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New Zealand Farm Forestry Association | Oranga Rākau Aotearoa November 2023

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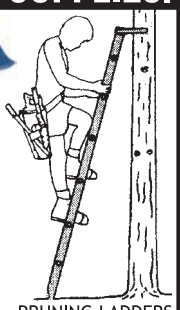
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New Zealand Tree Grower
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ISSN 0111-2694

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Subscriptions: $75 annually for New Zealand, $NZ85 for Australia, $NZ95 for the rest of the world, including postage.

Subscription enquiries and changes of address should be sent to NZ Farm Forestry Association, PO Box 10 349, The Terrace, Wellington. Phone 04 472 0432

The *Tree Grower* is published in February, May, August and November.

The *Tree Grower* is partly funded by the Forest Grower's Levy.

supported by forestgrowers commodity levy

From the President

Neil Cullen

The election has happened but it is going to take some weeks to find out the final form of the new government and who our new Minister of Forests will be. Our pan-sector group, NZ Forest & Wood Sector Forum, has been preparing a briefing for that new Minister, pointing out the key points of our industry, the issues we face and where we need support from the new government. The briefing will emphasise the wide support for the Industry Transformation Plan and its aims of increasing the value from our forest products while decarbonising our economy.

As with other rural endeavours, forestry is having to deal with increased scrutiny and regulation at both national and regional level. The National Environmental Standards for Plantation Forestry, in force since 2018, has been reviewed and replaced by the National Environmental Standards for Commercial Forestry. The new National Environment Statement in force from 3 November incorporates the previously exempt carbon and permanent forests but also increases notification required before planting that many farm foresters will find onerous.

As well as new planting, replanting harvested blocks will need regional authorities to be notified along with council compliant maps and plans and completion of the wilding risk calculation even if replanting with the same species. Rules around how much slash and wood can be left on cut-over and skid site have also been added and mean it is increasingly likely that a consultant's advice will be required.

On the horizon are new land and water regional plans. Otago's draft plan proposes setbacks for forestry from rivers, meaning any watercourse, of 20 metres for slopes under 10 degrees and 50 metres for those greater than 10 degrees. If adopted, these plans would mean many farm forestry woodlots would be 100 per cent non-compliant and would require resource consent to get exemption for planting. This is all very discouraging for those considering new planting. Needless to say, the NZFFA are joining others and pointing out the implications of blanket rules.

For those with Emissions Trading Scheme registered forests, the news is no better, with new annual charges of $30.25 per hectare now in effect along with a host of other charges for related services. A judicial review of these new fees has been enacted in the High Court by several forestry groups who claim the charges are excessive, unreasonable and disproportionate. Members who wish to pledge support for these actions should contact either the New Zealand Institute of Forestry or the Forest Owners Association. Some members may be considering whether it is worth remaining in the scheme if they have not already withdrawn.

I recently attended part of the Wilding Pine Conference in Queenstown. Much of the work of these enthusiastic groups is dealing with legacy planting where the risk of wilding spread was unknown. But we were told of more recent planting of Douglas-fir which is now spreading into surrounding conservation land. Such planting would not now be allowed under rules confirming the need of such controls. Most forest owners are meeting their responsibilities in dealing with spread beyond their boundaries and for some it will mean a decision on whether the cost of containment exceeds potential returns. Balancing those who tend to demonise all exotic conifers, it was good to see presentations from Peter Oliver representing the Forest Owners Association and our own representative on the Wilding Pine Network, Nick Ledgard.

Our mid-year Councillors meeting on the 9 November was a chance for Branch input and feedback. There were presentations on the Industry Transformation Plan and the regional Wood Council Accord with news on planned workshops on alternative species with support from the Ministry for Primary Industries.

The Emissions Trading Scheme Where to next?

Ollie and Mathilde Batelier-Belton

This article is the seventh of a series about the New Zealand Emissions Trading Scheme.

The year 2023 has proved to be a year of remarkable disruption within New Zealand's Emissions Trading Scheme, leaving forestry participants grappling with a whirlwind of uncertainty stemming from continuous consultations and policy changes. This transformation has significantly affected the carbon price, introducing unprecedented volatility into the market. From reaching an all-time low of $34 in July 2023, the carbon price rebounded when the High Court's ruling forced the government to re-evaluate its Emissions Trading Scheme auction settings.

Revised auction settings and new fees

A few days following the High Court's decision, new auction settings were unveiled. These adjustments included an increase in the reserve price from $33.06 to $60, as well as a rise in the cost containment reserve price – the threshold at which additional units can be released during the auction – to $173. This move brought about a welcome surge in carbon prices, delighting many foresters who had just received their carbon units after completing their final emissions returns.

The optimism surrounding the recovering carbon price was short-lived, as Te Uru Rakau – New Zealand Forest Service announced plans to introduce new and significantly higher fees by the end of the year. The government introduced 22 new fees for all forestry participants, with the most contentious being the $30.25 per hectare. Critically, this fee fails to differentiate between forest types – indigenous or introduced species, forestry regimes, such as timber or permanent, or Emissions Trading Scheme participants who intend to sell their carbon units.

Response to the fee hike

Concerns were publicly raised in response to these fees, calling the decision short-sighted and unfair. Critics argued that it failed to account for variations in forest types and management strategies, therefore disproportionately affecting certain stakeholders. Encouragingly, the New Zealand Institute of Forestry and the Forest Owners Association have initiated a judicial review of this decision, with the backing of a majority of industry experts, ourselves included, and forestry participants. Additionally, there remains hope that the incoming National-led government will potentially amend these fees.

Anticipated events

One of the pivotal events on the horizon is the December auction, which many industry experts anticipate may not meet expectations, potentially removing 15 million carbon units from the market. This reduction in supply to polluters may trigger a price increase in 2024. However, it also implies that the government could miss out on approximately $1 billion in revenue, which the incoming government had counted on to help fund tax cuts.

Looking ahead, an essential question lingers – how will the Emissions Trading Scheme evolve under a National-Act government? Forestry participants have expressed concerns, particularly given the historically low carbon prices during the National Party's previous tenure in power.

Nevertheless, it is worth noting that several factors have changed in the past six years. The urgency and reality of climate change are now widely accepted, and National has expressed a commitment to restoring market confidence in the Emissions Trading Scheme. This suggests that the scheme may remain relatively untouched for the next three years, serving as New Zealand's primary method for reducing greenhouse gas emissions.

We hope, for forestry participants first and foremost, that the roller coaster of policies and changes will pause for a while. We need to restore confidence in the carbon forestry space and not lose sight of the main aim – to plant trees on our least productive land to accelerate carbon sequestration and help avert catastrophic climate change.

Ollie Batelier-Belton is Managing Director of Carbon Forest Services, a consultancy specialising in carbon forestry. Mathilde Batelier-Belton is a Director and the General Manager at Carbon Forest Services.

Forest Growers Research conference in Rotorua

Julian Bateson

Many NZFFA members may not know much about Forest Growers Research, but they should. For those who would like to know more, Forest Growers Research manage the research funded by the Forest Growers Levy Trust, money which comes directly from all forest growers via the 33-cent levy for every tonne of harvested timber. The annual research budget from the levy is a little over $5 million.

Forest Growers Research also manage other research programmes which are funded elsewhere. The *Science Report,* a copy of which you will see included with this issue of *Tree Grower,* lets you know much more about what has been going on over the last year. It is well worth the read.

Three days in Rotorua

You may ask why members of the NZFFA or other owners of small forests would want to spend three days at the conference in Rotorua. In the early years of the levy-funded research presentations at these conferences, there was a heavy bias towards projects which were of minimal direct benefit to the owners of small forests or those growing alternative species. However, time has been our friend. Almost all the presentations this year had relevance, directly or indirectly, for those of us who own small forests or grow species which do not have radiata in the name.

After one or two virtual conferences thanks to Covid, this year was again close-up and personal. The cost in time and money could well be a disadvantage in attending. Conference fees aside, there is the time taken to travel to and from Rotorua, the three days of attendance and the price of a few nights in a motel or hotel. If you give up almost a week of your time, you need good value, which is what we got.

There were over 30 presentations, six question-and-answer sessions and a field day in Kaingaroa forest. The presentations were incredibly varied and if you want to know all the details, have a look at the programme on the website. There was enough from the past, present and future of forest research to keep most of us interested throughout. In the breaks we could mix and mingle with the brightest and best scientists from Scion, or so they say, which is more fun than you might imagine and you also learn a lot in the process.

Vaughan's shed

One of the minor highlights, according to Vaughan Kearns, was the specialty timber cabin which demonstrates the use of various alternative species suited to small construction projects. The photograph of the cabin in the car park outside the conference hotel does not do it justice, nor does the one of the inside with Vaughan looking smug.

Field day

The final day of the conference was a field trip to Kaingaroa Forest. Two busloads of attendees benefitted from an excellent itinerary, effective presenters and good weather. We learned how debarking logs has changed from a cost to an income earner, how effective drones can be in spraying seedlings and that pines may still be the tree of choice, but eucalypts are making an inroad.


In Kaingaroa forest


Loading one of the log trains


A very sophisticated drone ready for spraying action


The really hard bits on the de-barker


Some recently planted eucalypts on mounds to avoid frost


The removed bark now a valuable income earner


One of the felling machines in action


Some eucalypts planted 14 years earlier

Resilient landscapes
The Hawkes Bay conference
From 9 to 13 April 2024
Napier War Memorial Conference Centre

Hawkes Bay branch

If there is ever a year which called on resilience, it is this one. It is only fitting that the theme of the 2024 NZFFA conference is resilient landscapes. This 66th annual conference in April will be hosted by the Hawke's Bay branch.

Cape Sanctuary with the predator fence in the foreground

Resilient landscapes

Tim Forde, Chair of the Hawke's Bay branch, says that his team are looking forward to hosting the conference. It was hard to settle on a theme which realistically depicted the Hawke's Bay region after the devastation of Cyclone Gabrielle, but 'resilient landscapes' sums it up. This conference provides an opportunity to demonstrate just how the region are recovering after Cyclone Gabrielle.

There have been many lessons from the adverse weather, including how different species of trees had helped the various landscapes during the bad weather. There is still much to learn since the cyclone. The committee have endeavoured to put together a memorable event to present examples of the province's assets, of which there are many. In addition, attendees will also hear about the many changes affecting forestry.

The conference is a chance for Hawke's Bay to promote the good work of places such as Cape Sanctuary, and how strong the relationships are between Hawke's Bay farm foresters and key businesses including PanPac, Napier Port and the Hawke's Bay Regional Council – all of whom are critical to forestry.

There will be the usual awards dinner. The NZFFA Farm Forester of the Year awards will be presented, as well as the Michael Hay Memorial Award and the New Zealand Landcare Trust Award for Innovation in Sustainable Farm Forestry.

Organisers have stuck with the tried-and-true action group meetings format on the opening day of the conference. Wednesday is the business end of conference. In the morning, NZFFA members can have their say at


Winch-assisted felling machine at Pan Pac forest


Eucalypt plantation


Napier Port

the Council meeting and the AGM. It will be followed in the afternoon by a series of seminars and workshops. The day culminates with Julia Jones as the guest speaker at the welcome dinner in the evening. Julia is the former head of analytics at NZX and previously KPMG farm enterprise specialist.

Field day highlights

The programme has been designed to accommodate those who can attend only part of the conference, but the three days of field trips will most certainly be the highlights. There will be organised tours through the Napier Port, PanPac Whirinaki and Cape Sanctuary which will give an insight into the some of the many things going on which not many will have had have a chance to see before.

Attendees will also see some of the damage the cyclone caused and the different ways people have taken to move forward in such challenging times. Friday's field trip will incorporate the Tuki Tuki catchment through to central Hawke's Bay to see the effect on highly productive rural areas. There will be examples of blackwood erosion control planting and areas of well planted landscapes.

Saturday's field trip is a special visit to Cape Sanctuary – a predator fenced area incorporating Cape Kidnappers. This sanctuary, developed by the Robinson and Lowe families shows native biodiversity work to an exceptional level.

It is not the first time Hawke's Bay has hosted the national conference, which will showcase examples and initiatives to help farmers improve sustainable land use, increase biodiversity and champion a resilient environment.

Programme summary

Tuesday 9 April is a full day for the action groups including Eucalypt Action Group, Cypress Development Group, Indigenous Forestry Section, Sequoia Action Group, Acacia Melanoxylon Interest Group, Farm Forestry Timbers, Poplar and Willow Action Group and Oaks New Zealand.

Wednesday 10 April starts with the Councillors meeting and is followed by the AGM. The afternoon is workshops and seminars and the evening opens with welcome drinks, then dinner with Julia Jones as the keynote speaker.

Thursday is the first of the field days with a tour of Napier Port and a tour of PanPac Whirinaki. Friday includes field trips to Tuki Tuki, Elsthorpe and Otane. Saturday concludes with a visit to Cape Sanctuary and a farewell dinner.

Book now

Booking early for your conference space helps the conference organisers. It is easy to use the registration form enclosed with this issue of the *Tree Grower* which has full details of the conference programme. Alternatively, you can book online by using the link bit.ly/NZFFARegistration.

Planting native trees
Feeding the soul not the bank account

Julian Bateson

There are many experts who know lots about New Zealand native trees, how to plant them and ensure they survive grow well. I am not one of these experts. However, over the past few years I have planted and transplanted around 1,000 native trees and the majority of them are still alive.

If you plant trees just for income, good for you – someone has to do it and we need the timber. Native trees are not usually planted for money, more as 'food' for the soul, for the benefit of other wildlife and for the long-term future. Perhaps there are those of you who will want to skip the rest of this article because there is no hint of money to be made. On the other hand, you may be pleasantly surprised.

This is not a comprehensive guide to planting native trees as you will see. But it is how I have done my best to adapt to the climate and the pests.

Poor survival

I started planting native trees on my property in the Wairarapa about a dozen years ago. Most of the trees which I planted in the first year did not survive for long. I had only managed to plant a small number of species, including cabbage trees and tree fuscia. I soon found out that deer would remove most cabbage trees not long after they were planted, just pulling them out of the ground, along with the plastic rabbit protectors around each one. Almost all the remaining cabbage trees which survived the deer slowly died of disease. Some of the

A windy wet landscape of pines, cypress, regenerating bush and bare land


One of the paddocks a year without sheep


Year two


Year five


After 10 years

fuscia grew well when they were planted near water, but the deer also liked to eat them.

These problems put me on the back foot for a while as I had been following the wrong plan – learning by failure. I put my native planting on hold while I spent time finding better ways for them to survive. Obviously, I should have done this in the first place.

Starting again

I have around 20 hectares of land. When I moved in this consisted of some well grazed paddocks, a small pine plantation about 10 years old, a smaller adjoining macrocarpa plantation of a similar age, some recent regenerating bush and a hectare or two of older regenerating bush. I wanted to gradually add new natives to all of this.

The climate here at 300 metres above sea level and close to the Tararua Forest Park is wet and windy. The average rainfall is over 2,500 mm a year and the wind can be fierce. It means that my native trees need a lot more shelter than most if they are to survive. Planting on open bare land was not an option, which it rarely is for most native trees, but providing shelter at low or no cost was the challenge.

The paddocks were well grazed by the sheep which the previous owner had on the land before I arrived. Once the sheep were removed, the grass grew and then the manuka and kanuka slowly started to appear. Regenerating manuka and kanuka like the rain and cope well with the wind. Even better, they do not have a direct financial cost, just time.

Within five years the paddocks were becoming well covered, if patchy, with manuka and kanuka shelter providing plenty of opportunities for successful planting. The sequence of photographs on the right shows the changes. Problem one, finding shelter for planting the open paddocks, was solved.

Under the radiata pine it was an opposite problem with too much shade and shelter. The plantations of just a few hectares have been in the Emissions Trading Scheme for about 10 years. My plan is for these trees never to be clear felled, but for the forest to gradually transition from pine to natives. However, there has not been much native regeneration among the pines, even among those thinned and pruned.

To enable successful native planting among these

trees I am gradually thinning them, but keeping well within the Emissions Trading Scheme rules and keeping over the minimum 35 per cent cover. The tricky part is to create enough open space for sufficient light while keeping enough total cover. I started to plant among the open areas while selectively thinning for firewood with the aim to gradually transform to a full native forest. Felling the trees safely in places where natives have not been already planted is always a challenge and not always as successful as I would like.

Most of the macrocarpa had already helped with my thinning decisions by dying before they could be felled, or most of them did. Cypress canker is a real problem in wet areas as many of you know. But dead trees had left too much open areas so I had planted some replacement canker-resistant ovens cypress to retain the required cover. Once these were a few years old I was able to plant native trees under the young cypress. But these cypress grow vigorously and very regular pruning is needed to make sure the young native seedlings do not end up in the dark.

Choosing what and where to plant

The decisions about what trees to plant is often dictated by the availability of plants. There are, as we know, around 250 native trees to choose from and although they are not all native to every part of New Zealand, it would still make for a lot of choice if all were for sale at the nursery. Fortunately the tree nurseries have limited their stocks.

I decided that I should have a good mix of shrubs as well as trees, as you would find in natural regeneration. I have now planted around 25 different species, and the variety will slowly increase. Among the manuka and kanuka the main aim is to add another 'layer' which will help provide shelter for the bigger trees later on. Examples planted so far include lemonwood, *Coprosma robusta,* tarata, akeake, tree fuscia and kawaka. Among the pines and macrocarpa I have concentrated on larger trees such as red beech, black beech and totara, but still with a mix of smaller ones.

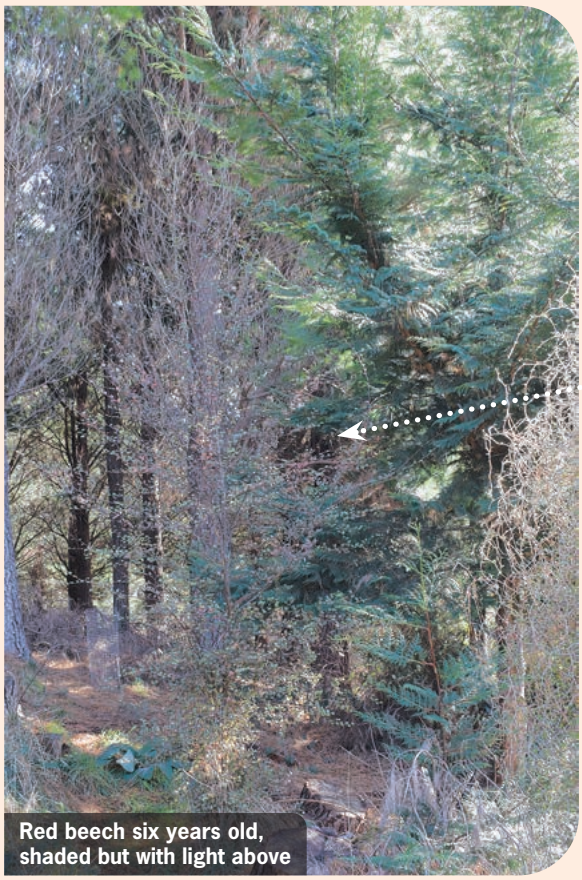
What to get wrong

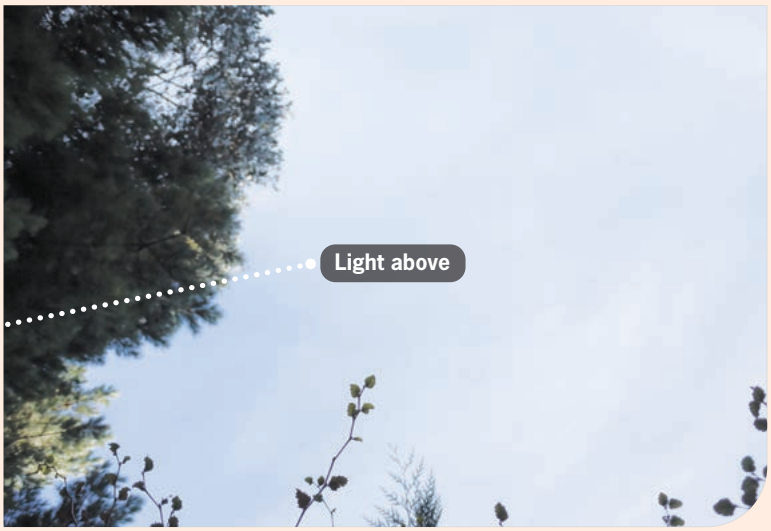
Initially it seemed that the ideal place to plant among the randomly regenerating manuka and kanuka was in the smaller gaps, not the bigger open spaces. This, I thought, would provide the best shelter for the young seedlings, even though it was harder work. However, manuka in particular grows very quickly once established. The small gaps rapidly become shaded, and often slow or stop the growth of the new seedlings desperate for a bit of light. I soon discovered that the larger open spaces provided enough shelter and allowed me to find them over the next few years for occasional weeding and maintenance.

The trees I planted in the small gaps often meant that within a couple of years I had to spend time fighting my way through the ever-thickening bush to find the now heavily shaded seedlings. In addition, the manuka needed pruning to give a bit more space for light to get in.


Planting among the regenerating bush


Planting in a light well in the pines


Red beech six years old, shaded but with light above




Red beech six years old, heavy shade above

Among the pines

Available light or too much shade can be a similar problem for planting among the gaps in the pines. Lancewood will fight its way to the light through thick regeneration and miro is very happy to grow in heavy shade for years, waiting for a lucky break in the canopy. Northern rata is another species which happily endures heavy shade for years, so no problem there.

However, pines are very good at filling in any lightwells created by thinning. I knew that, of course I did. But I did not realise how quickly this happened or quite how much light some of the trees need. A good example is red beech. They grow quite happily in the shade, but very slowly if there is no light directly above. When planted with shelter but with plenty of light, they can grow a metre in height every couple of years. Under shade, this can be as little as a couple of centimetres a year. Totara is similarly happier with plenty of light and a little shelter.

The spherical densiometer

I wondered how I should measure the amount of shade and toyed with the idea of a light meter used with a camera. While asking around I was told about spherical densiometers which professional foresters will know about, but I only recently discovered. It is used to measure how much actual shade there is above a particular spot. I have now bought one and will be using it in future to help find the right places to plant trees under the pines, that is once I have got the hang of using it.

Survival protection

You may have noticed in the various photographs that the young trees are all surrounded by netting. I had soon discovered that the seedlings which the rabbits did not eat, the deer consumed with relish. Small plastic or cardboard protectors were no use against the deer. They are just extra food or something to chew before they get to the main course. I did try electric fencing but it did not stop the rabbits nor the occasional deer which broke through.

I find that the only successful method is for each tree to be well protected. I tried normal wire netting, as shown in some photographs, but eventually settled on square mesh netting, which is more rigid, although more expensive. This works well until the tree reaches the top of the netting and deer nibble the tree top shoots. For the vulnerable species, such as broadleaf, additional protection has to be used, but that is another story. To be fair, not all trees are nibbled once they reach the top of the netting at about a metre above the ground.

The cost of each wire netting protection and posts is over $15, but they last for more than one tree planting process. If you think it is expensive, you may be right. But if they save a five dollar tree each time, it is cost effective. I did say at the beginning of this article that planting native trees was not a money-making venture.

Good things take time

What have I learned about being more successful when planting native trees in a very wet and windy climate and competing with lots of deer and rabbits? Mainly, I have understood that good things take time.

I have not worked out how long the whole process takes to cut the protective wire mesh, to fasten it into a tube, to find and cut stakes, to carry everything to


Northern rata a year old in an old pine stump


A rata in a tree fork

the planting site, then plant the tree and install the protection. However, if I can plant and protect around 20 trees in a day, I have had a good day, with a few breaks. This may not be up to the planting rates of the professionals, but I aim to enjoy the process.

I have learned that deer are relentless in their appetite for edible young trees. I have also learned that weeding around the trees is generally not needed unless the weeds get as high as the seedling. They do not seem to starve the trees of water in my wet climate.


Five finger with the top nibbled by deer

I have also learned that rotting pine stumps have a use, in which to grow northern rata. The photograph is looking down on a northern rata which has only had a year in the ground, or a rotting pine stump in this case. It seems to grow well like this. I have also 'planted' some rata in the forks of tall manuka. This is their more normal habitat, but usually higher up in older trees. Planting in pine stumps is much easier to do and to monitor.

I have discovered how important light is. Yes, I knew that before I started. But shelter trees like to fill the gaps quicker than I expected. My new densiometer will help me monitor the amount of light available, and how to make improvements.

I have learned not to despair if a rabbit grazes a seedling to ground level. Some, such as kowhai, will recover completely and grow as if they have never heard of rabbits. I have also learned not to despair when native seedlings just die after two or three years. Not many, just enough.

I have learned that some natives are sensitive to harsh frosts, such as kawakawa. I should have known that, but I got lazy with my reading.

I have learned that planting nurse trees as protection in the form of tree lucerne does not work as well as manuka and kanuka. Rabbits and deer eat tree lucerne, but generally not manuka or kanuka.

I will keep on learning.

Julian Bateson is enthusiastic about native trees.

An update on harvested wood products
A simple idea made complex

Howard Moore

Some things appear to have a beautiful simplicity. A friendship, a seashell, a single malt. Of course, if you choose to go nit-picking you can discover details in each which are really deeply complex, subtle and perhaps even intoxicating.

Our parents teach us which are safe to explore and which are not, and in response we grow up choosing the things in life we take at face value, such as seashells, and the things we want to develop closer relationships with, such as Scotch whisky. As we become adults we discover that life offers a warehouse of anoraks, among which each of us is free to choose.

As an example, I have a book with a chapter devoted to 'The museum of all shells' in which Richard Dawkins proves that because sea creatures can only do so much with calcium, shells have a limited range of designs, which to marine biologists must be totally fascinating. In a way, harvested wood products are something like seashells. There is a lot of complex detail behind an idea with charming simplicity. At face value –

- Trees suck carbon dioxide from the atmosphere and turn it into wood.
- If we stop that wood from burning or decaying, we can store the carbon for centuries.
- Logs float, landfills are in short supply and lonely places, such as the Arizona desert or Antarctica, are too far away.
- That means we have to store the wood in the open, close to people, which is inherently risky.
- To manage that risk we need to make the wood into really useful, durable products that people will treasure for centuries, and therefore want to protect.

Durable timber

Back in 2016 I wrote a *Tree Grower* article about harvested wood products which I illustrated with a picture of the Borgund stave church, which along with Notre Dame, is perhaps the most ancient bit of the built environment which I have actually touched. These have survived for 800 years because their builders converted timber into really useful, durable things that people have treasured, as in the last bullet point. Although of course Notre Dame has since burned down, which emphasises the fourth point.

Taking harvested wood products at face value, we might ask 'How do we make wood into really useful, durable things that people will treasure and want to protect?' The logical answer would be to give an incentive to wood processors. Encourage them to develop really useful, durable products and market them at prices everyone can afford.

Of course, life is not that simple. Anoraks abound. While some children grow up to explore harmless things such as music and metaphysics, others grow up to explore public policy and the dark arts. Among them we find there is a group arguing that, in fact, harvested wood products are not only deeply complex and subtle, but how we handle them has wide-ranging implications for the forestry sector, the national economy and our international obligations. Wow. If they had medical side-effects we would have to ban them.

The debate

To recap from within the anorak, as it were. In 2008 when the Emissions Trading Scheme was introduced it was based on the international Kyoto agreement which had no provisions for accounting for harvested wood products. However, in 2015 it was officially recognised internationally that short-lived and long-lived wood products store carbon. Since then, New Zealand has reported a deferred liability for the emissions from harvested wood products as part of our 2021 to 2030 target under the Paris Agreement. Furthermore, in 2021 the Climate Change Commission proposed that we incorporate credits for harvested wood products into the 'averaging' regime for commercial forestry, and effectively raise the 'averaging age' for radiata pine from 16 years to around 23 years.

This caused some excitement and several more

parties joined the discussion, wrote papers and speculated what, if and how anything should be done. Of course, that debate is still evolving but a few points of consensus are beginning to appear.

Four options

First, the government is considering devolving the benefits and liabilities from harvested wood products to the forestry sector in order to reduce its fiscal risks. They admitted: 'The closer the settings in the NZ ETS align with (harvested wood product methodology) the more easily the NZ ETS can be used to manage the Crown's financial risk.' From there, four clear options have emerged.

A The benefits and liabilities could be devolved to end-users, such as building owners. After all, the people who buy the harvested wood products are the ones who treasure them and protect them to make sure that they last, and so create and maintain the long-term reality of the carbon store. There may be perhaps 300,000 serious building owners.

B The benefits and liabilities could be devolved to the forest growers as the Climate Change Commission proposed. The growers own the trees which suck the carbon dioxide from the air in the first place. This not only has a direct effect on climate change, it also creates the opportunity to store the carbon. There may be perhaps 3,000 qualifying forest owners.

C The benefits and liabilities could be devolved to the wood processors. The processors develop and make the really useful, durable products which people will treasure for centuries, and so create the means to store the carbon. There may be perhaps 300 qualifying processors.

D Finally, the government might decide that it is all too hard and not devolve anything, and continue with familiar tools like grants, loans and regulations to try to achieve its economic, social and environmental goals.

Keep it simple

Based on numbers alone, I would instantly dismiss options A and B. Basically, if you have to devolve the benefits and the liabilities, then choose the smallest group possible or the compliance costs will choke the scheme to death. Also for end users, no-one has the systems to monitor the carbon stored by tens of thousands of building owners for decades. For forest owners, the Climate Change Commission is now saying they already get too much benefit from the Emissions Trading Scheme. These options look unlikely and dismissing them makes several complex and subtle arguments frankly irrelevant. That leaves a choice of option C or option D, which is not easy.

While we can make wood into really useful, durable products that people will treasure and protect for centuries, the principle of 'additionality' means we cannot give anyone credit for that unless the logs come from forests planted after 1989. Milling pre-1990 forests is counted as business as usual. In addition, to establish how much credit should be given, I am told by someone who knows, that the wood flows should include –

- All harvested wood products from post-89 forests together with
- The difference between the pool change in harvested wood products produced since 2013 from pre-1990 forests as projected by 'business as usual' forecasts in 2021 to 2030, and as actually achieved in 2021 to 2030.

The 'pool' of course is the built environment of treasured products which stores the carbon, so rises in the pool are good and falls are bad. The rest is a little beyond me but it applies to anyone seeking credit for the harvested wood products, not just the wood processors, although they are preferred because there are fewer of them. Naturally they have their detractors who argue, for example, that the processors might go bankrupt. That giving them the benefits would not guarantee more investment and that they are an exclusive group with high barriers to entry. Those arguments are not totally sound but managing them adds to the complexity.

Debate continues

Option D is that the government will decide it is all too hard and not devolve the benefits after all. It might continue to use contestable grants, loans, accelerated depreciation, procurement rules and other policies to encourage the market to store more carbon in the built environment. Officials find this idea attractive because the tools are familiar, if not necessarily cheap, effective or politically durable. Nor do they pass the fiscal risk across to the sector, as the government intended. The debate continues, with no decision expected any time soon.

In my simple view, giving the benefit of harvested wood products to the processors is the best choice. If we cannot do that, we will have to rely on piecemeal government intervention that will be subject to continual change. It might be less stressful to grow trees that naturally sink.

Howard Moore has no shares in Red Stag.

More activity for the NZFFA branches and perhaps more members

Julian Bateson

Over the past few months, NZFFA members have submitted a number of grant applications to the Forest Growers Levy Board and Te Uru Rakau – NZ Forest Service. A summary of these is given on page 18 of this issue of the *Tree Grower*.

Two of the projects might help some of the NZFFA branches and would really benefit from your input. One is for us to attend more regional agricultural shows, and the other is to host a series of field days around the country celebrating alternative species.

Attending more agricultural shows

Covid-19 put a stop to most shows, but for the past two years we have attended the Forestry Hub at Mystery Creek, and we will almost certainly do the same in 2024. To understand the benefits we have been monitoring what happens there, and it appears to have been very useful for communicating with the farming audience, signing up new members, encouraging planting and helping explain the continuing value of trees on farms.

Having invested in Mystery Creek we now own a range of fresh, portable displays, a suite of relevant leaflets and experience in providing useful information to people attending agricultural shows. It makes sense to use these materials and skills more than just once a year, and reach a wider audience around the country. We can put them to work and have some fun at the same time.

The plan

The plan, assuming we score some levy funds, is to attend at least five agricultural shows during 2024 possibly, but not necessarily, in association with Te Uru Rakau – NZ Forest Service. As long as the events are not too close together in time, we will be able to use the same material and skills for each including displays, handouts and activities.

By having a presence at several agricultural shows we should be able to promote our message, sign up some new members and significantly encourage more trees on farms. We know that these events attract farmers in large numbers and those who come are open to new ideas. If there are some land owners who have not thought about more trees on farms, who do not know where to start, or who are yet to be convinced that it is a good idea, we can give them the good word and help them along.

Shared responsibility

National office will book the space, arrange a contractor to safely deliver the displays and other material to each show, and ensure that the displays are installed and then removed and packed ready for transport to the next venue. We would like the local branches of the NZFFA, with the support of members of the Executive, to man the displays over the course of each event, chat to the visitors and share their experiences. Anyone who you sign up will become a member of your branch. National office will cover all reasonable expenses, although the details have yet to be worked out.

So far we have space booked at Southern Field Days in Gore from 14 to 16 February, Central Districts Field Days in Feilding from 14 to 16 March, and Mystery Creek in Hamilton from 12 to 15 June. By the time you read this article, some of the branches will already be involved in planning for these shows.

Field days for alternative species

Feedback from the 'Opportunities from Trees' workshops run in 2022 and earlier this year showed that attendees wanted more information on alternative species. Te Uru Rakau – NZ Forest Service has invited us to follow up the workshops with a number of regional field days focussing on the choice, establishment and performance of appropriate alternative species, to encourage diversity. We are close to agreeing a contract to run 20 such field days around the country.

This is another opportunity for interested branches to reach a wider public, showcase good examples of small forests in their area, and perhaps sign up new members. The loose plan is have perhaps 10 branches hosting two events each on different dates between November 2023 and May 2024. We want to attract a group of around 30 people, most of whom would not be current members of the NZFFA, to each event. We know some branches will make a great job of this but others might find it difficult, so it is not obligatory.

The big idea

The idea is to showcase tree species which have proved successful in the area, and what they need in terms of location, climate, shelter, pest control and management. The National office will help promote the events using the field advisors of Te Uru Rakau and Beef + Lamb in each region, coordinate the field days and manage the registration process for the attendees, supply relevant hand-out information not site specific, and meet all the branch costs of running these events.

We need branches to –

- Choose locations with reasonably easy access
- Find someone to speak who knows about the species being discussed
- What has happened there and how well it has gone
- Manage standard health and safety precautions
- Provide tea and coffee.
- Apply normal field day guidelines.

If there is a farm in your area that you think should be showcased, such as a past award winner, please let someone on the Executive know. What has succeeded? The usual suspects are –

- Eucalypts – especially those which are naturally ground durable
- Poplar – for erosion control and for timber
- Cypress – for high value timber
- Redwoods – for erosion control and timber
- Douglas-fir – for cooler sites
- Oaks – for high value timber
- Totara – for high value native timber

Each field day should involve a short talk introducing the owner and the property, then a tour of the property explaining the reasons the trees were chosen, how they were planted, their survival and performance, the benefits they have provided, and the costs and expected returns. Local information should be provided in handouts, and allow for questions during the presentations and during the obligatory refreshments.

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Applications for money from the Forest Growers Levy and Te Uru Rakau for projects in 2024

Julian Bateson

It seems only a short time ago that I last wrote an article about grant projects for small-scale forestry. If you check the May *Tree Grower*, you will see it is only half a year, so why does the process never seem to stop? That is because it never stops. While grant projects are being worked on during this year, applications for work in 2024 had to be contemplated, planned and completed by August this year.

The rules have changed slightly due to an expected reduction of levy income as log exports slow. The usual deadline for applications to the Forest Growers Levy Board has remained at 31 August. However, any projects in the research category will be assessed differently. Instead of the standard application form, an outline expression of interest has been required and then all the projects will be assessed on their various merits from a significantly reduced amount of money.

The table below, in no special order, along with the project summaries following the table, are grants which the NZFFA have applied for separately or jointly with others. The results will be announced in December. The single project involving Te Uru Rakau is being assessed with results expected soon. There are two other projects we are progressing which involve the Industry Transformation Plan and Te Uru Rakau but the details are yet to be finalised. However, the total applied for already, as shown in the table is almost $800,000 and although we do not expect that every grant requested will be approved, we are hopeful that many will. Of course, the more we get, the more work the NZFFA will have to do.

Proposed project	Amount being requested	Levy committee or other
Books for schools and field days	$150,000	Promotions
Airships for transporting logs	$20,000	Transport
Mobilising wood waste from small forests	$65,000	Small and Medium Enterprises
Poplar and willow stage two	$118,000	Small and medium Enterprises
Trees on farms advanced workshops co-funding	$50,000	Promotions
The potential of *Abies grandis* seedlings	$25,000	Small and medium Enterprises
The potential of *Abies grandis* timber testing	$50,000	Research
Stringybark trial evaluation	$25,000	Small and Medium Enterprises
Agricultural shows	$50,000	Promotions
Elite hybrid cypress evaluation next stage	$50,000	Research
Canker resistant cypress	$25,000	Research
Permanent Sample Plot continuation	$50,000	Research
Design of new forest systems	$30,000	Small and Medium Enterprises
Treefarmer promotion	$20,000	Small and Medium Enterprises
Total applied for from the levy	**$728,000**	
Field days – options for other species	$65,000	Te Uru Rakau
Total grants applied for	**$793,000**	

Creating forestry secondary school resources

This project aims to incorporate past and current resources to present simple forestry statistics, forestry practices and knowledge for secondary teachers and students to use in their classrooms. Many other primary sectors have resources available, either as hard copies or online, with data about their sector and information which is simple and aimed at the classroom. However, the last set of resources developed by the forestry sector for this purpose was in the early 1990s, around 30 years ago.

The aim of these resources is to demystify forestry practices and provide information on statistics, wood use, markets and forestry systems in a simple format. They will be easy to update and with basic information which is at a level that teachers and students can incorporate into current subjects such as mathematics, geography, science and agricultural studies.

Feasibility of airships as an alternative for forest harvesting

Modern airships can provide access to otherwise inaccessible land areas. An airship is a lighter-than-air craft which can navigate through the air under its own power. It can be powered by electricity, solar-powered motors or a variety of other fuels and may be capable of remote operation. It is a technology, which if used in harvesting, could significantly reduce roading and transport costs, improve environmental effects and perhaps even make continuous cover forestry profitable.

Benefits also exist for disaster response and recovery. There may well be other uses as renewed international interest in airship design have led to improved safety and carbon-neutral operation. The aim of the project is to assess international developments in the use of airships, check technical and economic limits of such operations in New Zealand and to provide a scope of work with recommendations for further relevant work.

Adding value with repurposed biomass

This project will investigate the feasibility of developing a forest biomass heat recovery system appropriate for small-scale forests, to generate additional revenues and contribute to biofuel supplies. It will trial small-scale, portable incineration systems at farm forests in the greater Wellington region. The project will also explore how these systems may be used to generate sufficient heat to produce electricity for complementary on-site equipment such as a portable pellet mill with biochar as a by-product.

This coupling of small-scale portable technology could increase the recovery and use of biomass, help with site maintenance and provide new income from the growing demand for renewable energy. The project is consistent with the aims of the Forest Industry Transformation Plan and the government's intention to invest in biomass forestry and research to promote the recovery of woody residue and forestry slash.

Poplar timber evaluation

This project will bring together and publish information on timber yield and quality for identified cultivars of poplar grown in New Zealand. Information will be obtained from research trial plots, milling poplar cultivars of known age and from case studies from sawmillers. It will encourage land owners to grow poplar for timber as well as for soil stabilisation, shelter, carbon storage and help meet the targets of the Industry Transformation Plan.

The aim is to identify the status of a poplar as an alternative timber. The project results are expected to contribute to an increase in poplar planting on farms and increase the supply of poplar timber.

Working in partnership with Te Uru Rakau – NZ Forest Service

The series of forestry extension workshops funded by Te Uru Rakau – NZ Forest Service and run by the NZFFA for sheep and beef farmers earlier this year was a success. We are discussing further work with Te Uru Rakau about specific projects that will help it meet its objectives in forestry promotion, education and extension.

These new projects are currently only in outline, but they will be covered by an annual work programme that falls under a draft Memorandum of Understanding between the parties. This application is for co-funding to assist with the annual programme through 2024.

Improving yields of *Abies grandis*

Abies grandis might be a good commercial substitute for radiata pine should the latter ever succumb to pathogens. *A. grandis* in New Zealand appears to be as productive as radiata pine, although it is hard to say if it will perform as well everywhere. Few stands were ever planted, and a research project in 2023 collected seed from mature stands in Hanmer and Gwavas for nursery trials to see if it could be successfully propagated and planted more widely.

These trials revealed that once the seedlings had germinated, they sulked for a year after being moved from the germination trays to their nursery pots. Fortunately, Appleton's nursery in Wakefield has now employed a manager from Oregon with experience in successfully growing *A. grandis* from seed. She will conduct further trials aimed at improving survival and speeding up the process, with further seed collection planned.

Building on the results of attending Mystery Creek

The NZFFA has attended the Forestry Hub at Mystery Creek for the past two years and almost certainly will do the same in 2024. Staff have been monitoring attendance in the Forestry Hub and found it has been significant and useful for communicating with the farming audience, and helping restore forestry's social licence to operate. By investing in these events, the NZFFA now has a range of portable displays, a suite of relevant leaflets and experience in providing useful information at agricultural shows.

It makes sense to use these materials and skills more than just once a year. There are at least five medium to large agricultural shows around New Zealand which the NZFFA could attend and at which we could get the message across to significantly encourage more trees on farms including alternative species and radiata pine woodlots.

Evaluation of historic eucalypt stringybark trials

In 2004 and 2005 the Eucalypt Action Group organised a series of trials across the country to determine the survival of a range of stringybark eucalypt species under different conditions. These trials were partly funded using the Ministry for Primary Industries Sustainable Farming Fund, and survival data was collected three years after planting. Subsequently growth rate measurements were collected at nine years and growth rate performance maps were produced for those species with the most complete data.

This proposed project will obtain the data from the surviving trials from ages 19 to 20 for further analysis. All the stringybark eucalypts produce naturally durable wood over a range of durability classes.

Assess and select canker-resistant cypress hybrids

This application is for work to continue the process begun in 2023 of assessing a range of canker-resistant cypress hybrids from Scion trials planted in 2017. This involves selecting the 100 most promising candidates in terms of growth and form, taking cuttings and establishing stool beds at two locations for their mass propagation.

These will give the opportunity for reproduction at forestry scale when the selections are later refined by timber testing. Cypress is a high value species that may be planted at scale if growers are assured of the trees' productivity

Evaluation of elite cypress clones

Cypress clones developed by Scion and already selected for their growth, form, vigour and canker resistance will be investigated for their timber properties, and whether those vary across two trial sites with different climates. They will be tested for heartwood content, heartwood colour, timber stiffness, strength and durability. The project began in 2023 but essential silviculture in the trial plots has added to costs and delayed the original programme.

Measuring Permanent Sample Plots

Scion is aware that there are nearly 700 Permanent Sample Plots for alternative and contingency species around New Zealand. Of these, nearly 500 have not been measured in the last 10 years. With Forest Growers Levy funding in 2022 and again in 2023, the NZFFA has been working on a programme of re-measurement so that the relevant growth models and yield tables can be brought up to date. This project is for assistance to re-measure the balance of the Permanent Sample Plots, to establish a number of additional plots in suitable locations and to commission Scion to record and maintain the data.

The redesign of forest systems

The aim of the project is to provide confidence in the future redesign of forest systems particularly their role in mitigating climate change effects. This project will help form a working group to consult across a diverse expert group. This will determine who the experts are and the availability and quality of evidence of main plantation species which provide resilience, such as rainfall interception, reduction in erosion and wind stability.

A facilitated workshop will be organised to gather expert opinion and help with visits to appropriate field sites for practical input and local knowledge. The results will be recommendations on knowledge gaps in the short term and a plan to collect appropriate information for the long term.

Promoting Treefarmer

Treefarmer was developed over the last four years with the aim of improving the afforestation and harvesting experience of small-scale forest growers. It achieves this by raising the grower's awareness of the issues, costs, risks and opportunities they will encounter with tree planting and harvesting on their property.

Use of Treefarmer is monitored with current usage by New Zealand users averaging around 30 a month. While this is steady use, it needs to improve if we are to reach the intended audience of over 12,000 small-scale growers.

This project will apply resources to promoting and demonstrating Treefarmer to gain greater uptake and benefit. It will include developing publicity material, updating support material such as a user manual and tutorial as well as training demonstrators at extension workshops and field days

Field day options for other species

Feedback from the 'Opportunities with Trees' workshops run in May and June 2023 showed that attendees wanted more information about alternative species. To further encourage land owners to plant trees, the NZFFA aims to contract to Te Uru Rakau – NZ Forest Service to run a number of field days around the country focussing on appropriate species choice, establishment and performance.

The NZFFA will run 20 field days for groups of up to 30 people between October 2023 and June 2024. Each field day will focus on tree species which have proved successful in that region, and what that species needs in terms of location establishment, weed and pest control and management.

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Transforming forest management The precision silviculture programme

Claire Stewart

The precision silviculture programme is the most recent addition to the Forest Growers Research programme, complementing the five other government and industry partnerships already under way. The programme is just entering its second year of seven, and is focusing on mechanising, automating and digitising forest nursery, forest establishment and tree management operations. Eventually, the programme will develop technology and systems to increase productivity, create higher-value employment and reduce the environmental effect of operations.

Labour shortages and health and safety concerns have resulted in significant uptake of mechanisation by the forest harvesting sector over the past decade or so. Forest nursery and silviculture sectors face similar challenges with many activities little changed from the way they were 50 years ago. The precision silviculture programme was the missing link in Forest Growers Research's research, acknowledging that research and development in silviculture has been an under-invested space for many years.

The programme is underpinned by a Ministry for Primary Industries Sustainable Food and Fibre Futures Partnership grant of $25.5 million, with additional funding and support from the Forest Growers Levy Trust, 12 forest companies and various forestry contractors, forest nurseries and manufacturers. I am the programme manager, to oversee the multiple projects happening with nursery, planting and establishment, pruning, thinning, and data and engagement.

Demonstrating the tree and box-tracking app

Nursery research

The nursery work concentrates on addressing bottlenecks in tree nursery production systems. It spans containerised and non-containerised nurseries, encompassing activities from seed sowing to the deployment of trees in the forest. Three projects have been making good progress and are set to make a marked difference to the nursery sector in coming seasons

Tree and box tracking

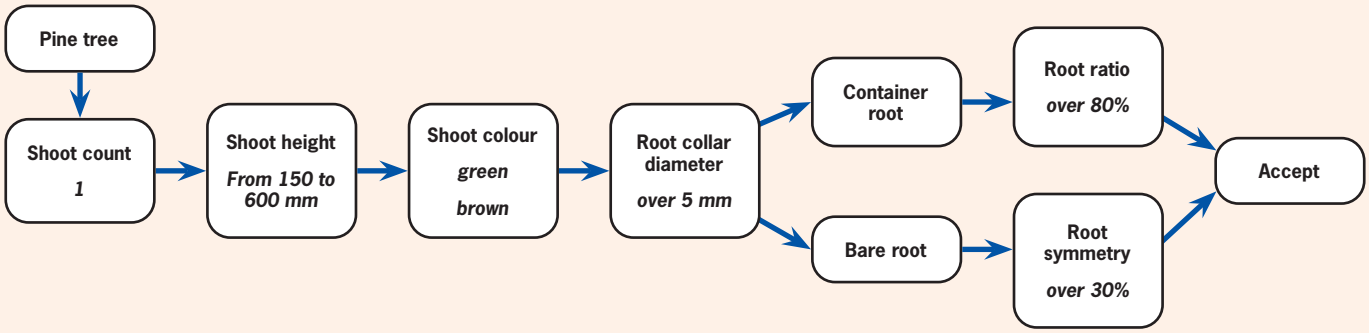
A phone-based app to track trees from the nursery to the planting site is well on its way to being ready for use. The app, developed by technology company Integral, enables users to scan a unique GPS-linked identifier on each box of trees as it leaves the nursery, and at every stage of the journey including when the trees are delivered to the planting site.

Although tracking apps are already well-used by urban couriers, a few extra challenges have had to be overcome to develop something which is fit for its purpose in forestry conditions where consignments often total many thousands of boxes delivered to remote locations. As well as knowing the whereabouts of trees once they leave the nursery, managers will be better able to retrieve boxes for re-use.

Mechanised lifting bare root nursery stock

Manual bare root tree lifting and grading remains the norm in many nurseries. It is hard physical work and requires skill to grade trees quickly before packing. A new block-lifting machine has been developed by Waikato nursery owner Jonathan Sudano. The machine, which will be ready for the 2024 season, can lift at

Training rules for the AI system to pass or fail planting stock after lifting



least 20,000 trees an hour, the equivalent of 10 people working. It is a small-scale piece of equipment, requiring only a small tractor to operate and has very low environmental effect.

Automated seedling grading

Automated seedling grading and packing is the next stage, and an artificial intelligence based visual system is being trained to grade trees. This is likely to be applied in the packing shed initially, but later could be adapted to work during the tree lifting process. The system is being developed on a set of pass or fail rules. Decision stages will –

- Detect seedling from an image or video
- Identify relevant parts of seedling such as stem, needles, root, root hairs or dirt
- Calculate relevant measures such as stem thickness, number of stems or root kinks
- Decide pass or fail against predefined rules such as the number of stems or root dimensions
- Recommend action to machinery or human operator such as pass or fail.

Another nursery project due to start shortly will develop technology for autonomous tree stock monitoring using drone and ground-based systems. This information is critical for managers to predict how much stock will be available to the market. It will transform the previous manual task of counting seedlings and visually assessing them for growth or the presence of disease.

Precision weed control is also possible. If the monitoring system detects weeds in nursery beds, a targeted method is needed to deal with them, and work on this will begin in 2023.


Preparing the M-Planter machine during hydrogel trials

supported by forestgrowers commodity levy

Planting and establishment

The planting workstream aims to create production-ready mechanised planting prototypes and tools for increasing planting precision and reducing chemical use. Extending the planting season beyond the traditional winter months is another aspect of this project. Two main projects have dominated this work.

Mechanised planting machinery

Mechanical tree planting is common in some countries and New Zealand contractors are already testing and adapting planting machines for local conditions. For these machines to be cost-effective they need to operate beyond the normal winter planting season. A seaweed based moisture-retaining hydrogel applied to tree roots at planting is being tested in conjunction with planting machine trials, in the expectation that it will enable planting to continue into the drier months of the year.

Pan Pac Forest Products Ltd have also been evaluating the Swedish Plantma-X mechanical planter. We are now working on an adaptation project to make the machine more suitable for work in New Zealand.

Using drone for precision spraying

Conventional spot spraying with backpack sprayers, either before planting or release spraying, requires significant labour resources. The current alternative, blanket spraying by helicopter, is environmentally debatable. Scion and technology company SPS Automation are running a series of trials in Pan Pac's Glenmore Forest to test drone based spot spraying with the aim of developing commercially deployable technology. Other planned work in this project will assess the potential for drones in precision nutrition and vegetation management.

Pruning

The pruning project aims to produce prototype technology which improves the safety and productivity of pruning operations in the forest while also reducing costs. Progress is being made in two projects developing battery-powered hand pruning tools and developing mechanical pruning machines.

Battery-powered pruning

Battery-powered pruners are already commonly used in viticulture and horticulture and comprehensive trials in the forest tested one – the Pelenc battery pruner. Two participating pruning contractors found that pruning

The large drone used for precision spraying

Using the battery-powered Pelenc pruner during the trial

with battery-powered tools was less tiring than using conventional hand loppers, but also significantly slower, mainly because the battery-powered cutting head was not well-suited to pine branches.

The University of Canterbury mechatronics and mechanical engineering students are now rebuilding the cutting heads of the Pelenc tool, and a second Infaco one. The new designs will be ready for testing later in 2023.

Mechanical pruning

Auckland-based engineer Marsh Hudson is working to develop a mechanised pruning machine suitable for radiata pine. The aim is to have a machine which can operate safely even on steep land, prune at heights up to 15 metres and be able to handle large branch size up to 50 mm in diameter. The prototype will be tested this November, beyond which an improved prototype is anticipated for pruning height from three to 12 metres. University of Canterbury final year engineering students continue to work on a tree-climbing pruning device, as well as working to support manual operations using battery powered devices and modifications.

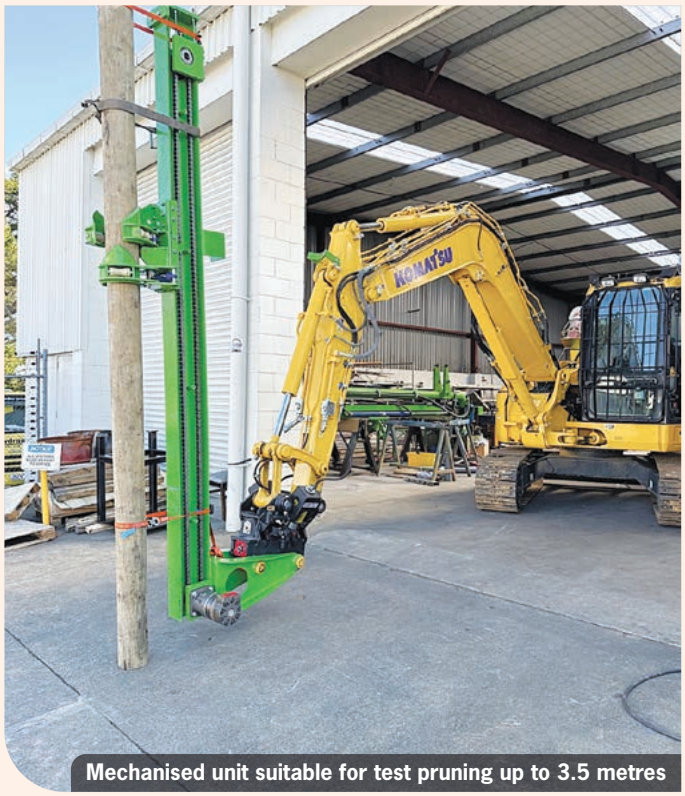
Thinning

The thinning workstream aims to develop equipment and techniques to for cost-effective mechanised thinning which reduces reliance on manual labour and creates a safer working environment.

Battery powered chainsaws

Replacing petrol chainsaws with battery powered ones would reduce missions from a typical waste thinning crew by about 6,580 litres of two-stroke fuel a year. Operator exposure to carbon monoxide fumes would also be eliminated. Two makes of battery-powered chainsaws, a Stihl MSA300 and a Makita UC013GZ, were tested by contractors in a conventional waste thinning operation.

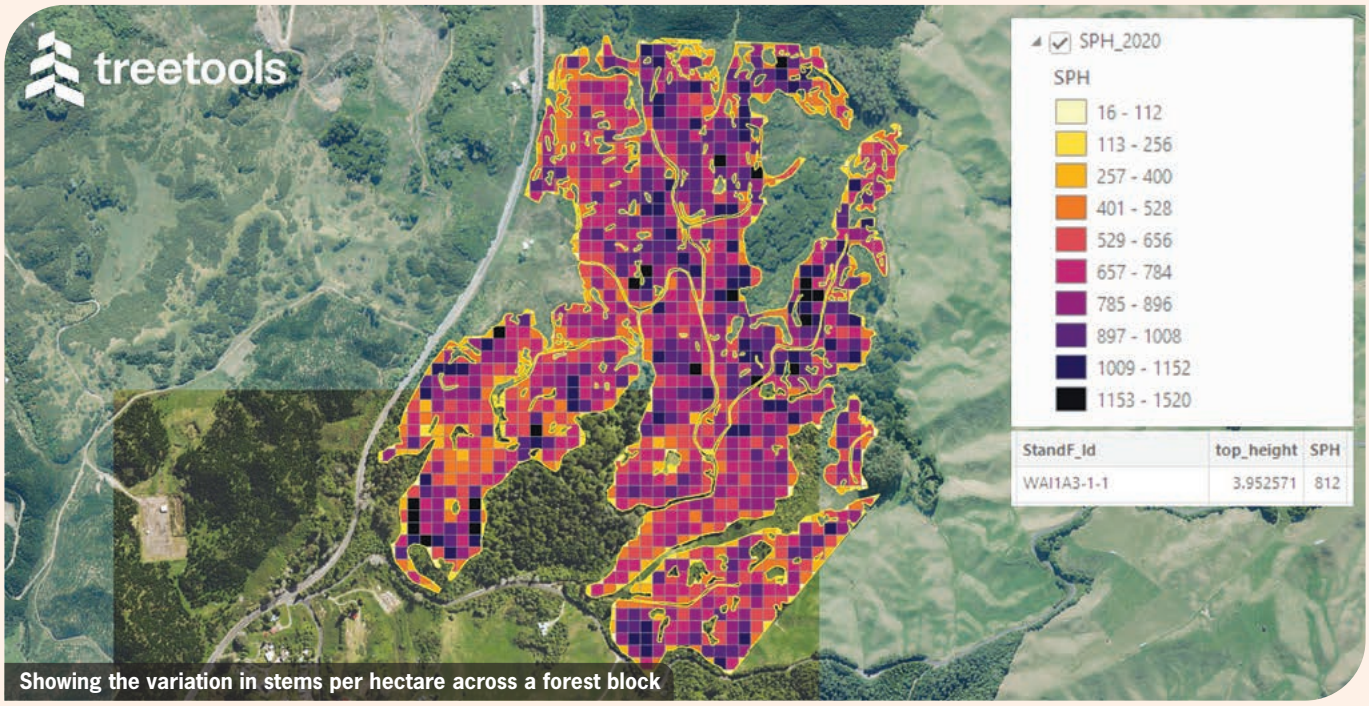
Management of batteries on site was revealed as the critical constraint. Each battery only lasted between 25 and 45 minutes and weighed approximately two kilogrammes each. Operators need a number of batteries for a full day's work. Future work will look at on-site battery distribution techniques as well as systems for efficient battery charging overnight.



Mechanised unit suitable for test pruning up to 3.5 metres


A contractor using the Makita battery powered chainsaw

supported by forestgrowers commodity levy



Showing the variation in stems per hectare across a forest block

Improving thinning efficiency

TreeTools is being developed by Interpine and will enable forest managers to direct thinning crews in a better way, improving thinning efficiency and accuracy in terms of working to standardised and consistent management specifications. A Lidar file is uploaded to produce –

- A digital elevation model
- A canopy height model
- Tree peak detection including height
- Crown detection and crown mesurements
- Stocking and tree height heat map
- A summary.

TreeTools will be available for the industry to use in a and will be accessible via the Interpine website interpine.nz

Future versions will identify routes or pathways through the forest for thinning machines or manual operators to maximise their efficiency. These could operate in real time, guiding operators from tree to tree. A virtual reality training option for thinning contractors is also on the cards.

Data and engagement

The data workstream focuses on implementing data standards and governance practices for precision activities. We want to release the value of interconnected data which will underpin the entire programme's success. We are developing new silvicultural standards and will need a comprehensive data strategy. Identifying the value of knowing where an individual tree is in a forest is one concept under review.

The engagement workstream is dedicated to encouraging involvement with Maori to co-design innovative ways which provide direct value and opportunities for Maori. This includes a new partnership with Nga Pou a Tane to help Maori aspirations in the programme.

As the precision silviculture programme enters its second year, there is an array of projects looking at the main challenges and opportunities in the industry. Project reports are available on the Forest Growers Research website fgr.nz. The programme is managed in close collaboration with Forest Growers Research other multi-year partnerships, with many links and mutual research benefits. For more information on any of the projects covered here, email claire.stewart@fgr.nz

Claire Stewart is the programme manager of the precision silviculture programme.

Almost painless membership renewal

Howard Moore

Membership renewal is rolling around again. Being the Treasurer, and also sweet natured, I want to make it easy for everyone. This quick guide may help.

First, if you are one of those select few who ignore the internet, smart phones and emails, call or write to Liz at head office asking for a paper invoice. Then skip this page and read something more interesting. For the rest of us, here is a trot through the on-line process.

Getting started

On the NZFFA home page click on 'Membership', then under 'Personal' click on 'Manage subscription'. That will take you down the page to the personal section where the manage subscription link appears again. Click on it there, and it will take you to the log-in page so that you can ask the system to let you in.

Having entered your name and password, hit log in. It will display your contact details on the left, and your subscription information on the right. Scroll down the right hand side until you see the heading 'Subscription options' and below that, two links. Click on the one which says 'Renew subscription for 2024'.

That takes you to a page headed 'New subscription'. Ignore the new part, where you can fill in your membership options. The choices you made last year should already be shown by default, but change the tick boxes if you have changed your mind and want to leave some groups and join others.

Payment

The cost of your membership depends on which boxes you tick, and the total is shown further down the page in the section headed 'Expiry date. For me that part says Subscription price $134.00

If I wished to pay immediately with my Visa card, I would click on 'Pay by credit card' and it would take me to a page where I could do that, and pay $137.08 with the extra credit card fee. But if, like me, you resent paying bank fees, click instead on 'Print and pay by direct credit', which gives you a one-page, black-and-white 'Subscription renewal 2024' form showing all of the same information. Print that, and then go to your internet banking website to pay without the surcharge.

In the box at the bottom of that form it says for me 'For direct crediting - Account 06 0501 0145507 00 – give your membership ID and name for reference: 46406 Howard Moore'. Using that information, I paid $134 by direct credit, saving $3.08. I ignored the bit where it says 'If you are paying by credit card etc.' The form only says that because it is also designed to be used by the select few who ignore the internet and want a printed invoice to work from.

Proof for tax

Once the system has had a couple of weeks to digest your membership renewal it will generate a tax receipt. You can access this from the home page of the website by clicking the green 'Login' link near the top right hand corner. Once there, complete your details, hit the 'Log in' button, and it will take you to the page which has your contact details on the left, and subscription information on the right. Just above the heading 'Subscription options', the one you found earlier in this process, there is a link that says 'Print receipt'. Click on this. Of course, if you printed the renewal form and paid by internet banking, you can keep the form as your tax receipt.

Dean Satchell has produced an on-line tutorial for the process that you can find on the page you first navigated to, and play the video. It is not TikTok, but is short and effective.

If you have any trouble, send me an email explaining what went wrong. I do not promise to sort it out, but being sweet natured I might make sympathetic noises.

Howard Moore is the NZFFA Treasurer.

To harvest or not to harvest

Kelly Coghlan

It is becoming increasingly more difficult to prepare quarterly forestry articles which indicate any direction or confidence regarding future log markets. In the August *Tree Grower* the expectations were that prices would rise and should remain stable through to the end of the year. Yes, we achieved a strong rise in August on export prices. This was only to be short lived with a sudden drop in the United States sale prices combined with increasing shipping costs, and any benefit from a weaker New Zealand dollar has been totally eroded.

Referring to my November 2022 article, it appears that the some of the suggestions or thoughts outlined are starting to materialise a lot sooner than many would have expected. A year on, the industry may have to accept the reality that China will no longer need the volume of logs New Zealand has been supplying over the last 10 years.

Market update

During the last three months discussions with many exporters and domestic customers indicate that the industry is operating month-to-month. Therefore, any assumptions or projections on the market have no commercial foundation, confidence or faith for future planning or investing, including the Emissions Trading Scheme.

The Chinese property market continues to weaken, and it is becoming increasingly clear that their market is over-supplied and the urbanisation programme is complete. There is some reporting that it could take China 10 years for the property market to recover. Manufacturers are not only experiencing a weak domestic economy but also a reduced global demand for products. Log consumption appears to remain stable, stock levels are down but there appear to be sufficient deliveries to sustain a smaller inventory of logs as customers purchasing strategies are more controlled.

Log prices rose to $120 in August, only to trend back in September and currently there is a range between $115 and $110. This has seen a wide range of prices at the wharf being offered over the last two months, with large variation between ports.

Currently the central North Island windthrow is producing anything up to 300,000 cubic metres a month, all bound for China. This is expected to last until June next year, but there is no exact time on this. In the meantime, it is a large volume for a depressed market. Customers know it is coming, so it is difficult to apply any price pressure in a soft demand market.

Shipping rates are under pressure and currently at US$33 to US$35 are up from US$28 a few months ago. The domestic market for pruned logs remains stable, although framing logs are coming under pressure as many mills continue to struggle to sell framing timber to the New Zealand construction market. This could take some years to recover if we consider the history of depressed property markets.

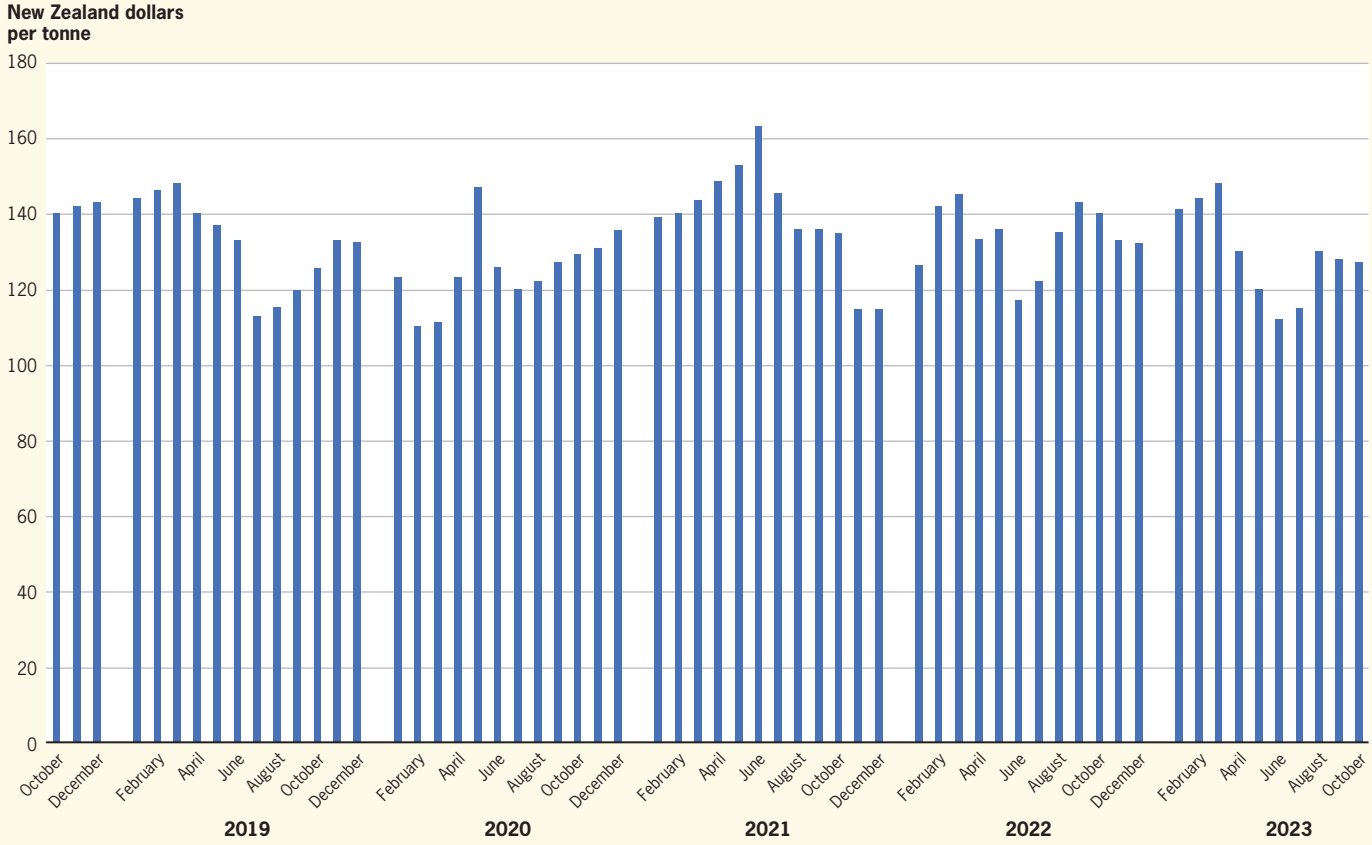
In summary it appears that the markets will remain subdued until after Chinese New Year in January and February 2024. There remains the big but – what is going to change for New Zealand suppliers to achieve a better price? There will need to be a concentrated effort for a reduced cut, which is unlikely to take place considering the number of exporters and the way we trade log. Perhaps price is the only lever to make it uneconomic to harvest.

The first graph on the following page was prepared and formulated from a forestry database of actual prices over given months and highlights the composite trend price of all log grades combined.

Private forest owners

Over the years many private forest owners have asked what the effect of the market is on nett returns.

Five year composite export and domestic log prices



I decided to analyse several forests harvested to assess the effect of current market conditions and operational costs in respect of forest returns over the last five years. As every forest has its own unique aspects with respect to forest roading, distance to markets and mix of markets, along with varying grade yields it is difficult to provide any clarity between one forest and another on actual returns per hectare.

Forest assessment

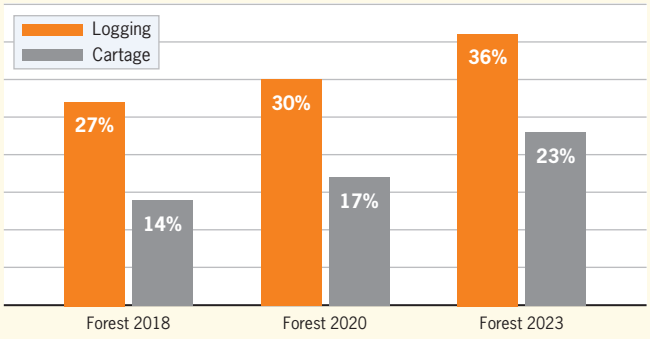
For this exercise, I selected three forests which had very similar grade yields, used a nominal 100 kilometres cartage rate and all forests were hauler logged. The three forests are privately owned, on their first rotation and range in size from 50 hectares to 150 hectares. All forests yields were similar, as shown in the table above right.

The effect of reducing forest returns over the last five years are due to increasing logging and cartage costs. These increases are due mainly to higher fuel, labour and other associated operating costs. In the bottom graph no allowance has been applied for the costs of roading, harvest management or environmental management.

Log grade	Customer	Per cent
P35 pruned	Domestic	18
PE pruned	Export	4
P30 pruned	Export	2
S grade	Domestic	10
A grade	Export	39
K grade	Export	17
KI grade	Export	6
KIS grade	Export	4
Total		**100**

Increasing trend of harvest costs

Proportion of sales value



Composite sales and costs

The graph on the right highlights the effect on the mean composite sale price achieved over the three forests, the actual costs paid in the harvest year stated, showing that increased costs are eroding forest returns. The most interesting point is that the composite sale price achieved has been reasonable stable. Over the harvest period there were monthly ups and downs, but the overall harvest sale price has remained reasonable consistent. It means that owners need to consider the average sale price over a harvest rather than choosing a spot price to decide when to harvest.

So, what does this mean when it comes to what you will get when you harvest your forest? Costs have increased approximately $19 a tonne over the last five years or $10,000 to $12,000 a hectare.

Log price averages over five years

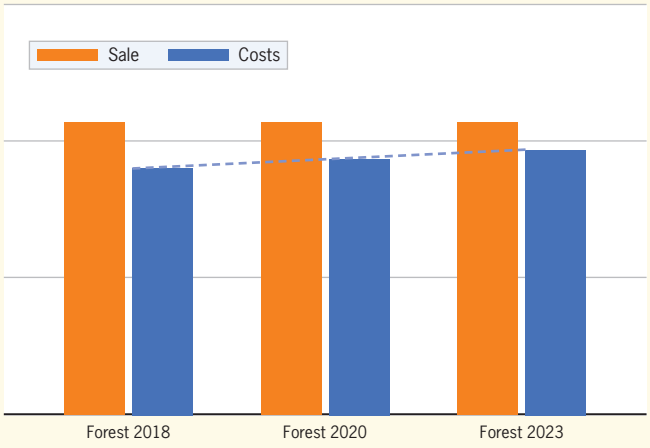
The last table is a summary which shows the log market over the last five years has remained flat. Therefore, considering the current global pressures what can we expect regarding pricing in the future? There is nothing which signals improved sale values. Notably, the domestic market continues to be the best although unfortunately there are limited domestic options for all grades especially in different regions.

To harvest or not

The data tells the story that over the last five years the market has been flat and trending down, with input costs up and unlikely to fall considering inflation pressure, fuel and labour costs. With the current and future reliance New Zealand will have on export log markets, which is where up to 80 per cent of logs are sold, the perceived expectation for many private forest owners of forest returns are often unfounded. Unfortunately, many private growers do not obtain a valuation and therefore do not know what the value of their forest investment is.

To harvest or not harvest is usually the question being asked. Most owners of small forests have their trees effectively as a passive investment meaning there is no pressure to harvest the trees which will continue to grow and put on more weight. However, at some point after 25 to 30 years most owners would like to realise some return on the investment and cash up. Many growers are waiting for the market to improve, but as outlined above, a flat market and increasing costs are only eroding future investment value. All forest owners are optimistic about the industry and were optimistic when the trees were planted 25 or 30 years ago. But the markets have not matured as hoped and today a new realism needs to be considered from a very different commercial viewpoint.

Composite sales and costs over the last five years



Log price averages up to 2023			
Grade	Five year average	Three year average	One year average
A grade	$125	$126	$120
K grade	$118	$118	$111
KI grade	$108	$108	$101
KIS	$100	$101	$93
Domestic	$120	$120	$120
Domestic pruned	$185	$188	$190
Export pruned	$173	$178	$180
Composite	$132.7	$134.3	$130.9

Kelly Coghlan is a director of TAML forestry.

Eastern blue gums

Elizabeth Miller and Matt Buys

In New Zealand, two eastern blue gum species are particularly well-known – *Eucalyptus botryoides*, also known in Australia as southern mahogany, and *E. saligna*, commonly called Sydney blue gum. These species thrive in the warmer regions of the upper North Island and were extensively planted there for shelter purposes during the 1970s. There is limited planting in warm situations further south.

This group of eucalypts collectively occurs naturally in eastern areas of Australia from Victoria to southern Queensland. *Eucalyptus botryoides* grows from along a coastal strip in mid-New South Wales south into Victoria, and *E. saligna* from coastal areas and nearby ranges of New South Wales north into southern Queensland.

The eastern blue gum trees in New Zealand produce timber which is highly valued for its hardness, strength and durability. The wood usually has a range of pink to reddish tones, adding to its aesthetic appeal. This attractive timber has found applications in various industries, including furniture-making, panelling, veneers, flooring and engineering. The timber is considered to be easy to dry but can be difficult to saw.

The group has Class 2 durability, with the expectation of 15 to 25 years in the ground. The sapwood is not durable in contact with the ground and should not be used in exterior situations. The dense blue gum hardwood is marketed in New Zealand for firewood, with a reputation for burning hot and slowly.

Since the increase in planting of these species, insect pests which also find the trees attractive have arrived across the Tasman Sea, and have caused significant damage, partially or almost completely defoliating trees so that their growth is stunted and some trees die. The main culprits are the blue-gum chalcid, the blue-gum psyllid, the leaf gall and the brown lace lerp. It is hoped that some suitable biological control agents will be found.

Although the eastern blue gums are no longer recommended in areas where these insects thrive, there

Stand of *E. botryoides*, Glenbervie Forest

Trees in stand of *E. saligna* at Rotoehu Forest

are still trees about which have survived. *Eucalyptus saligna* was the most commonly planted, particularly in Northland. In areas with fertile soils, these trees can reach impressive heights, forming towering canopies with straight trunks that are a striking pale blue-grey or green-grey above a rough-barked stocking. However, they are less successful in exposed sites or in salty air.

Eucalyptus botryoides is tolerant of salt winds and wet but not swampy sites, often successful near the coast. It more often forms a heavily branched tree and has thick red-brown furrowed bark that is slightly spongy beneath, over the whole trunk and often the branches.

Less common

There are two other less common eastern blue gums that have occasionally been planted in New Zealand. *Eucalyptus grandis,* known as flooded gum or rose gum, indigenous to the high rainfall coastal areas in northern New South Wales and southern Queensland, is very similar to *E. saligna* and is reported to have sometimes been confused with that species in Northland. It also has a smooth grey trunk above a rough-barked basal stocking.

The other less common species is *E. robusta* or swamp mahogany, occurring naturally in a narrow coastal strip from New South Wales northward into Queensland. It shares with *E. botryoides* thick, rough, soft, spongy, persistent bark over the whole trunk. It favours swampy conditions, but in New Zealand it has tended to produce smaller trees of poorer form than the other eastern blue gums.

All four species are somewhat variable in form and growth, with some provenances producing much better trees, so provenance selection is important if planning to plant any of them. Equally, siting is also vital, because of species requirements and tolerances.

***E. grandis*, showing rough bark on the lower trunk and smooth white bark above on trunk and branches**

Leaves of an ash eucalypt, *E. regnans*, with steeply angled leaf veins

Feather-veined leaves of *E. botryoides*

A fifth related species, *E. deanei*, with roundish, glossy green leaves on coppice growth, saplings and lower branches, is rare in New Zealand. It originates from two small areas in New South Wales and southern Queensland.

Characters in common

The eastern blue gums form a natural evolutionary group, united by possessing adult leaves with side-veins at a wide angle to the midrib – feather-veined or penni-veined – and that are darker green above and paler below. The have two bud caps or opercula and bilobed seed leaves or cotyledons. The fruit or capsules are generally squat and chunky, and each cluster is borne on a flattened stalk. Individual flowers and fruit are mostly short-stalked or stalkless but *E. deanei* does not fit this pattern.

Of the five species discussed here, *E. saligna, E. grandis* and *E. deanei* form a group characterised in part by the presence of smooth, pale bark with a short remnant of rough bark at the base. The remaining *E. botryoides* and *E. robusta* form another group characterised by bark that is rough over most parts of trunk but spongy, not disintegrating to fibres as in true stringybarks.

Distinctive features

Smooth-barked group

Eucalyptus saligna Usually with rough, thick, short-fibred bark in a short stocking or up to four metres from the base, progressing upwards to thinner bark which sheds in long flakes or strips, then smooth, grey-green or bluish green over most of the trunk. The flower bud cap is conical or narrowly pointed and flowers occur in summer. The seed capsules are similar to those of *E. botryoides* but smaller, broadly funnel-shaped with a thin rim, with valves that are thin with pointed tips, erect or slightly out-curved, usually protruding from the top of the capsule.

***E. saligna* bark, with peeling remnant flakes of previous bark layers**

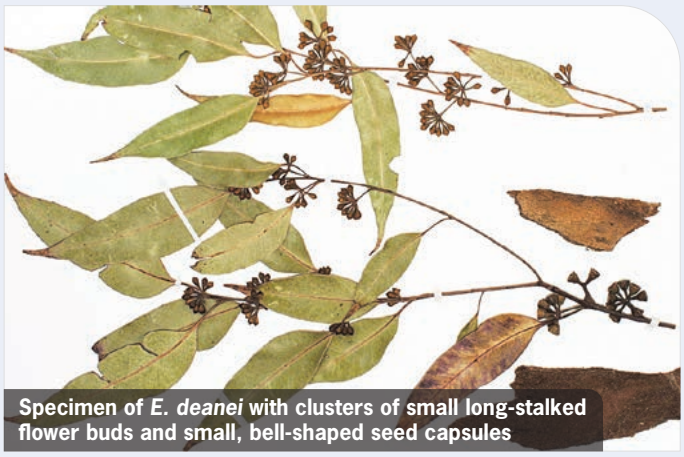
Sample showing clusters of flower buds and seed capsules with narrow protruding valves

Flower buds of *E. saligna* with pointed conical cap

Eucalyptus grandis Usually has bark that is rough at the base, then thin, fibrous or flaking on the lower stem, progressing to smooth white or grey-white on most of the stem. Newly exposed bark may be bright pink. Flower buds are usually shorter and wider than those of *E. saligna*, with a shallow, conical cap. Flowers occur in winter. Seed capsules, which are often waxy grey-white or glaucous, are pear-shaped or cylindrical, often contracted inwards towards the top, and the valves are incurved.

Eucalyptus deanei Closely related to *E. saligna* and *E. grandis*, has occasionally been included in park plantings and very occasionally in forest trials. The bark is smooth, creamy yellow weathering to greyish, sometimes with a short stocking of rough bark. Coppice growth, saplings and lower branches possess roundish, glossy green leaves as opposed to egg-shaped to lance-shaped leaves in *E. saligna* and *E. grandis*. Flower buds are stalked, small, rounded to pear-shaped. The cluster stalk is slender, not flattened. This species flowers in autumn. Capsules are small, to 0.6 cm long, cup-shaped to bell-shaped, valves to rim level or slightly protruding.

Seed capsules of *E. grandis* showing inward-curving valves



Specimen of *E. deanei* with clusters of small long-stalked flower buds and small, bell-shaped seed capsules

Flower buds of *E. grandis* have a short, pointed cap and seed capsules often narrow at the top

Specimen of *E. botryoides* with clusters of flower buds and very short-stalked, chunky seed capsules

Rough-barked group

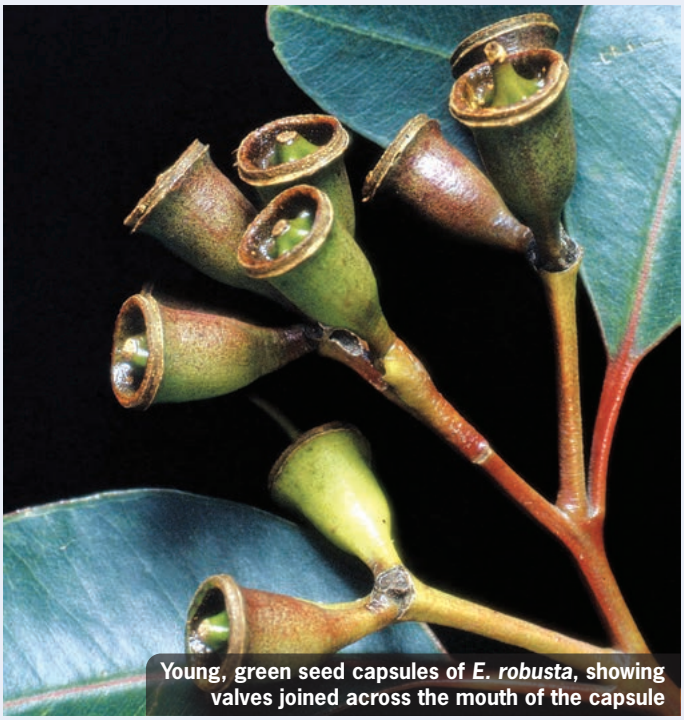
Eucalyptus botryoides Usually has rough bark which is persistent on trunk and larger branches. The bark is thick, in coarse elongated slabs with shallow longitudinal furrows, but spongy, not long-fibred. Upper branches are smooth, white or greyish-white. Stubby flower buds have a conical to rounded cap that is shorter than the base of the bud. Flowers usually occur from mid-summer to autumn. Chunky seed capsules are cup-shaped or barrel-shaped, larger than those of *E. saligna*. Capsule valves only reach to about rim level.

Eucalyptus robusta has persistent thick, rough bark to the small branches, in coarse, soft, spongy, elongated slabs, grey or grey-brown. Flower clusters are 9 to 15 flowered – other eastern blue gums have 7 to 11 flowers per cluster – with particularly long, flattened stalks, to three centimetres. Flower buds are long-stalked and larger than others of the group. The bud cap is long and pointed; flowers appear in winter and spring. The long-stalked fruit are cylindrical. The 3 to 4 valves are usually joined across the mouth of the capsule, reaching rim level or slightly protruding.


A widely branched *E. botryoides* tree with grey-brown, furrowed bark


Flower buds, flowers and immature seed capsules on long, flattened stalks of *E. robusta*


Specimen of *E. robusta* with long, pointed flower bud caps and long-stalked seed capsules


Young, green seed capsules of *E. robusta*, showing valves joined across the mouth of the capsule

Look-a-likes

Eucalypts which might possibly, from a distance, be confused with *E. saligna* or *E. grandis*, because of their smooth-barked trunks.

Eucalyptus pauciflora snow gum or cabbage gum. It has been planted occasionally as an ornamental tree in parks and gardens, and included in North Island high country forestry trials. This is an ash eucalypt with smooth, creamy white to greyish-white bark throughout. Leaf veins are parallel with the mid-rib, not feather-veined. Young branchlets are often grey-white or glaucous, the leaf bases are uneven and leaves are the same colour both sides which are ash eucalypt characters. The flower buds are often warty and may be glaucous; fruit are cup-shaped, to 1.2 cm long, larger than in *E. saligna*.

Goblet- or cup-shaped seed capsules of ***E. pauciflora***

E. pauciflora leaf veins are parallel with the midrib

Corymbia citriodora lemon-scented gum. It is occasional in parks and tree collections. This species forms tall, straight trees with completely smooth bark which can be white, coppery or pink, shedding in large, curling flakes, the trunk is sometimes spotted with patches of blue-grey older bark. Leaves are not feather-veined and are lemon-scented. Juvenile leaves are hairy. Flowers and fruit are in clusters of three, fruit are urn-shaped, narrowed towards the top with the rim sometimes flaring outwards, and are larger than *E saligna* or *E grandis*.

Eucalyptus botryoides and *E. robusta* can be distinguished from other rough-barked species by the spongy texture of their bark, which can usually be broken off and the inner side examined. True stringybarks, featured in the November 2022 issue of *Tree Grower*, have long-fibred bark that can be pulled off in strings, and when rubbed between the palms, it breaks down into a mixture of fibres and powder. Blue gum bark will crumble to powder.

This, in combination with general eastern blue gum features of feather-veined leaves, distinctive chunky seed capsules and wide, flattened stalks of flower and fruit clusters, is diagnostic.

Leaves of ***C. citriodora*** are long, tapered and lemon-scented. Small flower buds and urn-shaped seed capsules are in groups of three, some fall off with age as on this specimen.

Bark of ***Eucalyptus botryoides*** is thick and spongy, crumbling to dust without the long fibres in bark of true stringybarks

Airships – an alternative transport for forest harvesting?

Lorna Zach

We have all heard of airships, lighter-than-air craft which can navigate under their own power and these days may be operated by remote control. In calm conditions they can take-off and land vertically. There is renewed international interest in airship design, which has led to many safety improvements and to carbon-neutral operation.

Modern airships can transport loads of up to 100 tonnes. The technology has low environmental impact and they can fly to places inaccessible to road vehicles, which makes them useful for disaster response and recovery. They could also be used to haul logs and substantially improve the poor returns of many of New Zealand's small-scale forests, and make continuous cover forestry profitable on erosion prone land.

New designs of airships are being built, and it might be timely to evaluate what design specifications would best suit New Zealand conditions. They need to take safety into account while providing a balance between load capacity and suitability for rough weather and difficult terrain. Once the specifications are known it would be possible to estimate the capital and operational costs of such an airship to see if it would be cost effective for removing logs. This article aims to spur interest in investigating the feasibility of this idea.

Overall construction

Airships may or may not have an internal structure. A non-rigid airship, or blimp, is simply a large balloon which is relatively cheap to make and easily deflated and stored. A dirigible has a metal framework covered by a fabric or aluminium outer skin. Semi-rigid airships use both an inflatable envelope, and a modest frame to hold the envelope and internal machinery.

Hydrogen is the cheapest lifting gas, but its use for this purpose is now banned in many countries. The alternative is helium, which is rare, quite expensive with world supplies running out. In either case, to land the airship the gas is compressed into cylinders, and to lift it again it is released with none of the gas lost.

Airships were popular before the development of reliable passenger aircraft, but lost their attraction in the late 1930s after one or two spectacular disasters. Their use has since been limited, but they have advantages. They can load and unload while hovering, carry heavy or awkward loads, get to places that would be inaccessible to other transport and cross difficult terrain faster than trucks.

Still mainly prototypes

Being 'lighter' than air, airships are susceptible to strong winds but they are fuel efficient. They use power only for thrust or for descending. Some are fitted with rotating thrusters which can point in any direction. Of course, airship costs increase geometrically as they get bigger and require more gas, hangar space and fuel. A new airship would also need Civilian Aviation Authority approval.

There is a significant international drive towards the development of a robust, cargo-carrying, and environmentally-friendly airship to relieve handling systems and offer fresh alternatives to conventional air freight. As yet, few are being built other than as prototypes, which are still rather expensive. Some of these include –

- Flying Whales, a French company pioneering the use of airships for taking logs from land-locked areas of Gabon and Congo.
- BASI Research or Buoyant Aircraft Systems International is developing airships for use in the Canadian far north, where economics discourage road transport.
- Aeros Corp in California builds airships and has developed one which can load and unload while hovering, powered by electricity from hydrogen fuel cells
- Lockheed Martin developed a large airship for the US military, but has now allowed the technology to be used by a private partner company, AT2 Aerospace in California.
- Hybrid Air Vehicles is starting production in the UK with the Airlander, which lifts 10 tonnes. It has a semi-rigid design and conventional engines but plans to go all electric.

This is a new and interesting transport option that could provide substantial benefits to New Zealand and to our owners of small forests. It would be useful to understand how our conditions differ from those overseas.

Lorna Zach is enthusiastic about using airships.

A guide to Japanese cedar

NZFFA

This is another of the species guides prepared to help new growers understand which ones would probably do well on which sites. A fuller version of this guide for cedar is on the NZFFA website under species selection.

Japanese cedar or cryptomeria is a large, temperate conifer native to east Asia. It does not like dry conditions, requiring good rainfall, but tolerates frost and wind and does best in well drained, deep soils at altitudes of up to 600 metres. With an elegant conical form, it is commonly planted as an ornamental, or for shelter. Many small blocks have been successfully planted by farm foresters. If allowed, it will grow for over 300 years reaching 70 metres high and four metres in diameter.

Site preparation and planting

Prepare grass sites by spot spraying a one metre circle for each planting site. Use glyphosate herbicide with spray dye a few days before planting as this will not leave chemical residue in the soil. Prepare spots using straight lines and accurate spacings between spots so that trees can be easily found later. Cut down woody weeds and flatten these on the ground so they decay and do not support weed growth.

Container-grown and bare root stock are both available from some commercial nurseries. Japanese cedar prefers reasonable soil depth and evenly distributed rainfall. It will grow well in most soils, but does not tolerate poor soil drainage. Young trees are shade tolerant, but are slow starters so need reasonable weed control during establishment.

As usual, take great care in the handling, transport and storage of seedlings, especially bare-rooted stock which must be kept cool and moist and planted as soon as possible. Containerised stock should also be planted promptly, making sure the root plugs are moist by first soaking in a water trough.

Plant trees with a slow release fertiliser tablet underneath or put a trowel of high nitrogen fertiliser in a spade slit above the seedling. For containerised stock, dig a hole twice the size of the plant container, leaving some soft soil at the bottom. Tease out, straighten and trim, any pot-bound roots before firming the soil around them, ensuring there are no air cavities.

Establishment and maintenance

When growing Japanese cedar for timber, plant at a relatively high stocking to ensure a high selection ratio of vigorous final crop trees and to encourage narrow form and fine branching. A suggested initial stocking density is 1,670 stems a hectare or a spacing of two metres by three metres. However, lower stocking of down to 833 stems a hectare or four metres by three metres are acceptable. This species grows in a narrow conical form and so branching is not too heavy at low stocking.

Remember to prevent weeds from competing with the seedlings for at least two years after planting and protect them from browsing by stock and wild animals. Japanese cedar is shade tolerant but establishes much faster with good weed control. Release spray weeds around the seedling after planting once the weeds begin to regrow and for the first two years for good growth rates.

Japanese cedar is palatable to deer and stock and all stock should be permanently fenced out because the tree has a thin bark which is easily damaged. Young seedlings are also palatable to hares, rabbits and possums which should be controlled. In New Zealand, Japanese cedar is generally healthy and rarely harmed by insects, disease or frost, although severe drought can kill the trees. If planted in ground that can become waterlogged it will be susceptible to root-rot.

Management and silviculture

Japanese cedar is a relatively fast-growing tall and narrow conifer. It is common in forestry plantations in Japan and China, but here it is mostly used for shelter. It has a strong root system which resists windthrow and it filters the wind rather than creating a solid barrier creating turbulence on the windward side.

Grown for timber, Japanese cedar is very productive over long rotations, lending itself well to steep land regimes for controlling erosion especially because it is tolerant of extremely strong winds prevalent on steep sites. It does not cause wilding spread and being shade

tolerant will regenerate in light wells, making it very suitable for continuous cover forestry where individual trees are harvested on reaching a particular size rather than a particular age.

When grown for timber, the target is to achieve large pruned logs and upper unpruned logs with green or moribund branches smaller than 50 mm in diameter. Because of its narrow conical form and shade tolerance, this species is one of the easiest to grow for timber production, and at a final stocking of 400 stems a hectare will produce logs with good diameter.

Pruning

Japanese cedar has few malformations or double leaders and will grow tall and lightly branched, but to develop quality clear wood with no knots, it does require pruning. The aim of clear wood pruning is to minimise the defect core and produce wood free of knots. Pruning must be regular and undertaken at a frequency which minimises branch size.

Ideally, only final crop trees are clear-pruned. The smaller more horizontal branches on lower stems of Japanese cedar established within a highly-stocked stand will generally self-prune when they are shaded out. Larger, upward pointing branches should be removed as soon as possible as they will reduce height growth and increase defect core diameter.

Prune the stem in three to four lifts, depending on the site productivity, to a stem diameter of 12 cm, and to at least six metres in height. This pruning should be carried out annually from approximately age five, or when two to three metres tall, then every year or two after that.

Thinning and harvesting

The target product is the naturally durable heartwood, therefore thinning should aim for a final crop of evenly spaced trees of around 400 stems a hectare and a 35 to 40-year rotation. Thinning should begin when the crowns touch and before branches die from shade.

Growth rates vary around the country. They can be as much as one metre a year in height and two centimetres a year in diameter, but in general allow a year for each centimetre of diameter growth. To get to an acceptable 40 cm diameter log, plan on a rotation of 40 years.

Grown for erosion control on steep faces as a permanent forest, Japanese cedar could be harvested as soon as it reaches 45 cm diameter at breast height. This could be between 30 and 50 years depending on site conditions.

Timber

Japanese cedar timber is pleasantly scented, reddish-pink in colour, lightweight and resistant to decay. It is easy to saw and season, with good woodworking properties, and is favoured for its appearance. It is used in joinery, boxes, panelling, veneers, plywood and furniture.

The heartwood is suitable for exterior cladding but is not accepted as a structural timber. A handful of mills around the country have developed a small market for cedar timber, especially for weatherboards and exterior cladding.

Growth, yield, economics and carbon

While Japanese cedar is one of the largest volume producers of any plantation softwood, data from older blocks planted for timber is variable because the stands have been affected by site conditions, high stocking and neglect. The best growth has been in the central and northern parts of the North Island where it can grow at a metre a year in height. One plantation near Gisborne stocked at 940 stems a hectare had an average height of 18 metres and diameter of 38 cm after 19 years.

If the land is registered in the Emissions Trading Scheme and the trees are planted to comply – in a minimum of one hectare with tree crown cover of more than 30 per cent in each hectare – then they should earn carbon credits. As Japanese cedar is an exotic softwood, tables suggest that over its first 30 years it stores carbon roughly half as fast as radiata pine.

There are no economic analyses of Japanese cedar grown for timber in New Zealand. However, based on productivity and export log prices, it would probably be similar to Douglas-fir.

Methane, cows and citizenship

Howard Moore

When you think about it, there is a really simple solution to New Zealand's methane problem – shoot lots of cows. Naturally this idea upsets farmers, especially dairy farmers, so no-one talks much about it. Furthermore, sheep and beef farmers realise that if people get hooked on shooting cows, they might go on to shoot other animals, so they would also be worried.

The usual argument against shooting lots of cows is that without them we would go broke. We need our dairy exports. In round terms, selling milk powder, butter and the like overseas earns us around $20 billion a year, which helps support the lifestyle to which we have become accustomed. As Labour and National made obvious in their election policies, no-one touches the lifestyle, it is sacrosanct. We have to take that as a constraint.

Cows are safe

If we want to cut dairy herds and protect our lifestyle we have to find a way to replace $20 billion in exports, which is quite tricky. The last time we were really good at exporting was in the 1950s, which was a long time ago. Times have changed, and although successive governments have tried to build up our export industries, the results have been mixed. To build export markets we need to find demand, develop cost-efficient processes, promote what we have to the customers, and continue to refine and adjust the offering to suit their evolving needs.

Most of this is outside any government's control and it is even harder when the government just plays around the edges because it believes 'the market' will do it. Right now, the market says we cannot earn another $20 billion a year. The present incentives of Industry Transformation Plans, tax breaks and turning a blind eye to environmental damage are not sufficient to overcome trade barriers, technological challenges and skills shortage while offering a good return on investment. Money rules, the cows are safe.

Anyway, producing more 'things' which have to be made, packaged, shipped, used and ultimately discarded is not altogether smart. That sort of activity got us into this problem in the first place.

Climate change risk

The other popular argument against shooting lots of cows is that we should not fight climate change by putting food production at risk. This came out of the *Paris Agreement on Climate Change – Threats to Food Security* document of October 2019. In this, one of the aims was to 'Increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production.'

Naturally farmers have seized this as clear evidence that they are a protected species and there is no way in the world anyone could start shooting cows. Cows are food, QED.

There are lesser arguments against slashing our dairy numbers. For example, people like seeing cows, especially clean ones with big eyes and no horns. We would put Fonterra's investment in dairy factories at risk and we would have to find jobs for a lot of unemployed dairy farmers. None of these arguments is particularly compelling and for now we might safely ignore them. But if there was a way to cull the cows, feed the world and produce the money, would we not at least consider it? Well, here is a suggestion.

Investor visa

First, understand that the latest statistics from July this year show inward migration of 208,000 people a year and outward migration of 112,000 leaving a nett migration of 96,000 people. Indeed, migrant arrivals

have run steadily at over 100,000 a year for the last 20 years. Happily, we absorb these numbers each year without a lot of trauma.

Second, you might know that Immigration New Zealand offers a dozen forms of visa to people wanting to settle here permanently. They range from skill visas to refugee visas, and include one really interesting category – the Active Investor Plus visa. This is open to rich people, and you can qualify if you invest $15 million or more for four years in listed equities, direct investments, a charity or managed funds in New Zealand. A dollar invested in direct investments counts as three dollars, and one in managed funds counts as two, so the minimum needed is only $5 million if you pick the right investments. Buying property does not count as part of the $15 million, it is too easy, but after four years you can do what you like with the money. The cost of this visa is $7,900, which looks a bit of a bargain if you really want to live here.

Third, and this is not really news, there are lots of rich people around the world who are starting to get a little worried about climate change, political instability and general threats to the lifestyles to which they have become accustomed. Some have already bought land here, think James Cameron and Shania Twain, although her ex-husband now owns most of it. They would be naturals for the Active Investor Plus visa.

Replace dairy

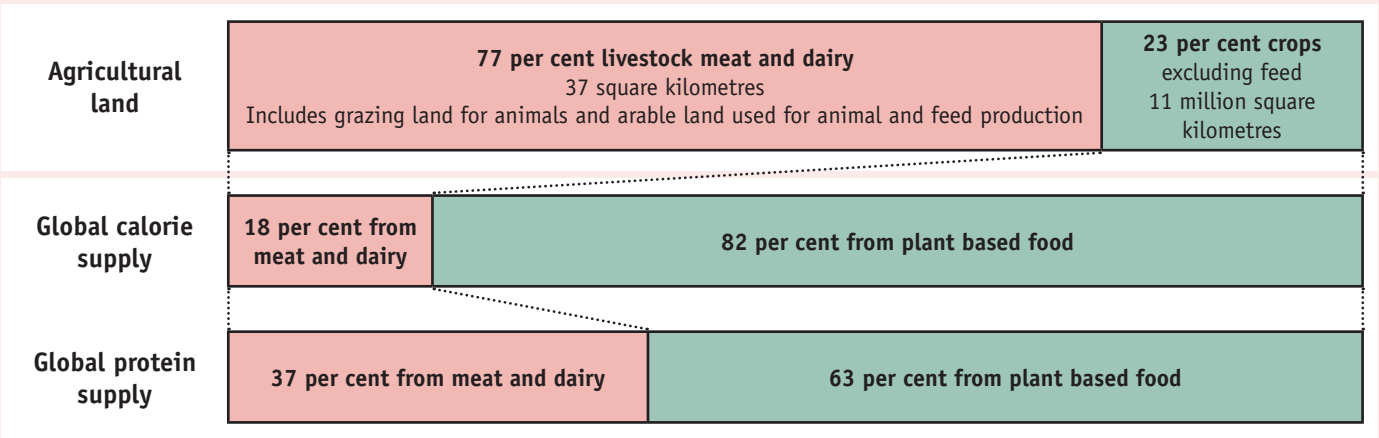
However, while foreign nationals investing in New Zealand is useful, it does not immediately help our balance of payments. What if, instead of asking them to invest a minimum of $5 million, we sold them a visa for a minimum of $5 million. Then the money would go directly to the government as overseas income. If we promoted the scheme to attract say 10,000 migrants a year, we would earn $5 million times 10,000 or $50 billion a year. This would fully replace our earnings from dairy exports and hardly affect our migration numbers. Because dairy is earning only $20 billion a year, we would have $30 billion a year left over for infrastructure investment, climate adaptation and a universal basic income. What is not to like?

In addition, we could include in the conditions of the visa that applicants had to be, for example, over 65 so that they would not have any more children and that the visa applied only to the individual and did not include any other family members. As a sweetener we could offer immediate citizenship, full New Zealand Superannuation and health care. After the migrants arrived of course they would grow old and die, and with a minimum entry age of 65 I expect most of them would drop off within around 25 years. Given a steady influx of 10,000 a year that would cap the total number in the country at around 250,000, which would not be too obtrusive.

More arable

Of course, the people who bought the visas would not necessarily have to come here. Some might use their citizenship as a fall-back position and choose to live in their own countries until things got too hot and they felt the need to move. Which will happen. This looks like it could solve the earnings problem, which leaves us with food production.

Many of our dairy farms are on the best land in the country, so their conversion to arable farms is a possibility. Many of them were created from arable farms. Crops are harder to farm because they are more affected by the weather than cows and around the world arable makes up less than a quarter of all agricultural



land. But it produces over 80 per cent of the calories and over 60 per cent of the protein that people eat. The chart below is based on one produced by the UN Food and Agriculture Organisation.
If we took New Zealand's dairy farms and converted them to cropping, we could produce more food than we do today. Problem solved.

To summarise, we can cut our methane emissions and meet our climate change targets by shooting a few million cows. If we chose, at the same time we could make more money and grow more food than we do now. We would still need some dairy farms, but a lot fewer.

We would have to shut down some dairy factories and meat works and retrain some dairy farmers. But at the same time, we could invest in less energy-intensive processing for grain, fruit and vegetables. Perhaps we could even clean up our waterways.

After all, they say desperate diseases need desperate remedies.

Howard Moore has a variety of views.

Letter to the Editor

The Editor
I really appreciate the missives by Howard Moore in the *Tree Grower*, always informative as well as entertaining. Not being a farmer, I was confused by his recent statement about the longevity of methane in the environment and the statement about the increase in the national dairy herd, with no mention of the concurrent decrease in beef-cattle and sheep numbers. What matters with greenhouse gases is how much is in the atmosphere and is it increasing. When the concentration is low, and the increase is slight, the longevity of particular emissions is a red herring.

At sea level, with an air pressure of 1,013.25 hPa and a temperature of 15°C – standard atmospheric conditions – one cubic metre of air weighs 1,225 grams, of which 514 mg are CO_2, and 2.1 mg are methane. If the relative humidity is 50 per cent, this air also contains 6,400 mg of water vapour. For reasons which are a mystery to me, climate scientists reckon methane is 25 times more powerful as a greenhouse gas than CO_2, so the methane is equivalent to just over 50 mg of CO_2. Thus, in the standard cubic metre of air, there is over 10 times more water vapour than CO_2, which itself is over 10 times more common than methane. This would seem to indicate that methane is rather small beer.

Before the twentieth century, for hundreds of thousands of years the concentration of methane in the atmosphere was less than 1 ppm. Then it crept up to over 1 ppm by 1950 and shot up to 1.6 ppm in the 1990s, before levelling off to its current level of 1.7 ppm. Where did this increase come from?

Methane comes from the decomposition of organic under anaerobic conditions, and in earlier times it was thought that about half came from the enteric fermentation of roughage in the intestines of herbivores and the rest came from a great variety of mostly dead organic matter.

A 2020 inventory of methane emissions in the United States estimated that approximately one third came from natural gas and petroleum systems, one third came from enteric fermentation by herbivores including ourselves, and one third from miscellaneous sources such as coal mining, landfills, soils etc. If this is indicative of the global situation, it means that most of the increase to 1.7 ppm probably came from natural gas and petroleum systems. This does not conflict with the conservationist's contention, that before humanity went on the rampage, the Earth was host to vast populations of wild herbivores, many of which are now extinct.

There is no doubt that global warming is with us now, and even though most climate scientists probably think they know the cause, physicists who study the greenhouse effect of atmospheric gases, are not so certain. It would be a great pity if farmers are taxed for methane emissions and it eventually turns out that this was a wasted effort because other gases are the real culprits.

Dudley Franklin
Rangiora

NZFFA submissions on government consultation

Julian Bateson

Over the past few years various government departments have put forward proposals which directly or indirectly affect forestry. Part of this process involves requests for submissions about these proposals from anyone and everyone interested in all, or part, of the suggested changes being considered. I have lost count of the number requiring a response from the NZFFA, but over the past few years it has probably reached double figures. For example, in 2022 there were at least three about the Emissions Trading Scheme and two more this year. Two questions could be raised –

- Is it worth all the effort for NZFFA volunteers?
- Should we combine our submissions with others to save time and effort?

Time and effort

The time and effort involved in providing a submission on behalf of the NZFFA can be substantial and all the work comes from volunteers. This is not a complaint, just a clarification. For the submissions I have been involved in preparing, each has taken many days of reading, research, writing and consultation with the Executive before final approval is given. I am sure others have spent as long or longer on their submissions.

The results are varied and not easy to evaluate, even if our suggestions seem to be ignored or accepted. However, we provide a voice on behalf of owners of small forests and their concerns – no-one else does that. We are also raising the profile of the owners who provide just under half of the currently harvested forests.

We could share the work

A less onerous option would be to work with others, such as the Forest Owners Association, and produce a combined submission, which has happened once or twice. The benefits are that the Forest Owners Association have paid professional staff to do the work. The advantage would be a time saving for the NZFFA. The disadvantage is that different organisations have different priorities and a joint submission will have inevitable compromises which is not necessarily a good thing.

One recent example of where the priorities could differ, requiring a compromise, is the recent decision that there will now be a standard annual charge of just over $30 a hectare for land in the Emissions Trading Scheme. For a corporate owner with 1,000 hectares in the scheme it means it would cost them just under a million dollars for the 30-year life of a forest. This is a lot to take from profits before they are earned at harvest time.

On the other hand, for a small-scale owner with perhaps just a few hectares in the Emissions Trading Scheme, the cost would be a lot less and not such a big bite out of cashflow. Therefore, a joint submission would give very different weight to this particular concern, even though it affects owners of both large and small forests.

In another example, the recent changes to the National Environmental Standards for Commercial Forests will have significant effects on small-scale owners. Planting a new small woodlot will now require much more consultation with the local authority, making it almost impossible to start the planting process without having to employ professionals to help work through the new rules. For the corporate owners, the new rules are the same as for owners of smaller forests. However, these owners already employ, or have regular access to, professionals to guide them through the current rules. It is inconvenient for them, and will be a cost, but not likely to be a serious financial constraint.

The two entities the Forest Owners Association and the New Zealand Farm Forestry Association represent two quite different groups – the large corporates or the smaller woodlot owners. Some of the problems will overlap, but many will apply quite differently. Therefore, are compromise submissions a good idea?

Help needed

Finally, a request for more help with regard to submissions put together by the NZFFA for owners of small forests. The work over the past couple of years has been carried out by around half-a-dozen individuals. There have been no complaints, as far as I am aware, but it would be helpful if other members were able to contribute.

As explained above, it does require time and effort. However, if anyone wants to volunteer for one of the next submissions, whatever it is, I am sure our President, Neil Cullen, would be pleased to hear from you.

Forest Growers Levy Trust Board elections

supported by forestgrowers commodity levy

Three members of the Forest Growers Levy Trust Board are retiring by rotation this year and nominations for their re-election or replacement have been invited. Two of these represent owners of forests of over 1,000 hectares and one represents forests under 1,000 hectares. Currently Graham West and Bert Hughes represent these small-scale forest owners.

Bert Hughes, elected in 2021, is standing down but he is willing to stand again. The NZFFA executive supports his re-election and nominated him. Bert is CEO and Forestry Director at Forest Enterprises Growth Limited. He is a member of the NZFFA, with a multi-generational family-owned forest with pine and alternative species planted in Marlborough. His company manages over 65 forests on behalf of over 6,500 small-scale forest owners.

If you are eligible to vote, go to the website fglt.org.nz where you will be able to participate.

Branch and action group contacts

All the branches and action 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 action groups. Contact names are listed below for branches and action groups.

Northland
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Taupo & Districts
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Southern High Country
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Email: jill.clif@xtra.co.nz

Action groups

AMIGO
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Cypress Development Group
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Email: milliganseeds@xtra.co.nz

Eucalypt Action Group
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Farm Forestry Timber
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Oaks New Zealand
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Poplar Action Group
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Sequoia Action Group
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Are you a member of the NZFFA?

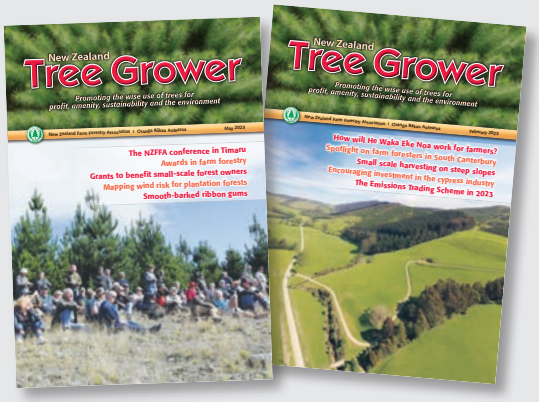
The New Zealand Farm Forestry Association has been around for over 50 years and has around 1,500 members. There are 32 active branches and special interest groups.

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.

You are welcome to join even if you have no trees.

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.

Action 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. 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, QE II Trust covenanted areas, logging sites or other places of interest. It is also an opportunity to attend the AGM, meet up with up to 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 have no trees or have up to 10 hectares of trees the membership cost is only $134. For 10 to 40 hectares the cost is $192 a year. For over 40 hectares of trees the cost is $270 a year.

I would like to join the NZFFA ❑ $134 a year ❑ $192 a year ❑ $270 a year

Please debit my credit card: ❑ Visa ❑ Mastercard

Number: ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ Expiry date: ☐☐ / ☐☐

Name on card: _____ Signature: _____

Address: _____

Email: _____ Phone: _____ Postcode: _____