill clear of the skid site.

By the end of June it was evident that the crew had really done all that could be done. They had felled all the trees, taken the most valuable logs, made a much more comprehensive slash mess than we had contemplated, and they were a long way from completing the sort of tidy-

Removing the logs on the wet and muddy ground caused a few problems

Some of the fences were damaged by careless handling of logs which rolled down the hill

Some of the slash piled being burned

Harvesting over but still some clearing up to be done

up that we had asked for, and which they had agreed to.

In addition, the payments for April and May due in May and June fell short of what we had expected. When I discussed this with the managing director, the fundamental message was that the company had not been operating as profitably as he had planned and he did not expect to be able to pay the full amount.

He undertook some tidying up around our right of way and the neighbour's property, and we agreed that we would call it quits. As a result, we were left with most of our original plantation area covered in slash, mixed with logs. Some of these were already stacked in piles and many limbed and ready to extract, but very few big enough to have much value in the log trade.

The contractors left at the end of June. We had a wasteland of slash, much of it mixed with large branches, mud and small logs, completely unmanageable with our resources, and with rather less money in the bank than we planned. By that time, we were grateful to see them off our property.

The solution we found, which in the end was much more satisfying, was to engage a willing firewood merchant with a moderate sized digger. Over the course of the summer, he worked his way through the piles of firewood and slash, took as much of the firewood as he wished and stacked the slash into a series of burn piles – at one stage there were 14 ready for our attention.

Although the job is still not quite finished, we spent the summer tending fires, replacing fences and restoring the property to where we expected to be in autumn 12 months earlier. We were finally able to plant grass in the 2016 autumn over most of the harvested area.

Have you got anywhere to plant trees?

Jean-Paul Praat

This article about harvesting is from a slightly different viewpoint. The author was the investor and he wrote the article originally for those unfamiliar with growing a woodlot.

Have you got anywhere to plant trees? That is how it started, a question which led to a significant cash injection into a dairy farm business currently coping with the low payout. At the time of the question it was 25 years ago, on a newly purchased dairy farm on the terraces of the Oroua River, in the Manawatu. The farm had been running a mob of sheep on the steep, wet and shady sidlings which flanked flat productive paddocks of silt loam and this was not an attractive option for the new owner.

The catalyst for the question was an opportunity to which a forester had alerted a budding agriculturalist at university. It was suggested that for a cash injection of around $2,000 a hectare you could get a return of $20,000 a hectare in 25 years or more. In addition, if you did the work of planting spraying, pruning and thinning yourself, the only cash required was to buy trees and some herbicide, potentially as little as $300 a hectare. This was based on radiata pine clearwood regime and a saleable yield of around 500 tonnes of wood per hectare. There were risks. Who knows if the price in 25 years will be the same, but given the potential, it seemed worth it at the time.

The deal was agreed

Where could you find the land for this money-making deal? It turned out that you did not need to own the land. A forest could be established with the land owner retaining ownership of the land and the forester owning the trees. This solved a land management problem given the sidlings were unsuitable for grazing dairy cattle, prone to slips and if left unmanaged, would grow only blackberry and barberry. These days we would call this prevention of erosion and sedimentation of waterways.

A deal was struck. Tree ownership was registered against the land title for a set period with the new forester to foot the bill for the trees and manage the growing forest. It was agreed, via a contract, that returns from wood sold would be split 50:50 after harvesting and marketing costs had been deducted.

Planting begins

In winter of 1991 four hectares of radiata pines were established on the largest and most at risk area. In 1992 a further 10 hectares were established with the help of Taskforce Green which provided subsidised labour for on-farm projects such as tree planting. This included four hectares of alternative tree species such as blackwood, Douglas-fir and lusitanica. In the process of establishing the new forest, the dairy farm was further developed by the removal of large old macrocarpas, re-fencing, cow race upgrades and new troughs. The farm was bordered by a sealed road on two sides providing easy access to the forest blocks.

The advantage of this arrangement was that the farmer did not have to risk his capital or become sufficiently knowledgeable about forestry to manage the trees for profit or pay someone else for that expertise which could entail other risk. It can be difficult for someone not experienced in forestry to judge if work such as pruning or thinning is being carried out correctly and on time.

In this case land ownership has changed twice since the trees were planted. The current farm owners produce organic milk. Each successive landowner has enjoyed the benefits of improved property value due to the land stabilisation, aesthetic value and provision of shade and shelter for livestock. Landowners are unlikely to establish forestry if they think they may sell in the next five or 10 years. A partnership under the Forestry Right system can overcome this hesitation.

Forest management

The work of pruning and thinning was carried out by the investor and his contractors. It was suggested at the time that one person could tend eight hectares of forest with weekend and holiday work. When the forest was 10 years old over 100 tonnes was harvested as production thinning. While it felt good because logs were sold and not simply thinned to waste, the harvest

income was about equal to thecosts. Generally, it is more cost effective to thin to waste rather than production thin unless harvest costs are low and log prices are good because, although it is marginal economically, damage to remaining crop trees may result during the process.

Several major slips occurred during the first five to seven years of forest growth. These slips were planted with poplars to stabilise soil and improve the quality of pines on the slip edges by keeping branch size in check. In later years, notably 2008 and 2015, small areas of the main blocks were knocked over by the wind. In late 2015, just under 25 years since planting, and a minimum age for harvest, with some risks now clear it was decided to assess potential income.

Choosing a harvest manager

Several harvest management companies were approached, some never returned emails or telephone phone calls. It seems that not all harvest managers are interested in harvesting farm woodlots. After some initial discussions Forest Owners Marketing Services assessed the stands of pine in October 2015 and indicated a nett return after harvesting and management costs of around $10,000 a hectare. This was below target so at that stage it was decided to keep the trees growing.

That is the beauty of a productive forest, you have about a ten-year window in which to harvest, quite unlike a vat of milk or a prime lamb which must go to market almost irrespective of the available return. By February 2016 there had been noticeable rise in log prices and Forest Owners Marketing Services was again contacted. Re-calculation now estimated a nett return of around $20,000 a hectare. A 20 per cent rise in log prices had doubled potential nett returns.

The next question was to ask if there was a harvest crew available, which there was. As the blocks were close to the road and required no special roading, we were able to move quickly and two weeks later trees were coming down and logs were going out of the gate. This also coincided with dry conditions underfoot and good weather for harvest. The log price, contractor availability and weather all came into line for a potentially successful harvest.

A further question was raised about timing because waiting a further three years would add a significant volume of quality timber. However, given that the new farm owner wanted to recover some area for pasture and the investor had a new project to invest in, it was decided to go ahead with the harvest. Not all the forest was to be harvested, so any increase in profitability as a result of additional yield could be taken advantage of in the future.

Health and safety

The Health and Safety at Work Act came into force in April 2016 which was around the time the harvest started. The land owner was concerned that risks were managed and minimised. Hautapu Pine Logging was contracted to carry out the logging and already had a business relationship with Forest Owners Marketing Services.

The harvest manager put an environmental and safety management plan in place and took overall responsibility for these aspects. Particular consideration

Summary of costs and returns

	Per tonne	Per hectare	Total
Logging	$35.80	$17,930	$152,403
Cartage – road and rail	$29.20	$14,636	$124,404
Harvest management	$6.70	$3,357	$28,533
Other costs such as levy, re-fencing and machine transport	$11.00	$5,511	$46,840
Total cost	**$82.70**	**$41,433**	**$352,180**
Total income	**$135.80**	**$68,036**	**$578,306**
Nett return to be split 50:50	**$53.10**	**$26,600**	**$226,126**

was given to worker safety, sediment control and traffic management. Traffic management was required as some trees posed a risk of falling on to the road. Additional signage was placed at a distance from the road entrance because, although the road was sealed, it was only one way with poor visibility for about 1.3 km. The plan came to around 200 pages and was signed off by the land owner, harvest manager and logging contractor. This is a significant part of the project requiring specific expertise.

Harvesting begins and ends

Other considerations particular to this organic production site was that no chemical residues could be left on site. Petroleum products, paint and log dip were potential sources of concern. Petroleum products were managed to avoid spills, logs were raised off the ground for marking with paint and it was arranged that logs requiring anti-sapstain were treated off-site.

The job of harvesting and marketing amounted to around $40 or more a tonne. Some might be tempted to do the job themselves as the cost comes off your bottom line, but handling 4,000 tonnes of logs is beyond most people and there is also the management of health, safety and the environment to consider.

Logging was carried out mainly using a mechanical ground based system. Trees on steep upper slopes were felled manually while lower, shallower slopes were harvested by machine. Harvesting took about eight weeks between late February and early May 2016 using two excavator loaders, one tree processor and a grapple skidder.

Harvest analysis

A total of 4,264 tonnes of logs were sold from 8.5 hectares for an average yield of 501 tonnes a hectare. Costs included machine transport to site, harvesting, cartage, loading, commission on sales, traffic management, re-fencing, re-grassing and legal fees. The nett income or stumpage was $26,600 a hectare, about 33 per cent better than the initial estimate at the beginning of harvest due to a continuing rise in log prices and a better than anticipated log quality. A large range in log grades and lengths helped achieve this return.

Two modes of payment were offered. One was a variable rate based on actual returns at the time logs were paid for at the mill or port. This could be a good option on a rising market as it can be weeks between harvest and when the logs are actually paid for, and the method allows the forester to benefit from any rise in the price. The alternative, which was the option chosen in this case, prices were fixed and agreed on the first of each month during harvest and paid in the following month. This provided certainty to the forester in what can be a volatile business.

Approximately 800 metres of pines planted as a shelterbelt were also harvested. The income per tonne from this was about half that of the main two blocks because harvesting costs were relatively high, the quality of timber was relatively low and there was a significant re-fencing cost.

Conclusion

The decision on when to harvest is very important to the success of a farm forestry project. In this case the dairy farm and investor each received over $113,000 with some trees still to be harvested. The key to harvesting success was establishing a relationship with a harvest manager early and keeping in touch with movements in the market.

With the benefit of hindsight, I would suggest that it is never too early for this. Obtaining experienced harvest advice when you plant would be wise and can help avoid future losses. For the dairy farm involved, the income was welcome at a time when when successive payouts were low.

Traditionally, trees on farms are not valued on the books until they are cut down. However, having a profitable forestry block can improve business resilience by providing cash flow when income from pastoral enterprises is challenged by the market and the environment.

Dr John-Paul Praat is a director of Groundtruth Ltd and provides advice for sustainable land management.

The best is always in the middle

NZFFA Conference, Feilding 6 April to 9 April, 2017

Denis Hocking

Some years ago one of the Tui advertisements was 'I'm going to Palmy for New Year – yeah right', suggesting of course that Palmerston North and the surrounds are boring. Rest assured that this is certainly not a boring corner of the country. We may be Middle Districts but we are not middling. We incorporate the best of each end and a whole lot more as well. More on Tui later.

When you come to the 2017 NZFFA conference you will be visiting one of the oldest NZFFA branches in the country, with Middle Districts having been established in 1956. The Tararua branch, established in 1959 as Southern Hawkes Bay, amalgamated with Middle Districts in 2010 giving the branch coast-to-coast coverage, virtually the same boundaries as the local Horizons Regional Council. Farm forestry has a long and proud history throughout the region, with some notable farm forestry figures.

The challenge of diverse landforms

The theme for the 2017 NZFFA Conference is – The challenge of diverse landforms. It reflects the variety of landforms on which trees and forestry play important, even critical roles. The landforms of the Manawatu and Whanganui region, as well as Tararua and Horowhenua, include the rugged Ruahine and Tararua ranges through some very good hill country on relatively fertile mudstones, some more difficult hill country on highly erodible unconsolidated sands in the west and argillite on the east coast, to the fertile and versatile terrace and flood plain land. Another distinctive landform is the 100,000 hectares of wind formed sand dune country along the west coast.

Trees and farm forestry are important on all this land. The sand country has a long history of afforestation for sand stabilisation and farm forestry extending back to the 19th century. The coastal strip is mostly in protection and production forestry, protecting the more inland areas.

The highly erodible hill country has been recognised as needing more tree cover for soil conservation since the Catchment Boards were established in the late 1940s.

The erosion on these slopes can be a threat to hill country terraces

More recently, in the wake of the flooding and erosion damage of the 2004 floods, Horizons Regional Council established the Sustainable Land Use Initiative, with one key role being more afforestation of the highly erodible, class 7 hill country. Needless to say, the manuka honey rush has reached the region, with all the spin-off effects.

Good commercial return

However, farm forestry has been much more than just a soil conservation measure, it has also been a nice little earner. Numerous farm foresters can attest to the commercial value of forestry blocks on the hills, the sand and the terrace country. This is not new.

In 1963 a Massey University masters' thesis – An economic comparison of forestry and agriculture by A H Chisholm – demonstrated the superior returns from forestry compared to other farming operations on the drier soils of the coastal sand country.

It is not all radiata pine. Cypresses thrive throughout the region, there are magnificent old redwoods which have given growers, including the NZ Redwood Company, the confidence to establish a sizeable redwood resource. Many of the high quality eucalypt species are also being grown with considerable success.

The NZFFA Conference

The 2017 NZFFA Conference will be based in Feilding over four days, from Thursday 6 April to Sunday 9 April with an optional fifth day on Monday 10 April. Thursday 6 April will include the Branch Management, Council and Annual General Meetings in the morning, with the industry speaker session in the afternoon. Some of the industry speaker sessions will be covering familiar territory but two presentations are especially notable.

One will be a talk on mycorrhizal fungi in forestry by emeritus Professor James Trappe and Todd Elliot from Oregon State University. The other is a presentation by high profile, primary industries commentator, Ian Proudfoot from KPMG. The exact programme is still being developed, but will include talks by Scion, representatives from the Forest Owners Association and the Forest Growers Levy Trust, as well as information on the local geology. There will also be a presentation of the Horizons Regional Council's work to mitigate erosion problems with afforestation and better land management.

For those who would prefer looking at trees to meetings and talks, a bus trip around northern Manawatu parks, gardens and plantings will be available. The opening dinner will be held on the Thursday evening.

Friday meetings and field trips

Friday will start with action group meetings. In the case of the Sequoia and Cypress Action Groups we are planning to 'banish' them in the morning to the NZ Redwood Compnay's Ohutu forest near Hunterville. This forest is mainly redwood, also includes cypress stands and eucalypt trials. The action groups may choose this site for their meetings.

The main conference party will also leave at 10.00 am to visit the Williamson and Dermer farm forestry operations. These properties on fertile terrace country close to Feilding both have a wide variety of species and plantings, with the Dermer property having won the North Island Farm Forester of the Year award in 2014. The awards dinner will be held on Friday evening.

Saturday field visits

Saturday will feature the coastal sand country. The first visit will be to the Santoft coastal protection and production forest to look at fore dune management and production forestry on land which, 60 years ago, was drifting sand. This is mostly State Forest with Ernslaw One having cutting rights. Some areas have been returned to local iwi.

We will then move on to the adjacent Dalrymple property, Waitatapia. This is a large, mainly sand country, cropping and finishing property, notable for extensive irrigation and high technology land management, but

The terraces and cliffs of the Rangitikei River tell a story of erosion, uplift and changing climate


Sand country today regarded by some as ideal farm forestry country

forestry still plays a major role. It provides an excellent case study in evolving land use and the role of forestry.

During the afternoon the alternative species enthusiasts will move to Denis Hocking's nearby Rangitoto farm. His is on the bigger, higher, more inland Foxton phase dunes and has a wide diversity of alternative species including mature stands of cypresses and various eucalypts. The rest of the conference attendees will see more of the Dalrymple property before catching up with the alternative species group.

Sunday visits and dinner

Sunday will feature a trip through very different land forms, including country that few visitors get to see. We will travel through the superb Kiwitea country to view the spectacular erosion of nearby Goulter's Gully. From there we will travel down the western side of the Pohangina valley viewing the severe erosion and remedial afforestation, including a lot of Sustainable Land Use Initiative plantings, which have been undertaken in a production and protection role. We will have regional council staff and geologists from Massey University to explain what is going on.

From there it will be over the Saddle Road, just north of the Manawatu Gorge, with a stop at the wind farm and then on to Murray's Nursery. This long established forestry nursery is now owned and managed by Patrick Murray. He has adopted a high tech approach to seedling production and in particular, is trying to reduce fungicide use to enhance mycorrhizal levels in seedlings. This will bring our American guests back into discussions and promises to be a very informative afternoon.

I said we would be coming back to Tui, and so we will. The Sunday evening dinner will be at the iconic Tui brewery at nearby Mangatainoka.

Monday optional visits

Officially the conference will end on Sunday night but we have planned a trip to Whanganui for the Monday. The main feature will be steep land harvesting in one of the Whanganui hill country forests, but there will be an alternative trip to the protected indigenous forest of Bushy Park and some of the other notable parks and plantings around Whanganui. There will be the option of an early return to Feilding or the airport for people wanting to leave during Monday afternoon

Feilding is a neat little town, notable for its sale yards, the biggest in the southern hemisphere, and its Friday farmers' market. We are working to keep registration costs down and in terms of value for money, we are confident that it will be as good or better than any NZFFA conference you have attended. We look forward to hosting you next April.


The peace and serenity of the Pohangina valley belies the instability of the surrounding hills

Pathways to Building Code compliance for farm totara timber

Dean Satchell, David Bergin and Paul Quinlan

Building Code compliance is essential for developing timber markets for any tree species. Therefore, understanding the labyrinth of the regulatory framework and knowing how and what to do in order to achieve such compliance is a necessary step. This has been the focus of a recent Tane's Tree Trust project for farm totara.

Totara is a prominent feature of many Northland landscapes. Because it is relatively unpalatable to grazing stock, farm totara regenerates so prolifically that many pastoral land owners have regarded it as a weed. However, over the last century or more, substantial areas of second-growth totara-dominated forests have developed on private land in the region.

The Northland Totara Working Group sees an opportunity to develop a regional industry based on the sustainable management of totara as a specialty timber. A functioning supply chain linking the resource to markets is required. However, at present, lack of compliance with the Building Code is a significant restraint which needs a solution.

Why we need code compliance

Market potential for farm totara timber would be significantly improved by complying with New Zealand's performance-based building code. A range of products and applications have the promise of market demand but these are not currently given consideration because they are not code compliant. Code compliance requires evidence of structural and durability performance, even for such low-risk uses as interior linings.

The path to compliance would require research and testing, particularly into levels of durability, followed by lobbying for inclusion into compliance documents based on the evidence obtained. The broader concern, one which producers of farm totara are currently facing, is the need to understand and quantify the physical properties of the timber and to get the necessary research carried out to produce the required evidence.

Pathway to code compliance

Research and actions to achieve code compliance of farm totara timber with the Building Code are set out in the recommendations of the full report. Durability performance is a main part of compliance and the Building Code gives guidance for the expected service life of different building components. These vary from only five years for interior linings to 50 years for structural components that are not easily replaced.

Durability performance of farm totara interior linings is well proved and does not require testing. However, other farm totara products which require testing for levels of durability include structural timber, exterior cladding, exterior joinery and decking. Durability performance of structural elements would need to be compared to H1.2 treated radiata pine and untreated Douglas-fir, both being code-compliant under different circumstances. Exterior cladding and decking should be tested in service for evidence of meeting the 15-year durability performance required, along with accelerated decay testing to compare natural durability of farm totara with H3.1 radiata for cladding and H3.2 radiata for decking.

A mechanism for change

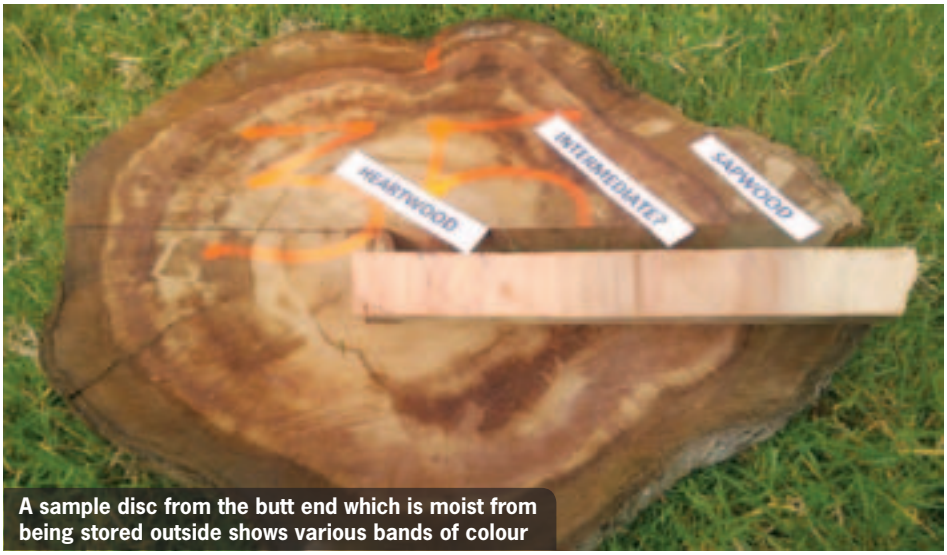
The NZFFA has representation at various committees led by Ministry of Business, Innovation and Employment and Standards NZ looking at changes to the Building Code. This representation is essential for minor forestry species with special properties such as natural durability. A seat at the table ensures that those interests are served, but this needs to be backed by evidence of code compliance.

Timber properties which have natural durability, are unfavourable for chemical impregnation or induce processing and drying, all contribute to decisions on the product mix options. Because there is limited knowledge on timber properties of farm totara, selection of pathways would mean testing wood properties to determine appropriate products while simultaneously determining code compliance.

Therefore, it is suggested that two visual grades for farm totara, based on timber colour, should be tested for durability in all applications. These are 'heartwood/intermediate wood' and 'intermediate wood/sapwood'.

Farm totara with a diameter at breast height of 75 cm before felling

The knotty, slab-grade butt log shows several bands of colour in cross-section at the large end



A sample disc from the butt end which is moist from being stored outside shows various bands of colour

The end of a top log from a young farm grown totara tree also reveals bands of colour

Visually graded samples of sapwood/intermediate and heartwood/intermediate grade farm totara timber for testing

Visually graded samples of farm totara timber have been provided to Scion as part of this project for the purposes of wet frame testing for durability performance. However, it will be several years before the results are available.

More needs to be understood about relative durability of farm totara in relation to tree age and radial position in tree. Until then, such differentiation based on colour is based on industry experience regarding the likelihood of significant differences in durability performance that would lead to commercial products which are suitable for the purpose required.

Results from a well-planned and targeted testing programme, would provide the evidence required to lobby the Ministry of Business, Innovation and Employment for inclusion of farm totara in compliance documents such as NZS 3602 *Durability* as an 'acceptable solution'. This would mean that Building Consent authorities could not question the suitability of the timber for the application. This would allow architects and designers to specify farm totara timber without hesitation for applications requiring code compliance.

Incentive for developing regional based industry

Preliminary studies confirm farm totara is potentially a high quality native timber with strong market interest. Removing the uncertainty around Building Code compliance, particularly relating to durability performance, is likely to have an immediate and significant effect on market demand and greatly increase the potential value of the resource to land-owners.

It is also likely to stimulate greater interest in management of the substantial resource of farm totara in Northland and many other regions of New Zealand where totara is naturally regenerating on private land. Of course, industry would need to take advantage of this opportunity and develop markets, but interest is increasing in doing just this for a range of locally grown specialty timbers.

This work has been funded by the Ministry for Primary Industries' Sustainable Farming Fund with co-founding from the NZFFA and Tane's Tree Trust. The full report is available for download on the NZFFA and Tane's Tree Trust websites.

Deaths and quad bikes

Julian Bateson

I am sure that many of you will have seen or heard recent news about deaths caused by quad bike accidents. Depending on whose figures you believe, the number killed so far this year in quad bike accidents is between 10 and 14, two or three times the 'average' of recent years. These figures are just up to the middle of October so there is still a sixth of the year to go.

WorkSafe have said that they are doing as much as they can with various inspections and prosecutions on farms where most of the accidents happen. However, they also said in an interview I heard on the radio, that there is little more they can do to reduce the accident rate. I am not sure how many quad bikes there are now as many are being replaced with the much safer side-by-side vehicles. Common sense would suggest that if there are fewer quad bikes there would be fewer accidents, but this seems not to be the case. The only point I would make is to re-iterate that quad bikes are inherently dangerous, and the best option in my opinion is to use a different vehicle.

Reduced injury rates in forestry

The good news overall is that recent figures show a reduction in accident and injuries in forestry. These figures are from ACC. Those of you who read my safety articles will remember that WorkSafe are now aware of significant under-reporting of accidents at work and the most accurate figures are those supplied by ACC. This is because any injury which requires treatment is paid by ACC and so there is more precise reporting. The slight disadvantage is that the figures are historic, meaning that it takes a while to get the data.

Year	New claims to ACC
2011/2012	1,419
2012/2013	1,390
2013/2014	1,286
2014/2015	1,058
2015/2016	993

However, it is clear from the figures shown in the table, that between the middle of 2011 and the middle of this year the annual claims for compensation due to accidents in forestry have fallen steadily from just over 1,400 to under 1,000. We can hope that the trend continues.

Julian Bateson is the NZFFA health and safety representative.

Plantations can be very productive

Wink Sutton

On a visit to Poland in 2006 one of my Polish forester hosts was adamant that plantations of non-indigenous trees could not be as productive as plantations of indigenous trees. Non-indigenous plantations were also at much greater risk. Some overseas foresters, as well as some environmentalists, hold similar opinions.

Why do they hold such negative opinions of plantations of non-indigenous plantations? There is now ample evidence that, if planted on suitable sites, non-indigenous tree species can be very productive.

The experience with plantations in Saxony, Germany in the late 19th Century has been retold countless times. A plantation of Norway spruce, a tree species not normally occurring so far south, had poor growth and general ill-health. This early experience is the probable basis of many objections to plantations of non-indigenous tree species. In addition, plantations world-wide have been established as monocultures and many believe monocultures are not natural, even though there is ample evidence that in the temperate regions natural monocultures are not uncommon – see my comment in the August issue of *Tree Grower*.

Subsequent research of the site showed that the poor growth and poor health were because the site had limited drainage and waterlogged soils – the roots of the spruce trees were unable to penetrate below the topsoil. The site was totally unsuited to the species. Later research showed that local farmers had for decades removed the fallen needles for animal bedding, thereby depriving the trees of being able to recycle nutrients and therefore contributing to the site decline.

Successful plantations

As well as New Zealand's plantation experience there are many examples of successful plantations of non-indigenous tree species. The most dramatic example of plantation success comes from Brazil. The indigenous forest of the Amazon basin is very slow growing. According to the UN Food and Agriculture Organization, Amazonian mature forests only average 100 cubic metres a hectare of which only 12 cubic metres a hectare can be used. To the south of the Amazon, but north of the Tropic of Capricorn, are the eucalypt pulpwood plantations of Aracruz. There are reports of an annual growth rate of these plantations exceeding 50 cubic metres a year for each hectare.

In agriculture there are no concerns about the use of non-indigenous plants or animals. If New Zealand was limited to indigenous flora and fauna there is no way that we could support a population of over four million people. We would be very limited in what we could eat – fern shoots and roots, a few plants, native birds and seafood. We would have almost nothing to export.

Feeding the world

By having access to the biodiversity of the whole world and combined with selective breeding, the world has been able to feed over seven billion people globally. In food production the world has been very selective. The UN Food and Agriculture Organization estimates there are 250,000 to 300,000 plant species globally that could be eaten. However, humans consume only about 200 plant products. Although the latter estimate probably understates what is globally consumed, most of our plant food comes from only nine plants – with maize, wheat, rice and potatoes being the four most significant ones.

When we consider meat sources we have been even more selective. Most meat comes from cows and pigs while the consumption of sheep meat, venison and goat meat hardly register. When it comes to bird meat almost all comes from one bird – the chicken. We have been so selective because we have concentrated our breeding effort on the few species which are very easy to manage, very pleasant to eat and are very productive.

In the future less of our wood will come from managed indigenous forests. These forests are not only expensive to manage but also less productive and therefore less profitable. Because wood is essential to our life style and because wood is environmentally friendly and renewable, our wood will increasingly come from plantations. Most of these will be monocultures of non-indigenous tree species. In the future we will have no option but to parallel agriculture and concentrate on those tree species which grow fast and are very useful.

Pine trees powering the future

Michelle Harnett

We hear messages of doom and gloom nearly every day. Resources are being used faster than they can be replaced, greenhouse gas emissions are increasing, the climate is changing and rising sea levels will inundate us all. What if forestry is the solution to all these problems? A partial solution, anyway. It is time to include the concept of the bio-economy and forestry's vital part in it and think about how developments in forest products could shape our future.

A bio-based economy

The fossil fuel economy of our everyday reality is blamed for any number of environmental and political ills. Based on finite resources, it is not sustainable in the long term. An alternative is a bio-based economy, where sustainable and renewably-grown materials are used as alternatives to oil, gas and coal to produce food, energy, chemicals and industrial products at the same time as protecting the environment and mitigating climate change.

The move to a bio-economy is already under way. The European bio-economy is worth more than €2 trillion annually and employs over 20 million people. Forestry, with its large and sustainable biomass resource, is in an excellent position to lead the way in New Zealand. However, there are a few kinks to iron out first, including how to get the most out of forestry's resources and ensuring the sums add up. Working out how the forestry bio-economy might function is a major focus of Scion's Manufacturing and Bioproducts division, the side of Scion dedicated to turning wood into timber, other products and energy.

Planted forests are set to play a vital part in New Zealand's developing bioeconomy

Toughening up

The radiata pine backbone of New Zealand forestry is already a bio-product. Growing sustainably, it provides income, wider ecosystem services and stores carbon as trees and timber. But being a fast growing softwood has disadvantages. Radiata lacks the toughness and appearance of hardwoods, limiting its use in some applications.

Modifying the properties of wood to improve its performance is one of Scion's aims. It is possible to alter the function and appearance of pine by taking advantage of the chemistry of wood to change and lock its structure in place. Successfully altered, wood cell walls and the cell interiors are stable and attract little or no water, which eliminates swelling, shrinking and distortion. The altered wood is also more durable as it is often no longer recognisable as food by fungi and insects.

A simple way to do this is to heat wood in the absence of oxygen, known as thermal modification or torrefaction. The process is not new, as Vikings were known to treat wood in this way. Today, a number of commercial processes are in use around the world.

An alternative is to put out of action the reactive, water-loving chemical groups found in wood. These can be permanently modified by introducing new compounds into the wood by chemical modification. The introduced compounds can form links between water-loving groups, react with them and convert them into bigger, bulkier, water-repelling groups to form polymers that fill the voids that usually contain air in dry wood.

Commercial chemically-modified wood products include Accoya, which uses acetic anhydride to plump cells up to their original green volume, and Kebony, which uses furfuryl alcohol, a polymer that links with the cell walls. Along with increased dimensional stability and durability, the wood is often darker and resembles tropical hardwoods.

Removing water

To chemically modify wood, water first has to be removed from the wet wood then the chemicals need to be introduced. Technologists have been investigating dewatering wood and further modifying it using supercritical carbon dioxide fluid extraction.

At the right combination of temperature and pressure – the supercritical point – a solvent acts as a gas and a liquid. In its supercritical state, carbon dioxide can quickly diffuse into the wood as a gas, interact with wood and sap like a liquid, then diffuse out removing the water. The supercritical process can be also be reversed to impregnate dyes, chemicals, preservatives and other functional compounds into wood. The substance to be introduced is dissolved in the supercritical fluid then deposited in in the wood.

De-watering is not a drying technology. De-watered wood looks and feels like any other piece of timber, it is heavier with a moisture content of around 40 per cent compared with 10 per cent for kiln dried timber. Scion has developed and built an automated lab-scale plant which combines de-watering and modification. Recent research has focused on understanding how the process works. The novel properties of de-watered wood are also being studied and modified to achieve desired hardness, colour and durability. An early application of the patented technology produces modified radiata pine with similar physical properties and appearance to wood such as teak.

Chemically-modified radiata pine with the hardness, durability and appearance of teak

Deconstruction and reconstruction

Wood is made up of cellulose, hemicelluloses and lignin. Products such as paper are the result of separating the cellulose from the other components. Extending the idea of splitting things into their constituent parts further, the wood components can be reduced to their basic building blocks, vastly increasing the options for new products to support a bio-economy.

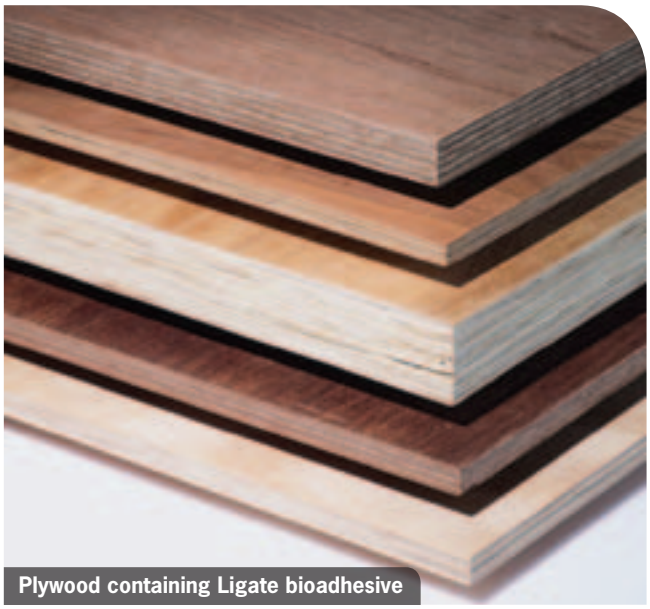
Nature's glue

Lignin can be thought of as the glue that holds the cellulose fibres, and the tree, together. The basic units of lignin contain what is termed aromatic rings. These are a ring of six carbon atoms, usually shown as a hexagon with a circle inside it. Aromatic rings are a feature of solvents derived from petrochemicals such as benzene. The name aromatic comes from the smell associated with the benzene compounds when first discovered.

Benzene, along with toluene and xylene, are important industrial hydrocarbons. Around 35 million tonnes are produced from fossil fuel sources worldwide every year and used to make a range of chemicals and polymers such as polystyrene and nylon. Lignin has the potential to be used as an alternative source of aromatic rings. Thanks to the pulp and paper industry, which has been efficiently and effectively separating lignin from cellulose for decades, large supplies of lignin are readily available.

Using the inherent chemical properties of lignin was the approach taken when scientists started to develop a petrochemical-free and sustainable adhesive for wood panel products such as plywood, particleboard and MDF. The result of seven years of work is a bio-adhesive made with renewably-grown ingredients, most of which are found locally. The development process also took into account how, and where, the adhesive would be made, and how it would be used.

The patented bio-adhesive technology has been trademarked under the name Ligate. Panel boards made with Ligate have very low emissions of health-damaging chemicals and have the same performance as standard products. Panel boards made with Ligate can directly replace those currently in use, helping people live more sustainable lives.



Plywood containing Ligate bioadhesive


Scion's wood dewatering plant

Attractive extractives

Wood also contains low levels of organic compounds, such as resins, waxes and terpenes, referred to by the general term extractives. These compounds usually play a role in protecting trees, whether it is from browsing animals, insects, fungi or microbes. Turpentine and rosin are two common examples obtained from conifers.

Extractives can be valuable. Due to their protective role, many are bioactive, with anti-microbial, antioxidant or other properties. The trick is get the extractives out efficiently and without damaging them. Traditional extraction methods include soaking plant material in water, alcohol or other solvents at different temperatures, often followed by evaporation or distillation to concentrate the active ingredients. These methods do not work well at an industrial scale.

Supercritical fluid extraction is one commercial option for removing extractives. For example, it is already used to decaffeinate coffee and extract hop compounds for beer production.

The sap removed from wood during supercritical carbon dioxide de-watering contains a range of interesting compounds, including pinenes, which are some of the most important constituents of pine resin and turpentine. Other parts of the tree and by-products of processing, such as needles or bark, can also be extracted the same way.

The path to commercial extractive products will include identifying the various extractives, separating and purifying them, followed by investigating which functions they might have. One form of pinene, for example, is known to be a bronchodilator to open up airways, anti-inflammatory and a broad spectrum antibiotic, as well as being used in industrial perfumes.

This development process has already started. Scion scientists are analysing the extracts from supercritical extraction and identifying the chemicals they contain using a chemical reference library. The work so far has produced some promising results, but before the analysts talk more widely about their findings intellectual property specialists are checking out if any of the discoveries can be patented.

Burn baby burn

Wood has been used as a source of energy for a very long time, early campfires, firing boilers to heat houses, power steam locomotives and generate electricity. In many forestry-related industries waste wood is burnt and the energy released is used somewhere in the process. Some operations are practically energy self-sufficient, burning bark, wood offcuts and sawdust to generate the steam and electricity they need.

The potential energy in wood can be extracted in ways other than burning. The process of breaking cellulose into simple sugars that can be fermented into ethanol is well known and being used worldwide. While it is currently cheaper to import sugar than to use forestry waste for ethanol production in New Zealand, wood has other rich sources of the carbon that equals energy.

Heating wood gently in the absence of oxygen changes its physical properties. Increasing the temperature of the process causes the wood to decompose into gases which can be condensed into a crude bio-diesel, and a solid carbon-rich residue called char. The process is called pyrolysis – from the Greek separation (lysis) by fire (pyro).

It is possible to use pyrolysis to produce bio-fuels. Being able to make biofuels for transportation would

Collecting crude bio-oil produced by Scion's pilot scale fast pyrolysis unit

increase New Zealand's fuel security and reduce greenhouse gas emissions. A small-scale fast pyrolysis plant, which can turn a kilogram of sawdust into 750 millilitres of crude bio-oil, was installed at the Rotorua campus this year.

Putting the puzzle together

New technology and products emerging from laboratories are all very well, but to contribute to the bio-economy they need to be scalable commercially and make sense financially. This can be particularly difficult in New Zealand, which is small in terms of population and demand but large when the distances between resources, manufacturing sites and ports are considered. We need ways to manage and integrate new technology and products within existing framework and, at the same time, invest in new infrastructure.

Building bio-refineries could be the answer. Bio-refineries convert organic materials, into power, fuel, fibre and chemicals, just as petroleum refineries produce multiple fuels and products from fossil fuel. Considering the existing infrastructure supporting forestry, sawmilling and pulp and paper manufacture, and combining them with some of the developments discussed here, it is possible to see how a bio-refinery might work.

More value from trees

Using a sawmill example, logs come in, are debarked, sawn and the timber is kiln-dried. Adding a supercritical extraction and modification unit to the operation would expand the range that could be produced on site to include high value modified wood and extractives from the de-watering process. Additionally, bark and wood waste could also undergo supercritical extraction or be subjected to pyrolysis to produce bio-fuel. Finally, any remaining material could be burned to provide additional energy for the site.

Extending the concept of combining operations, siting bio-refineries close to renewable raw materials and energy resources, and to other industries, opens up the possibility of cooperative relationships, or industrial symbiosis. When complementary industries are near one another, the by-products of one company can become the raw materials of another. Some of the advantages of this type of relationship are reduced operating costs, new business and job opportunities, especially in the regions, waste diverted from landfill and lower carbon emissions improve the sustainable credentials of New Zealand's exports.

New technology supporting the growth of bio-refineries and industrial symbiosis will be part of the transition to a bio-based economy in which forestry, wood and biomass feature heavily. The bio-economy will realise greater value from trees, with more on-shore processing and value added to resources previously considered to be waste.

Rising log demand and farm gate log prices will encourage investment in forestry. Alongside radiata pine, alternative species or trees bred with special characteristics, such as a high terpene content, are also likely to be become more attractive to grow. Benefits for foresters and the whole country will increase with more jobs, improved regional infrastructure and generally greater prosperity. The environment will also benefit, with wiser management of natural resources, reduced dependence on fossil fuels resources and greenhouse gas emission.

Michelle Harnett is the Senior Communications Adviser for Scion.

A Licorice Allsorts selection of forestry risk

Jo McIntosh

This month's article is a bit of a mixed bag, as reflected in the title. At times risk is a bit like a bag of Licorice Allsorts – not all of it to your taste and with a few surprises in the mix. I thought it worthwhile to touch on some topical and growing areas of risk affecting forest owners. I will briefly touch on the insurance implications of stumpage contracts, carbon pricing, drones and charter aircraft, along with a reminder about my favourite topic, that of standing timber insurance.

Stumpage contracts

First of all, let us look at stumpage contracts or selling forestry rights. Many of you will see the benefit in selling some of your assets and retaining others and it may be a good way to free up capital. In terms of forestry insurance, I often see contracts where a land owner has sold the land but retains ownership of the trees until such time as the trees are harvested. Alternatively, they sell the rights to harvest the trees but retain the land.

When engaging in these types of agreements good advice is imperative. I recommend that you always obtain a legal review when entering into such a contract but also talk to Aon to review any insurance implications. Some aspects to consider are discussed below.

You need to determine who retains the risk of financial loss if the trees are destroyed? Any contract you enter into should clearly set out who carries this risk and when that risk transfers. The transfer point needs to be very clear – for example, the transfer point might be once felled, or once the log has left the skid site. The insurance placement should mirror that risk transfer point.

The contract should also be clear on insurance. What levels of insurance cover should be purchased? What perils are covered? For example, when considering the trees themselves do you agree that it is reasonable that the cover is for fire only or should it be broader and include wind and other problems, such as weather landslip? What happens if the loss is caused by a problem that is not insured, difficult to insure or perhaps too expensive to be commercially practical to insure, such as disease?

Liability risk

The other area that needs to be considered and determined in these forestry right contracts is a very clear understanding on liability risk. Liability in these multi-party contracts can be tricky because who is ultimately liable will depend very much on the circumstances which caused the loss. In simple terms however, each individual should hold liability insurance for their respective rights and interests.

For example, if there is a health and safety incident on the land, Worksafe may pursue the harvesting contractor, the forest company and the owner of the trees. As another example, say there is a fire on your property. The rural authority can levy costs to control and extinguish that fire under the Forest and Rural Fires Act. Section 43 allows recovery from the person responsible for the fire. This might be fine if that responsibility is clear cut, such as a harvesting contractor causing the loss. However, if the cause of the loss is undetermined then the rural authority can use Section 46 to recover of costs from the eligible landholders of the forest area affected.

The Act defines land holders and any 'owner lessee, sub lessee, licensee, holder of permit, other person having a right lawfully to use or occupy the land'. Section 46 of the Act is also relevant and relatively broad. This is where there is a fire in the district and the authority levies landholders in the district. The Act refers to the ability for the Rural Fire Authority to levy –

- Any landholder in respect of any land in the district
- Any owner, lessee, licensee, possessor, or occupier of any property which was in the district at the time of the fire and was menaced by the fire.

In effect, the Forest and Rural Fires Act may be able to bring many people and companies into cost recovery. I would stress that each rural district applies and enforces the Act as they read it. Enforcement varies by region and circumstances, emphasising again that everyone needs their own separate liability covers for their respective rights and obligations.

Avoid extending liability

The other area to consider is when entering into contracts around cutting rights, or indeed any contract. You should be careful to not extend your liability beyond that which exists in normal civil law. For example, avoid signing any agreement to indemnify another party if that is beyond your normal responsibility at law. Liability insurers may deem this as being a contractual liability which is not covered. Once again, getting a legal review and good advice around insurance is the recommended way to go.

Carbon prices on the rise

Carbon prices have been rising recently, at last, and that is good for forestry as it gives forest owners another alternative income stream. However, as prices for carbon increase, so potentially does the financial effect of a loss of trees, leading to a potential loss of carbon sequestration. This is especially true if you have taken the leap and have entered into carbon trading.

You can insure carbon stock in a number of ways. One is a fairly blunt instrument where you simply add a dollar amount to your nominated values under a traditional standing timber policy. That might be effective, but keep in mind that it is not going to work for everyone.

Definition of loss

It is also important to note that the definition of loss under a traditional standing timber policy is not always going to work for a carbon loss. The definition of loss or damage under a traditional standing timber policy will refer to physical damage which triggers the tree to require righting or to die. That definition is fine for a plantation timber loss but perhaps not exact enough for a carbon loss.

The other option is you can purchase a suitable carbon policy that has been tailored to specifically cover forestry carbon risk. In these specialised policies, you will see that the definition of loss specifically refers to an emission leading to a decrease in the biomass. A tailored carbon policy will also have valuable options such as the ability to cover future carbon stock. However, forestry carbon cover is a particularly complicated area of insurance.

I suggest that the key is to try and keep things simple and go back to basics. Try to focus and think about values, and consider what can go wrong.

Contracts and carbon

I am concerned about some of the contracts I have seen floating around in the carbon space. I have seen a few where third parties have purchased the carbon and, as part of that purchase, have arranged insurance for the trees. From my reading of these contracts, there appears to be a number of unanswered questions.

The insurance limits often appear low especially when you consider the total value of the plantation and limited clarity around which party has precedence over any insurance funds. Who gets the money in the event of a claim? This might not be a problem with a small loss which is under the policy limit, but what happens if there is a large scale problem, such as Cyclone Bola? As a forest owner, I would not want to be left with a large uninsured tree loss together with a carbon trade debt. Again the solution is to get a thorough review. I would highly recommend engaging a carbon consultant and obtaining a legal review and pay close attention to insurance implications.

Flying risk

Aviation and forestry have been partners for a long time and the forestry industry has always been an early adopter of aviation innovation. Forest owners have often used aircraft to carry out survey work, spraying and many other activities. Today the trend is increasingly to use unmanned aerial vehicles or drones.

I think it is worth highlighting that aviation insurance is generally not covered by standard insurance policies. If it is covered, it often has many limitations and exclusions applying.

Like all risk it is important to consider what you are doing. Are you contracting another party to use aircraft or drone on your behalf? Are you the actual owner or operator? Have you chartered the aircraft? What happens if there is spray drift which affects the neighbours? What happens if there is an accident and damage to the aircraft?

Extending the policy

If you are contracting another party to undertake work on your behalf, one of the easiest ways to manage some risk is to ask the aircraft owner or operator to extend their policy to include you under their insurance programme as an additional insured in respect of liabilities. This extension should also include insurer's agreement to waive their rights against you. In the case of spraying contractors, it is recommended that you also ask for confirmation of their operators' aerial application liability policy which generally includes cover in the event of an error.

With a growing number of drones being used in forestry, we are seeing more and more mainstream general insurers offer extensions to standard property and liability insurance policies. We suggest however that this might not be the best way to cover this risk. A specialised policy will have broader definitions and broader coverage for agreed values which will likely be more appropriate. Aon has an aviation team which specialise in this aviation and flying risk area.

Agreed values

As you will note in the above discussion, the subject of values come up frequently. It is so important that when you purchase insurance you consider the basis of settlement of a policy and set your cover accordingly. In terms of the standing timber policy, we offer NZFFA members an agreed value policy and you nominate the value you want any claim to be calculated on. I suspect that a number of people still have values which are too low and do not reflect the real value of the trees.

Please take some time to dust off your policy and ensure it is in order. Finally, a reminder that we are pleased to offer advice to NZFFA members and that Aon pay a contribution to NZFFA for all standing timber insurance placements.

Jo McIntosh is an Executive Director for Aon and specialises in insurance for forestry and horticulture.

What you might not know about forestry and fencing

Neil Cullen and Hamish Levack

A quote noticed recently in the South Otago branch newsletter was by a founder and driving force of the branch, the late Vic Stephens. It stated that 'the best fences on the farm should be around the tree blocks.'

Most farm foresters can probably understand the sentiment behind the statement above because protecting young trees, especially in their first decade, from marauding mammals is an essential part of forest establishment where land use is divided between grazing and forestry. When feed supplies are tight on a farm, hungry sheep cattle or deer are going to try their utmost to access the apparent free lunch they can see inside tree blocks, and a well-constructed and appropriate fence is a must.

However, fencing and forestry are not always happy partners. While the crop of trees is growing, the outside trees can blow down, and because of heavier branching on the open side they usually fall out over the fence requiring repairs and patch ups. When it comes to harvesting the forest, access for heavy machinery and logging trucks will often require removal of considerable lengths of fencing which has to be resurrected to protect the next planting.

Sawmills, naturally enough, do not appreciate staples or sections of wire attached to logs when they pass through their bandsaws. Most logging crews are skilled at directing falling trees away from fences but where slope or access make this difficult it will pay to offer to remove the fence or understand if a tree rolls on it. As we found recently, post harvest root raking can also result in fence damage as dislodged root balls can become unguided bouncing wrecking balls.

The right fence

So what is the best sort of fence to put around your precious trees? Most farmers are well aware of the various options, the costs and how to go about putting up a fence. But many NZFFA members do not come from a farming background and may find they have to erect fences to keep out stock.

First, you have to decide what type of animals you are going to keep out or in with your fence and how long you want the fence to last. In some cases, a fence may be only required until the trees are large enough to withstand grazing, which with radiata pine may be only six or seven years. In that situation cheaper or more

Netting fence but without electrified wire


A sound strainer assembly

temporary options may be used, but in most cases it would pay to erect a fence that will last the length of the rotation. A well constructed and maintained fence will easily remain effective for 40 or more years.

If you want to keep out sheep and cattle, my choice of fence would be would be treated posts four to five metres apart with 90 cm high netting and a separate high tensile wire above and below with the top wire electrified. The netting and wires must be strained tight using wire strainers, straining boards or permanent wire strainers fixed to the fence.

To be able to hold and maintain that tension you need to have constructed a sound strainer assembly at each end of the length of strain. To achieve this, which is the key to a successful fence, you need to dig or drive in a 2.4 metre strainer post. You then need to brace it using either an angled stay on to an underground block or a horizontal stay on to a solid post which is tied back to the bottom of the strainer. This latter method, usually known as a box stay, is most effective and shown in the photograph. A fence of this description using all new materials and erected by a contractor will cost in the region of $15 a metre.


Post and batten fence

Various options

There are many different options available. Steel standards, commonly known as waratahs, can be substituted for wooden posts. They are cheaper, easier to carry and bang in the ground, and do not burn, but they are generally not as strong as wood and can rust away quite quickly if you are near the coast.

North Islanders for some reason seem to prefer posts with eight or nine wires and battens attached every hammer length. As tree growers we should encourage using more of the material we grow, but battens are labour-intensive and can come loose with time. There is a long term problem with copper-chrome-arsenic treated posts which has been identified by vineyards and organic crop producers. One of the main problems is how to dispose of them when they break or come to the end of their useful life. However, until we adopt a more benign treatment method or grow enough naturally durable species to produce posts which do not need toxic chemical treatment, there are few viable alternatives.

If only cattle are to be kept out by the fence, then the options are much cheaper. Three barbed wires or two electric wires on posts 10 metres apart could be sufficient. Electric wires are very effective as long as they are not shorted by long wet grass or tree foliage. If there is no electricity for a mains unit, there are reasonably priced solar powered electric fence units available.

If you are trying to keep rabbits or deer from your trees the fencing costs are going to increase. A South Otago farmer has successfully kept out wild deer from his newly planted native seedlings by topping up a sheep fence with two or three barbed wires. Costs can be greatly reduced by erecting the fence yourself especially if it is easy terrain with deep soils.

Contractors with their specialised equipment are probably the best option on steeper or rocky ground. It will always pay to level the line before starting with


New fence with three barbed wires

a bulldozer or digger. New fencing materials and tools are readily available. PGG Wrightsons and Farmlands have stores nationwide and there are many other local options. They also have videos available on how to erect fences correctly.

It pays to shop around for the best prices especially for treated posts. Specialist firms such as Goldpine in the South Island often have special offers and there are many small mills and treatment plants which sell direct at lower prices. Second-hand materials can be purchased at farmer clearing sales and there is always TradeMe to check for bargains.

Taking offence about a fence?

Disputes between neighbours over the liability for the cost of a fence can make life unpleasant. An understanding of the law relating to these matters may help avoid potential problems. The Fencing Act 1978 provides a set of rules that govern financial obligations associated with a fence erected on a common boundary.

Responsibility for the costs

Normally you and your neighbour are obliged to share the costs of building or repairing a boundary fence. If you want to initiate this, the first step is to approach your neighbour to discuss what work you want to do and how much it will cost. If your neighbour is uncooperative a formal procedure must be followed before you can do any work on the boundary fence and claim a contribution from them.

You need to serve a written notice setting out the details of your proposal. If the fence is damaged or destroyed, which often happens on tree boundaries, the person responsible for the damage is liable to pay the full costs to repair the fence. If you cannot reach an agreement with your neighbour as to who is responsible to pay, the matter can be taken to either the Disputes Tribunal or the District Court depending on the amount involved.

A give-and-take boundary

A give-and-take boundary occurs when a give-and-take fence has been built over the legal boundary of an adjoining property because it was impracticable or undesirable to build a fence on the boundary. Usually, this will have been due to the nature of the topography, or the presence of a lake or stream.

If a forester plants trees over the legal boundary but inside the-give-and-take fence, the forester does not have automatic ownership of the trees. However, it may be possible to gain ownership of them by way of financial compensation, or better still, by way of a forestry right negotiated before the trees are established. Once you have begun to spend money on your crop your bargaining position will be weakened.

Wandering stock

Damage caused by straying stock from neighbouring land is covered by the term known as cattle trespass even if the damage is caused by sheep or goats. As with human trespass, cattle trespass applies where land is crossed without the consent of the owner. Under the rules of cattle trespass the owner of the livestock is liable for the damage caused by the stock straying on to another person's land. However, it does not apply where stock stray on to a highway and then on to another person's land which is covered by a different set of rules.

If your property or land is damaged due to cattle trespass you can either claim damages or impound the trespassing stock. There are special statutory procedures to follow when impounding stock. Do not dispose of the stock by selling them because legally, that would be theft and you could be prosecuted. Conversely, if you own the trespassing stock, you can refuse to pay damages if you can demonstrate that the claimant's land was not adequately fenced.

There are other defences against a claim by your neighbour that your animals have been trespassing, such as that he consented to the stock entering the land, that the trespass was caused by the act of a stranger, or that your neighbour contributed to the trespass by his actions. Where you can establish a claim for cattle trespass the damages recoverable are those which are a natural consequence of the trespass such a damage to land and crops, chattels, and other stock. Yes, damage to young trees would be recoverable if cattle had eaten them or trampled on them.

Neil Cullen is a farmer in Southland and Hamish Levack a forest owner in the lower North Island. Both are members of the NZFFA executive, but these are their personal views.

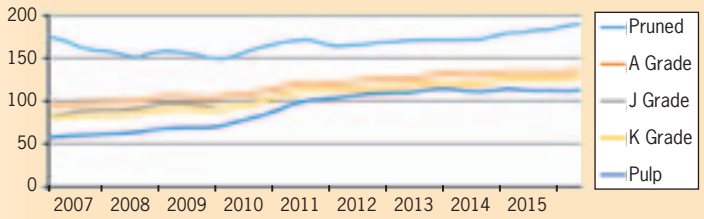
Selling your forest just became easier

Kim von Lanthen

The needs of forest owners change as time passes. Not everyone wants to keep their forest into the future. Children build their own lives, land prices rise, health fails, partners want to go their separate ways and Gold Cards start arriving in the post. For some it makes sense to sell their forests before harvest, and while the demand for immature forests and woodlots is not large, blocks quietly change hands all the time. Selling standing trees with or without land is a practical option. A new forest exchange has recently been developed to help standardise the process, and make it easier for buyers and sellers.

While international commodity prices have been soft to declining in the last five years, New Zealand log prices have been steady or increasing, albeit with a few bumps along the way.

Rolling average log prices from 2007 to 2015 on dollars per tonne



This trend offers some promise for landowners across the country who invested a long time ago and faithfully protected their forests through storm, drought and global financial crises. Those who planted in the 1990s should now be looking forward to a good reward for their long wait – all things being equal.

Of course there are many factors affecting returns which are out of the growers' control. Decisions around location, species, genetics, stocking and silviculture will have been made long ago. Harvest variables such as resource consents, forming or upgrading access roads and the availability of skilled contractors will fall where they may.

Better information

However, there remain two important points over which forest owners do have full control. The first is the spread of buyers that they can reach and the second is the quality of the information about their forest that they can produce. The wider you reach, the more likelihood of finding the right buyer. The better the information, the lower the risk and the more buyers that are willing to pay. Reach and risk can be within your control.

To help with both of these areas Commodity Markets has developed a specialised online exchange where forests and woodlots can be bought and sold. The exchange at www.forestx.com allows sellers to list forests and buyers to browse what is on offer by species, age, management regime, location, price, and type of sale. Examples of listings are shown below. Each is backed by more detailed information, maps and photographs that are also available

The principals of Commodity Markets are John Stephens and Kim von Lanthen, the latter is the author of this article and he has the experience of being a licensed statutory supervisor of over 150 forest partnerships, with a Financial Markets Authority licence. Supporting the exchange, the company has teamed up with Scion to provide forest owners with access to quality, specialised information they can give about their forests. Scion draws on decades of science to provide an assessment of each forest, covering more than 30 factors that help inform buyers.

Scion's neutral description of the resource covers the local area and the specific forest. Topics they report on include the following.

The local area –

- Land resource description, maps, soils and terrain
- Wood supply forecasts for the local area to help in harvest scheduling
- Possible risks from wind and disease by locality.

The owner's forest –

- Forest resource description and expected wood quality

	Radiata pine Untended Trees and land	15 ha	Planted 1996 20 years	East Coast	Fixed price	Closes 1/01/2017	NZ$99,000
	Mixed Untended Trees and land	60 ha	Planted 1991 25 years	Canterbury	Tender	Closes 1/07/2017	

- Forest productivity and growth projections to indicate future value improvement
- Indicative roading and harvesting costs.

Other sales –

- A summary of sales of similar forests and an indication of where this forest sits within the range.

The Scion report allows a seller to put comprehensive data in front of buyers, specific to their forest block. This provides transparency, reduces the cost to prospective buyers of gathering the same quality information in the due diligence process, and gives the buyers greater confidence in the seller and what they are bidding on.

In addition to this background information, the trading platform provides standard procedures for selling logs, standing trees, or trees and land. It accommodates a range of species and maturities and the options of fixed price, tender or auction. It has all been developed after consultation with a range of local and overseas buyers and investors, and is designed to give them clear information to make decisions and put bids forward. All buyers and sellers must first register with the exchange where the rules of involvement, terms and conditions of use along with privacy policy are set out in the registration document.

Site now up and running

Sellers can be confident that they are reaching a wide range of domestic and overseas buyers. Buyers can be confident that the rules by which their bid will be received and processed are clear and fair.

If you are thinking of selling your forest, you can browse the listings on the exchange to see how other forests in your region have been described. The trading platform is live, and currently has listings ranging in size from five hectares to 475 hectares, varying in price from $50,000 to an estimated $5 million, and located from the Catlins to Kaitaia.

Points to consider

Before you decide to sell or buy a forest you should look at what methods other sellers are using. For example, have they set a fixed price, are they or opting for tender or auction?

Consult your accountant or forest valuer to determine what price level is appropriate for your forest, and what type of sale method will get buyers to that level. A fixed price provides a direct signal to buyers. If you are not sure about demand and you do not want to give a price signal, consider a tender. If you know there will be buyer interest, an auction is a good means of getting the highest price from a group of competing buyers.

Take advice from a solicitor on how to document the specifics of your sale. Setting out the contract to match your own interests, settlement and the post-sale period can work to your best advantage. It is important to deal with things such as roading and access, as well as arrangements in respect of carbon liability associated with harvest. If you are keeping the land, you need to know when you will get it back for the next rotation. It may be that you want a sale without any conditions from the buyer. To control this, use a prescribed sale and purchase agreement that discourages or disallows extra conditions, and make it available to potential bidders before the sale process.

Take advice from an accountant on your tax position. Income from the sale of standing timber is assessable for tax, but there are spreading provisions that can help limit the effect.

Seller's guide

If you decide to list your forest using Commodity Markets, there is a seller's guide to lead you through how to register and make your listing. In addition to providing a Scion forest description report, make sure you include photographs and any reports from your forest manager that give the buyer a full appreciation of what you are selling. When the listing goes live on the trading board, be ready to take calls, answer questions and help potential buyers with due diligence.

It is probable that buyers they will want to visit the property. If you are not sure of your ability to answer the full range of questions likely to come your way, get support from a professional adviser such as a forestry consultant or forest manager.

There is no charge until the forest sells. If the sale goes ahead there is a charge 0.4 per cent of the transaction along with a further 0.4 per cent if you have commissioned the Scion report. This is a maximum of $8 for every $1,000 of sale price. For forest owners wishing to sell land and trees you should engage a suitably qualified land agent to act for you, either before or after you find a buyer.

The aim is to try and bring liquidity to forest investments and to bring new investors into forestry for the benefit of everyone in the sector. The hope is to encourage investment funds which are attracted by the returns from forestry but which need an exit mechanism for those interested only in the medium term.

Growers, farmers and other land owners should be able to sell immature standing trees to investors more easily. They will have the freedom to get forests established, manage them through their planned silviculture then realise their capital should they need it for re-investment while retaining their land and future land use options.

Kim von Lanthen is the Director of Commodity Markets (NZ) Ltd.

A safe workplace is free of alcohol and other drugs

Sue Nolan

This is the first in a series of articles about drugs in the workplace. You do not need to know everything about the subject, but it is very useful to have some additional background information before employing someone or signing a contract for work on your forest. The health and safety provisions in the contract should include a drug and alcohol policy. The more you know, the more confident you can be. Editor.

People affected by alcohol and other drugs pose a threat to health, safety and performance. Therefore, testing for alcohol and other drugs in the workplace is now common in New Zealand, particularly for industry which has safety-sensitive jobs – forestry falls within the safety sensitive category.

The Health and Safety at Work Act requires employers and employees to identify the risks of potential hazards and have procedures in place to manage and eliminate the risks. An alcohol or drug impaired person has always been identified as a potential risk. Therefore, a robust modern alcohol and drug policy and procedures, which include testing, should be a requirement for managing this risk. This article will focus on –

- Drugs which are commonly available in New Zealand
- Misuse and abuse of alcohol
- What companies should be testing for.

The article in the next issue of *Tree Grower* will focus on methods commonly used to beat the test and how to prepare a drug and alcohol policy and procedures for small businesses.

Traditional and current drug trends

Over the past few years there have been significant changes in the drugs which are readily available and are being abused in New Zealand. Until 2000, the most commonly available drugs were called depressant drugs because they slow a person's brainwave and central nervous system down. Typical adverse effects of an employee or contractor being under the influence of a depressant drug at work include –

- Slow reaction time and information processing
- Poor concentration
- Difficulty in measuring distances
- Short term memory and forgetfulness
- Uncoordinated and bad balance
- Fatigue and low output

Adverse effects of an employee or contractor being under the influence of a stimulate drug at work will depend on whether they are at work when they are high or crashing. The effects include those shown in the table below. Alcohol is the most commonly used and abused depressant drug but there are many others.

Cannabis

Cannabis is readily grown outdoors and hydroponically. The potency of cannabis is higher now than 20 years ago due to the elevated levels of the active drug component, THC or tetrahyrocannabinol. Hash oil is manufactured by extracting the resin from the plant material using

High	Crashing
Hyperactivity and alertness, being wired	Tired, poor energy
Focussed	Moodiness
Greater self-confidence and talkative	Low output
Euphoria	Poor quality
Superhuman strength	Paranoia
Reduced appetite and weight loss	
Unreliability causing mistakes and errors	
Erratic behaviour	Erratic behaviour
Aggression, violent behaviour	Aggression, violent behaviour

a solvent and concentrating the extract to a sticky oil which is a more potent form of cannabis. The international statistics indicate that New Zealand is the second highest user of cannabis per person in the world.

Opiates

These drugs include heroin, morphine, codeine and oxycodone. They are analgesic drugs used to treat mild to chronic pain. While it is commonly known that heroin is a highly addictive drug, the other opiates drugs also can cause dependency if regularly used. The most common form of heroin is manufactured from codeine preparations, such as panadeine tablets. The process involves extracting the codeine and cooking it with chemicals which will convert the codeine initially to morphine and finally an impure form of heroin. This unique Kiwi manufacturing process is called homebaking.

Benzodiazepines

Benzodiazepines are tranquillisers, sedatives and antidepressants which can legally only be obtained with a prescription. However, unfortunately some are readily available on the black market and over the internet. Drug users who regularly use stimulant drugs such as P often resort to these drugs to become sedated after being high.

Kava and LSD

Kava is made from the root of the kava shrub and traditionally use by Pacific Islander and ethnic Fijian Indians. It causes numbing and drowsiness and should not be used within at least 12 hours of reporting to work.

The other dug which was commonly available in the flower power period of 1960s and 1970s was the potent hallucinogen drug, LSD, commonly referred to as acid. While LSD abuse was not prevalent in 1990s, it has resurged since 2010. The effects of hallucinogenic drugs are to rewire the chemical signals in the brain creating the illusion of seeing sound and hearing colours. LSD is normally sold as a small square of brightly coloured absorbent paper called a ticket or a tab which is either swallowed or absorbed into the eyeball.

The new Millennium

Crystal methamphetamine

In 2001, New Zealanders decided they needed to be highly stimulated as well as depressed so the gangs worked out how to accommodate this need by starting to manufacture the very addictive drug crystal methamphetamine. The name given to the New Zealand brand of crystal methamphetamine is P. There are P labs scattered all over the country manufacturing this drug from the decongestant drug pseudoephedrine. More recently, large importations of crystal methamphetamine have also been seized, such as the $448 million seizure in June this year from a yacht in Northland.

For the past four years New Zealand has been one of the world's highest users per person of this drug. In some regions it is claimed to be easier to access P than cannabis and numerous houses are contaminated with the toxic by-products of P.

Ecstasy

Ecstasy or E is readily available and could be one of four or five designer amphetamine drugs. It has both stimulant and hallucinogenic properties and is a favourite of the rave dance scenes due to the mood altering properties and increased energy.

Cocaine

New Zealand does not yet have a significant cocaine problem but there has been an increase in importation over the past few years. The most recent was the $14 million seizure found in a large ornamental replica of a horse's head.

Party pills and herbal highs

Since 2000, there has been a wide range of imported drugs referred to as party pills or herbal highs which were being sold as legal drugs at local dairies and dedicated party pill shops until 2014. While these drugs are no longer legal to sell, they are readily available on the black market.

Party pills and herbal highs

Most of them have a mix of stimulant and hallucinogenic properties, such as BZP, DMAA and Salvia. Some of these are now categorised as illegal or restricted drugs and others are still legal to use but not to sell. Regardless of their legal status, an employee or contractor should not be at work under the influence of any of these mind altering substances.

Designer drugs

Since 2009, the international drug scene has changed significantly with the emergence of a wide range of designer drugs referred to as novel psychoactive substances. Many of these are readily available in New Zealand and popular among workers who want to deliberately beat their company's out-of-date drug

testing programme. Most of these designer drugs will not be detected in a traditional workplace drug testing programme and require additional laboratory tests to pick them up. Currently the most commonly available on the black market are outlined below

Synthetic cannabinoid

These depressant and hallucinogenic drugs started to be sold as legal highs around 2009. The initial product was named Kronic and it was formulated and distributed from a factory in Albany and sold from every corner dairy and party pill outlet throughout the country.

When Kronic was declared illegal in 2013, many other types of synthetic cannabinoids were immediately imported and sold under a variety of brands such as spice, Northern Lights, K2, Puff, Tai High and Magic Dragon. There have now been over 60 different types identified in New Zealand. The current status is that they are illegal to sell but some versions are not illegal to use. Internationally the medical and treatment experts are claiming these synthetics are between five and ten times worse that using cannabis. Some of the adverse effects are shown in the table.

Mind altering	Rapid heart rate	Psychosis
Confusion	Nausea	Paranoia
Disorientation	Anxiety	Suicidal
Dizziness	Depression	Dependency
Hallucinations	Seizures	Schizophrenia

Synthetic cathinones

Synthetic cathinones are also known as bath salts or plant food. This class of synthetic drugs have both stimulant and hallucinogenic effects and can cause serious out of control behaviour. They are also known to be highly addictive. At least 30 different types have already been identified in New Zealand and commonly used by workers to beat the standard drug test.

N-bomb

While LSD is often painted as the psychedelic equivalent of a tie-die t-shirt, the new n-bomb is portrayed as a potent potion of peril. This hallucinogen, often sold as acid, is much more potent than LSD. There have been some different derivatives identified as readily available in New Zealand since 2012. There have also been reports of people ending up in critical care and sometimes deaths result from abuse of this hallucinogenic.

Alcohol misuse and abuse

The most commonly misused and abused drug is alcohol. Over 85 per cent of adults in New Zealand use alcohol. If a person is a consumer of this drug, and they are working in a safety-sensitive industry, it is not acceptable to report to work with alcohol still in the system. It is definitely not acceptable to drink alcohol during a working day or working shift.

The rule of thumb is that the average person can metabolise one standard alcoholic drink each hour. Therefore, if a person was expected to report to work at 6.00 am and had consumed three or four drinks the evening before by 11.00 pm, and also has a wholesome dinner, the three or four standard drink should have flushed out of the system by the early hours of the morning. However, if that person was still drinking until the early hours of the morning and loading the body with surplus alcohol, they would not be sober and alcohol free at 6.00 or 7.00 am.

Alcohol and your metabolism

Alcoholic beverage	Standard drinks
Beer can or bottle 330 ml	1 to 1.5
Beer pint	2
Wine standard glass	1
Wine bottle	8
Spirit nip	1
Spirit pub serving	2
Pre-mixed drink or alcopop	1.5 to 3

What companies should be testing for

For a compliant drug and alcohol free workplace policy which include testing, a company should consider testing for the wide range of drugs which are commonly misused or abused. Many of these drugs, particularly the designer drugs, will only be able to be tested at the laboratory because on-site instant screening tests cannot be produced for drug classes which are continually changing.

The standards drug testing suite which has been traditionally monitored and which out-of-date policies still only include are –

- Cannabis
- Cocaine
- Amphetamine type substances
- Opiates
- Benzodiazepines.

A modern testing policy also should include –

- Synthetic cannabinoids
- Cathinones or bathsalts
- Misuse of prescription drugs which are commonly abused
- All party drugs and legal highs whether legal or illegal
- Kava
- Ketamine
- Other mind altering substances as they become available and are misused.

Sue Nolan is the Director of DrugFree Sites
www.drugfreesites.co.nz

Propagation – a bottleneck in tree breeding programmes?

Paul Schroeder and Clemens Altaner

Large gains can be expected from tree breeding. You just need to compare wild corn, banana or wheat with what is grown commercially today. An undesirable feature of tree breeding programmes is their rather long time horizon. Tree breeding cycles are often measured in decades rather than years. Compared to breeding programmes of other agricultural crops, some of which can achieve more than one breeding cycle a year, progress in tree breeding is slow and expensive.

Tree breeding programmes have mainly focused on growth, but in another analogy to agricultural crops, growth is not the only requirement for success. A large banana will not sell if it does not taste good. So trees need to grow well but must also produce quality timber. Reasons for neglecting other properties are numerous including negative correlations between growth and some wood quality measures as well as the difficulty to measure wood quality quickly and cost effectively.

The analogy to agricultural crops suggests the strong case for tree breeding for several traits including wood quality. It also highlights the fact that to be successful breeding cycles need to be shortened. The age of selection of superior trees has been reduced in recent years.

Research at the New Zealand School of Forestry developed methods to radically shorten the age of selection for wood quality to an age of one to two years. While it is now possible to make selections of superior trees at a young age, we also need to make sure that the selected trees are quickly propagated. This is to make sure that the seedlings are produced and planted promptly so that they produce an income and to get on with the next breeding cycle. The propagation options for the two purposes may vary depending on the method of tree selection.

Minimising growth strain

Currently the Sustainable Farming Fund is supporting a research programme to minimise growth strain in eucalypts to improve processing. Minimising growth strain in plantation grown eucalypts by breeding will remove one of the most restricting features of these trees for solid wood processing. Around 50 replicates of 200 families which have seed from one tree, a common mother, of *Eucalyptus bosistoana* and *E. argophloia* will be screened for growth strain in the next two years.

***E. bosistoana* plantings for growth-strain assessment**

The newly developed assessment which splits the stem along the pith and measures its distortion is cheap, quick and can be performed when the tree is at age two. However, the test is destructive as it requires the trees to be cut. This has consequences for the propagation of the selected superior trees.

A range of options

There are several strategies for selecting the best trees. It is possible to select the best individuals, the best families or even the best individuals within each family. The strategy which provides the largest gain depends on the heritability – how much of the growth strain variability is under genetic control compared to how much is determined by the environment. Generally, selecting individuals independent of the family works well in most cases. Family selection works best when heritability is low and within-family selection produces the biggest gain when heritability is high.

Another factor to consider is to keep a broad genetic base by including as many families as possible. Selecting best individuals within each family has obvious advantages, while family selection narrows the genetic base the most.

Implications for the eucalyptus breeding programme

What are the implications for the eucalyptus breeding programme? As the assessment of growth-strain is destructive it would seem that families would be an obvious solution as seed from the same mother trees can be collected. This would allow immediate use of reasonable amounts of improved stock and also have the potential to embark quickly on the next breeding cycle by controlled pollination of the mother trees. However, because growth strain is of intermediate heritability, the genetic gain would probably be small and the genetic base of the next generation be drastically reduced. To achieve it all – good genetic gain, a broad genetic base and timely use of improved material – we need to select and propagate individuals which are either independent of families or within families.

We therefore need to retrieve selected individuals following growth strain assessment. It is fortunate that the chosen eucalypts *E. bosistoana* and *E. argophloia* coppice, meaning that when they are cut down new shoots grow from the base of the trunk. Coppice growth from the superior individuals can be harvested and grown as cuttings. If, like radiata pine, the species did not coppice, individuals could be kept alive by cutting them above the lowest whorl. The developing branches produce material for propagation. Alternatively, there is the more expensive option of tissue culture. But successful tissue culture has been developed for only a very limited number of tree species.

Vegetative propagation or seeds

Improved material can be used by either of two methods. One is bulk vegetative propagation of selected individuals from cuttings or the other is seed from seed orchards. Clonal propagation has been adopted for several eucalypt species in commercial forestry and can be scaled up quickly. The detail of the procedures for our species needs to be worked out as they are not well researched. This is the approach we are trying first.

Crossing superior individuals in a seed orchard can be expected to produce even larger genetic gains, especially when parents originate from very distant populations which have had no opportunity to interbreed. However, there is a considerable lag time until improved material is available as trees need to be old enough to flower and large enough to produce useful quantities of seed. Trees might need to grow for a decade before they start flowering. Nevertheless, the programme also includes seed orchard establishment.

Finally, all this leaves a need for controlled sexual reproduction to begin the next breeding cycle. Sexual reproduction in trees requires them to flower at the same time. Alternatively, male parent pollen needs to be collected, stored and applied to the female parent flowers when they are receptive. Synchronised flowering is not certain considering the distance of the original seed stands of the breeding populations. Grafting improved material to older trees can prompt early flowering. The application of certain hormones might also be possible. The latter is currently being considered at the University of Canterbury.

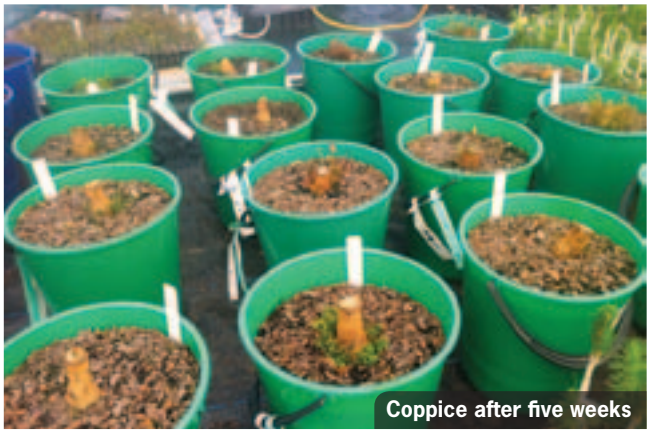
Logistics

We face a logistic challenge in the current programme because the field trial at Woodville and the propagation facilities in Amberley are in two separate locations. Live plant material needs to be transported from one site to the other. One option is to cut the coppice and transport the cuttings quickly in cooled containers. As an alternative we have investigated the possibility of lifting the root stools and transporting them to the propagation facilities. This could be an attractive option as the robust root stools are easy to transport as long as they have no coppice and if kept alive would provide a continuous supply of coppice material at the propagation facility.

Root stools from six half-sibling families were lifted over the past growing season. At the beginning of September, October and November a total of 16 plants were lifted and placed into 10-litre buckets.

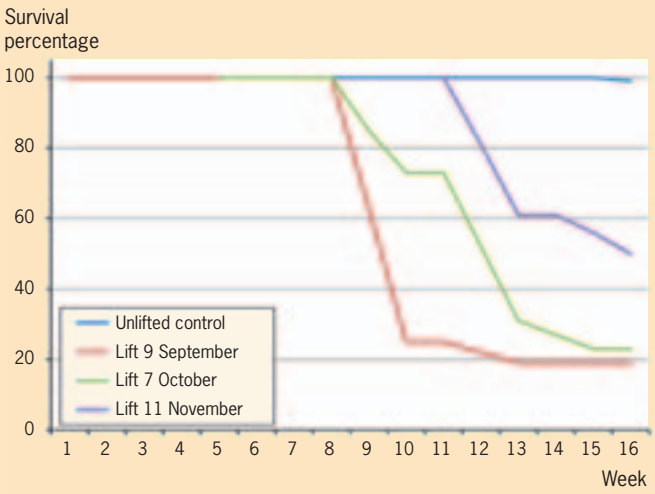
After five weeks 93 per cent were growing coppice shoots. But after the sixth week the shoots started to

Lifting freshly cut one-year-old root stools



Coppice after five weeks

Survival of topped and lifted *E. bosistoana*



look unhealthy and plants were starting to die. After three months, only 25 per cent of the lifted plants had survived. However, the plants which survived the first three months are continuing to grow. In comparison the survival rate for the control trees left in the ground is close to 100 per cent.

To ensure that the high loss of plants is not caused by root diseases, plants lifted at the later stage were root pruned and dipped in phosphoric acid for sterilisation, but this treatment did not improve survival. However, a few trees which were put into hydroponics where the medium was much better aerated and they were supplied with ample supply of nutrients, did show an improved survival rate.

The conclusion drawn from this is that damage to the root system by our rough lifting procedure was too severe. Most of the vital fine roots were lost which *E. bosistoana* could not cope with.

Root stools directly after lifting on the left, and subsequent pruning

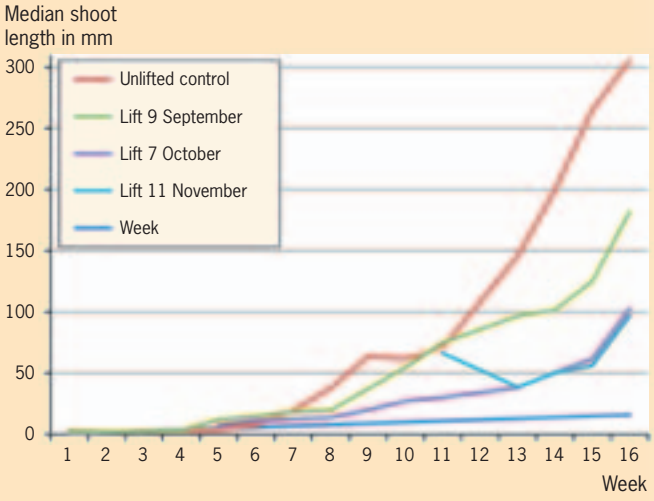
The good point about this is that *E. bosistoana* appears to be easier to clear from a site. Nevertheless, the *E. bosistoana* root stools have enough stored energy to produce coppice growth for about a month before running out of energy and succumbing to disease. This might be just enough to harvest cuttings for propagation but without a backup if propagation fails. It might have been that a more gentle lifting procedure or conditioning plants by undercutting to ensure the development of a compact root system, commonly practised in nurseries before transplanting trees, would have produced a better result. Unfortunately there was not enough time to investigate this further.

We have also checked how long it is possible to store living coppice material. It turned out that *E. bosistoana* coppice is quite resilient. Cut material which was kept for up to a week in a fridge was still vigorous and good propagation success was achievable.

Propagation

The number of coppice shoots per plant is an important factor for propagation. No significant difference in rate of shoot production between lifted and control plants was found. However, shoot production stopped with an average of 27 shoots for each plant lifted after five weeks. This was the time when they started to die.

Median coppice shoot length of topped and lifted *E. bosistoana*

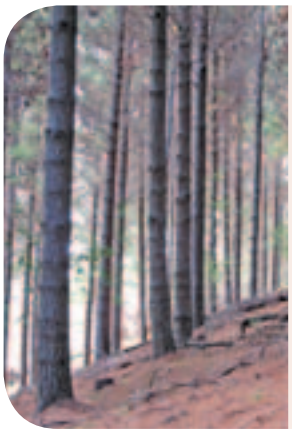


Shoot production continued for plants left in the ground and reached 35 shoots per plant after seven weeks. The number of shoots was also strongly family dependent as well as weakly affected by plant size. Over the long term the shoot growth was more vigorous in the control plants left in the ground than that of the transplanted trees. Coppice shoot growth was not strongly family dependent and independent of plant size.

The cuttings of varying coppice age were set under a range of different conditions. Propagation success was higher with older material. With some treatments propagation success of up to 90 per cent was achieved.

We are now confident that we will be able to propagate superior *E. bosistoana* trees. Then we will verify the details of the propagation process for *E. argophloia*, the other species in the current programme.

Paul Schroeder is from Proseed in Amberley and Clemens Altaner from the NZ School of Forestry in Christchurch.



Steady as she goes in the log market

Allan Laurie

Market conditions have remained stable to slightly firm across most log segments over the last month. Domestic supply constraints appear to have improved but all regions report sawmills are just getting enough logs. Some were reported to be bending a few of the quality rules to get the volume of logs they need.

Our log pricing review suggests domestic prices across several grades have improved by three dollars a tonne overall. But this is very much the average with, in one region, a rise of as much as $10 a tonne since July. Export pruned logs have dropped five dollars a cubic metre. It is good to see a price correction but based on my recent trip to China I can confirm quality remains a big problem.

Overall, unpruned export prices have improved four dollars a cubic metre since the last *Tree Grower* report. There is an interesting scenario developing here. It is evident that where more than one India export company is operating at a port, the equivalent China prices have risen more sharply. The China exporters are having to squeeze their margins to get what they need.

This is the first tangible sign of the India market featuring sufficiently strong enough to significantly influence prices. From a New Zealand forest grower perspective, long may this continue.

India prices are remaining slightly ahead of China based on prices at the New Zealand wharf. This is particularly so in the lower priced bottom grades where industrial and pulp logs have a clear preference in India.

China market chugging along

I have just returned from China so will devote more space in this report to some interesting factors emerging from this market. Before that, I can report that it is very much business as usual with consumption running at a steady 60,000 to 65,000 cubic metres a day. This equates to 1.2 to 1.3 million cubic metres a month of total softwood log usage. This is ahead of earlier predictions but is more significant in that daily consumption has varied little during the period.

Meanwhile, supply has also been running at a very steady pace although just slightly below usage. As a result, total inventory across the eastern seaboard has dropped about 100,000 cubic metres over the last quarter, currently running at about 3.35 million cubic metres.

The other reason we can expect more of the same lies in the domestic prices for timber in China. At time of writing these remain stable and look destined to remain so. All in all, this tells us that most market planets are their normal orbital alignment and, outside the election circus in United States, we do not see any other seriously stupid stuff that will upset the rickshaw.

A few comparisons

Let us take a quick look at China and New Zealand comparisons. Five years ago, the average sawing cost in China was about the equivalent of six dollars a cubic metre of sawn timber. At that time the sawing cost in a New Zealand sawmill was in the $50 to $60 range.

The average cost in China is now $18 to $20 a cubic metre while New Zealand costs have remained about the same, despite compliance, running costs and maintenance costs increasing significantly. The New Zealand sawmill owner has the advantage of technology enhancement to improve productivity, therefore reducing cost. The China factory is more constrained by the daily productivity of a factory worker.

Five years ago the average wage of a sawmill worker in China was the equivalent of $600 to $1,200 a month. The average now is $1,800 to $2,500 a month. There is no New Zealand sawmill employee who can boast a 100 per cent wage rise in five years.

A sawmill in China is very much a factory operating on contract rate rarely including further processing. Sawmill owners do not always own the logs but some sawmill owners are also traders. A typical factory is multiple sets of two bandsaws. In a single set the first bandsaw is as in a normal head rig, cutting the log down to flitches or slabs. The second is a standard breast bench, milling to final timber dimensions. There are usually seven or eight people operating the sawmill. They will have a typical target of 50 cubic metres of logs a day.

The sawdust extraction system is normally a shovel and every off-cut is used in some way in further processing or taken to the chip or pulp mill. The set-

Radiata pine log sales

Dollars per tonne	Northern North Island	Central North Island	Southern North Island	Northern South Island	Central South Island	Southern South Island
P1 (P36-P38)	172 - 192	175 - 190	170 - 180	172 - 180	167 - 175	168 - 180
S30	107 - 120	110 - 120	107 - 115	110 - 120	103 - 110	115 - 120
S20	90 - 100	-	-	101 - 113	88 - 92	-
L30/A30	85 - 90	-	-	-	85 - 90	80 - 90
Postwood	75 - 85	80 - 85	75 - 85	65 - 80	80 - 95	75 - 85
Chip	50 - 55	48 - 52	40 - 45	38 - 40	43 - 46	43 - 47
Dollars per JAS						
Pruned (P40)	164 - 169	170 - 175	160 - 165	160 - 165	155 - 159	162 - 167
Pruned (P30)	125 - 132	132 - 137	123 - 128	123 - 128	120 - 125	127 - 132
A grade	115 - 119	122 - 126	112 - 116	113 - 117	109 - 114	117 - 122
CS/KS	108 - 112	116 - 120	109 - 113	112 - 116	102 - 107	109 - 113
CI/KI	104 - 109	112 - 117	105 - 110	108 - 112	98 - 103	105 - 110
Pulp (CIS/KIS)	98 - 102	106 - 111	99 - 104	102 - 107	92 - 97	99 - 104

up is very basic with a single roof overhead, housing several sawmill sets and few creature comforts. A typical sawmill set costs about the equivalent of $100,000 to set up including infrastructure. This means that for about $1 million you can have 10 sets running and milling 500 tonnes of logs a day. A typical modern sawmill in New Zealand of similar capacity would cost $20 to $30 million to set up

The reason for going in to this in some detail is to explain to some of the 'why don't we mill the logs in New Zealand' group that this cannot happen at the moment. However, we should continue to watch that space and seize upon opportunities that arise as inevitable they will.

Supply chains

Interestingly, from the many hours spent around the negotiating table in China, I can say the factors important to a China sawmill owner are cost of logs, price instability, cost of labour and retaining good trained labour. This is almost identical to a New Zealand sawmill owner.

While in China I was asked to give a presentation to a supply chain logistics conference in Qingdao. This is a small city by China standards boasting about nine million people in the city and immediate environs. Qingdao is in the Shangdong province, 600 km north of Shanghai and boasts the longest bridge in the world at about 27 km.

My presentation included a table explaining that it takes 60 to 70 days from felling the tree in New Zealand to it being sawn into timber in China. This leads to quality problems, principally sap stain. At the higher quality end of our business with pruned logs, I said I believe the only solution is to mill these in New Zealand and this received a good deal of support.

The other issue I highlighted was the significant fluctuations in prices in recent years. Both sides agree the recent more stable market has been good. Another factor identified is an apparent pattern between US dollar CNF prices and New Zealand dollar wharf gate prices. While both have generally, and not surprisingly, moved in unison, the average difference two years ago was US$14, now it is US$4. It is perhaps a signal perhaps of a more mature market functioning in a more reasoned and predicable fashion

Domestic scene supply constrained

During the last quarter there have been reports of sawmills in New Zealand stopped due to lack of log supply. All respondents have reported constrained supply and owners looking over their shoulder for the next load to arrive.

The positive dynamic to this is the strength shift to the seller side of the negotiating table resulting in the price firming. The downside is the likely loss of operating efficiency and challenge to the profitability. To my mind this tightrope of risk carries the clear message of the importance of the domestic sawmill to every New Zealand forest grower. I would caution against extending the price negotiating hand too far, as there is the possibility there will not be another hand on the other side of the table to shake.

As in my last report, the significant variability in standard S30 sawlog prices continue and even increase since my last report, now at $104 to $125 a tonne. Export price parity appears to be the largest reason for this.

Allan Laurie is the managing director of Laurie Forestry Ltd with over 27 years of experience in marketing logs for small to medium growers – website www.Laurieforestry.co.nz

Blackwood market report

Malcolm Mackenzie

Farm foresters are well served by Allan Laurie's regular market reports in the Tree Grower for information on radiata pine and to some degree macrocarpa. However, special purpose species get little attention and growers express frustration at the lack of information.

A comment at a relatively recent annual conference that one blackwood grower had given up on the prospect of ever harvesting his trees because there is no infrastructure to assist him really got me thinking. Assuming the NZFFA members might be interested in seeing the results of my blackwood marketing efforts I have summarised my sales below.

Please note that the timber sold is not all mine as I have been assisting fellow growers by being an agent selling on behalf others for a commission. Where in the past I have found a small but ready market for clear select grade timber, I have recently had regular sales of knotty grade to make platters and chopping boards. I hope the trend for restaurants to serve meals on wooden and especially blackwood platters is permanent and increasing.

The clear blackwood price varies depending on volume and dimension. One pleasing aspect to my experience is that the number of buyers is generally increasing and all the 2016 customers are repeat ones. Although it is obvious that these volumes are not very big, they are increasing.

The supply of sawn timber from fellow growers is also increasing so I am always keen to hear of any new prospective markets. In my role as chair of AMIGO, the blackwood growers group, I plan to initiate a survey of blackwood timber users such as furniture makers and joiners and timber merchants over the next year.

Year	Grade	Volume in cubic metres	Value in dollars per cubic metre	Number of buyers
2014	Clear	3.3	$3,149	2
	Knotty	0.7	$1,948	1
	Total	**4.0**	**$2,939**	**3**
2015	Clear	4.0	$3,387	5
	Knotty	2.25	$1,400	1
	Total	**6.25**	**$2,672**	**6**
2016 – 8 months	Clear	6.8	$3,886	3
	Knotty	4.2	$1,383	2
	Total	**11.0**	**$2,924**	**5**

In the ETS, is safe carbon really that safe?

Stuart Orme

Many tree growers may have a vague notion that their carbon liabilities at harvest will in fact be less than the total amount of carbon they have claimed in their emissions returns up to harvest. The Ministry for Primary Industries provide residual carbon tables to calculate the carbon left in the branches and roots which stay on site after harvest. Residual carbon is, in effect, a delayed surrender of the carbon remaining on site.

The safe carbon point is where this decreasing line crosses the next rotation's increasing growth. But, depending on when you joined the ETS and the age of the trees at the time, you may or may not be eligible for any of it. Our recent experience is that the safe, or our preferred term 'enduring', carbon calculation is complex.

The main points

Enduring carbon is made up of the carbon that remains after harvest, less what will continue to rot down between the periods of harvest and when the new forest crop starts to sequester more carbon than is rotting. This happens approximately eight to ten years after harvest. The enduring carbon does not disappear and the perception is that it can be sold with no need to surrender it. But this is only true as long as the ETS registered land stays registered and stays in forest use.

After the surrender of harvest related units, the carbon accounting record for that enduring carbon stays attached to the land, signalling that there is an obligation for the safe units which need to be surrendered if that land is deforested in the future. Therefore, a registered obligation exists, but one that will never be triggered as long as the land stays as forest land.

In terms of practical implications for growers, most trees being harvested now were planted in the early 1990s. There is no enduring carbon in these stands that can be sold and growers will be liable for the total volume of carbon claimed in emissions returns.

A carbon accounting record exists for every unit of carbon which has been allocated to an ETS participant and not surrendered. This includes their enduring carbon. When land is transferred, the purchaser may or may not be willing to accept the obligation that comes with the enduring carbon previously allocated but long since sold by the vendor believing it to be safe carbon.

To date, most transactions we have been involved with have seen the vendor leaving the ETS, surrendering all units allocated and wiping the carbon accounting record clean so that the land transfer has no obligations. This is not so easy in a Permanent Forest Sink Initiative (PFSI) which is a 100-year covenant.

An interesting example

The following example explores the implications of attempting to transfer units to the purchaser to ensure the new landowner has the required units to surrender should leaving the ETS become necessary.

A farm is owned by a family member who is an advocate for afforestation on land that is best in vegetation as a long-term land use. They entered substantial plantings into the PFSI and the ETS with the hope of creating a long-term asset. As part of a succession plan the property is about to change ownership within the family. The financial and legal ramifications that such transfers produce are –

- The need to ensure no credit obligation is passed on
- The corresponding tax implication which occurs when credits are transferred to cover the obligation.

Although they entered the ETS with the best of intentions, they now find they are in a negative position. As far as I understand, the tax implications on a transfer of wealth are unavoidable when PFSI or ETS accrued credits are transferred. This will be further accentuated in the next succession or land sale.

For example –

- After eight years from 2008 to 2015 a total of 50,000 units are allocated
- If the registered land is transferred by sale or by succession, the credits to cover the land obligation will transfer as well
- Therefore 50,000 units at $18 a unit is $900,000, with the tax on this sum around $300,000.

They can leave the ETS before transfer, but then they will only have had costs with no financial benefit from being involved. Although some might point out this was always the case, neither scheme was sold to the public this way, nor was it well understood in general that this would be the result.

The current ETS review may adopt harvested wood products accounting or averaging. This could see the carbon accounting record obligations not decreasing at harvest as long as the land stays in forest use. But for now, the above seems to be the case and should be understood by all participants who have heard or believe in a 'safe' carbon philosophy.

Stuart Orme of Woodnet is a Registered Forestry Consultant based in Masterton.

What we do in the NZFFA National Office

Glenn Tims and Bruce Bulloch

In general, few NZFFA members know much about what goes on at the National Office. This article outlines most of the work carried out during an average year.

The NZFFA National Office is located in the Forestwood Centre on The Terrace in Wellington. We share the office suite with the NZ Forest Owners' Association, the Forest Growers' Levy Trust Secretariat, the Wood Processors and Manufacturers Association and the NZ Institute of Forestry. The Forest Industries Safety Council is in the same building but on a different floor. The NZFFA Association Manager, Glenn Tims, works in the office on weekdays, and Bruce Bulloch, who looks after the accounting system, comes in usually for one day a week.

Subscription management

Each year, and the current year is no exception, subscription renewal notices for the ensuing year are generated in November and sent out early in December to counter the risk of being buried in the Christmas mail influx. A major task for the rest of December and January is processing subscription renewal payments as they flood in by whatever means – cheques, direct credits, credit card payments and online payments.

A trend in recent years has been an increasing number of direct credits through the banking system. However, it is important that people using this method should give a reference which identifies who they are, ideally with their membership number. In addition, if you pay a different amount from your renewal notice subtotal, let us know the reason for the difference.

We send out reminder renewal notices in late April and August to members who have not yet paid for the current year. In 2016 we sent out most of these reminders by email, and as this worked well, we will continue to use email as the first preference for renewal notices in the future.

Many members will be aware that NZFFA membership subscriptions consist of at least two parts – an administration levy and a branch levy, and in individual cases there may be additional ones for action groups or special interest groups and other branches. Each month the National Office reports to the branches and special interest groups the amount received on their behalf in the previous month, and the funds are transferred over to their bank accounts. Each month there are also the usual bills to pay, PAYE returns to lodge and every two months, a GST return.

Maintaining our national online database is a vital function. The database includes members and *Tree Grower* subscribers, as well as forest owners who have registered to receive a special reduced version of our e-newsletter. Maintaining communication channels with non-members is a requirement of our Forest Growers' Levy communications contract. Current work on improving the national database includes adding first names where there were just initials, and requesting email addresses at every opportunity so that we can speed up communication and save postage costs for branches and the National Office.

Financial management

Because our financial year ends on 31 December, in December and January we work through the end-of-year adjustments to our accounts. These involve assigning payments and receipts to the right financial year. For example, some December transactions may actually apply to activities that are going to occur in the new year, and similarly, some January transactions apply to activities that occurred in the previous year. We also make provisions for interest earned but not yet received or annual leave owing, and assemble supporting information for the auditor to justify the income received and expenses paid during the financial year.

The auditor comes into the office for two days in the February to work through our records on site, and we aim to have the approved financial statements ready for presentation to the AGM at the conference which is usually in April. Over the past couple years, we have been learning about and implementing the changes to the accounting standards for not-for-profit organisations. The National Office has nearly completed conversion to the new standards, and once completed will be developing templates for the branches to use.

Work for the national conference

The conference generates its own cycle of activities. Before November we call for nominations for various national awards – North Island and South Island Husqvarna Farm Foresters of the Year, Landcare Trust

Award for Innovation in Sustainable Farm Forestry, and Michael Hay Memorial Award (see August 2016 *Tree Grower*). Nominations may be lodged at any time, but 1 November is the deadline for the ensuing conference.

In December we call for nominations for the elected members of the National Executive. There are six National Executive members, two representing the North Island, two the South Island, and two 'at large'. Their term is three years, so two are elected each year. If the President's term ends at the upcoming conference, we also call for nominations for President. The President's term is two years with a right to opt for a third year.

In advance of the conference, National Office supports the local organising committee. We contact potential national level organisations for sponsorship in return for the sponsors having a profile at the conference. The local organising committee approaches local sponsors. As the conference nears, the National Office compiles the information for the annual report which is presented to the AGM. We also produce the minutes, agenda and any other supporting information required for the Council meeting. We have a coordinating role in arranging framed certificates for the awards presented at conference and liaising with the sponsors and presenters.

Servicing executive meetings and funded projects

National Office services the National Executive meetings which are held usually four times a year – in February, before the conference in April, in July and in November. In 2015 an October meeting was held instead of July and November. Except for the pre-conference meeting which is held in the same place as the conference, the others are usually held in Wellington. The National Office helps in preparing the agendas and arranging visitors for the meetings, arranges catering, accommodation when required, and takes the minutes.

The NZFFA is usually involved in a range of special projects which are generally short-term and partly funded by other contributors. Often, one of the contributors is the Sustainable Farming Fund. Frequently the NZFFA's role is one of financial manager – we collect the funds from various contributors and then pay the entities carrying out the work.

In 2015/16 one such project was the Speciality Wood Partnership where the NZFFA collected $12,600 from branches and some individual members, and then made the total contribution from the NZFFA up to $25,000. Another example was the Sustainable Farming Fund project 'Getting to the heart of coastal redwood' where the National Office is acting as financial manager on behalf of the Sequoia Action Group.

Communicating about the levy

Since the advent of the Forest Growers' Levy in January 2014, the NZFFA has had a contract to provide a communication service to smaller and medium scale potential levy payers, including NZFFA members and non-members. To help with this for the non-members, Howard Moore along with others, has compiled a database of all owners of properties with forests.

As one avenue of communication we have been inviting forest-owning land owners to levy roadshow information sessions. The National Office organises the roadshows and Glenn is one of the speakers on the day. Over the past 18 months, levy roadshows have been held in Whangarei, New Plymouth, Christchurch, Dunedin, Hokitika, Hastings, Gisborne, Feilding, Nelson and Blenheim. On average 50 people attended each session. The objective is to cover the whole country over a three-year period. As you would expect, the levy contract involves regularly reporting back to Forest Growers' Levy Trust on activities and expenditure under the contract.

Other important work

Unseen and unsung could be a facetious reference to much of what goes on at the National Office. We are developing position statements on issues relevant to NZFFA members. Such positions may differ from a branch's or an individual member's views, but are intended to be representative of the NZFFA as a whole and give us a head start if an issue suddenly arises. National Office has a facilitating role in advocacy and consultation. Main concerns we have been involved with included reviews of the Afforestation Grant Scheme, the National Environmental Standards and the Emissions Trading Scheme. We are in discussions with Transpower, who want to develop a more workable situation with respect to their cable corridors which cross many woodlots on farm forestry properties.

To help us keep a track of activities and provide an element of future-proofing, we are compiling an office manual of the myriad processes and procedures at the National Office. We are also working to develop closer working relationships with our major sponsors, Husqvarna and Aon.

As well as speaking at the levy roadshows, Glenn was able to attend the Action Groups Weekend in Nelson and the Husqvarna North Island Farm Forester of the Year field day at Rissington in Hawkes Bay. Glenn has been involved in discussion and consultation with Landcare Research regarding their Rural Decision Making Survey, with the NZ Institute of Forestry regarding their forest policy project, with Woodco and the Ministry for Primary Industries regarding the Forestry Sector Strategic Partnership, and with the Department of Conservation regarding wilding pines.

Bruce is the NZFFA representative on the Land and Water Forum and attends the plenary sessions which are held at about two-monthly intervals. He also engages in the consultation processes on the changing legislative and regulatory regimes for not-for-profit organisations.

Glenn Tims is the NZFFA National Manager and Bruce Bulloch is the accounts manager.

How will we sell our specialty timbers?

Gabrielle Walton

In 2015, Devcich Marketing and Communications were commissioned by the NZFFA, Farm Forestry Timbers and the joint NZFFA/FOA Promotions committee to carry out a discovery and definition investigation for marketing New Zealand grown specialty timbers. I presented the findings at the Hokitika Conference in April 2016 and received support for the project to continue. This article provides a brief summary of the report and my thoughts on this topic.

After six weeks of interviews and investigating the specialty timber market place, the Devcich report said that demand for specialty timbers is currently high and business is good for those selling it. In fact, some mills and processors are turning away work because they cannot get the timber. But have they approached you for your timber? Do they know what timbers we grow or how much we have? According to the investigation, they do not. The grower's fate currently lies in the hands of a force they cannot control.

The report explained that, if we raise awareness of our timbers and create a demand for them, we can, in turn, create a new market for them. New Zealand's specialty timbers have the potential to sell well and for good prices especially in the top end housing and office market. Owners of executive houses are interested in the origin and story behind the more glamorous features in their homes which make specialty timbers a good fit. Being able to explain the provenance of your solid timber feature wall, floor, bench top or cladding makes for good dinner table banter.

Developing demand and branding

To develop demand, we need to raise the profile of specialty timbers and the report recommended the best way to do this is to address the market online. The report outlined that the NZFFA has an excellent members' website with Farm Forestry Timbers, containing good technical information for builders, architects and engineers. But the present format does not have the selling appeal required to lift the profile of speciality timbers.

The report suggested separating the sales function from membership. There was an opportunity in front of Farm Forestry Timbers to build and own the hub for all marketing of specialty timbers to develop something unique and outstanding that would attract the timber marketplace, high end users, architects and designers.

The report recommended a sophisticated, customer-friendly website which sells the timber and incorporates the Farm Forestry Timbers technical information and inventory of stock available now and into the short term future. Such a website would need to be constantly maintained and updated. In my opinion, professional help with this is essential to get the best result.

The report also described the advantages of branding and how brands can add value. Ideally there would be a brand name which represents all New Zealand grown specialty timbers. Farm Forestry Timbers or the NZFFA are not what the consumer wants to buy. Consumer brands should be built to appeal to the consumer, not the seller, who wants to buy a product with an identity.

Are we ready for change?

The process to achieve what the report proposed would not be quick. It would involve mass awareness and changing people's perception and attitudes towards specialty timbers. Change takes time, but I believe the timing is right to start this process. We have a strong economy, burgeoning building industry, high demand for specialty timbers and many of us with trees reaching maturity. Some may wonder whether we have enough timber? I for one have never questioned this. With good systems in place scarcity can play in our favour as has been the case with many other primary products. Without doubt there is the bigger opportunity to increase the demand for planting and researching specialty timbers and in turn, lift the profile of what NZFFA has been doing well for over 50 years.

Footnote from Dean Satchell

Although the Promotions committee decided to not follow the specific plan of action recommended by Devcich Consulting, we agreed that growers' levy funding should go into development of markets for locally grown specialty timbers. Rather than funding an all-out marketing campaign, the approach decided on is one of steady market development and based on the selling platform already in place on the farm forestry website. The Promotions committee and Farm Forestry Timbers agreed that the existing Farm Forestry

Timbers online market place has well divided sales and membership functions and was a good platform to base further initiatives that promote specialty timbers.

Initial plans to raise the profile of specialty timbers will include a series of seminars targeting architects, designers and others who specify timber, to both raise their awareness of locally produced product, but also to seek feedback on their needs.

Barriers continue to plague markets for locally produced specialty timber. For example, almost all imported specialty timber is environmentally certified and of consistently high quality, whereas no local product is certified and sawn timber and log quality is variable. Furthermore, the NZ building code currently constrains use of specialty timbers.

These issues will take time to address and an expensive one-off marketing campaign was seen as less cost-effective in the longer term than a progressive approach to market development.

The first steps will be to improve and maintain the online marketing platform and to resource the trading desk to link buyers with sellers. To date the Farm Forestry Timbers marketplace has been entirely user-driven with no industry funding, which has proven to be less than adequate. To get the ball rolling the website will be upgraded and trading will be actively facilitated. These initiatives will provide a feedback loop to guide next steps such as considering re-branding.

Dean Satchell is the chairperson of Farm Forestry Timbers and NZFFA representative on the Joint Promotions committee.

Letter to the Editor

I am writing to applaud John Moore and Michelle Harnett for their article, The Good Wood, in the recent *Tree Grower*. We growers appreciate the time and effort involved in writing up research in a readily digestible non-academic form. However, I feel compelled to comment on a couple of points in the economic evaluation of tree stocking.

I wonder what log prices were used for the evaluation as there is minimal difference between the gross values calculated for pruned and unpruned stands. This is far from my experience from recent harvests where pruned log values have shown significant premiums over unpruned logs. I suspect long-term averages may have been used. These do not adequately reflect the current situation where local and export markets both demonstrate significant and increasing premiums for pruned logs.

The other aspect I wish to comment on is the relevance of using gross stand value rather than net value as a decision making tool for silvicultural practice. I understand the difficulty of deciding on a representative location to allow for the costs of transport but not doing so can lead to a major distortion of the real return to the grower. Our situation cannot be too different from many others where we have two pruned log sawmills within 30 kilometres and the bulk of our other grades go to Mount Maunganui for export.

The difference in cartage cost is approximately $20 a tonne and has a massive impact on net returns. It has the effect of increasing the pruned log premium to over $80 a tonne or 150 per cent on a net return basis.

Gross pruned log price $190 a tonne, less logging and cartage $40 a tonne, net $150 a tonne

Gross A grade log price $120 a tonne, less logging and cartage $60 a tonne, net $60 a tonne.

My experience of high or fully stocked (400 to 600 stems per hectare) stands is personal, due to woefully ill-disciplined thinning. (No one to blame but myself.) I see many tall, thin trees that will never meet minimum SED (small end diameter) log specifications for the higher priced grades. Many pruned trees will never produce pruned logs as they will not reach the minimum diameter. I cannot wait to harvest and replant to see a stand of high value with a maximum stocking somewhere near 300 stems a hectare.

Malcolm Mackenzie
Waitomo Branch of the NZ Farm Forestry Association

Response to the letter

Thank you for taking the time to respond to our article. We are glad it stimulated debate on silviculture. Our key message was the importance of considering how best to use an available site to achieve the best return, taking into account long term market trends. We definitely do not advocate a 'one size fits all' silvicultural regime for radiata pine and recommend that careful thought goes into developing silvicultural regimes.

Our intention was not to dismiss pruned regimes as a viable silvicultural option. The values we presented in our article were based on 12 quarter average log prices, which may have not fully represented the recent higher values that are being obtained for pruned logs. The other point to note in our analysis is that the trees in the silviculture breeds trials were not pruned to six metres as would be the case in most pruned stands. We did take this into account, which brought the value realised from the pruned and un-pruned stands closer together, but the unpruned stands did offer higher gross values than pruned stands. High prices are currently being paid for pruned logs and many appearance grades as mills are struggling to secure good quality logs, which bodes well for forest owners with pruned stands.

Recent research, which includes analysis of data from silvicultural trials and computer modelling, indicates that it is important to get right the balance between individual tree size and stocking. It is unlikely that the premium for having logs substantially larger than the target size required by a mill will offset the loss of volume from understocking a stand. We totally agree with Malcolm's point that there is no point in growing trees that do not meet the minimum diameter requirements for key log grades.

As Malcolm correctly points out, when making silvicultural decisions it is import to consider local context. An important aspect of this is distance to market. If your pruned stand is located close to an appearance mill then the net returns will likely be much greater than would be achieved from sending unpruned logs further afield, such as to export. In such situations a pruned regime may give greater net returns to the grower under current market conditions.

John Moore and Michelle Harnett.

Branch and special interest group contacts

All the branches and special interest groups now fall into the same category in the NZFFA rules. This should not make a lot of difference but it does make it easier to set up new special interest groups. All the contact names listed below for branches and groups are the relevant secretaries.

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Are you a member of the NZFFA?

The New Zealand Farm Forestry Association has been around for over 50 years and has around 2000 members. There are 32 active branches and special interest groups.
If you are reading this issue of the *Tree Grower* you are probably already a member, but could well just be a casual reader or subscriber. If you are a member of the NZFAA, you could make a gift membership to a friend or relative.
The cost of joining if you have less than 10 hectares of trees is only $85 a year.

Why join the NZFFA?

Tree Grower

You will get four copies a year of the *Tree Grower* – the best source of information about growing trees in New Zealand.

Field days

Your branch will hold regular field days where you can see what other farm foresters have grown, where they may have made mistakes, and what trees grow well. This is an opportunity to mix with other like-minded tree growers.

Special interest groups

If you want to know more about cypress, eucalypts, redwood, blackwood or indigenous trees, then you can have the opportunity to join one or more of these groups. Some have their own magazines, such as *Indigena* for the indigenous group. Many are involved in field trials that you can join and help with.

Annual conference

This is held in a different region every year. The conference is mainly field days and gives attendees the chance to visit farm forestry properties, QEII Trust covenanted areas, logging sites or other places of interest. It is also an opportunity to attend the AGM, meet up with over 200 other members of the NZFFA and have a good time.

How to join

Joining is very simple. Copy the form below, complete the details and send it to NZFFA, PO Box 10 349, The Terrace, Wellington.
You will get some free back issues of *Tree Grower* and all your membership privileges.
If you have less than 10 hectares of trees the membership cost is only $85
For 10 to 40 hectares the cost is $135 a year.
For over 40 hectares of trees the cost is $204 a year.

I would like to join the NZFFA ❑ $85 a year ❑ $135 a year ❑ $204 a year
I enclose a cheque payable to NZFFA ❑
Please debit my credit card: ❑ Visa ❑ Mastercard
Number: | | | | | | | | | | | | | | | | Expiry date: | | | |
Name on card: _____ Signature: _____
Address: _____
Email: _____ Phone: _____ Postcode _____