Tāne's Tree Trust
Native trees for the Future
Newsletter
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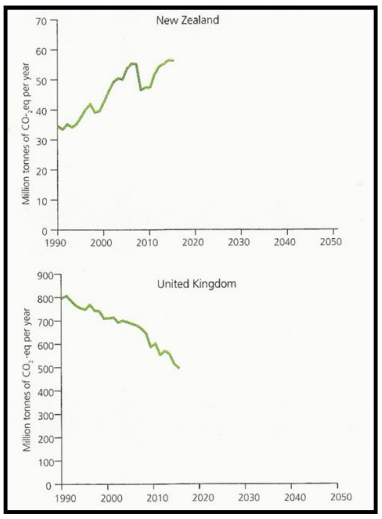
THE ROLE OF NATIVE TREE SPECIES IN REDUCING CARBON EMISSIONS

WARWICK SILVESTER & DAVID BERGIN

International agreements

New Zealand has signed up to three international climate change outcomes, viz. Kyoto, Copenhagen and Paris, and one longer term target - the National government's 50 by 50 target, or a 50% reduction in New Zealand greenhouse gases emissions from 1990 levels by 2050. The international commitments gave rise to a set of greenhouse gas (GHG) targets expressed as net emissions which are gross emissions minus GHG removals by sinks (mainly CO_2 taken out by trees). However, despite commitments shown in the first graph for New Zealand taken from a recent Parliamentary Commissioner for the Environment paper, our net emissions since 1990 have in fact increased – currently they are up by as much as 20 million tonnes of CO_2 equivalent on 1990 levels. The New Zealand result is a marked contrast to that of the United Kingdom (second graph). At the current rate of increase, reaching the Paris target of reducing GHG emissions to 30% below 2005 levels by 2030 (about 4% below 1990 levels) is nigh on impossible for New Zealand – unless there is a dramatic shift in policy and practice (the 50 by 50 target also seems to be a highly problematic one too).



Benefits of forests

There are things that could be done that would make achievement of the target more likely. For example there is at least a million hectares of erosion-prone pastoral hill country in New Zealand that would benefit from afforestation. Every year, erosion results in an estimated 200 million tonnes of soil being lost (Landcare Research, 2006). The resulting sedimentation can damage freshwater and marine ecosystems, and increase flooding risk. The risk of erosion is affected by land use, with pasture-covered hills being most vulnerable. Strategies to reduce erosion, such as planting trees or reverting land to native cover, can prevent nutrient loss and soil slippage. In addition, significant areas of our working lands in intensive agriculture will also benefit from planting natives such as riparian zones to improve water quality, and providing corridors for wildlife.

A stand of totara planted over 50 years ago, Holts Forest Trust, Hawke's Bay, with a mean annual increment in CO_2 sequestration of 8 tonnes/ha/year averaged over the current life of the stand.

Trees are very efficient in assimilating and storing carbon as wood and a plan to plant one million hectares in trees has been postulated. For radiata pine production forestry the cost of land in competition with intensified grazing pastures, and the cost of logging the more remote steep hill country, is becoming increasingly prohibitive. Regular clear-felling of radiata as part of 30 year rotations means that assimilated carbon is also quickly lost. Interest in planting native forestry or encouraging natural reversion of marginal land is therefore increasing.

Planting native forest and carbon

Tāne's Tree Trust has data to show that plantations of the major native tree species can sequester on average 8-10 tonnes CO_2 equivalents per hectare per year within 30-50 years of establishment depending on

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AGM REMINDER

We are holding our AGM at the Copthorne Hotel in Masterton on Saturday 4th November at 1pm.

On Saturday 4th and Sunday 5th November the annual Action Groups weekend is being hosted by the Indigenous Forest Section and the Wairarapa Branch. See http://www.nzffa.org.nz/events/ for information and the programme, or email hdickens@ihug.co.nz for a registration form.

If you are going to be attending the Tāne's Tree Trust AGM please RSVP to the office at office@tanestrees.org.nz

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species planted and stand density. A million hectares at this rate could sequester 10 million tonnes of CO_2 annually, a very significant proportion of the required carbon reduction. Under a regime of continuous cover, this could result in long term storage of 500-1000 million tonnes of CO_2. With the high cost of planting natives, encouraging natural regeneration that includes enrichment planting of selected native trees is likely to be practical option on some sites for large-scale conversion of pasture to native forest.

Tāne's Tree Trust is currently developing a carbon calculator for planted native trees and shrubs that will be available for use on our website in the next few months. This basic version of the calculator originates from pilot work done in the Waikato region with a limited number of stands. The Trust has recently submitted a funding application into the latest round of the Ministry for Primary Industries' Sustainable Farming Fund to expand this to a species-based national calculator. This will be part of a suite of calculators on productivity, carbon sequestration and economics for planting and managing native forest. These will be generated from the Tāne's Tree Trust Indigenous Plantation Database. This is New Zealand's largest database of planted natives comprising 15,000 trees and shrubs, 5-100 years old, and will be used to develop carbon models as part of a freely available web-based interactive toolkit. This toolkit will provide robust science-based calculators to support other initiatives such as Trees That Count, a project managed by The Project Crimson Trust and funded by The Tindall Foundation, aimed at encouraging New Zealanders to plant more native trees for climate change and improving our natural environment.

The Tāne's Tree Trust growth and carbon calculators will allow corporates and landowners to calculate how much native forest they need to plant to offset their carbon emissions. There is substantial and increasing interest from the business sector, both large and small, in supporting the planting of native forest and encouraging natural reversion to offset their carbon emissions as part of voluntary carbon platforms for which a robust carbon calculator is essential. In addition to addressing the impacts of climate change, this interest also includes recognition by an increasing number of New Zealand companies of the wider benefits of planting native forest in restoring indigenous biodiversity, improving water quality and promoting more sustainable land use practices.

HE TOHU: A NATIONAL TREASURE

On 19th May 2017 the new display exhibition of three of the country's founding documents opened at the National Library in Wellington. Called He Tohu, the permanent display room is based on the concept of a waka huia, or treasure box, and aims to improve access for all visitors while preserving the three fragile documents.

The display was conceived in partnership between the Minister of Internal Affairs and iwi leaders throughout the country. It was then designed by Studio Pacific Architecture in Auckland, with salvaged wind-blown rimu from cyclone Ita specified as the timber of choice.

Around 40m^3 of 200x50 rimu was supplied for the construction, with timber being laminated into 1200mm square lengths before each block was individually sculpted on a computer numerical control (CNC) machine. In all, 480 blocks and 110 panels were machined to shape the room's seamless organic interior. Fletcher Construction managed the building process which was carried out within a working library with final assembly by a team of German specialists.

For me as a forester, seeing these images offers one of those rare life moments when the circle is complete. He Tohu demonstrates a tangible connection between the past, present and future with wood as the medium.

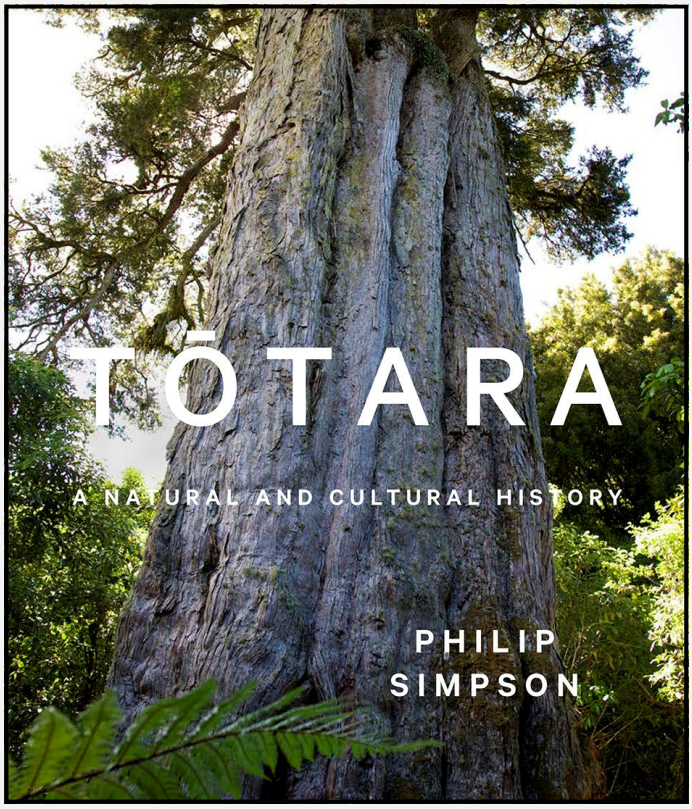
Winning those precious stems from the storm ravaged forests, milling the timber - that's our story, but cases like this show the vision, the marriage of design and technology, the very real human craftsmanship required to assemble and finish this project, demonstrating why wood, when used this brilliantly, adds such magic and soul to our buildings.

When we factor in the awe it will inspire in visitors into the future, the tactile experience people will have in touching this wood for generations, connecting with Aotearoa, it kind of makes the job worthwhile.

TOTARA: A natural and cultural history by Philip Simpson

Auckland University Press 2017

Reviewed by Mark Smale



Tōtara is one of our most iconic trees, to use an over-used word. It has played a pivotal role in the human history of these islands and long before, when it formed tall forests on fresh deposits from volcanoes and rivers during our long and turbulent geological history, and shorter woodlands scattered across the vast eastern drylands. It is also a great survivor. Although the dry woodlands vanished in ancient Maori fires (their existence was unknown even 50 years ago) and the great forests were milled generations ago, the species regenerates prolifically on open sites, and young tōtara are a notable feature of the landscape in many parts of the country.

After his earlier surveys of cabbage tree (*Dancing Leaves: The story of New Zealand's cabbage tree, ti kouka*) and pōhutukawa and rātā (*Pōhutukawa and Rātā: New Zealand's iron-hearted trees*), it is only fitting that botanist Dr Philip Simpson should turn his attention to tōtara, the largest – though not the tallest – and most magnificent of the native podocarps. Like those earlier works, *Tōtara: A natural and cultural history* is remarkable for its comprehensiveness. In 287 lavishly illustrated pages, he navigates his way through a welter of botanical, ecological and human aspects of the species in the past and present, with a peek into the future.

The first chapter is an overview of the four species and one variety – the familiar tall lowland tōtara has four smaller relatives, mostly in cooler upland or southern climes – and their place in the wider world of the southern conifers in geographical and evolutionary terms. As an aside, the most familiar smaller species, Hall's tōtara, named after a nurseryman whose arboretum still graces a hillside in Thames, has a maddeningly unstable scientific name. In recent years, it has been *Podocarpus hallii*, *P. cunninghamii*, *P. hallii* again, and now *P. laetus*. An insightful and detailed chapter on the external and internal morphology and reproductive biology follows. I found the feature on totarol, the chemical terpene peculiar to tōtara, fascinating. In the third chapter, Simpson describes the specific habitats of the species – which reflect its predilection for disturbed sites – and the relationships such a large and long-lived organism inevitably has with a host of other plants and animals.

The middle chapters reflect the author's *forte*: the role of native trees in the Maori world. Of course tōtara was, and still is, the timber of choice for carving and canoes, and Simpson explores these and many other aspects of the Maori relationship with the species with his characteristic thoroughness. A novel feature of this book is an entire chapter devoted to the extraordinary bark and its amazingly varied uses by Maori.

The following two chapters give equal weight to the vital role of tōtara in the early days of European settlement, not only as a fencing timber but also for houses, furniture, bridges, telegraph poles and boats. But its usefulness and versatility as a timber, as well as its flammability, were also its undoing, and the long demise of tōtara by fire, milling and forest clearance is documented next. The greatest threat is now the indirect one posed by the ubiquitous introduced possum, for which tōtara is a preferred food. In a survey of the beech forests of Mount Aspiring National Park some years ago, we found a startling correlation between the absence of Hall's tōtara and the length of time possums had been present, a serious loss of biodiversity over wide areas.

The final chapter provides an overview of the sad history of forest conservation in New Zealand, "too little, too late". Despite the prevailing theme of loss, Simpson ends on a very positive note, describing the organisations and individuals whose efforts are ensuring a brighter future for the species. NGOs like Tāne's Tree Trust and the Northland Tōtara Working Group are playing a key role in ensuring that tōtara recovers something of its former glory, and may again provide a small but significant timber resource for specialty uses.

The use of numbered references and a chapter on sources elevate a semi-popular book to the status of an academic work. They are a welcome feature for those who wish to delve further into specific aspects of tōtara. As is usual with books of this kind, stand-alone feature boxes provide pleasant relief from what would otherwise be unbroken text. A table of their contents would have been a useful addition to the book. But this is a small quibble. *Tōtara* is a quite remarkable and very readable fusion of the botanical, ecological and human elements of a very familiar and much loved New Zealand tree. It is a book to dip into again and again as a reference for information about any aspect of tōtara, or simply for pleasurable reading. We look forward to further works of this stature from Dr Simpson.

IAN BRENNAN - ONE MAN'S JOURNEY TO TANE'S TREE TRUST

My academic career peaked in 1976 when I left school with five subject passes in U.E. That was a couple of months after my form teacher, Brother Ambrose told me, "You know Brennan - a big lad like you would have been accredited if you'd played rugby for the school instead of going in that damn silly school play". In hindsight, perhaps that was my first step to a lifetime as a recovering catholic - realising that I didn't believe in rugby.

From 1977, I meandered through a series of unrelated jobs before stumbling through a back door into a career in IT. I was 23 and seriously considering signing up for a computer science degree, when I discovered an eight week COBOL programming course in Auckland. That got me a job at the Post Office in Wellington as a trainee programmer. Four years later, when I might have been graduating from Uni, I already had enough experience to join the exodus to London where anyone with three years' experience was welcomed aboard the IT contractors' gravy train.

After four months working in London, I interviewed for a contract job in Edinburgh on a cold, still day in December 1987. It was already dark at 4.30pm as I left the interview and walked down Princess St to Waverley Station. With my breath freezing in the air and Edinburgh Castle lit up above me, I really hoped I'd get the contract. I did. I began work at Scottish Widows Fund in January 1988.

At Widows, I accidentally acquired the habit of planting trees. While working there I met Trisha, who lived 17 miles out of Edinburgh with her two horses on a 24 acre run-down ex pig farm. She likes to tell people I fell in love with her the moment we met and I found out she owned that much land. For my part, I'm far too polite to contradict my wife in public.

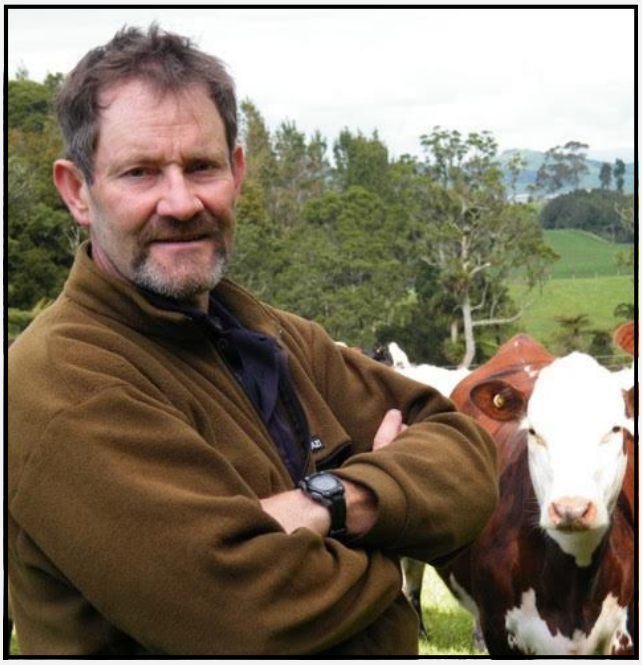
That was 1995. Trisha's land was cold, wind-swept and dominated by a central rocky hill with a 19th century hematite mine at one end and a small quarry (of similar vintage) at the other. This land had probably lost its trees in the sheep boom 250 years earlier. Barren would be an accurate description. Around the base of the hill was enough pasture for a few horses, but on the hill itself, rabbits and hares ate everything that grew on the sparse, stony soil except thistles, nettles, ragwort, a few stunted hawthorns and a lot of gorse. I wanted to plant trees for birds. There was little enough grazing and Trisha didn't want to lose any, so we finally agreed I could plant trees anywhere on the property currently supporting gorse.

When we left for New Zealand in 2005, despite the slow growth rate of the trees in the Northern climate, we could already see a marked increase in birdlife on our block. Flocks of small birds that previously had nowhere to perch and no reason to visit, gradually became common around the property. Ten years, 4000 root trainers and a lot of tree shelters later, we had managed to establish a thriving six acre mixed woodland.

Before we left Edinburgh, Trisha had escaped from IT and was making a living helping horses solve their people problems. She intended setting up a similar business here. With that in mind, we viewed a lot of lifestyle properties from Taupo to the Bombay Hills. Looking for a place to live and base her business, we eventually decided on the Cambridge area. By then, I had begun seriously wondering what I was going to do for a job. Commuting held no appeal and I was sick of staring at a screen for a living. So we widened our scope from lifestyle blocks to see if we could afford some kind of farm.

This place was a 225 acre ex-dairy farm with resource consent for three 5000m^2 subdivisions. We figured we could afford to own the farm if we sold three sections quickly. It didn't happen quickly. It took years. Of course we grossly underestimated the effort and time required for every aspect of the subdivision process. But that's life. There were quite a few stressful days in the early years and numerous freezing midwinter nights when I lay awake in a cold sweat, listening to rain hammering on the roof and beating myself up for being so arrogant and foolish as to think I could make a go of this farm. But eventually the sun comes out, the mud dries, you give yourself a slap and just get on with it. We're still here 12 years later and, aside from those angst-ridden days in our first 5-6 years, I have never regretted my decision to become a farmer so I wouldn't have to get a job.

One sunny December day during our second summer here, I looked up from knapsack spraying thistles to see cattle trudging along the ledges worn around the hillsides above me and realised with a sinking feeling just how precarious was the state of the land I had convinced Trisha we should invest our entire life savings into. At that moment I had a clear insight that this farm would one day look like our land in Scotland had before we planted it. It might take another fifty years, probably fewer, for our gullies to degrade beyond the point where it's worth putting stock in them. But it will happen. I felt like such an idiot.



As I watched, grassy clods of dry crumbly soil rolled down from above, bits flying off them as they bounced their way towards the stream. Slowly but irreversibly, the cattle were sending soil down into the creeks from where it would eventually be washed out to sea. Blackberry and gorse were well on their way to claiming the worst areas of exposed clay. It hit me for the first time that, ignoring our 40 acres of (by then) covenanted native bush, fully half of our remaining land was too steep to support cattle and would have been poor country even for sheep. These gullies needed to be returned to forest cover asap and I had no idea how we'd make it happen.

Shortly after that lightbulb moment, I attended the Tāne's Tree Trust AGM at Jaap and Sue's in Ngongotaha and was truly inspired by two things. First - what they had achieved with their riverside planting and secondly - the idea of planting native trees for eventual timber production. Like the vast majority of people who have ever planted a tree, I had never done it with the idea of my tree one day being cut down for timber. Here was a conservation model with the ability to pay for itself! Why had I not thought of this before?

We began planting natives during our second winter here (2007) and had managed 15,000 in total, spread around windbreaks, wetlands and amenity areas, before David Bergin visited in 2015. Saint David, as he is known in our house, secured a grant on our behalf from Trees That Count, to plant 7500 trees on three hectares in one go. That was last year. This year we planted another 7000 on three hectares adjacent to last year's planting with help from Waikato Regional and Waipa District Councils. Next year, I don't know. Waikato Regional Council have money budgeted to subsidise more planting on our farm in winter 2018, but I currently have no idea where we might find the money for our share of the cost.

…and so it goes. We live from year to year, enjoying the fresh air and freedom, planting as much as we can afford each year. Perhaps one day we'll be able to say we turned a dairy farm into a native forest.

I was surprised and chuffed to be asked by Warwick whether I would consider becoming a trustee, though I've since realised this will at some point involve work. I've loved the whole TTT concept since I first heard it. Plant Native Trees for Multiple Purposes. Heal the Landscape. Plant native forest on all the ugly land, stop erosion, protect the water, provide habitat - and eventually get regular income from the timber. Why is this not obvious to everyone? I may be an idiot who has finally found my village.

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If you receive your newsletter via email we will advise you if you haven't yet paid your subscription.

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