New Zealand Tree Grower

Official journal of the New Zealand Farm Forestry Association

May 2018

Trees, sheep and beef
Growing a bio-fuelled New Zealand
Forestry rights
Planting a billion trees
Three phase harvest on the sand

Promoting the wise use of trees for profit, amenity, sustainability and the environment

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From the President

Neil Cullen

In February, Hamish Levack and I met with Minister Shane Jones and two senior MPI officials. Hamish has reported on the details of our discussions in an article in this issue of *Tree Grower*. It was encouraging how receptive all three people were to our suggestions on how the NZFFA could assist with increased afforestation, and to other measures the government could take to support small-scale forestry. More interaction with MPI and the Ministry of Environment will be needed to further advance the issues raised.

The ForestWood Conference held at Te Papa in March reflected the current air of enthusiasm for an industry which has for too long been in the background. A big bonus of this gathering is the chance to meet and mingle with all parts of the diverse forest and wood industry. Some of the messages I took from the conference were that indigenous planting is an important part of the government's strategy, as is regional and Maori development, the value of carbon is an essential part of enticements for land owners to plant more trees, wood does deserve special attention, and much increased local demand is coming with a boosted domestic build and a wider wood first policy.

The Forest Growers Levy Trust Board Chairman Geoff Thompson will have by now addressed our conference at Nelson and focussed on the referendum for renewing the levy in April 2019. It will decide if it continues beyond the present term which ends in November 2019. The Forest Growers Levy Trust has put out a discussion paper on possible changes to the governance and voting systems that could be incorporated into the next six-year levy period. Other possible changes include a name change and expansion of the levy to include seedlings and cuttings. The Forest Growers Levy Trust Board and the council which advises it will ultimately decide what is voted on in the levy package next year, so members who want to be heard on this issue will need to be informed on the options and talk to the small-scale representatives on those bodies. Another facet of this discussion is the remit to our Council that a survey of members experiences with the levy be undertaken.

The Executive hired Natalie Smith as Office Manager in 2017 but unfortunately for personal reasons she was unable to continue with the role and her niece Savannah Chmielewska – the first two letters are silent – has replaced her to handle the administrative duties at head office. Savannah works five mornings a week and is pleased to serve the NZFFA and its members. There remains a need for the NZFFA to have an advocate working on its behalf – attending meetings, writing submissions and generally representing the interests of small-scale forest owners. If finances permit we will be looking for someone to fill this role.

The National Environment Standards for Plantation Forests are now in effect throughout the country and members will need to make themselves familiar with these regulations and how they affect their forest activities. There will be a six-month period of learning and settling in for MPI, the regional councils and foresters as all parties come to terms with how it is going to work for them. A further round of workshops is planned by MPI where different scenarios will be considered. A users' guide, a consent and compliance guide, and three risk assessment tools are available on the MPI website. Some members may decide it is easier to get professional help for the likes of developing a harvesting plan. More interaction with the local council is inevitable and some councils have indicated they will charge for monitoring of activities requiring a management plan.

Log market in good shape with cautionary indicators in the mix

Allan Laurie

International shipping rates have affected the market significantly over the first quarter of 2018. A combination of a busy northern hemisphere following Chinese New Year, together with an abundance of capacity, has seen a rise of three to four US dollars a cubic metre over the same period leaving shippers reeling.

In January 2018 the New Zealand forest industry set another record with 1.1 million cubic metres of logs exported representing a 32 per cent increase on January 2017. This also explains the shipping cost increases with a total of 35 vessels required to move this volume so affecting the supply demand. The indications are we well on track to maintain or increase previous annual harvest volumes. Statistic NZ are still to report, but it seems that the total harvest in 2017 exceeded 33 million cubic metres setting another record.

At current delivery rates to the China eastern seaboard softwood market, New Zealand log supply accounts for 40 per cent of the total volume supplied, significantly ahead of the next largest which is Russia at 21 per cent. In this market New Zealand is no minnow as we dominate the China softwood segment.

New Zealand mills important

Even with these extraordinary figures, it is important to remember export logs comprise about 57 per cent of total harvest with the remainder being sold to domestic processors. As I have highlighted many times, while many focus on what is happening in China, the good old and some not so old Kiwis battling away in sawmills in New Zealand are a fundamental component of everything we do.

A quick round-up of sawmills suggests the supply and demand planets are in alignment. Sawmill downtime due to lack of supply has not been a major problem in recent months, probably the consequence of the elevated harvest levels nationally.

A summary of the factors that have affected the market over the first few months of 2018 are –

- Domestic markets are generally in planetary alignment with mills getting what they want in terms of volume with prices largely stable
- Shipping costs for logs destined for China, India and Korea increased US$3 to $4 per JAS cubic metre effectively eroding wharf gate prices by NZ$4.50 a cubic metre
- The US/NZ dollar exchange rate medians moved from about 69 cents to 72.5 cents effectively decreasing wharf gate prices by $4.70 a cubic metre.
- Prices in China increased US$3 a cubic metre over the same period.
- The bottom line is the New Zealand wharf gate prices moved down about five dollars a cubic metre
- India demand is back on track with a small price correction and shipping cost increases exceeding China sailings leaving the nett wharf gate position running on a par with, or just slightly below, China prices.

Comparing JAS and a tonne of logs

The conversion rate from a JAS cubic metre and a tonne of logs is usually about 0.95 although this can vary. It depends on –

- Stem taper which, for example, is usually less in pruned than second or third log
- Summer or winter
- North Island or South Island
- Soil fertility
- Rainfall
- Aspect such as sunny or shaded back face.

If we accept an average day, average site and the 0.95 conversion rate, an export log grade comparative for an S30 log sold domestically would need to be about $137 per JAS to compare with a $130 a tonne for a domestic sale.

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	175 -185
S30	127 - 146	127 - 133	116 - 124	119 - 125	115 - 120	122 - 130
S20	116 - 121	111 - 116	101 - 106	109 - 113	96 - 101	-
L30/A30	101 - 110	-	-	-	95 - 105	100 - 105
Postwood	82 - 95	90 - 100	84 - 94	72 - 90	90 - 100	82 - 93
Chip	54 - 59	48 - 52	46 - 51	45 - 50	50 - 54	44 - 48
Dollars per JAS						
Pruned (P40)	186 - 191	190 - 195	177 - 182	179 - 184	169 - 174	173 - 178
Pruned (P32)	154 - 159	158 - 162	147 - 152	149 - 154	140 - 145	144 - 149
A grade	138 - 143	145 - 148	131 - 136	133 - 138	123 - 127	127 - 132
CS/KS	133 - 138	137 - 142	125 - 130	127 - 132	116 - 121	120 - 125
CI/KI	121 - 126	125 - 130	115 - 120	117 - 122	109 - 115	113 - 118
Pulp (CIS/KIS)	114 - 119	117 - 122	107 - 112	109 - 114	102 - 107	106 - 111

Domestic scene chugging along

The spot price opportunities which have been a feature of the recent past appear now not to be so prevalent. Stable and steady as she goes appears to be an over-riding feature now.

The S30 or S35 grade sawlogs are the most common grade sold to local mills, reflecting a log with a minimum small end diameter of 30 or 35 cm and capable of producing framing grade timber. Prices vary quite dramatically up and down the country with over $130 a tonne being common in the North Island and around $120 a tonne more common in the South Island. It is important for those who would want to compare export comparatives, domestic sales are on a tonne basis and export sales for JAS cubic metre basis.

Good prices for pruned timber and firewood

Pruned logs are reported to be in strong demand with an apparent supply shortage in some regions. The lowest price I heard in a recent from a recent ring-round was $169 a tonne for a small South Island sale versus $195 a tonne in the North Island. The average seems to be about $175 which is pretty good if you have them. Remember this review covers sawlogs only. Plywood mills appear to consistently pay better prices with $215 a tonne being the best I have heard of recently.

Residues, including pulp and firewood log prices, are on the rise. The wonderfully coolish climate we get in the South Island sees higher fuel wood usage and in Canterbury prices are on a big rise. The norm for many years was $45 to $50 a tonne for radiata and it never seemed to change. The current industry norm is $60 to $65 a tonne and rising. If you are lucky enough to have cypress firewood logs $80 to $90 a tonne is the current norm.

Macrocarpa log sales	
Macrocarpa logs	South Island
Pruned minimum SED 40 cm	350 - 375
Pruned minimum SED 30 cm	170 - 190
Small branch minimum SED 30 cm	155 - 160
Small branch minimum SED 20 cm	125 - 135
Large branch/boxing/sleeper	115 - 120
Firewood logs	75 - 80

China performing ahead of forecast

In China, the eastern seaboard consumption exceeded all previous records by a big margin in the week beginning 16 April. Daily port off-take for all softwood suppliers and species has been in the realms of 100,000 cubic metres a day compared with the highest ever previously recorded 92,000 a day in 2017. For the industry this is 'wow' territory and sends a mood of positivity through all sectors.

The almost way too high inventory of 5.4 million cubic metres back in December 2017 is starting to ease back. Again, as at mid-April, total inventory of all ports and softwood species is dropping through 4.8 million cubic metres. It will take a sustained period of high consumption to get this back under the four million mark which is the current market comfort level.

New Zealand has a key role to play here. At current production rates, we continue to run the gauntlet of over-supply. In April, China is in its normally high usage period relating to the construction sector after winter

and before the onset of the hot summer with reduced hours of work. We will need to monitor consumption closely and match supply to an under four million tonnes of inventory if we are to avoid the sword being run through the price later in the year.

The China government has introduced a lowering tax regime on logs. The previous 13 per cent tax was reduced to 12 per cent in 2017 and 11 per cent in 2018. While the material effects are not substantial, the positivity effects are substantial. This tax is applied to the total value of the cargo and is a key component to the document 'cleaning' process. Once the documents are deemed cleaned, in other words the tax paid, the cargo is available for discharge. The reduced tax helps cashflow moderately but more particularly is an expression of government pleasure and support for the industry.

Some price trends

In my last report I indicated in November and December 2017 that settlements for radiata pine logs landed in China were in the order of US$140 to $142 a cubic metre, up between one and two dollars on previous months. Just to clarify this refers to the market indicator A grade which is a 3.8-metre long log with a 30 cm small end diameter and a maximum branch size of 12 cm.

In April, A grade settlements have been in the band US$143 to $144 per JAS cubic metre. This is still well up there comparing year-on-year prices.

While on that subject, I thought it would be interesting to look at the trend line over the last three years. The table gives the landed price in China in US dollars for A grade per JAS cubic metre.

A grade price in US dollars per JAS cubic metre	
April 2016	$113
November 2016	$124
April 2017	$130
November 2017	$140
April 2018	$144

India market in good shape

The Indian economy has continued the recovery path following the imposition of demonetarisation policies. Confidence is returning to the industrial sector with overall economic growth statistics and forecast now more positive.

There are three ports which currently receive bulk cargos from New Zealand. All three are on the western side of the continent. Kandla and Mundra are very close to one another and effectively act as one, taking about 1.8 million cubic metres a year. Tuticorin takes about 300,000 cubic metres a year.

While these volumes currently reflect just over what we sell in China in two months they are important volumes in the overall market. Realising that this market is destined to grow in the future has an important moderating effect.

The India market is indeed set to grow in the future, most believing that annual volumes will hit three million cubic metres by 2020. Expansion at Tuticorin is in the wings and Kiwi sellers increasingly looking at other port options. In particular where slight improvements in infrastructure could see Handy Class vessel with the standard 30,000 to 35,000 cubic metre payload class be received and unloaded.

A potential high level scandal could potentially disrupt the log trade in the medium term. The Punjab National Bank has been financing about 30 per cent of the log trade with letters of credit. It is emerging this bank has been involved in high level fraud centred around illegal loans. Now other banks have withdrawn financing letters of credit until the full extent of the fraud is known. The effects on buyers and how they will fill this critical funding pathway are yet to play out at time of writing.

Some cautionary notes

There are some cautionary notes in what is otherwise a very stable and healthy log market –

- China eastern seaboard inventory has to come under four million cubic metres quickly for market confidence to be retained
- What will Mr USA, Mr China, Mr Russia, Mr Syria and Mr North Korea do next?
- A forecast strengthening in the US and NZ dollar exchange rate will not be helpful
- How long will the current housing boom last?
- In terms of our current government, when will the money run out?

Back to JAS

I was asked recently what a JAS was and realised after doing this for 30 years it is easy to forget some people do not understand our everyday acronyms. A JAS is short for a Japanese Agricultural Standard cubic metre.

History shows that around the mid-1970s the first major export deals were struck with Japan and the common practice has stuck. Whereas a New Zealand cubic metre is based on a three-dimensional formula – small end diameter, large end diameter and length, the JAS is based on a two-dimensional formula – small end and length with a small allowance for taper.

It has never been more important that the only way forward for climate, country and the planet is to get out there and plant more trees.

Allan Laurie is the managing director of Laurie Forestry Ltd with 30 years of experience in marketing logs for small to medium growers.

Trees, sheep and beef make an interesting mix

Victoria Lamb

New Zealand has an area of about 25.9 million hectares. Around 40 per cent or 10.6 million hectares of that is in sheep and beef farming.

As many will know first-hand, there is a lot of native vegetation growing on sheep and beef farms, representing a significant biodiversity resource.
A recently completed report by researchers from Canterbury University and Auckland University of Technology for Beef + Lamb New Zealand has looked at just how much native vegetation there is and how it is distributed through the country. The results are some fairly significant numbers.

Native vegetation of all types cover about 44 per cent of New Zealand, with more than half of it found on public conservation land. Just under a quarter of all native vegetation, amounting to a significant 2.8 million hectares, is found on sheep and beef farms.

About a quarter of all sheep and beef farms have native vegetation on them, ranging from a high of 41 per cent cover on Marlborough farms to a low of 12 per cent in Hawkes Bay.
The study looked at three classes of vegetation –

- Forest and potential forest as native woody vegetation
- Native grasslands
- Native wetland vegetation, the proportion that occurs on sheep and beef farms and the different distributions by region.

Native woody vegetation nationally is estimated at 30 per cent which is about eight million hectares across New Zealand. Out of the eight million hectares, about 1.36 million hectares are on sheep and beef farms, with the percentage of woody vegetation occurring on sheep and beef farms varying across regions. Where there is a lot of public conservation land, the proportion on sheep and beef land is often low, whereas in regions with less public conservation land, the percentage found on sheep and beef farms can be much higher. For example, around Gisborne, just over half of all native woody vegetation remaining is on sheep and beef farms.

Native grassland vegetation nationally is estimated at 10 per cent or 2.6 million hectares with 1.2 million hectares on sheep and beef farms. Not surprisingly, Marlborough, Canterbury, Otago and Southland feature as the regions with the biggest amount of native grassland.

When it comes to wetlands, the story is not good. Native wetland vegetation nationally is estimated at a critically low one per cent or 259,000 hectares, of which 3,600 hectares is on sheep and beef farms. Almost 80 per cent of remaining native wetland vegetation is on public conservation land. Overall, however, the report shows, sheep and beef farmers have a significant amount of native vegetation on their land.

Forestry blocks

Of course, woody native vegetation is not the only type on sheep and beef farms as the following data from the Beef and Lamb Economic Service Sheep and Beef survey shows. Their survey, based on a statistically representative sample of 550 farms, identifies 181,000 hectares of planted forestry blocks on sheep and beef farms across the country.

Farm class	Forestry block average size in hectares	Number of farms	Total area of forestry blocks in hectares
1	35	215	7,525
2	28	810	22,680
3	27	1,005	27,135
4	18	3,640	65,520
5	9	1,275	11,475
6	13	2,505	32,565
7	5	1,290	6,450
8	4	495	1,980
9 Total of all classes	**16**	**11,295**	**180,720**

The data collected did not determine which tree species was being grown but the majority is likely to be radiata pine. Further work is needed to look at what trees make up the forestry blocks on sheep and beef farms.

These figures do not include the other trees found on farms. Shelter belts, erosion prevention plantings of willows and poplars and other more widely spaced

or scattered trees are common, especially on the hill and high country farms. These also have value for their primary purpose of shelter, shade, erosion prevention, but also for the looming issue of climate change.

Changing climate of climate change

Climate change policy is fast moving and changing. We have seen the Paris agreement targets, but the new government has signalled a desire of the much greater target for the entire economy to be nett carbon neutral by 2050, compared with the earlier aim of 50 per cent below 1990 emissions by 2050.

New Zealand has a unique emissions profile when compared to the rest of the world. Around half of the country's greenhouse gas emissions are generated by the agricultural sector, predominantly from livestock and livestock farming. As a result, most of the emissions are methane and nitrous oxide as products of ruminant animal digestive processes and the by-products urine and faeces.

The sheep and beef sector is responsible for about half the emissions from livestock. At last count there were about 27,580,000 sheep and 3,470,000 beef cattle on sheep and beef farms. Sheep numbers have fallen by more than half since the early 1980s when numbers were in excess of 70 million.

Now the 27 million sheep produce almost the same amount of meat as a result of improvements in genetics, animal management, higher reproduction rates, pasture improvements and better feeding. Beef cattle numbers have also fallen, but not to the same degree as more beef animals are produced from the dairy herd.

Fallen emissions

One of the benefits of the reduced livestock numbers associated with improved performance is that there has been a significant decrease in the sector's emissions profile. Greenhouse gas emissions from the sheep and beef sector are currently 19 per cent below 1990 levels, putting the sector ahead of New Zealand's current target of 11 per cent below 1990 levels by 2030.

Total emissions have fallen, along with the emissions per kilogram of meat. Further reductions are possible by building on the genetic gains and further improvements in reproductive performance, feed types and pasture utilisation, but these are likely to be small although they will be cumulative. Research is continuing into novel mitigation which can generate significant reductions in emissions, but potential products are still being tested and some years away from being available on the farm.

As with any product, markets fluctuate, with the sheep and beef sector being no exception. Currently, red meat prices are good and the sector is doing well. The products have appeal as the animals are pasture-fed, free range and fit well into the calls for sustainable farming.

To continue to meet the call for sustainable production, the sector is looking closely at how it can become nett carbon zero. The good news is that, based on recent research, if sheep and beef sector's tree coverage is taken into account – native vegetation along with forestry planting – then it is realistic and achievable for the sector to become fully carbon neutral. This will require modest further planting of about 73,000 hectares of radiata pine or 368,000 hectares of native forest. This translates to about seven hectares of radiata pine per farm based on 11,295 farms, or 33 hectares of native forestry for each farm.

How many trees

To calculate these figures we have used the Parliamentary Commissioner for the Environment's 2016 calculator for emissions and forestry offsets.

	Hectares of radiata pine		Hectares of native forest
One sheep	0.012		0.06
One beef cow	0.057		0.28
27,580,000 sheep	330,960		1,654,800
3,470,000 beef cattle	197,790		971,600
TOTAL	**528,750**		**2,626,400**
Forest on sheep and beef land	180,720		1,360,000
Forest needed	73,080	or	367,700
Forest needed per farm	7	or	33

Not all farms will be able to put in more trees, particularly the intensive finishing farms which may have all their land committed to production. However, many others will be able to put some of their less productive, highly erodible or less accessible areas into trees. This would make the sector nett carbon neutral for now.

Consideration will also need to be given to the tree species. Trees which are destined for harvest will, when harvested, need to be replaced with an equivalent amount of land planted or replanted. On the other hand, native forest, if left to regenerate and mature, will remain a permanent carbon sink.

All trees come with other benefits. They help keep soil in place, reduce overland flow of water which can carry sediment and pathogens into waterways. They can also help soil retain moisture, have biodiversity benefits, can provide shade and shelter for livestock, have social and cultural values, can be used for timber and they can add value to the landscape.

Victoria Lamb works for Beef and Lamb with sheep and beef farmers for a nett carbon neutral future.

Husqvarna South Island Farm Foresters of the Year 2018

Claire and Terry Gavin

Claire and Terry Gavin's 53-hectare forest farm Otiria is situated at Owen Junction, 23 km north of Murchison on flats alongside the mighty Buller River. The predominantly north-facing property lies under the flanks of Mount Murchison, is approximately 50 km from the West Coast as the crow flies, with Nelson 110 km to the north east. A place of beauty and natural interest, it has been designated as a 'landscape area' by Tasman District Council.

The property was purchased in 1994 when, returning from a family southern holiday, Claire and Terry saw a 'for sale' sign half an hour north of Murchison. They had been looking for somewhere to plant trees and seeing this property were instantly smitten, and 24 years later still are. Since 1994 they have been flat-out planting, landscaping, pruning and controlling weeds which they describe as the complete cure for mid-life angst, apathy, boredom and sloth.

Previously farmed as a cattle and sheep farm, at the time of purchase it was all in pasture of variable quality, except for patches of indigenous bush and scrub. An adjoining seven hectare block acquired in 2005 was a jungle of four-metre high blackberry, broom, muehlenbeckia, bracken, along with neglected oak, walnut, Tasmanian blackwood, eucalypts and cypress.

While a beautiful and picturesque location, it is challenging for forestry. The soil is stony, which makes planting difficult. The climate is harsh, with baking hot summers and cold winters. There are occasional droughts with one particularly severe lasting three-and-a-half months. Occasional severe flooding has resulted in the loss of several hectares of river flats. Frosts can be heavy, to the extent that there can be permafrost across the property in shaded areas for two to three weeks.

When they purchased the farm, Claire and Terry were both living and working full time in Nelson, but they still managed to work the best part of three days a week on the farm, mostly planting and scrub cutting. Now retired, they are spending more than half the week at the farm spraying, planting, pruning and increasingly important riparian work. Their aim is to grow good-quality alternative timber species and to protect, enhance and enjoy the environment they work in for themselves and future generations. In recent years they have been working in conjunction with Tasman District Council on riparian management and flood remediation work in a co-operative relationship.

Soils and climate

Soils are part of the Hokitika and Ahaura series, which consist of well-drained sandy loam derived from granite, greywacke and some schist. Topsoil is minimal, with a lowish pH of 5.7. The subsoil is made up of sand, gravel and rocks. The farm is at an interzone between the wetter West Coast and the drier Marlborough to the east.

Rainfall is upwards of 1500 mm a year, frosts are

frequent in winter. There is also the occasional hoar frost and snow falls about once a year but does not linger on the ground for more than a day or so. The prevailing south west winds are funnelled from the west along the Buller Valley. These are generally mild but occasionally severe enough to cause windthrow in wet weather.

The plantings

There are plantation and shelter plantings on Otiria in which a wide range of species have been planted – too many to list here. Shelter plantings consist of a 350 metre hardwood mixture of oaks, chestnuts, shagbark hickory and tulip trees and 250 metres of Leyland cypress. A further 4.5 km of shelter is provided by bush boundaries, plantation edges and riparian plantings. There are approximately 21 hectares of plantations, predominantly cypress, redwoods and poplars.

Amenity plantings include native and exotic species – small groves of remnant beech, totara kahikatea and matai have been retained, fenced off and nurtured. A barrier of relatively fire-resistant native species has been planted alongside State Highway 6. This also provides continuity between the Owen Scenic Reserve just across the highway. As is usually found on such properties there is an extensive arboretum containing exotic and locally sourced native species.

There is a stream riparian and conservation programme which involves the removal of old crack willows and keeping flood channels open and enhancing riverside vegetation. Most of riverside vegetation is natives such as beech, lancewood, kowhai, flax, coprosma, pittosporum, wineberry and where appropriate this has been supplemented attractive ornamentals, bird-friendly species, and poplar or bitter willow for erosion control. A new initiative is a joint riparian project with the Tasman District Council which will see plantings of lacebark, ribbonwood, lancewood, mountain totara, kapuka, kowhai, toetoe, flax and carex planted.

Weed and pest control, and silviculture

Weeds are synonymous with the West Coast and controlling broom, bracken, blackberry, buddleia, Himalayan honeysuckle and muehlenbeckia has been a long battle for Claire and Terry. Occasional incursions of gorse have been found along the river and they have been swiftly dealt with. In conjunction with the Department of Conservation and Tasman District Council, there is a spraying programme to eradicate reed sweet grass in wetland areas. On the positive side, damage from pigs and possums has been minimal as they have been controlled as part of the TB free programme.

Terry and Claire love pruning which has resulted in almost every planted tree being pruned, frequently to 6.5 metres using secateurs, loppers, pole saw or a reciprocating power saw. In many cases the prunings are collected and placed around trees as mulch which results in a very neat plantation. Pruning evergreen species is usually carried out in the winter, while deciduous species are pruned in January and February. Many of the plantations are now ready for thinning and with the help of fellow farm foresters Claire and Terry are deciding on what is going to work for them.

Service to the NZFFA and wider community

Claire and Terry have been active in the in NZFFA for more than 20 years. Both were part of this year's conference organising committee with Claire taking on the demanding role of conference registrar. Otiria has hosted numerous field days, was featured in the Trees on Farms initiative and was also used as a case study for the Farm Forestry Model, both of which can be found on the NZFFA website.

They are both active in local community activities including the Wai-iti Domain or Mangarakau Swamp restoration projects. They act as a resource for farmers in the wider area, for example giving advice on suitable species for a woodlot. People have come from as far away as Blenheim to see their farm and ask advice.

Husqvarna North Island Farm Forester of the Year 2018

Dean Satchell

The winner of the 2018 North Island Farm Forester of the Year award was not born into land, money, horticulture or forestry. In fact, growing up in suburban Auckland would probably have steered most in a direction far from practical forestry. This is a story about perseverance, vision, a goal of leaving things in a better state than before and without messing up the environment in that pursuit.

It has involved investment mostly for the benefit of others with a fair amount of careful but enthusiastic experimentation thrown in. Our recipient has established a modest home and nursery business with a minute environmental footprint on a picturesque one hectare on the outskirts of Kerikeri.

Dean Satchell went to Auckland University to study accountancy and commerce but he became disenchanted with how those skills were used to support entities which put profit ahead of all else including the management of the planet's resources. He quickly abandoned that chapter of his life and headed up to Northland where he could pursue his interest in growing trees and making the world a better place, perhaps even helping to heal a few scarred bits along the way.

Dean's interest was in growing commercial trees, not amenity horticulture. The trees he wanted to grow had to be useable without being pumped full of chemical preservatives. It was when he had moved to his first small block of land at Tangateroria west of Whangarei, to set up a tree nursery, that he discovered several things which would shape his life and the path that it led him. His natural aptitude for science which previously had never been kindled eventually resulted in extramural studies towards the completion of an applied science degree from Massey University with a focus on soil science, and more recently an MSc at Canterbury University focussing on processing *Eucalyptus nitens.*

He also discovered farm forestry and simultaneously all the wonderful durable eucalypt species which were growing in Northland at the time. Lastly, he discovered two people who would be extremely influential in the direction of his forestry experimentation and plantings. Jim Cox, a retired forest service forester and Richard Davies-Colley, a sawmiller and active farm forester.

He met Jim and Richard at a mid-north farm forestry field day in a stand of trees just down the road from where he was living in early 1990. This stand and the way it was production thinned influenced Dean's mantra around looking after and extracting value for the grower as well as the sawmiller. As Dean put it '…the sawmiller came in and skimmed off the cream but left a huge amount of value on site because it was deemed too hard'. In typical Dean style he organised a mate with an old truck and a small portable mill to come and obtain value out of the head logs to benefit the grower.

A place too far

Dean's first nursery at Tangateroiria was in his own words 'too far from where the people lived who might potentially grow his trees'. However, it was situated in an area with a long history of exotic hardwood planting that influenced the species mix of his future product lines. After a time he sold up and moved on to a small block of land at Kauri, just outside Whangarei to be closer to many of his potential clients. It was at his Kauri site that he met two clients who would eventually become good friends and important investment partners.

The first was Sandy McKay, an American expatriate who was setting up a glass house horticultural venture with her husband. Adjacent to the glasshouses was a hillside covered in gorse that she wanted to make something of, so a joint venture planting was set up between Sandy and Dean. In Dean's words '… there was this massive hillside of 2.5 metre-high gorse that needed planting in something productive, but I did not want to clear it all so I donned a leather jacket and helmet and set off with my tiny chainsaw to cut tracks and light wells into the stuff'. After 25 years there is now a wonderful park-like environment with not a single gorse bush in sight, but with a collection of really magnificent exotic hardwood forest trees.

Establishing a forest

The second client was another expatriate, a Swiss called Ricco Legler. He had purchased over 200 hectares of recently harvested pine forestry land which was reverting to gorse. He had started to replant by himself but was struggling to get advice on the species mix that he could grow and how to establish them effectively. He wanted his forest established using organic principles, including the selection of tree stock that would give rise to a forest which would grow species and which did not require artificial chemical preservatives to make them fit for purpose in their intended end use.

These demands were placed on a site that was fairly impoverished due to earlier mismanagement. It also had some big challenges in terms of the variability of the soils, ranging from gravelly volcanic loams at one extreme to podsolised clays at the other, and weeds, particularly rampant gorse and blackberry. Dean had to undertake many roles in the establishment of this forest – species consultant, nurseryman, tree planter, silviculture manager as well as joint venture partner on an adjacent 20-hectare portion of the block.

Experimentation

It is in this joint venture portion of Horowai forest trust that the early experimentation with respect to species and provenances, regimes, shelter, fertiliser intervention and what to do when all else fails took place. It is Dean's experimental altruism which shines here.

His joint venture block which was meant to be his retirement income stream effectively turned into a learning exercise for both himself and Ricco. The saving grace on income was that Dean grew the majority of the forest stock for the rest of the 200 hectares and was paid to establish and manage it. A key factor in the establishment of this forest estate was the fact that Ricco was prepared to spend money on mechanical land preparation, including sweeping debris and mechanised spot cultivation of planting sites.

The things that worked against them initially was a lack of knowledge about where some species successfully grew best in this difficult and variable site, the current wisdom around site selection and species, and the availability of reliable sources of seed that contained the species that they were sold as.

During the establishment phase there always was a plan B and C based on the initial trials. Currently Horowai forest and the joint ventures can be divided by species into equal quarters of cypresses, eucalypts, radiata pine and native retirement. It was during the

establishment phase of Horowai that Dean sold his land at Kauri, which was a 90 minute drive from the forest, and moved to his current location outside of Kerikeri, only a 15 minute journey from the forest.

Farm forestry community

Dean's service to the wider farm forestry community has been long, and since he joined the NZFFA executive team over 12 years ago, it has also been time-consuming. Living in Kerikeri and travelling to meetings in Rotorua, Wellington and Christchurch would be relatively easy if it was not for the first leg of the journey, from Kerikeri to Auckland – the shortest and most expensive. Despite this, Dean has continued to represent the NZFFA on various industry committees. These include biosecurity for six years, the Specialty Wood Partnership three years, and the New Zealand Standards Committee for NZS 3602,3603,3604 which govern how wood is preserved, specified and used in construction.

The NZFFA website has been Dean's 'baby' and he managed continuing upgrades with external technical help for over 10 years. He has been newsletter editor for the Cypress Action Group and Farm Forestry Timbers for six years as well as chairing both groups. He still produces articles for the *Tree Grower*, other action group newsletters and national publications.

As mentioned earlier Dean undertook a post graduate masters degree four years ago which incorporated a sawing and value optimisation study for *Eucalyptus nitens*. What many of you may not realise is that *E. nitens* does not grow in the warm and sub-tropical north where he lives. In Dean's word's 'There are lots of farm foresters who have grown *nitens* and someone needed to do the maths on it to prove that it could be successfully sawn to appropriate dimensions profitably and sold, despite what the detractors might say'.

As if all the work within New Zealand has not been enough, Dean has travelled a number of times across to Tasmania to collect parasitoid wasps which could be used as a bio-control agent for *Paropsis charybdis*, the eucalyptus tortoise beetle, which is a common browsing insect on some eucalypt species. He also rescued the southern ladybird *Cleobora mellyi* from the Marlborough Sounds and distributed it around New Zealand as a useful biocontrol agent.

Pruning and thinning

Dean has carried out a large amount of pruning to improve form and to maximise clearwood production and this has led to small innovations in practice. The best example is the use a battery powered reciprocating sabre saw for branch pruning and stand thinning.

Thinning takes place in spring and is achieved with a double ringbark cut around the stem into the sapwood, followed by the bark sheath being levered off, and an application of Glyphosate solution to the exposed cambium on the lower part of the wound. The resulting stump stays alive due to root grafting to neighbours, with the upper portion of the tree slowly decomposing while still giving some mutual protection to its neighbours in the short term. This method is particularly effective with cypress.

The future

It is now a year since Dean stepped down as national President of NZFFA. When I asked him in Horowai forest what his plans were for the future he replied 'I would really like to develop the best of these eucalypt stands into seed orchards so that the next generation of foresters up here don't have to put up with crap genetics like I did. And there needs to be some work done developing appropriate cypress genetics for the north'. I suspect that there may also be some production thinning with case study done on the resulting value stream from

stringybark eucalypts such as *E. muelleriana* and *E. globoidea* which were planted 20 years ago, as Dean puts it, 'to show other growers what they're missing out on'.

Then there will be the commercial harvest from the forest. With the growth rates currently being achieved in Horowai it seems highly likely that there is a harvest and a second rotation planting just around the corner. With what has been learned so far, I suspect that the second rotation will leave the first well and truly in the shadows.

There is a new and exciting phase about to begin out in Horowai forest. Ricco's son Li has his mill and processing site set up and when I visited, there were already filleted stacks of Dean's timber awaiting the planer, some even colour coded according to the position in the tree stem to measure the characteristic strength, stiffness and durability.

Dean also has an idea for a kiln and storage unit to suit low volume wood producers. It is my observation that out east of Kerikeri in a forest called Horowai, innovation will continue to thrive, the future will be anything but dull, probably quite profitable, and the boundaries of the species planted, the technology used and the people who come to view, learn and work will continue to be pushed just a little.

Landcare Trust Award for Innovation in Sustainable Farm Forestry 2018

Ken and Robyn Ferguson

Ken and Robyn's picturesque farm Waipuna is nestled alongside the Grey River on the West Coast and consists of 1,000 hectares of flat pasture and 850 hectares of indigenous forest. One of the West Coast's first farms dating back to 1862, it has had a long history of farming, mining and logging in various guises. Today under Ken and Robyn's stewardship it is being farmed with an ethos of innovation and sustainability and a focus on doing things well.

The farm

Cattle, sheep and deer are currently being managed with all stock being finished on the farm and all replacement stock being bred on it. The farm is stocked with 1,300 ewes and 500 hoggets, 300 Angus beef cows and 150 Friesian bull calves, 1,200 hinds and 400 velveting stags. Typically, the ewes would lamb at over 180 per cent and the hoggets at 125 per cent. The target weight for cattle sold is 300 kg on the hook and the velveting stags are averaging nine kilograms of velvet per animal.

The forest

Since 2002 the forested area has been managed under a Sustainable Forest Management Plan administered by the Ministry for Primary Industries and overseen by Jan Dirks who has considerable experience in beech management and sustainable management plans. The forest had been repeatedly logged for selected species until the mid-1980s. Most of harvesting activity occurred before 1950 with the predominant extraction method being ground-hauling to bush tram, although some tractor extraction also occurred. The targeted species were rimu, kahikatea and red beech.

In general, regeneration of beech and podocarp species is well established today in areas of historical logging. Today forest composition is generally a red and silver beech mixture, with occasional kahikatea and rimu on younger alluvial terraces and floodplains with hard beech becoming more prevalent on higher, older terraces and ridge country.

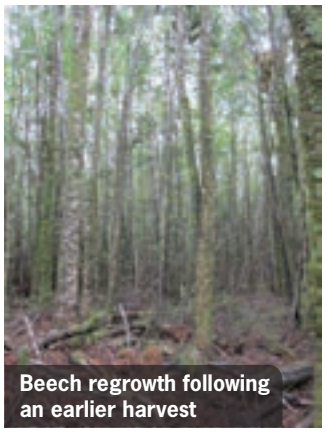
Conservation

Ken and Robyn have a strong focus on conservation and with the help of a local Biodiversity Fund have fenced off an additional 150 hectares of regenerating forest both alongside the river and on the farm. In addition, Ken is a strong advocate for kanuka, a species which was once very common on Waipuna, but now of limited occurrence. It has been highly sought after for firewood in the past and with current farming practice there is limited opportunity for natural regeneration, so a re-establishment programme is under way.

Waipuna – a picturesque farm alongside the Grey River

Sheep grazing paddocks surrounded by regenerating forest


Fodder crop sown into renovated gold mine tailings


Beech regrowth following an earlier harvest


Fencing off and encouraging regeneration alongside the Grey River

There are several old gold mining sites on Waipuna and these are slowly being rehabilitated or planted out as wetlands. Old gold tailings are being levelled and sowed in pasture.

Advocacy

Ken is a passionate advocate for farm forestry and sustainable beech forest management and valuing the timber that comes from such management. As Ken says, 'New Zealand beech is a high value timber, as good as any imported beech, but it's just not recognised here in New Zealand'. Ken has the view that if the wood is not valued, then in should stay in the forest until it is valued.

Waipuna hosts numerous farm visits each year from local and international visitors and most would leave with a different view of West Coast farming from the one they had when they arrived. Waipuna has hosted attendees at both West Coast farm forestry conferences with the 1994 conference particularly memorable because of the rain and large barbeque dinner provided.


Beech regeneration following fencing and stock exclusion


Old gold pond being planted out as a wetland


Riparian forest alongside Grey River

NZFFA's recent interaction with Shane Jones

Hamish Levack

This is a report on NZFFA matters raised with Shane Jones, the Minister of Forests, by Neil Cullen, President of the NZFFA and Hamish Levack, vice President, on 28 February 2018. The Minister's responses are included in this article.

Wood supply, afforestation and reforestation

The NZFFA affirmed its strong support of the government's new policy to accelerate afforestation to about 50,000 hectares each year. However, we also pointed out that planning was needed to incentivise exactly where the new planting should go so as to obtain sustainable regional log supplies. Without this, new investment in domestic wood processing would not occur. The Minister agreed.

Telling potential investors that changes in global wood supply and demand, technology trends, and environmental imperatives favour investment in forestry

The NZFFA drew the Minister's attention to the article on forestry profitability published in a recent issue of the *Tree Grower*. On the basis of likely future global changes in the supply and demand for wood, the trend for substitution back to wood from other construction materials, the expected longer-term effects of the Emissions Trading Scheme, and the other environmental benefits of forestry, investment in afforestation was looking to be of much more value than hill country farming in many locations.

The NZFFA pointed out that during the next decade about 14,500 small-scale, forest-owning entities are likely to be producing about a third of the national log harvest with a cash flow of up to $12.5 billion. However, in general, forestry was not really the focus or main source of income, and their blocks are scattered, of mixed quality and sometimes badly located.

For these, and other reasons, such owners have often received poor or sometimes negative returns. Some had poor advice at the time of planting, and some at the time of harvest. The result has been a decline in confidence in replanting and afforestation. Sound advice, information and support will be vital for any increase in nett stocked forest area. The Minister agreed that the government needed to spend money to improve the public's understanding of these matters, and that the NZFFA had a role to play in assisting such forestry facilitation and extension work.

Encouraging economies of scale

To improve returns from smaller forests, growers in New Zealand will have to reduce costs because they cannot raise international prices. Costs could be reduced by aggregating forests to achieve economies of scale, providing continuity of work for contractors and a regular log supply for markets. The NZFFA pointed out that voluntary aggregation of small forests could be achieved by the use of cooperatives, companies or partnerships, and this would provide substantial benefits to existing owners as well as new investors. However, such benefits needed to be demonstrated with successful pilot examples.

The Minister agreed that MPI needed to work with the NZFFA to develop technical and feasibility studies for collaborative forestry, and perhaps even provide some start-up funding for related pilot projects.

Reducing the barriers to buying and selling forests, and the impediments to forest aggregation

The 'cost of timber' clause of the current Income Tax Act makes it difficult to buy or sell small forests. When standing trees are sold, the seller must immediately pay tax on the income, but the buyer cannot claim the matching expenditure until the trees are harvested or resold.

Calculations suggest that, depending on the age of the forest, the buyer's offer might be 20 to 30 per cent lower than the seller's expected price meaning there is little likelihood of agreement. Although immature forests do sell, the market is thin, illiquid and not necessarily rational. This discourages fresh investment and forest aggregation.

The NZFFA has been working with the Inland Revenue Department and MPI to resolve this problem. Officials now agree that the Income Tax Act could be modified to allow the aggregation of small-scale forests without penalty. The Minister was supportive of this and asked his officials to set up a meeting with Stuart Nash, the Minister of Revenue, to give priority to the necessary legislation changes.

Improving the Emissions Trading Scheme to encourage afforestation

The Minister agreed that James Shaw, the Minister of Climate Change, had said that there would not be any adjustment to the Emissions Trading Scheme for around the two years it would take to develop the necessary new legislation to ensure 'zero carbon by 2050'.

The NZFFA pointed out that to get land owners

interested in planting trees, the government would have to at least signal future high and stable New Zealand Unit prices and take steps to mitigate forest grower anxiety that carbon emission liabilities at harvest time might not be affordable. Such steps could include averaging and the recognition of embedded carbon in harvested wood products.

The Minister told the officials to organise a meeting between James Shaw and the NZFFA to sort this out.

The NZFFA's potential role

Small-scale growers own over 30 per cent of this country's production forests and most are unaffiliated to any forestry organisation, but the NZFFA represents them to MPI and the Forest Growers' Levy Trust. The latter has helped fund the NZFFA's work to develop channels of direct communication with these owners, and the NZFFA has offered these channels with our other resources and networks to help the government achieve its afforestation targets. Specifically, the NZFFA offered to assist by –

- Further developing its postal and email address lists of forest owning entities as channels to contact those already engaged in the sector
- Using its existing head office and 27 regional branches to encourage and support afforestation and provide a conduit for forestry advocacy
- Partnering with Beef & Lamb New Zealand, the Poplar and Willow Research Trust, Scion, Tane's Tree Trust, and relevant local authorities to contact and educate rural land-owners about afforestation
- Disseminating positive messages about the potential for forest investment and informing individual potential and current forest investor.
- Sharing experience on the best establishment and management of radiata pine as well as indigenous and alternative species
- Updating best practice management guides, providing case histories and field demonstrations of successful forest investments
- Informing and reminding landowners of the co-benefits of forestry, such as erosion control and soil conservation, riparian planting, fodder, bio-energy, nectar for bees, water quality, shelter and amenity
- Running a large conference with the theme of promoting afforestation in 2019.

In return the NZFFA asked the Minister to support the NZFFA where it could. In particular, mutual benefits would result if the government helped fund the NZFFA to carry out some of the services above. Increased membership would be a bonus because it would produce wider and more consistent support for small-scale growers.

The Minister agreed with this and asked the MPI officials to interact with the NZFFA to develop these ideas. He indicated that he would need to receive a business plan before any government funding could be approved.

The need for foreigners to obtain Overseas Investment Office approval before they can purchase forestry rights

In January, Treasury floated a discussion paper about amending the Overseas Investment Act. It invited submissions on a proposal to include Forestry Rights as 'sensitive land'. Apparently, this amendment was needed before the government could sign the trade and investment pact, know as the CPTPP, involving New Zealand and ten other Pacific region countries.

The NZFFA submitted that forests of 1,000 hectares or less should be considered 'small forests' because the Forest Growers' Levy Trust differentiated small from large forests on this basis.

The NZFFA went on to say that, because getting an application through the Overseas Investment Office was cumbersome, expensive and time consuming, it reduced exit options and anything which did that would reduce value. The claim was that the inclusion of cutting rights as 'sensitive land' would inevitably result in a reduction in demand for forestry land, and a reduction in the price of trees in the ground, and as timber. In addition, the indirect results would be to discourage land owners from planting or replanting land in forest, which would reduce the area of land planted in forest.

In the long run, this would harm the interests of all players in the New Zealand forestry industry, including land owners, service providers and New Zealand processors. This would also have environmental and economic consequences which would be contrary to the government's stated goals regarding forestry.

The NZFFA had copied these objections to the Minister of Forestry before the meeting. The Minister said that he supported the NZFFA position but that decisions would be up to the majority in caucus. However, he promised to present our views at caucus.

Subsequently David Parker, the Minister for Trade and Export Growth, confirmed that the Minister of Forestry's views had indeed been taken into consideration. In March, David Parker announced that overseas investors will be able to purchase up to 1,000 hectares of forestry rights each year, and any forestry right of less than three years duration, without approval from the Overseas Investment Office. In addition, processing applications by the Overseas Investment Office would be streamlined and unnecessary impediments would be removed.

Hamish Levack is a member of the NZFFA Executive.

Eucalyptus variegated beetle creates concern for eucalypt growers

Toni Withers, Rebecca McDougal, Michelle Harnett and Tara Murray

Annoying Australians are over here and eating 'our' eucalypt trees. Seven different tortoise beetles, named because their round bodies resemble a tortoise, have arrived in New Zealand and have been making pests of themselves for more than 100 years.

The most recent arrival is *Paropsisterna variicollis*, the eucalyptus variegated beetle. Its presence was noted in Hawke's Bay in 2016. A fast lifecycle, at least three generations a year, clustered larval feeding, a high reproductive output, and the fact that it feeds on both juvenile and adult leaves means eucalyptus variegated beetle is an unwelcome incursion. Furthermore, it is a beetle with the potential to affect a wide range of eucalypts, and where conditions support multiple generations each year, it may have potential to cause repeated defoliation and affect growth.

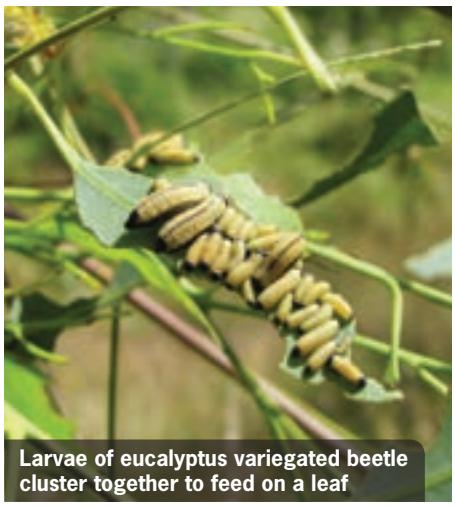
Eucalyptus variegated beetle has spread throughout Hawke's Bay and in 2018 moved to north east Hawke's Bay, to Taihape in the west and Masterton in the south. The spread of the pest can be tracked on NatureWatch NZ and we urge all readers to photograph and report suspected sightings at www.naturewatch.org.nz.

Which tortoise beetle has the worst effect?

The eucalyptus tortoise beetle *P. charybdis* has long held the title of tortoise beetle with the greatest economic effect on New Zealand. It limits the growth of eucalypt species in the sub-genus Symphyomyrtus, particularly *E. camaldulensis* river red gum, *E. viminalis* ribbon gum, *E. globulus* blue gum and *E. nitens.* It and has been the focus of four biological control introductions since the 1970s. It is also the only production forestry insect pest controlled by repeated aerial sprays in attempts to maintain the growth rate of *E. nitens* plantations. Eucalyptus tortoise beetle is also a significant defoliator of *E. quadrangulata*, one of the species of interest to the NZ Dryland Forests Initiative.

Unfortunately, the known biology of eucalyptus variegated beetle suggests it is a strong contender to knock *P. charybdis* out of first place. Although the most widely grown eucalypts such as *E. nitens* have not yet been assessed, two defoliation assessments of Dryland Forests Initiative plantings showed eucalyptus variegated beetle had caused moderate to severe damage to a level which is likely to affect tree growth and height.

The species most affected were *E. tricarpa*, *E. bosistoana*, *E. quandrangulata*, *E. argophloia*, and *E. camaldulensis*. Only one of the Dryland Forests Initiative's top five species, *E. globoidea* white stringybark, appears to be less preferred by eucalyptus variegated beetle. Luckily, the literature suggests monocalypts are



Larvae of eucalyptus variegated beetle cluster together to feed on a leaf

Adult eucalyptus variegated beetle green

Adult eucalyptus variegated beetle red

Australian tortoise beetles currently present in New Zealand by year of arrival

Year of arrival	Identity	Common name	Feeds on
1916	*Paropsis charybdis*	Eucalyptus tortoise beetle	Symphyomyrtus eucalypts
1976	*Trachymela sloanei*	small Eucalyptus tortoise beetle	Symphyomyrtus eucalypts
1976	*Pyrgoides sp.6*	leaf beetle	*Acacia spp.*
1992	*Trachymela catenata*	small Eucalyptus tortoise beetle	Symphyomyrtus eucalypts
1996	*Dicranosterna semipunctata*	blackwood tortoise beetle	Blackwood *Acacia melanoxylon*
2012	*Paropsisterna beata*	Eucalyptus leaf beetle	Symphyomyrtus eucalypts
2016	*Paropsisterna variicollis*	Eucalyptus variegated beetle	Symphyomyrtus eucalypts

less palatable to this beetle, so *E. fastigata* plantations may be less affected. In addition, it is encouraging that some individual family lines within each of the Dryland Forests Initiative species assessed showed only limited attack. Because reducing pest risk is a recognised objective of the Dryland Forests Initiative breeding programme, selecting for the most insect resistant or tolerant lines will be incorporated into the durable eucalypt species improvement trials as shown in the table below.

These early assessments suggest eucalyptus variegated beetle has the potential to affect some commercial eucalypt species. Therefore, further monitoring and impact assessments are urgently required.

Options for long term control of tortoise beetles

Two existing biological control agents introduced to control *P. charybdis* also attack and kill the eggs of eucalyptus variegated beetle. These are the egg parasitoid *Enoggera nassaui* and the predatory southern ladybird *Cleobora mellyi*. However, they have not been effective at halting the rapid population growth of eucalyptus variegated beetle observed in the Hawke's Bay.

Field work this year showed *E. nassaui* managed to parasitise 50 to 75 per cent of *P. charybdis* egg batches, but parasitism rates for eucalyptus variegated beetle are only one to three per cent. Parasitoids which do emerge are small, only two thirds of the size of those that emerge from *P. charybdis* eggs.

Female *E. nassaui* parasitoids are known to be reluctant to attack eucalyptus variegated beetle eggs, stinging only three an hour compared to nine an hour when given *P. charybdis* eggs. This is thought to be due the outside of the eucalyptus variegated beetle egg being covered in small sharp spines which put the parasitoid off. This is bad news which suggests *E. nassaui* is not a good long-term solution for eucalyptus variegated beetle.

The southern ladybird does predate eucalyptus variegated beetle eggs and young larvae, but we have no data yet to suggest how effective it may be. To maintain high population levels in forests, the ladybirds need a regular and varied supply of insects throughout the season.

Alternative biological control agents will be needed to support long term sustainable control. Scion has taken the first step in this process by undertaking molecular

Species assessed for tortoise beetle attack to date

Species in order of importance to Dry Forests Initiative	Common name	Susceptibility to eucalyptus variegated beetle	Susceptibility to eucalyptus tortoise beetle
E. argophloia	Western white gum	Moderate	Moderate
E. bosistoana	Coastal grey box	Highly susceptible	Moderate
E. globoidea	White stringybark	Low-moderate	Low
E. quadrangulata	White-topped box gum	Low	Highly susceptible
E. tricarpa	Red ironbark	Moderate	Low
E. camaldulensis	River red gum	Moderate	Highly susceptible
E. cladocalyx	Sugar gum	Low-moderate	Low
E. longifolia	Woollybutt	Moderate	Moderate
E. macrorhyncha	Red stringybark	Low	Low
E. eugenioides	Stringybark	Moderate	Low

analysis to confirm the identification and area of origin of eucalyptus variegated beetle. This was carried out to ensure biological control agents can be found from the same geographic region. Mitochondrial DNA and the genitalia of eucalyptus variegated beetle from New Zealand were compared to specimens from Tasmania and mainland Australia. There are many similar-looking tortoise beetles to eucalyptus variegated beetle and the taxonomy is still poorly defined.

We tested several closely related species from different regions, and can confirm that the New Zealand species is indeed *P. variicollis* but we cannot say which region of Australia our population originated from. Individuals genetically identical to those in New Zealand were found in Tasmania, Victoria, ACT and southern New South Wales. Molecular tests are continuing to increase our knowledge and narrow the point of origin further.

Natural enemies

Clues from eucalypt forests in Tasmania may help us locate biological control agents. Since 2012 Scion has been collaborating with Dr Geoff Allen from the University of Tasmania to investigate natural enemies of *P. charybdis*. This work has been supported by the Sustainable Farming Fund grant, eucalypt growers and the NZFFA.

Widespread collection and rearing of parasitoids from *E. nitens* plantations in Tasmania has revealed a number of braconid parasitoid wasps attacking tortoise beetles. One parasitoid has been studied in depth by Geoff and his students. Shiny black with a red head, the wasp attacks the spring generation of *P. charybdis* larvae during December. Parasitoid taxonomists from the United States have recently named this species. Scion will be applying to New Zealand's Environmental Protection Authority in 2018 for permission to introduce *Eadya daenerys* to act as a biological control agent against *P. charybdis* in New Zealand.

Will *Eadya daenerys* also be a control?

Eadya daenerys has, unfortunately, never been reared from eucalyptus variegated beetle. However, another species, referred to as *Eadya annleckiei* distinguishable by a black head with orange mouthparts, will complete its lifecycle on eucalyptus variegated beetle and two other related tortoise beetle species in Tasmania. A separate programme of research will be required to evaluate the potential of *Eadya annleckiei* in New Zealand before an application can be made to the Environmental Protection Authority to introduce this larval parasitoid.

Additional natural enemies that are specific to eucalyptus variegated beetle are likely to be required as eucalyptus variegated beetle has multiple generations each year in New Zealand and *Eadya annleckiei* only controls the spring generation. Ideally, we would like to find a parasitoid which could be present throughout the entire breeding season and attack all the generations of the pest. This might be an egg parasitoid, or even better, a combination of egg and larval-specific parasitoids.

What is needed for the future?

Scion and the University of Canterbury have begun research to assess the effects of eucalyptus variegated beetle and identify options for biological control. However, without industry support, a solution could be a long time coming. Funds to support long-term pest management research of new organisms which have established in New Zealand are generally accessible by using the Sustainable Farming Fund. The process requires a contribution from industry and can fund up to three-year programmes of research. This limited time frame is a big constraint when researching classical biological control options for insect pests. Therefore, a two-phase approach may be necessary.

Phase one would be to undertake dose-response and field trials to establish spray regimes to protect commercial eucalypt plantations in the interim

Eadya daenerys*, the proposed biocontrol agent for *Paropsis charybdis

***Eadya daenerys* stinging a *Paropsis charybdis* larva**

before sustainable long-term solutions are available. Simultaneously we would conduct a search for biocontrol agents of eucalyptus variegated beetle in Australia and assess *C. mellyi* in the field in New Zealand.

Phase two would be to conduct host testing trials on the target biocontrol agents identified in the first phase and then apply to the Environmental Protection Authority to release suitable agents in New Zealand. Toni Withers would be interested in speaking to any individuals and companies who have views on this proposal – email toni.withers@scionresearch.com.

If you would like to contribute to pre-application consultation on the release of *Eadya daenerys* as a biological control of eucalyptus tortoise beetle *P. charybdis*, please send Scion your feedback via an on-line consultation form accessible on www.scionresearch.com/paropsis

Toni Withers is a senior forest entomoloand gist. Rebecca McDougal is a molecular forest pathologist and Michelle Harnett, science communicator for Scion. Tara Murray is senior lecturer in biosecurity and pest management at the University of Canterbury School of Forestry.

Is there a case for timely pruning?

Wink Sutton

Two principles have emerged from a lifetime of plantation management research –

- That the size and the quality of trees at harvest are determined by the decisions at the time of planting such as site, species, genetics and spacing, and stand management in the first few years such as thinning and pruning.
- Log and tree returns at harvest are determined not by log and tree values at the time of early management decisions but by the price which exists on the day of harvest.

For sawlogs there are at least two decades between the time of early management decisions and that of the final harvest. To enhance the quality of the butt log, timely early pruning has been advocated, However, this increases management costs. Selective pruning – pruning only some of the final crop trees – is not feasible as on average, selected pruned trees tend to be soon overtaken by their unpruned neighbours.

In a recent article in the *NZ Journal of Forestry,* Tombleson quotes estimates that to compensate for the cost of pruning and the volume loss per hectare as a result of pruning, pruned logs at felling should command premiums of at least $80 a cubic metre. Current premiums for pruned logs are only about half this estimate.

For this reason, two of the largest plantation owners in the central North Island have generally decided not to prune. No other radiata growing country is effectively pruning on a large scale. Clear defect-free radiata is one of the best softwoods in the world, the equivalent of Ponderosa pine clears. The present competition for clearwood comes mostly from unsustainable old growth tropical trees. When harvested in 20 to 25 years time radiata pruned logs should be in considerable demand as there will be less international competition.

By concentrating simply on current log sale values, New Zealand could be seriously under-estimating the benefits of pruning. Certainly, the current premiums for pruned logs are lower than most growers or investors expected as well as being less than the compounded cost of pruning, but the downstream added value benefits are generally ignored.

Because of the possibility of pruned logs becoming sap-stained during sea transport, pruned logs are best processed in this country. Tombleson estimates that 12 plants in the central North Island process 1.226 million cubic metres of pruned logs a year, employ 1,575 staff and have an annual turnover of $734 million. These returns work out at $586 per cubic metre. This is an added value multiplier of more than three times the return that growers receive from supplying the domestic and export pruned log market, or over four times the returns for the best unpruned log exports.

I presume the central North Island forest owners have researched where future clearwood supplies will come from globally and have concluded that in the future, pruned logs could not command a $80 to $100 a cubic metre premium. The overseas forest owners appear to be most interested in reducing growing costs. They also appear to have little or no interest in downstream domestic processing.

Is there a case for timely pruning? Yes, there is.

supported by forestgrowers commodity levy

Levy funded Forestry Training and Careers Committee

Alan Reid

In bygone times colourful posters on lampposts and walls, featuring bronzed sailors and exotic seascapes, exhorted young people to join the navy and see the world. Nothing has changed with the need to attract, train and retain staff in a profession, although the recruitment is no longer via colourful posters and less through printed media and more increasingly through mobile phones and social media.

Training in New Zealand forestry used to be under the nurturing blanket of government. That changed in the 1980s and the task fell to new organisations. Today's bronzed sailor image of forestry may depict scenes of timber harvesting. Now the demands are for people skilled in a variety of work such as nursery work, machinery technology, road engineering, information technology, mapping, robotics and genetics. Therefore training has to keep up and keep ahead, attract funds, promote in the media and compete in the recruitment market while addressing critical safety concerns which are a critical element of training.

In this context, the Forestry Training and Careers Committee, funded and supported, by the Forest Growers Levy Trust, has been taking a fresh look at the complex picture of the training needs and careers across the New Zealand forest industry. The recent focus on training emerged from the findings of the Independent Forestry Safety Review in 2014 and subsequent formation of the Forest Industry Safety Council. The latter began to explore industry training needs as part of its renewed effort towards solving safety issues across the industry.

Training and safety are obviously vitally linked but it became evident that training and education across the whole span of forestry as an industry, sector and profession warranted a separate discussion. The NZ Forest Owners Association and the NZFFA decided this was needed and the new committee convened. It has now met twice, in late 2017 and in February 2018. The committee has been asked to –

- Consult on, and develop, a co-ordinated view on plantation forestry standards, qualifications and training needs
- Work with the Forest Industry Safety Council, the Forest Industries Contractors Association and Competenz, the forest industry training organisation, as well as funders and training providers to ensure standards and training solutions are supplying those needs
- Assume some of the career-promotion tasks of the levy-funded Promotions Committee
- Leveraging off other funding sources
- Working to promote forestry as a key primary sector through the NZ Forest Owners Association membership of the Primary Industry Capability Alliance.

The NZFFA is represented on the committee and there is an opportunity to find out the training needs of its members.

Training is important

History shows that the importance of forestry training, along with its diverse requirements across the whole sector has long been recognised. Forestry people know that forestry is a long-term enterprise and training is about the people that make up that enterprise.

When the government was directly involved in forestry the woodsman, ranger and university training institutions produced a range of technical and management-skilled people to manage, research and plan the expanding plantation estate. There were training centres which taught a full range of technical and life skills and the training systems were built around a relatively clear strategic view of New Zealand forestry. Graduates of these programmes continue to exert a strong influence in forestry and, in fact, other sectors.

With the exit of government from direct involvement forestry in the reforms of the 1980s and closure or reduction in training centres, new solutions were sought to meet and fund continuing training needs. At the same time reforms in education meant changes in the way training was carried out. There was concern about the then relevance and applicability of forestry skills. Organisations such as the NZ Forest Owners Association and Timber Industry Federation sought more coordination of training resulting in the 1991 establishment of the Forest Industries Training and Education Council. Known as FITEC, the functions included a strategic, coordinating and regionally-focused role. It looked for government funding, set qualifications for skill level training and organised resource materials for schools. A joint FITEC and Ministry of Forestry education project produced forestry education modules for schools from new entrants to the final year. FITEC merged into Competenz in 2013.

The contemporary issues about training, with the

obvious elevation of public and sector concerns about safety, are much as they were all those years ago. The broad spectrum of skills and qualifications for forestry remain as they have always been. But training content also needs to keep abreast of changes to remain relevant and in the shorter term, changing public perceptions, education and funding priorities and economic returns all affect the direction of and support for forestry training. In addition, training systems need to keep pace with new technology along with the attitudes and aspirations of the new generation.

Broad representation

The meetings of the new training and careers committee have representation from companies, contractors, training institutions, wood councils, Crown Forestry, NZ Institute of Forestry, NZ Forest Owners Association and the NZFFA. There has been good regional representation from around the North Island but none from the South Island. Hopefully this will improve as regional perspectives are important.
Below are some emerging issues from the discussions.

- There is significant concern about the shortage of skilled staff in forest operations, but also examples across New Zealand of training initiatives, often with a regional, community or company focus. Some of these with live-in facilities aim to teach self-reliance. These reflect shortages in important practical skills where staff turnover is high.
- Nationally, forestry seems to lack the ability to promote its broad diversity and its need for a wide range of skills. This is not well understood and not well canvassed in the important national organisations such as the Tertiary Education Commission and the Primary Industry Capability Alliance.
- Presentations on specific training initiatives and commentary by company, trainers and contractors from Northland, central North Island and the East Coast were initiatives and programmes which would contribute valuable perspectives in a national approach.
- The presentations and the discussion highlighted the concerns of contractors, especially the shortage of trained staff, ensuring retention of staff and the time and resources needed. They emphasised the need for skilled machine operators and ensuring the deployment of the inevitable skills that will be required.
- Primary industries only get three per cent of the Tertiary Education Commission funding. Within that, the forestry voice needs to be better heard in the collective area of primary industry training and careers. By comparison, the dairy sector has a strong, well-funded and well-organised profile.
- The regional wood councils can play key role and the work by the Eastland Wood Council to improve the public perception of forest related industries, in part the social licence to operate, and a recruitment and training plan is an example. The Eastland Wood Council is producing informative videos and talking to school leavers. It aims to support a 'boot camp' induction, teaching some skills and part-time study or on-site training over at least a 12-month period.
- Attendees emphasised that electronic media will have an important and growing role in promotion. The younger generation, and especially recruits to forestry, read less and rely more what is readily at hand from mobile phones and similar devices and effective communication will mainly be with these.

Farm forester interests in training

Farm forestry operations at a property scale and perhaps those among collective farm forestry groups suggest that relevant training regimes are likely to be about operational and safety skills. Nevertheless, the diversity of backgrounds and location among owners of small woodlots which includes farmers, city-based investors and partnerships, also suggests there could be demand for a variety of training and courses. These may cater, for example, to owners and investors with an interest in the business, policies and future developments in forests and forestry.

Small-scale foresters are also uniquely placed to understand and promote the skills and knowledge about silviculture and farming working together in the variety of situations around our regions. The government's Billion Tree Programme will rely on scaling-up tree planting on farm land. This is likely to take the form of commercial afforestation as well as a variety of planting, species, management and investment in other forms of tree management possibly for carbon, but also for stock shelter and water.
It may be useful to consider the farm forester potential input to training by –

- Keeping abreast of the training models and funding being proposed because this affects the interests of small growers, such as availability of task-specific training, training in health and safety and easing the shortage of the staff coming into the industry
- Contributing regional and property-scale perspectives to a proposed national approach
- Contributing their understanding of broader land management issues, the social licence of forestry to operate and how forestry training overlaps into farming skills and the common requirements of both
- Identifying the training regimes which better inform those with an interest in forest investment, forest-related policy, and the business of harvest, as well as those working with a variety of tree species or indigenous forest block management.

Alan Reid is one of the NZFFA representatives on the levy funded Forestry Training and Careers Committee.

Risk round up

Jo McIntosh

It seems the forest industry came through the last fire season well, with only a handful of small fires. Early indications were that summer 2018 would be challenging with very hot, dry conditions early in the season but wet weather quite literally dampened things down. In fact, one or two people might have thought it ironic that they had fire insurance on their standing timber policy when we were hit by multiple cyclones.

I think a quiet fire season was a very good thing for the industry. It enabled the merger of the rural fire fighters and urban fire fighters to progress without too many significant forestry challenges. The merger of New Zealand's fire services, bringing together more than 40 separate organisations, over 600 fire forces, more than 12,000 volunteers and approximately 3,000 paid staff into a single new organisation, was never going to be easy. Several forest owners still have some concerns around rural fire management. A quiet summer gives everyone the chance to take stock and prepare for the future.

As usual Mother Nature has had the last say and after much focus on fire, the experience was that most forest losses in the last 12 months were from wind and landslips caused by storms. It certainly seems from my chair that picking what the weather is going to do has become harder and whatever the weather does seems more extreme. What does that mean for your insurance?

Consider your specific risks

The first recommendation is to consider what the main risks to your trees are. When you consider this, I suggest you think about your location and what is relevant to you in your region. Look at the history of loss in your part of the country and the weather trends. It is also very important to think about the value of your trees and what value you would need or want a claim to be calculated on to ensure you have placed your policy with the correct sum insured values and limits.

Fire is the main peril covered under a standing timber policy but over the last few months some of the other cover that you can purchase under a standing timber policy has become more relevant. For example, weather landslip is optional, but extends your insurance policy to cover loss of trees as a result of the descent of earth and rock due to heavy and prolonged rainfall.

Along with this, we recommend you also take re-establishment cover which extends your policy to cover associated costs such as clean-up, removal of debris and, if relevant, replanting. It is important at this point to highlight that insurance under a standing timber policy covers the loss of your trees within your forest location. It does not extend to cover third party property damage and there have been some recent cases where that type of loss has been highlighted.

Minimising the effects of weather

You may have seen photographs from the Tasman Region following the effects of Cyclone Gita. Pictures have shown logs downstream in neighbours' properties, a real problem for those affected. Some of this damage looks to be linked to forestry. Discussions with several foresters around New Zealand recently has indicated that many have their own thoughts on this sort of event. Some feel that planting practices have changed and that the areas affected were planted many years ago in steep-slope topography that would not now be planted. In addition, foresters also now have larger boundary margins where they do not harvest, especially near waterways.

Others highlighted that the geography makes this sort of event occur when there is significant rainfall, regardless of the use of the land. In fact, in most cases forestry protects people from loss whereas bare land or grass land would have been worse. It does seem that looking from the outside this is an area which forestry needs to review and understand more to ensure that they minimise effects during significant weather problems.

When it comes to insurance for these problems, it is not easy. There are two policy phrases which may come into play – public liability and statutory liability. As with all liability claims, the devil is in the detail and the policy response comes down to the circumstances of the loss.

Hopefully all of you will have public liability insurance which responds to claims from third parties where you are legally liable to pay for damage to third

party property. The policy also pays for legal defence costs. But for this type of weather damage, are you legally liable? I would say that most liability insurers would argue that you are not, unless there was some negligence on your part such as the careless or negligent placement of debris, or knowing that trees or debris are in a bad state and ignoring their condition

If you are held liable by your neighbours, the policy will defend you, and most insurers will do this in a commercial manner to protect your relationships. In reality they will not just pay an amount if you are not legally liable. That might not be the response you are after. Most of us aim to have good working relationships with our neighbours. Generally, people sort these concerns out without the involvement of insurance.

However, it is more likely a statutory liability policy would respond if the claim was brought by a statutory body. For example, the local council may lay a charge against you under the Resource Management Act. An individual, such as an affected neighbour, generally cannot bring a statutory prosecution. They would rely on bringing a civil claim for damages which, as noted above, generally speaking relies on negligence.

These types of events may not sit easily under insurance and foresters will want to be sure that they always have best practices in place to minimise the effects. No one wants angry neighbours and potentially uninsured clean-up costs.

Wind a constant risk for trees

The other peril that we have seen most often in the last 12 months is wind. I often hear people say that they do not require wind insurance as they will simply salvage the wind damage to offset any loss. That might work for larger operators, especially in second rotation plantings.

However, it also relies on several factors being in place including good roads for access, cost and availability of harvest crews and the type of wind damage being salvageable. Often the reverse is the case and damage is in back blocks where there is no access, timely access to harvesters is difficult and expensive and the damage to trees is variable with some so badly damaged there is no viable salvage. As with weather landslip cover, having a comfortable limit for re-establishment is recommended as often much of the cost is associated with removal of debris and replanting.

Fire management

Who knows what the summer of 2019 will bring in terms of fire risk, but for now it is a good time to consider how to minimise your fire risk. For smaller woodlot owners it is often difficult for you to know what is reasonable and what best practice looks like.

The good news is that the NZ Forest Owners Association are currently finalising National Fire Management Guidelines and once completed, these will be available on their website. The guidelines focus on reduction, readiness, response, recovery and public education. If for example you are engaging a harvest crew and you want to make sure they are following good practice, the guidelines will provide a template which you can refer to.

They also provide some practical measures you can take such as checking boundaries for summer vegetation which easily carries fire, such as gorse. If you find this problem, consider reducing the risk by mowing, mulching, grazing or over sowing. You can also check that any mobile plant has spark arresters and carry adequate and tested fire extinguishers. Another action is mapping forest access points, listing equipment and people available for fire-fighting and arranging for Fire Emergency New Zealand staff to come on site and become familiar with the estate. The guidelines will include a lot of sound advice on ways to minimise fire risk. By following these guidelines and carrying adequate insurance, you will go a long way to managing the challenges that Mother Nature throws.

Aon has an insurance scheme for NZFFA members and in support, pays a contribution to the NZFFA. Jo McIntosh is an Executive Director of Aon and specialises in insurance for forestry and horticulture.

Growing a bio-fuelled New Zealand

Michelle Harnett

Put a tree into the tank of your tractor, or truck, or even your private jet. Large-scale biofuel production and use in New Zealand is within our grasp, if we have the will. Bioenergy specialists at Scion released their New Zealand Biofuels Roadmap Summary Report – *Growing a Biofuelled New Zealand,* earlier this year. The study was designed to stimulate debate on large-scale production and use of liquid biofuels. The use of liquid biofuels would significantly reduce New Zealand's greenhouse gas emissions, particularly for sectors which are difficult to electrify such as aviation, shipping and long-haul road freight, and improve the country's energy security.

Fuels are mixtures of carbon and hydrogen which originate from plant matter and other elements. Energy-rich fossil fuels have been stored underground for millions of years. Biofuels are made from new plant or animal material converted into forms that can be burned in boilers, engines or even home fireplaces.

Common liquid biofuels include ethanol and biodiesel. Ethanol is often made by converting sugar to alcohol just as in beer or winemaking. The source of the sugars can be plants such as sugar cane, corn or whey – a byproduct of cheesemaking. For example, Gull's Force 10 petrol contains 10 per cent bioethanol from various sources. Biodiesel can be made from oil crops such as canola or used cooking oil and even animal tallow. Z Energy is planning to produce up to 20 million litres of biodiesel annually using tallow from the meat industry at its new plant in Wiri, Auckland.

A biofuel future for New Zealand?

The Scion study was designed to provide an unbiased view of a wide range of feedstocks and technology options, and to come up with scenarios which explore different possible futures. People can now start seriously considering the role and scale of biofuels in New Zealand.

Five reasons why New Zealand should head towards a bio-fuelled future have been identified. The first is that moving towards liquid fuels from renewable crops will reduce the production of greenhouse gases which contribute to climate change. This feeds into the second reason – greenhouse gas reduction will help the country meet its international commitments under the Paris climate agreement. Closer to home, producing and

processing feedstocks into fuels will stimulate regional economies and growth. Locally grown fuels will make the country less dependent on imported oil. Finally, sustainably produced fuels and a reduced greenhouse gas footprint would help maintain access for New Zealand's goods and services to international markets.

Which fuels?

It will be harder to take fossil carbon out of some transport sectors than from others. Electric or battery powered vehicles are not currently practical in most shipping, aviation, long-haul trucking and machinery working in remote locations. This suggests that diesel, jet fuel and marine oil may be good long-term biofuels target. Petrol will also be needed, even with the rapid uptake of electric vehicles for passenger and light transport, but demand is expected to reduce.

Developing bio-petrol, bio-diesel and other fuels that can be introduced into existing distribution chains and engines, will simplify biofuel uptake. This will be by removing the need for widespread and expensive technology and fuel infrastructure changes.

New value chains

The study looks at possible biofuel value chains. This includes looking at different energy feedstocks, what land classes could be available to grow feedstocks and where the land is located, how to harvest and transport them to a production site, where production should be sited, which conversion technologies to use, and the final fuel mix. The work also took into account that developing a biofuel industry would take time.

The mixing, matching and analysis of the variables was handled by the Bioenergy Value Chain Model. Licensed from the Energy Technologies Institute in the United Kingdom, the model was modified to suit New Zealand conditions. The model balances multiple considerations to find the lowest cost solutions for alternative bio-fuelled futures.

One possible future

One future target might be using biofuels to meet 30 per cent of our liquid fuel needs by 2050. In one 30 per cent substitution option, biofuel replacement could be implemented with very few restrictions. In this example, the model identified the lowest cost solutions without any restrictions on the feedstock, conversion technology and biofuel mix.

The solution using all land classes

The model predicted that the cheapest option would be to produce bio-diesel from canola seed and a mix of petrol and diesel from miscanthus, willow, fibre logs and forest residues. For the first few years until 2025 the main output would be biodiesel from Northland-grown canola processed near Auckland. Then increasing volumes of biomass from existing central North Island forests, along with miscanthus and willow grown in Northland, central North Island and the East Coast would be processed into petrol and various grades of diesel. Finally, new conventional forests, primarily on the East Coast, would mature and become important feedstocks.

The solution using non-arable land

Restricting the available land classes to non-arable land limits feedstock options to forests and forestry wastes. Large volumes of fibre logs from existing and new conventional forests, energy forests and forest residues would be used to produce petrol and diesel. There would also be a lag of 15 to 30 years before new forest resources start to become available from 2030 onwards.

The technology chosen by the model for both land options as having the lowest cost for producing fuels is a combination of pyrolysis, where feedstock are broken down by heat to produce a bio-oil, followed by upgrading the oil to produce fuel. Pyrolysis is a commercially proven technology but upgrading has only been demonstrated on a pilot scale.

Regional growth

The model chooses to grow crops primarily in Northland, the East Coast, the central North Island and Marlborough-Nelson. These are areas where there is available, inexpensive land and the climate is conducive to growth. Processing would take place close to the feedstock sources.

Assuming only non-arable land is used to grow energy feedstocks, new energy forests and conventional forests would need to be planted, increasing the area in planted forests by around 25 per cent.

Translating this to an area such as the East Coast this would mean planting around an extra 80,000 hectares. It would also involve building four pyrolysis plants and four upgrading plants with an input of around $1 billion

in capital along with the indirect and direct creation of 1,000 jobs.

Replacing our liquid fuels

More than regional economies would benefit if New Zealand substituted 30 per cent of its liquid fuel consumption with biofuels. Five million tonnes of carbon, or the emissions of half the cars on the road, would be removed from the atmosphere. The country would also become more energy independent as oil imports could be reduced by 30 per cent. A further advantage is that our goods and services would continue to have access to international markets where consumers and legislation are demanding lower carbon footprints.

Which biofuel future could be the best?

We need to have a discussion as a country. Are we serious about reducing greenhouse gas emissions, becoming more energy independent and growing regional economies? Is it acceptable to use arable land or food crops for producing biofuels? Which biofuels should we produce? What level of fuel substitution should we target? When do we want to achieve this by?

Aiming for 30 per cent substitution is just one possibility. The model has been run investigating scenarios with substitution levels between five and 50 per cent, and with pre-determined fuel mixes such as jet fuel. Higher levels of substitution lead to greater reduction in greenhouse gas emissions but costs tend to rise as more costly fuels have to be produced at higher substitution levels. Prescribing a certain fuel mix can also cause costs to increase. Producing jet fuel, for example, currently requires several processing steps, all adding to the cost.

The aim of the Scion study was not to provide definitive answers. Instead the research team wants to show how various liquid biofuel options could work out and get people talking about them. To date, over 70 scenarios have been run. These are a starting point for stakeholders such as forest owners and other potential feedstock growers, technology providers, energy companies, marine and aviation companies, along with regional and national government and the public, to work out what a biofuelled New Zealand might look like.

A biofuelled future is unlikely to happen by itself. We need to agree on the role and scale biofuels should play in replacing fossil fuels. There has to be national commitment to do things properly. The investment needed is large and industries will need a degree of certainty when committing to feedstock and processing options. Government policy support and leadership will be needed to help start production.

Meanwhile what about forestry?

Plantation forestry is most likely to be the best long-term feedstock option for biofuel production. Large scale biofuels will need to be sustainably produced and understood as such by the consumer. This means it would be better to avoid using food crops or land capable of growing food for growing feedstocks. While this does not preclude the use of arable land, it is most likely that steeper and lower cost non-arable land would be used to grow biofuel feedstock – the land currently suitable for planting in trees.

We need to start planting the trees for future fuels now. If New Zealand were to replace 30 per cent of liquid fossil fuels with biofuels by 2050 it is estimated that to fuel the country we would need fibre logs and forestry waste from around 15 per cent of the current planted forest estate, and from another 350,000 hectares of new conventional and energy forests. The best places to plant these trees will be Northland, the East Coast

What would happen if by 2050 around 30 per cent of the liquid fuels we use were made from plants grown on non-arable land?

We would reduce greenhouse gas emissions by five million tonnes a year, equivalent to taking half the cars in the country off the road.

We would be more energy independent and cut our oil imports by 30 per cent.

Regional economies would grow as we plant feedstocks to turn into fuels at nearby processing plants.

Our goods and services would continue to have access to international markets.

With a forest the size of the Taranaki region, and processing as many logs onshore as we currently export, we could make 2.3 billion litres of liquid fuels a year, more than enough to meet all the South Island's needs.

Biofuel crops

Willow

Fast growing willow or *Salix* species are being trialled in New Zealand and around the world as a source of biomass for energy production. Willow crops can yield five to 11 tonnes a hectare of dry biomass annually. It can be grown on land that is not suitable for arable cropping or pasture. A typical growth cycle is three years, followed by mechanical harvesting. The coppiced trees can be harvested six to seven times before they need to be replanted.

Similar to willow, other species can be grown for biomass using short rotation coppicing. These include poplar, robinia and eucalypts grown for two to five years before harvesting.

Energy forests

Energy forests consist of fast-growing trees or woody shrubs specifically grown to provide biomass for energy production. Trees that reach their optimum economic size in eight to 20 years are used in this short rotation forestry. Alder, ash, birch, eucalypts, poplar and sycamore are some of the species grown.

The Scion study used radiata pine grown over a 15-year rotation as a model for an energy forest. Pine could be grown like this using alternative silviculture regimes such as high stocking rates, or trees selected for their growth rate.

Canola

Rapeseed is a member of the brassica family and their oily seeds have a long history of use as fuel. Conventional breeding has developed cultivars such as *Brassicus napus* and *B. rapa*, which are safe for humans to consume. The name canola is used to distinguish between the low erucic acid oil and rapeseed oil.

Canola is a good potential source for biodiesel and the seeds contain 40 to 65 per cent oil. Canola oil is most commonly extracted from the seeds either in an oil press or chemically with a solvent. The protein rich meal which remains can be sold as stock food.

In New Zealand, canola has historically been grown for biodiesel production, but most oil is now sold as cooking oil. A hectare of land can produce 3,400 kg of dry seed, or 1,130 kg of oil and 2,240 kg of canola meal. It is usually grown on a three to five-year rotation with other cereal crops, a single canola rotation lasting about six months.

Miscanthus

Miscanthus is a tropical grass related to sugar cane. *Miscanthus giganteus* has been trialled as a source of biofuel in Europe and North America. In ethanol production, miscanthus often out-performs corn and other alternatives in terms of biomass and volume of ethanol produced. It can also be converted into liquid transport fuels, burned to produce heat and steam for power turbines.

Photosynthesis in miscanthus is very efficient. It has very low nutritional requirements and grows well on less productive land. Rapid growth means it can reach 3.5 metres in a year and yield up to 15 tonnes a hectare of dry biomass annually. It is also sterile and not a food source for humans. Giant miscanthus can be harvested with a silage harvester or mowed and baled.

Miscanthus New Zealand Limited is working towards developing a local miscanthus industry.

and the central North Island. There may be options to plant and grow other species in energy forests, but exactly what is not clear yet. Owners of small to medium forests should watch this space, join in the discussion and above all, plant more trees.

Acknowledgements

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For more information contact paul.bennett@scionresearch.com

Forestry rights and the Overseas Investment Act reforms for forestry

John McSoriley

Forestry rights have been in the news lately because the government is in the process of making them subject to different rules where they are acquired by people not resident in New Zealand. However, for most of us, this is not something we need concern ourselves with when thinking about someone growing trees on our land. Forestry rights for small-scale forestry are a simple, flexible option for land owners who may want encourage investors to be part of a forestry project on their land.

For small-scale foresters, using the process of a forestry right is a way to reduce your costs and your direct involvement with growing trees, if that is what you want. The minimal formal requirements required for a forestry right mean that the costs of entering into it are a lot less than other joint venture arrangements such as leases.

An extension of the law

Forestry rights were introduced in 1983 as an extension of the law relating to 'profits à prendre' – a right to go on to another's land to extract or harvest some substance or produce such as minerals or timber. The Forestry Rights Act extended that right to include rights to plant and maintain trees as well as felling and removing the timber. A forestry right may include a single crop of trees of one or more species, multiple crops of trees of one or more species and any planting of trees of one or more species having the same or different expected harvest dates.

A forestry right may also grant or reserve rights of access, rights of construction and use of tracks, culverts, bridges, buildings and other works and facilities if those rights are ancillary to, and necessary for, the forestry right. The forestry right may also allow for charges, payments, royalties or division of the crop including the right to receive and the obligation to surrender carbon credits.

The formal requirement for the creation of a forestry right is that there must be a someone to give the right, in other words the land owner or lessee. In the Act the term used is 'proprietor' and the person to whom the right is given is called the 'holder' of the forestry right. However, a proprietor may create a forestry right for themselves. The holder of a deferred payment licence for the land under the Land Act is considered to be a proprietor under the Forestry Rights Act.

Flexibility of forestry rights

The common law concept of the profit à prendre, as it was developed by English courts, has been expanded to adapt it to New Zealand forestry needs. In particular –

- Investors can be granted the right to develop land for forestry in most respects as if they were the lessee of that land
- Land owners can, as far as practicable, retain full access to and use of the forest land as though they had granted a mere licence or easement over it
- Investors can cut down and remove trees as though they had been granted a simple profit à prendre as well as having the rights to plant and grow the trees
- Those involved can write their own bargain regarding sharing profits, benefits of carbon credits, location of trees and any number of other relevant matters.

Carbon credits or New Zealand Units

The rights and obligations in relation to carbon credits run with the land and are therefore, in the first instance, the responsibility of the land owner or proprietor. It is very important in drawing up the forestry right that the requirements of the climate change legislation are provided for. The land proprietor may assign the benefit of the carbon rights to the holder of the forestry right but this will need to be balanced with the proprietor's obligations to replant after the forestry rights ends.

This will be particularly important if the forestry right is only to extend over one or two rotations. To make these arrangement, those involved will need to agree on the value to be given to carbon credits. Alternatively, provision can be made in the form of ratchet clauses or some other mechanism to take account of changes of carbon credit values in relation to any arrangements to share the royalties resulting from harvesting.

The Overseas Investment Act

Under the current law, an overseas investor who acquires a forestry right is exempt from the screening

requirements provided in the Overseas Investment Act. The original reason for this was probably because forestry rights are not interests in land and do not give the holder exclusive possession of the land. In spite of this, as is indicated above, for all practical purposes, the rights of the holder of a forestry right are generally identical to the rights of a forest lessee. Leases are subject to the Overseas Investment Act. The government has now introduced legislation so that where forestry rights covering more than 1,000 hectares are acquired by overseas investors, permission from the Overseas Investment Commission will have to be obtained. The government has stated that it is important that forestry rights are included within the screening regime before the Comprehensive and Progressive Trans-Pacific Partnership comes into force, but that 'it will be possible to tighten or further loosen the criteria applied to forestry investment in the future if required.'

Summary

- A forestry right is a is a legal right to enter on to another's land to plant, maintain and harvest a crop or crops of trees
- Agreed arrangements or forestry covenants are recorded in the forestry right document registered against the land title. It binds the proprietor of the land at the time the forestry right is created and all subsequent owners or lessees of the land during the term of the forestry right whether the land or lease is sold or inherited
- Where the proprietor is a farmer the forest right should not stop normal farming operations on the land except where they are inimical to forestry operations such as planning, maintenance or harvesting, but these matters should be set out fully in the forestry right document so all involved know their rights
- The forestry right document will set out the financial arrangements especially where there is to be sharing of stumpage or royalties
- The forestry right document must be carefully drafted, especially in relation to carbon credits and how the benefit of them is to be shared between the proprietor and the holder of the forestry right.

John McSoriley was the legal manager in the Ministry of Forestry from 1990 to 1995. Since then he has practised law mainly in the legislative area.

Letter to the Editor

To the Editor

Congratulations to Rhys Millar and the team for getting the FSC over the line for the small forest owners – see *Tree Grower* November 2017. Finally, a financial reason for the small forest owners to join and support the NZFFA. It may be the answer to our declining membership.

The ecological integrity question – The members of the NZFFA hold as a group one of the highest numbers of QE II National Trust covenants. Could these also be pooled under the NZFFA group certificate? This would give a greater amount of reserves to be divided up into the group.

To add more strength, a contribution from the Forest Growers Levy Trust to the QE II National Trust would support the small forest owners achieve FSC certification. Why use the levy? One of aims of the levy through the trust is to further the interests of the small forest owners and having FSC gives us a level playing field with the big boys. By supporting the QE II National Trust and pooling the covenants it gives greater numbers in the NZFFA group.

This gives a win for the small forest owners, the QE II National Trust and NZFFA.

Jeremy Collyns
Wellington Branch

Ultra – a profitable short rotation regime for radiata pine on high quality sites

Graham West

A new management regime is proposed for growing radiata pine for export logs on a short rotation. The ultra regime is to plant 500 stems a hectare using best quality genetic stock on good sites and to not prune or thin. It is very simple to follow and could cash in on an expected wood flow shortfall in 16 years.

Predicted returns are good, giving an expected nett stumpage of $20,000 a hectare after 16 years, equivalent to a land expectation value of $5,300 a hectare or $430 a hectare each year. With carbon sales added to the cashflow, the rate of return excluding land costs is just under 18 per cent. Who could afford to miss out on this financial opportunity? Even at my age I am tempted.

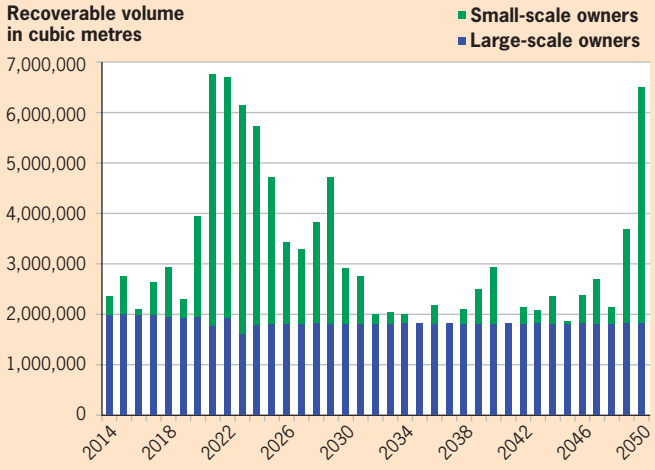
Wood supply forecasts

Plantation forestry in New Zealand has a major opportunity in the next few years to make a significant contribution to New Zealand's wealth and wellbeing by addressing many of our environmental challenges and boosting regional economic growth. The farming sector faces limits and restrictions from public expectations on water quality, greenhouse gas emissions and soil erosion. Forestry also faces problems of negative land owner sentiment and wood supply fluctuations.

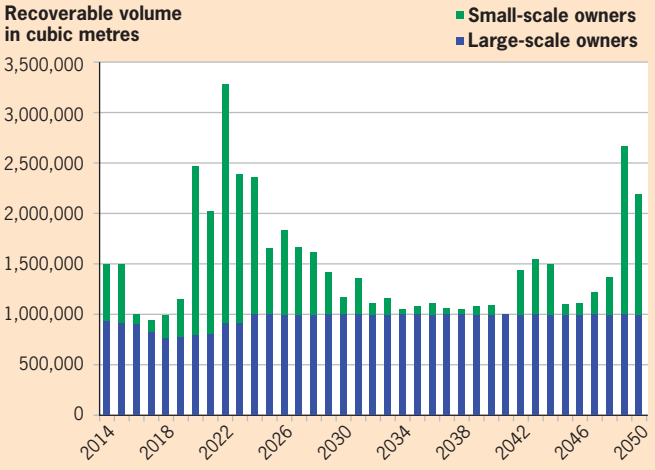
Most regions in New Zealand have a wood supply forecast which shows a very large wave of around six to eight million cubic metres a year flowing through. This will provide rapid increases in the next six years with a rapid reduction after approximately 16 years. The graphs below from the Ministry for Primary Industries 2014-15 Wood Availability Forecast are typical of at least eight regions. The large-scale forest owners shown in blue have a long-term cut plan primarily to give a non-decling yield. The small-scale owners shown in green have been assumed to cut their trees at age 28 years.

It is reasonably uncertain when small-scale growers will harvest because it often depends on log price and many personal and financial circumstances. But it is very likely that the peak flow indicated in the graphs will be significantly flattened because of the limited availability of harvesting contractors and trucks, along with limits in market demand.

East coast radiata pine availability under scenario 1 – by owner



Otago radiata pine availability under scenario 1 – all owners



Currently, while log prices are good, many woodlots are being felled at age 24 to 25 and not 28 which flattens the curve forward or to the left. The problem with this wave of opportunity is the trough behind it. In 15 to 17 years' time, there will be a reduction of 1.5 to 2 million cubic metres a year in some regions. This will result in approximately 15 harvesting gangs being redundant in each region along with about 60 truck drivers not needed, with consequences to service and support staff. Importantly, it creates uncertainty for potential wood processing investors and as a result this wave of opportunity only gets exported as logs without creating maximum jobs and added value.

New forest planting rates have been low for the last 10 years with 100,000 hectares of deforestation. While log prices have been good for the last five years there has still been a reluctance by land owners and fund managers to invest in forestry. Land prices have risen considerably, but for existing farmers, iwi and joint venture partners, land costs are not really the problem. Part of the problem is the long investment period, a lack of land owner knowledge on forestry, and the uncertainty around government policy and carbon trading regulations.

Short rotation option

To solve the above problems, a change in thinking is needed and some outrageous challenges made to traditional forest management. What could be done is a very short rotation to provide increased wood flow in approximately 16 years, a significant increase in profitability without carbon and a considerable effort in forest extension, particularly forest economics and business structures, to get land owner and investor interest.

Based on my experience in forestry science and practical knowledge in farming and forestry, this study suggests the following radical regime. If we used the best available genetics in our tree stocks in terms of growth rate and wood quality on fertile sites, and planted them at low stocking rates to avoid thinning, did not prune to minimise cash inputs, and clear felled at age 16, what would the economics and log grades be like? These are not really ultra-radical suggestions. The idea of short rotation has been tossed around by many innovative foresters such as Neil Barr, Harry Bunn, Wink Sutton and Leith Knowles. Perhaps it is just the right time for it.

Modelling

To examine this I have used a modelling method and the Radiata Pine Calculator v4.0 which is a farm foresters' tool, so that others can repeat the exercise for themselves. To keep this brief, I have examined only four concerns –

- What is a reasonable rotation length for a low-cost plant and leave a regime of 500 stems a hectare?
- If we prune to six metres and waste thin at age eight to none, what would be the best final crop stocking for 16-year rotation length?
- If we do not prune and waste thin at age eight to nine, what is the best final crop stocking for 16-year rotation length?
- What affect does discount rate have on the best rotation age?

This does not intend to cover the complete matrix of possible questions which arise with this sort of regime evaluation exercise, simply to examine the broad feasibility of a regime that could spark interest in a new wave of afforestation. I have given it the code named 'ultra'. I am sure you will remember where this was last was used.

The regime is intended for high quality sites only, with Site Index above 30 metres and 300 Index above 29 cubic metres a hectare each year. This is needed to produce marketable log sizes by age 16 and to have adequate wood density provided by warmer more productive sites. Good height growth is important because it helps control branch size with earlier shading of lower branches.

The tree stock genetic quality, such as GF Plus rating, needs to be at the upper limit for wood density, low spiral grain, straightness and growth rate. Juvenile cuttings should be used to provide early stability and natural good form – stem straightness and branch size. To cover this I have allowed $2.50 for establishment costs per tree which includes land preparation, tree stocks, transport and chemicals for releasing. It also assumes easy establishment and survival on pastoral sites or clean cutover.

Location, location, location

The following are the details for the silvicultural regime. Plant 500 stems a hectare and clear fell at age 16. That is it. There is nothing else to remember except using the best genetics on the best sites. Three other things matter, location, location and location because this determines roading, harvesting and transport costs, but that is for another time.

For the economic analysis I have assumed the following for rotation at age 16 unless otherwise stated –

Site Index	33 metres boosted by genetic gain
300 Index	29 cubic metres a hectare a year
Plant	500 stems a hectare
Survival	95 per cent
Altitude	Up to 350 metres
Latitude	38 degrees
Pruning	None
Thinning	None
Clear fell yield	85 per cent of total volume

Costs, prices and returns

Annual fixed costs such as rates, insurance and management would be $65 a hectare each year. Roading would be three dollars a tonne, log and load $35 a tonne and log transport $20 a tonne to give a total cost of $58 a cubic metre. Log prices are based on being delivered to port and based on the Ministry for Primary Industries 12 quarter average for pruned trees and adjusted down for age.

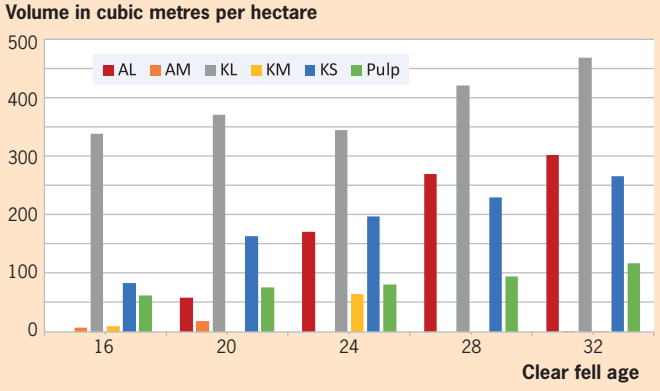
Grade	Price
Pruned	$166 a cubic metre
A grade	$119 a cubic metre
K grade	$113 a cubic metre
KS grade	$75 a cubic metre
Pulp	$50 a cubic metre

The total merchantable volume for the ultra regime at age 16 for this site quality is predicted to be around 500 cubic metres a hectare. Log grade volumes are in the table below.

Log grade	Code	Volume in cubic metres per hectare
A grade – long, 12.1 metres	AL	0
A grade – medium, 8.1 metres	AM	7
K grade – Long, 11.1 metres	KL	337
K grade – medium, 7.3 metres	KM	9
K grade – short, 5.5 metres	KS	84
Pulp – 5.5 metres	Pulp	62
Total merchantable		**499**
Waste		88

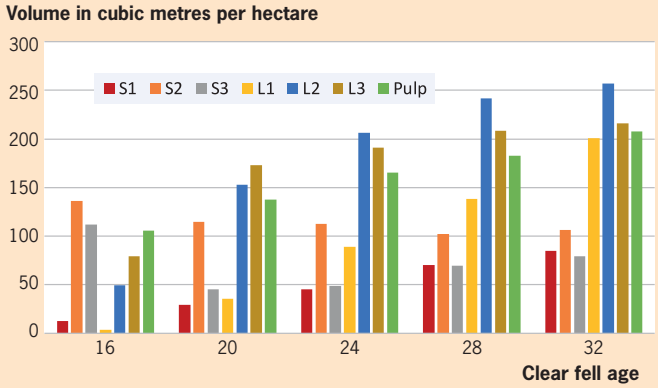
To examine how this grade mix may change, the rotation age was extended and is shown in the graph below. This shows what happens if the stand had to be grown on to an older age, perhaps if prices were low at age 16, or the cash was not needed.

Log grade volumes by rotation age for the ultra regime



This shows increasing volumes with time, particularly the KL, A, and KS grades. If the export market was not an option at harvest age, the next graph shows the grade mix with clear fell age for domestic grades. It shows that L grade logs would predominate. These are logs with the largest branch diameter in the 6 cm to 12 cm range. The grade is typical of what the export market consumes and may not easily be sold domestically. Wood volumes given above are in cubic metres per hectare. If the current conversion to JAS still exists in 16 years, the volume of export grades will reduce significantly.

Log grade volumes by rotation age for domestic grades



Stumpage returns nett to the grower for the 16-year rotation with the costs and export prices assumed are $20,425 a hectare. This is not as much as current full rotation returns but you receive it about 10 years earlier. Using discounted cash flow, all built into the Radiata Pine Calculator, at eight per cent a year, the analysis adjusts the returns for the period of investment and calculates a nett present value of $3,800 a hectare which converts to a land expectation value of $5,370 a hectare. A land expectation value is more useful because it is the price you could pay for the land and earn eight per cent return from the land production in perpetuity.

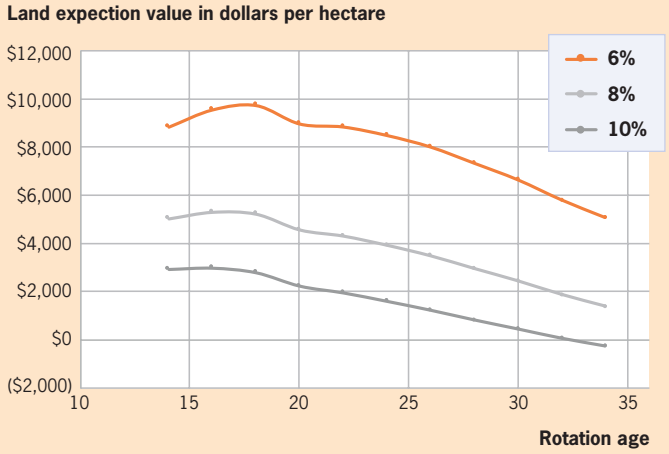
Put another way, if the land costs $5,370 a hectare, this regime makes eight per cent internal rate of return. If the land costs a lot more you make a much lower rate of return. These figures are better converted into the equivalent of an annual payment, such as an annuity, and works out to be $430 a hectare each year. This is about the same as good sheep and beef finishing returns, although the forestry would presumably be on poorer land.

Converted to the equivalent of a farm gross margin per livestock stock unit it is around $82 per livestock stock unit at a carrying capacity of six stock units a hectare. However, if the logs were all sold domestically, the nett returns would drop to about $14,000 a hectare.

This may change if new engineered wood processing, biofuels for transport and biomaterial engineered products are successful in 16 years.

To examine the optimum rotation length for this regime, the Radiata Pine Calculator was run for rotation ages 14 to 34 years. Results are given in the next graph.

Effect of rotation age on land expectation value for ultra regime for three discount rates



Land expectation value was found to peak at around 16 years for the costs and prices assumed. A main consideration here is whether the log market develops a better premium for older and larger diameter logs. The K grade logs currently consumed by the export market are mostly from the upper sections of the current older trees, and are likely to have the same number of rings and similar wood properties to ultra logs. KS logs, also known as KIS, are predominantly core wood, similar to pulp grade and currently traded at prices higher than I have assumed. This is mainly because if there is any downturn in the Chinese market, demand for this grade can disappear.

Discount rate or time preference for cash has a large effect on the land expectation value. If a rate of six per cent was acceptable then land prices around $9,000 a hectare could be paid.

Regime variations

To examine if the regime could be improved with different silvicultural options, variations in the number of stems planted with and without thinning was tested. It was also checked to see if pruning to 6.2 metres could help improve profitability. The graph on the right gives results for a range of regimes in terms of land expectation value at eight per cent discount rate.

Pruning gave no improvement over such a short rotation age. It was not sensitive to final crop stocking for the pruned log prices assumed, with land expectation values around $3,000 below the ultra regime marked with an arrow on the graph. Adding a thinning to waste process at eight to nine years was also well below the ultra regime. It would improve the look of the stand, and probably produce logs of better grade than was modelled, but would require a higher planted stocking to be worthwhile, adding cost, complexity and effort.

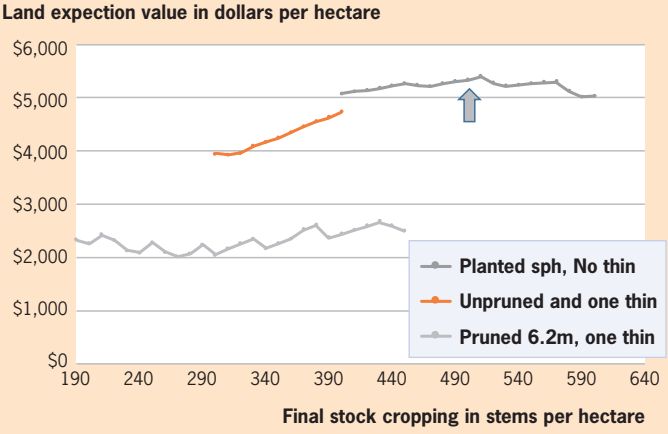
The planted stocking for the ultra regime was also close to final stocking of 400 to 600 stems a hectare and therefore not tested with a thinning. This appears to be a trade-off between establishment costs and improved merchantable volume, especially for the high costs expected to be paid for the high quality genetically improved stock. At $4.50 instead of $2.50 for every established tree in the plant and leave regime, this relationship tilts down at the higher stocking end indicating a lower stocking around 450 stems a hectare could be better if costs rise. However, there is a need for practical over-ride and although I have planted a commercial stand at 400 stems a hectare, there is little room for things to go wrong.

Carbon

There is the opportunity with this regime to join the Emissions Trading Scheme and sell carbon units. Assuming carbon sequestration occurs at the conservative rate as in the Ministry for Primary Industries look-up tables for less than 100 hectares, and only the safe carbon is sold every three years at a carbon price of $21 a tonne, economic returns begin to improve considerably.

The nett present value increases by $929 a hectare, land expectation value increases by $1,313 a hectare and the annuity increases by $105 a hectare. The internal rate of return excluding land costs increases from 15.8 per cent to is 17.8 per cent.

Effect of silvicultural variation on land expectation value for clear fell at 16 years



Discussion

This regime evaluation depends on the modelling system replicating the real world. The Radiata Pine Calculator has been tested by Scion and used by many foresters, but these results should be critically evaluated with a small amount of scepticism and conservatism, or whatever you find is prudent. However, this result is underpinned by the technology and knowledge which has been accumulating for some time in the science programmes and industry trials.

It is also showing up in the increased realised volumes at harvesting with improved tree breeds planted on farms in the 1990s. In my own farm forestry joint venture, in 1990 we planted 400 stems a hectare GF22 juvenile cuttings and never thinned. With the next block we lost our nerve a bit and planted 500 stems a hectare with GF 25 juvenile cuttings and hoped to production thin, but this never happened. The stands were all pruned to six metres based on 350 stems a hectare and are looking excellent. They have been pre-harvest inventoried and about to be felled. While this is on a dry Hawkes Bay site with 650 mm annual rainfall, the tree form is very good and most visitors to this forest cannot believe it has never been thinned.

Small forest planted at 500 stems a hectare, age 26, unthinned but pruned, near Taradale, Hawkes Bay

An opportunity

Radiata pine responds to fertile sites, moderate rainfall and low stocking by growing at an astonishing rate and its improved carrying capacity with better genetics has led to a trend of higher final crop stocking. This is not inconsistent with what has been found here.

What is important is the reduction in supply in 16 years. This may offer small-scale growers a good opportunity to cash in earlier if their life circumstances suit that option. In addition, the rapidly developing science of biomaterials means a greater demand for wood fibre, it is unlikely that wood will still be used in traditional forms or sold to the same markets. Afforestation grants from government or local authorities will only enhance the economic opportunity outlined here.

The concept of this regime could be tested with other species, particularly eucalypts and poplars. The market risk with these species is possibly greater, but a preference for non-pine species is common and may better suit your aesthetic preference.

For farmers and urban professional investors, the practice of growing a commercial forest has to be simple and quick. They are not so enamoured by the nuances of fine tuning the silviculture or the beauty of a well grown stand of fat straight butt logs. Land is about lifestyle and cash is king. I hope this has revitalised your interest to plant trees and to take advantage of the opportunity the ultra regime offers.

Planting a billion trees

Julie Collins

Land owners across New Zealand hold the key to realising the social, economic and environmental benefits from planting trees. The commercial forestry sector is projected to plant half a billion trees in the next 10 years, but there are examples of private landowners, government agencies, NGOs, iwi, regional councils, nurseries and the private sector working to plant the other half billion.

The government has a big part to play, but private land owners are vital in terms of potential land to plant, as are the nurseries who will need to ramp up their seedling production. For example, up to $5.8 million from the Provincial Growth Fund will be invested over three years to enable the Minginui Nursery in Bay of Plenty to scale up production of forestry grade native seedlings.

Planting native and exotic tree species

Many can see the potential for planting commercial crops of radiata pine in the traditional way and this can have a range of benefits for soil and water quality. The One Billion Trees Programme is focussed on enabling planting a wide range of native and exotic species. There is opportunity for a mix of permanent and harvestable plantings, exotics and natives.

The Ministry for Primary Industries is developing options to help planting efforts, with funding available to help land owners to plant trees and to be part of meeting the billion trees target. Many councils have funding available to help with planting and fencing, and there is an investment programmes, including the Afforestation Grant Scheme which provides $1,300 a hectare for new forests of between five and 300 hectares.

Opening later this year is the Erosion Control Funding Programme for treatment of Gisborne's most severely erodible land, to help ensure it remains productive and sustainable for future generations. To date, the programme has provided around $49.8 million and treated 42,000 hectares of erodible land. Applications for Erosion Control Funding Programme investment towards community projects can be made at any time. The Hill Country Erosion Programme will also be opening later this year for applications. In addition the Crown Forestry team at MPI is currently talking to land owners interested in entering a joint forestry venture or in leasing land for planting.

Complementing existing land uses

Tree planting does not aim to take over or hinder existing land uses, such as farming. It can be complementary to the existing farming business from an environmental and economic perspective, while helping land owners to create more resilient landscapes. Planting trees reduces erosion by helping to keep the soil on the land, improving pasture productivity and water quality.

Planting trees is also New Zealand's best method for storing carbon to offset emissions. Estimates suggest a billion trees could remove an additional 10 to 30 million tonnes of carbon dioxide from the atmosphere by 2030. Trees have many benefits, from creating local jobs and careers in the industry and addressing environmental issues, to helping New Zealand meet its climate change targets.

MPI is working on a programme to help provide land owners and others with access to useful information about planting trees and the incentives and mechanisms available. Part of this is about getting to events to speak to land owners. The aim is to help them to make decisions on whether planting trees is right for their circumstances and right for their land. In addition policies are being developed to avoid unintended environmental or economic results, land is being identified, seedlings are being grown, private investment is being stimulated and infrastructure is being developed.

Extra planting will start when the new season opens in winter – it will be low in this initial year, then quickly ramp up. Around 55 million trees will be planted this year, and increase to 70 million in 2019, then 90 million in 2020. From there, the aim is to plant 110 million trees a year over the next seven years of the programme.

Julie Collins is Head of Forestry at the Ministry for Primary Industries leading the One Billion Trees Programme.

Open letter to Minister Shane Jones

The billion trees programme – Here's how

Ian Cairns

The government's billion trees programme will provide opportunities for foresters. With the conservation estate, Landcorp and Maori land, initiatives are already under way. It is less clear what the initiative might mean for managers and owners of freehold rural land.

New Zealand has 14 million hectares of grassland and two million hectares of planted forest. Farm and forest businesses typically include a component of marginal land, also known as hill country, with significant erosion risks if maintained in pasture and which does not contribute significantly to farm and forest output. A 2008 Ministry for the Environment land use report estimates marginal land at around a million hectares.

It is this land which should be the prime target for afforestation under the billion trees programme. Under pastoral use it needs soil conservation measures. Under commercial forestry, it is either not planted in the first place, or if planted, may not be harvested. Stepping back, and bearing in mind a split between grassland, planted forest and marginal land, what does the tree planting budget look like?

Replanting commercial forestry replant

The one billion tree calculation will include replanting. So, if over the 10-year period, New Zealand harvests and replants 400,000 hectares, at a planting rate of 1,500 stems a hectare, then replanting might contribute 600 million to the target number. The contribution to the planting target would therefore be 600 million trees.

New commercial forestry

Where might commercial forestry establish today? MPI's own initiative gives the clue. It is asking for expressions of interest from land owners with 200 hectares or more of reasonable quality land. In other words, head-to-head competition with the farmers for land.

MPI is offering leases or joint ventures with the land owner retaining all carbon rights. The financial offer will be case-by-case, but I would pick that the incentive to convert will be pitched at the level of the Afforestation Grant Scheme of $1,200 a hectare. This is at a time when grazing properties suitable for conversion are selling for more than $11,000 a hectare.

While pastoral land values are so high, I predict the government inducement will not tip the land use balance. The market timing is simply wrong. The land likely to be converted over the 10-year period if 100 farms are involved would be 20,000 hectares. With an indicative tree stocking rate 1,500 stems a hectare, the contribution to the planting target would be 30 million trees.

Marginal land

Most hill country sheep and beef farms, and planted forests have small areas which, for reasons of slope, aspect and erosion potential contribute little to the core business. Carter Holt Harvey estimate these areas account for 15 per cent of their forests. Beef and Lamb NZ give an effective average area of 766 hectares for North Island hard hill country farms. Perhaps on that average farm there will be 30 hectares of ineffective land. How might such marginal lands be better used?

Some, but not all of this land, is suitable for growing trees. For the purposes of discussion, I estimate the land resource potentially available at 500,000 hectares. Management options for this land include –

- Doing nothing
- Planting or replanting in radiata or other commercial species hoping that improved harvesting technology will make for a profitable harvest in 30 years
- Planting willows and poplar poles, debris dams and continued grazing which needs new public money
- Managed reversion to permanent native forest which will need grants.

Doing nothing

Doing nothing is not really acceptable to farmers themselves, and even less so to the general public. Nevertheless, experience shows that half of farmers will simply not get around to taking up the opportunity. Land in this category is around 250,000 hectares and the contribution to the planting target would be zero.

Plant or replanting in commercial species

Bearing in mind that the main limitation to profitable harvesting is road distance and access, there is a variety of new harvesting technology that may reduce harvesting costs. Against this, returns may still be low

due to poor tree form and slow growth rates. If the land is planted and just abandoned, this is also problematic in that crop trees may topple when they become mature. Land in this category is around 100,000 hectares. The contribution to the target would be 150 million trees.

Willows and poplar poles

Planting poplar and willow poles is a proven strategy on pastoral farms and the species used are non-invasive. There is limited technical capacity in regional councils, but it could be rebuilt over the 10-year period. The cost per tree is high, but the cost per hectare is low. I argue for a funding boost.

Land in this category is around 50,000 hectares and the tree planting rate 40 stems a hectare. The contribution to planting target would be two million trees.

Managed reversion to native forest

Uptake for managed reversion will depend on the level of incentive payment. A number of farm foresters I have spoken to who have recently harvested and are facing the what-now decision lean towards native forest.

In addition to the soil conservation benefit, case studies show a marked increase in local bird life as forest processes begin again and there is the corridor effect from the mountains to the sea. A diverse tree and shrub environment is far more resilient to climate and disease.

It would be prudent for any government support to be in the form of a post-establishment grant rather than a subsidy to tree nurseries or a payment to the land owner for every tree planted. There is a high risk of establishment failure.

Land in this category is around 100,000 hectares with a tree planting rate of 2,500 stems a hectare. The contribution to the target would be 250 million trees.

If we add all the figures together – 30 million, 600 million, 150 million, 250 million and two million – it gives us a grand total of just over a billion trees. The target can be met.

Conclusion

The above analysis is unashamedly broad brush. Nevertheless, it shows that –

- The target of a billion trees is certainly attainable if the net is cast wide enough
- On private land, the big opportunity is planting small areas of marginal land rather than whole-farm conversion to commercial forest.

Incentives

The key to land owner response is the level of incentive. I believe that middle-class New Zealand, who pay most of the nation's tax bill are receptive to an increased level of government activity in the economy particularly for environmental and conservation purposes. Allow me to join the bidding. For commercial forest the level of support will be hidden in the terms of the lease or joint venture arrangement. Depending on discount rate assumptions, it could be around $1,200 a hectare.

How should soil conservation planting be treated? If 40 stems a hectare of poplars produce a similar soil conservation benefit as 1,500 stems a hectare of radiata pine, and that is worthy of a $1,200 a hectare grant, the payment from central government to support regional council planting programmes should be $30 a poplar pole.

For managed reversion you might expect large site-by-site variation. On a grassland site, the traditional prescription has been to start with 10,000 stems a hectare. Where scrub has already begun to establish, it may be that no planting is required just a fence, along with intensive weed and pest control. This is not cheap, but neither is a nursery-raised tree.

An experienced consultant forester comments that to date the sector has been very unsophisticated in its approach to the establishment and management of native forest. Five years of operational research points to new methods with much lower levels of initial stocking. The cost of this kind of afforestation is unavoidably high per hectare, but then so is the public benefit.

I propose applicants be required to submit a 10-year plan and indicative budget to the proposed new Ministry of Forestry who will screen for feasibility. The grant offer would be scaled according to Cabinet-agreed criteria to a maximum of $8,000 a hectare be paid after 10 years if establishment has been successful.

Final points

The expression of national targets in terms of trees planted is novel to foresters who are accustomed to hectares harvested, replanted or newly planted. There is scope for political mathematics. For example, if a commercial forest is planted at 1,500 stems a hectare and the final stocking after thinning is 350 stems a hectare, perhaps the latter figure is how the contribution to the national target should be counted.

Similarly, with managed reversion, a grassland site might be planted at 2,500 stems a hectare. In 10 years tree numbers might have risen to 3,500. Which figure do you use? Should an auditor try to distinguish a tree planted by a human from one that was planted by a bird? In both cases, what really counts is the area of forest established.

For general public, such questions are a little technical. The one billion trees target inspires. What matters to the land manager is the level of financial assistance. The calculation of progress against the target can be left to the Ministries concerned.

Ian Cairns is a Hawke's Bay forester and was formerly a Senior Policy Analyst with the Ministry for the Environment.

New environmental rules – the National Environmental Standards for Plantation Forestry

Chris Fowler

Whether you are an owner of a small forest or a land owner interested in planting trees under the government's billion trees initiative, you need to be aware of the new environmental rules that govern plantation forestry and what you should do in response. The *National Environmental Standards for Plantation Forestry* published by the Ministry for Primary Industries came into force at the beginning of May.

The new rules affect all aspects of plantation forestry activities. Owners of large forests and forestry management companies have the resources to establish internal policies and procedures to comply with the new rules. But how should owners of smaller forests and other land owners interested in afforestation respond?

The first step is to get familiar with the new regulations. Then you need to make sure that all forestry operations in your forest or on your property are undertaken in a manner which complies with the new regulations, irrespective of whether they are carried out by a contractor or by you.

What the NES-PF is all about

The NES-PF, the acronym often used instead of the full title the *National Environmental Standards for Plantation Forestry,* establishes a nationally consistent set of rules which address the environmental risks of forestry. The rules provide certainty for those involved in the establishment and management of plantation forests. At the same time, they allow local authorities to be more stringent where variation is necessary to protect sensitive environments.

The scope of the NES-PF is broad. The regulations apply to any forest larger than one hectare which has been planted specifically for harvest – an important point to note as some of you may plant trees which you do not intend to harvest. The regulations cover eight core plantation forestry activities –

- Afforestation
- Pruning and thinning-to-waste
- Earthworks
- Stream crossings
- Quarrying for road metal
- Harvesting
- Mechanical land preparation
- Replanting.

Most activities are permitted as long as foresters meet specific conditions to prevent significant adverse environmental effects. If you are unable to meet those conditions, you will need to apply for a resource consent. If you fail or do not comply you could be prosecuted under the Resource Management Act.

Most prosecutions under the Resource Management Act succeed because it is not necessary for the relevant council to prove that the offending was intentional. In addition, land owners, consent holders and land developers can be prosecuted for mistakes made by others working on site. This means that you can be liable for the acts and omissions of employees, contractors or sub-contractors even though you were not the person responsible for the breach.

Who will undertake the forestry operations?

You need to decide who will undertake the forestry operations. Will you complete the work yourself, or get a contractor to do the job for you?

If you decide to use a contractor, then there are several actions you should take to ensure, as best you can, that all forestry operations are compliant with the NES-PF and that you are protected as far as possible from any enforcement action, should things go wrong on site. First, assess your contractor with appropriate due diligence. Check their reputation and track record and ask questions such as –

- Do they understand the NES-PF?
- Do they have processes and procedures in place to secure operational compliance within the forest?
- Are they aware that some local rules may still be relevant?

Second is to make sure you have a forest services agreement with the contractor which contains appropriate provisions regarding environmental performance. This should include the requirement that they comply with the NES-PF and all other environmental protection laws and local authority planning rules.

The environmental protection requirements in the agreement should also require that the contractor –

- Avoids any significant adverse effects on the environment and, in particular, damage to any watercourse
- Notifies you immediately of any breach or potential breach of requirements
- Ceases work at your request in the event of significant non-compliance
- Remedies any breach or mitigates an anticipated breach at their own cost
- Indemnifies you against costs, losses, liability and damage arising from failure by the contractor to comply with the requirements.

Third, you should make reasonable efforts to understand what is happening on site and respond to any problems identified by –

- Active and regular site supervision
- Identification and recording of any problems
- Timely intervention to address those problems before they breach the requirements
- Escalation of the problem if those problems are not adequately solved.

Completion of these steps will help you and your contractor achieve operational compliance with the NES-PF, reduce the likelihood of significant adverse effects occurring during site works, and reduce the risk of enforcement action or prosecution in the event of non-compliance.

If you plan to do the work yourself then it is essential that you know what the rules are. You will need to understand and comply with the permitted activity standards which apply to the particular forestry activity you intend to undertake. If you cannot comply for any reason, you will need to apply for the appropriate resource consent from the relevant district or regional council.

Summary and more information

Owners of smaller forests and land owners interested in planting new forests need to understand the significant change in the environmental regulation of activities. You need to choose a contractor who you trust will achieve operational compliance with the NES-PF and have a forest services agreement which records the responsibilities of the contractor regarding environmental compliance. If you choose to do the work yourself then make sure you are completely up to speed with the new rules and how to comply with them.

You can download a copy of the NES-PF from the Ministry for Primary Industries website at mpi.govt.nz. However, the published document is long and complex and not easy to understand. MPI are planning a mail-out, with a simpler explanatory leaflet, to all owners of small forests followed by a more comprehensive insert in the August *Tree Grower*. In addition, the NZ Forest Owners Association are producing a range of best practice guides explaining a lot more about the contents of the NES-PF. These guides are planned to be available on their website within the next few weeks.

Chris Fowler is an environmental law specialist.

National Environmental Standards for Plantation Forestry

Ministry for Primary Industries

The *National Environmental Standards for Plantation Forestry* took effect at the beginning of May to maintain the environmental values and increase the efficiency and certainty in the management of plantation forestry. The NES-PF provides a set of nationally consistent rules and conditions for plantation forestry which as mentioned, took effect on 1 May. Before this, regional councils were responsible for developing their own separate policies to guide plantation forestry activities and they varied from region to region.

The NES-PF was developed over an eight-year period following consultation with a wide range of stakeholders. The standards reflect the considerable feedback and technical input received by MPI during that process. It is also based on up-to-date science and good management practices.

It permits plantation forestry activities, subject to certain conditions, where it is appropriate to do so and there is unlikely to be any significant adverse effects on the environment. Greater certainty about the rules should encourage more investment in forestry, provide a boost for regional economies and reduce costs for councils and foresters.

MPI is working with the plantation forestry industry to inform owners, operators and managers about their responsibilities under the NES-PF. There has been a range of workshops in different parts of the country run jointly by the relevant regional council staff and MPI. They are well worth attending. Some simpler guidance leaflets have been produced and more are on the way

MPI will be reviewing the NES-PF after a year to ensure it is being successfully implemented. After three and five years there will be an assessment to determine how well it is achieving its objectives.

A three phase harvest on the sand

Richard Weldon

I recently completed harvesting my forest at Waikawa Beach near Otaki north of Wellington, with some pleasing results. The terrain is rolling to steep sand dunes, interspersed with swampy gullies.

The total forest area was 21 hectares, planted in two stages −11 hectares in 1992 and 10 hectares in 1993. The forest was high pruned in two lifts and waste thinned to a stocking of around 400 stems a hectare. Tree form was generally very good with straight trunks and relatively small branches.

During 2012 when the oldest trees were 20 years old, it was suggested to me that the stand should be production thinned. The stocking was judged to be a little tight and the trees were possibly not going to reach their potential. The trees at that time were standing at an estimated 400 stems a hectare, with an average tree size of just under one tonne. I was approached by Sharo Sievers of Horowhenua Harvesting, a locally based logging contractor contracted to FOMS, who said they could fit this small job into their programme during the winter.

Production thinning

Chris Maher from FOMS came out to appraise the block with myself and Sharo, and preliminary costing estimates showed that the thinning was a viable operation, giving a nett return in the order of $15 a tonne, with an estimated 75 tonnes a hectare to be produced. The harvest rate of $35 a tonne was agreed with Sharo to thin down from approximately 400 stems to 300 stems per hectare.

Export prices at the time were relatively low, with shipping rates around US$36 and the New Zealand dollar at 80 cents. However, the nett return for virtually all grades was positive, and it was identified that the forest contained a percentage of poles and post wood for local mills at relatively good returns.

The idea was that the production thinning operation would improve the stand and the revenue from the thinning would pay for the construction of access roads and skids required to service the final clear felling. These amounted to 800 metres of road to be constructed and metalled and two skid sites to be built.

A decision was made to go ahead and Chris Arcus from CCA Earthmoving was engaged to construct the roads and skids. Once the first section of road and first skid were constructed, a road was made along the existing track to the second skid site and the 1992 stand.

The thinning carried out on the 1992 stand was excellent, with good tree selection and very little damage to the final crop. Good log making ensured that poles and post wood were produced. The final results were better than forecast with 912 tonnes, or 83 tonnes a hectare, produced at an average nett return of $21.30 a tonne

Thinning then began on the 1993 stand which proved to be much trickier. The sand type was less like the grey dune sand in the 1992 stand and more a black peaty top sand which proved to be very slippery. This, along with the steeper dunes, caused the skidder to slide around with an unacceptable amount of damage to the final crop. A decision was made very quickly to abandon this part of the operation. Road construction had cost $24,600 and this had not quite been covered by the production thinning due to the 1993 stand not being production thinned. Much head scratching followed over the decision whether to do a light waste thin on the 1993 stand. In the end it was decided to leave it as it was.

Over the ensuing few years it was easy to see the marked difference in tree size between the 1992 stand which had been production thinned and the 1993 stand which had not been thinned. The difference in size of the pruned butt logs was most noticeable.

First harvest

In April 2015, I asked FOMS to give me an estimate of the return I might expect if the un-thinned 1993 stand was to be clear felled. Part of my reasoning for clear felling this area was that Transpower wanted to take out two rows of trees along the entire boundary adjacent to their transmission lines, which would have resulted in a significant number of trees being wasted.

Export prices at that time were again relatively low. Shipping and exchange rates had reduced, but the US dollar sale prices had fallen dramatically after a sustained two-year period of upward movement. Despite this, with FOMS access to local sawmills and a good range of grades, this 22-year-old stand was estimated to give a nett return of around $35.40 a tonne. A logging rate of $32 a tonne was agreed with Horowhenua Harvesting and clear felling began in May 2015. Piece size was estimated around one tonne a tree and the block had quite significant pulling distances.

	Thinning at age 20		Clear fell unthinned at age 22		Clear fell thinned at age 25	
Grade	Percentage recovery	JAS Conversion	Percentage recovery	JAS Conversion	Percentage recovery	JAS Conversion
P35			8%		23%	
PB40	11%	0.93	4%	0.96	8%	0.97
PB30			11%	0.91		
S35			5%		11%	
S27			17%			
M30			3%			
M20			18%			
Long pole	3%					
Short pole	4%					
Postwood	5%		6%			
A	21%	0.91	9%	0.95	23%	0.98
K	32%	0.89	11%	0.91	20%	0.94
KI	11%	0.83	3%	0.91	4%	0.90
KIS	13%	0.77	5%	0.81	11%	0.82
Total tonnes	912		3994		4765	
Area hectares	11		10		11	
Tonnes per hectare	83		399		433	
Total nett	**$19,415**		**$158,606**		**$366,089**	
Nett dollars per tonne	$21.30		$39.71		$76.83	

With this harvest, 57 per cent of the logs went to local sawmills. Over 10 per cent were P30 pruned saw logs which could only go for export as there were no domestic pruned options for this grade. The final result was 3,994 tonnes at a nett return of $39.70 a tonne.

Felling at 25 years

During 2017 I watched with interest as the log prices increased significantly, and given the 1992 stand was now 25 years old, decided to see what sort of return I could expect if I felled now, rather than held on to age 27 or 28. The numbers from FOMS showed an estimated nett return of $76.50 a tonne and so I decided to go ahead and fell the 1992 stand.

A harvesting rate of $27 a tonne was agreed with Horowhenua Harvesting and felling began in May 2017 supervised by Blake Jones from FOMS, and was completed in early June. This harvest produced 31 per cent pruned, made up of 23 per cent P35 to Crighton's sawmill in Levin and eight per cent P30 export pruned. The final nett result was 4,765 tonnes at an average of $76.80 a tonne.

The purists among you might see that the yield of the 1992 stand at age 25 was only 433 tonnes a hectare, but I was very happy with a return of $33,267 a hectare.

It is interesting to note from the table above how the grade mix improves as the stand grows and if it is thinned. You can also see how tonnes to JAS conversions improve with the age of the forest.

Lessons learned

A multiphase ground-based harvesting operation is possible if you have good access, favourable terrain and ground conditions along with a good local contractor. Keeping in regular contact with a harvesting manager you can trust can allow you to make good decisions quickly, based on market conditions and crew availability.

There was a real focus from the FOMS staff throughout all the three harvesting phases on value maximisation. This was achieved with close supervision and liaison with the log maker.

A wide range of grade options gave skilled log makers a better chance to achieve good returns from different crop types and ages. Access to close domestic sawmills can be a real winner for returns to the owner.

Do not concentrate just on the logging rate or the marketing fee when considering who to use. Look very closely at how the wood is to be cut up, where it is going and what the nett result will be.

Overall, this was a very enjoyable experience for me as a forest owner, dealing with a very professional harvesting manager in FOMS, and a very professional harvester in Horowhenua Harvesting. It was nice to be able to support a local harvesting crew and local sawmills, at the same time getting a good return for my trees.

Think before you form that new access track

Geoff Wishart

Forming a new track beneath or close to a transmission line on your property may introduce an electrical hazard to yourself your workers or visitors. This will be a problem if the ground-to-wire clearance is not sufficient for vehicles to safely pass underneath.

Transpower operates the national grid and maintains the high voltage transmission lines which connect areas of generation to the local lines networks that supply your farms and homes with power. Most of these transmission lines are located on or across private land.

Constructing new tracks and other work around transmission lines can result in an electrical risk to machine operators and people working around them, especially if the vehicle or machinery encroaches the minimum electrical safe distances.

Electrical safe distances are set out in the New Zealand Electrical Code of Practice for Electrical Safe Distances issued under the Electricity Act 1992. Compliance with this code is mandatory, in other words, you have to follow it. A table in the code sets out the minimum safe vertical distances of wires from the ground. Transpower lines generally range from 50,000 volts to 350,000 volts.

Transmission lines have been built across some rugged terrain which was assessed as either traversable or not traversable. The code mentioned above recognises the difference between traversable or not traversable in terms of the minimum safe distances which are applicable. As shown in the table below, they specify distances to the ground for roads and driveways which can be greater than for other areas possibly traversable by vehicles. which is greater again than for areas not traversable by vehicles at all. Of course, those distances relate to when the line was built, and the use of the land underneath can change.

Land was defined as not traversable because at the time the line was constructed vehicles including mobile plant, were unable to travel beneath the lines. In these situations, the vertical clearance to the ground may be less. This includes ridges, steep side slopes and gullies.

As land use has intensified and properties subdivided, new areas of land have been opened up for farming and forestry. Areas that were once non-traversable may now be traversable, and other changes may make overhead transmission lines much closer to the ground.

If you are thinking about changing the nature of the land underneath lines, take care. We recommend you contact your local Transpower service provider to obtain some guidance on existing clearances and required clearances before you start. This will give you the confidence that you are not going to end up with a clearance problem once the project has been completed.

If you do end up working around transmission lines to bench cut a track, it is worth remembering that for voltages involved in transporting bulk electricity on the grid, you do not have to touch the wire for there to be a problem – the electricity can jump quite a gap. For that reason, you need to keep your vehicles and mobile plant at least four metres away from the wires.

Transpower, landowners and occupiers play an important role in ensuring everyone is kept safe when working on their land. Our local service providers can help you ensure that any proposed work around the lines is safe for you and the grid. Call 0508 526 369 for free advice when planning any work activity around the transmission lines.

Minimum safe distances of electricity lines from the ground

Circuit voltage	Vertical distance to the ground			Radial distance
	Across or along roads or driveways	Any other land traversable by vehicles, excluding across or along roads	Any land not traversable by vehicles due to its inaccessibility	In any direction other than vertical on all land
Not exceeding 1kV and insulated	5.5 metres	4.0 metres	2.7 metres	2.0 metres
Not exceeding 1kV	5.5 metres	5.0 metres	4.5 metres	2.0 metres
Exceeding 1kV but less than 33kV	6.5 metres	5.5 metres	4.5 metres	2.0 metres
Exceeding 33kV but less than 110kV	6.5 metres	6.5 metres	5.5 metres	3.0 metres
Exceeding 110kV but less than 220kV	7.5 metres	7.5 metres	6.0 metres	4.5 metres
Exceeding 220 kV	8.0 metres	8.0 metres	6.5 metres	5.0 metres

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.

Far North
Dean Satchell
33B Skudders Beach Rd, RD1, Kerikeri
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Lower North
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Waitomo
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Farm Forestry Timber
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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 $205 a year.

I would like to join the NZFFA ❑ $85 a year ❑ $135 a year ❑ $205 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_____