

The 2015 Tāne Mahuta Public Lecture: The Native Treelands of New Zealand

Philip Simpson¹

Introduction

When I travel, I look at the landscape: the roadsides, fences, paddocks, stock, trees, landforms and rivers. It always shocks me to see a paddock filled with cows or sheep without a single tree. I have to ask “does the owner really care about these animals?” It pleases me when I see trees, and animals sheltering from the hot sun beneath them. They can be native or introduced but I am especially pleased when I see they are native trees. There are many places where, unless you raise your head for a broader perspective, you would not know that this is our beloved New Zealand. Such trees remind me of our historical roots. They also bridge the gap for me between nature and culture. They remind me of where all our resources came from. We did not create the soil, nature did. We might think we own the land, legally anyway, but in fact every fragment will become, some day, un-owned land again: we have borrowed the land, and, at the very least, hold the land in trust for the future generations. These trees represent that link to a future.

The Queen Elizabeth II National Trust has offered a definition of rural lands that bear native trees. They are places where between 20% and 80% of the land is tree covered and beneath is predominantly non-woody vegetation (namely grass) or bare ground. I would probably alter this definition a little because I know places with less than 20% native cover that still gladden the heart. Widely scattered cabbage trees (*Cordyline australis*) or kānuka (*Kunzea* spp.) on an East Cape hillside illustrate this feature. And I would probably think that a place with 80% native tree cover is forest. In the New Zealand context treelands blend with small patches of bush, gullies of regenerating scrub and riparian strips along streams, so they are sometimes

difficult to define and they can also be a temporary phase, especially when stock is excluded.

The key elements to me are that the canopy is open and the ground is grassed and the business of farming can continue within, beneath, and around the trees. Although forms of vegetation with scattered trees are widespread throughout the world (woodlands, parklands, savannah), usually the result of seasonally very dry or cold conditions, the open treelands of New Zealand farmland are nearly always of human origin.

Importance of native treelands

With only a third of New Zealand in native cover, and most of this in non-agricultural mountains and national parks, treelands can be a significant element in species diversity. Farming is mainly lowland and mainly on fertile soil, especially alluvial valleys and plains. High-fertility demanding species like mataī (*Prumnopitys taxifolia*) and tōtara (*Podocarpus totara*), ribbonwood (*Plagianthus regius*), lacebark (*Hoheria* spp.), myrtle (*Lophomyrtus obcordata*), kōwhai (*Sophora* spp.) and tītoki (*Alectryon excelsus*), are frequently represented in treelands (Fig. 1). These species can be very rare locally. An example at Waimea in Nelson is narrow-leaved maire (*Nestegis montana*), where only four individual trees remained (before recent restoration).



Fig. 1 A characteristic treeland, composed of mataī, tōtara and tītoki, with an open canopy and grazed grassland beneath. Brightwater, Nelson. Photo: Michael North.

Nīkau palms (*Rhopalostylis sapida*) were often left owing to their attractiveness and uncommon occurrence in some places, like Hutt Valley. Kōwhai, being attractive and not casting much shade may have been preferentially retained along streams when other trees were removed. Being out in the open, treelands attract edge-loving plants like the threatened native mistletoes, including red- (*Peraxilla tetrapetala* and *P. colensoi*) and yellow-flowered species (*Alepis flavida*) on beech trees, as well as the dwarf mistletoes (*Korthalsella* spp.) on species like kānuka and myrtle. The isolated nature of trees in paddocks means that they can be somewhat protected from possums, or at least easily accessed for trapping. Over very large areas of New Zealand farmland, native habitat is reduced to small isolated remnants, either patches or riparian strips along rivers and terraces or in gullies. Treelands can form a link across productive farmland to these remnants and so create habitat continuity across a larger area.

Nearly all New Zealand tree species have endemic species of invertebrates like moths and aphids, or fungi. Species like tōtara (and other podocarps) and cabbage trees, carry an associated fauna with them. They can also form havens for common and rare animals such as geckos. Tōtara is a favoured tree of the jewelled gecko. Tōtara can form a habitat for large invertebrates like stick insects. These are food for birds, and it is no surprise that tūi frequently nest in tōtara trees that provide not only dense shelter for the nesting period, but also nutritious fruit for the chicks.

Richard Gillies (a Wildlands consultant) in an Environment Court Hearing (on 21 Nov 2014), stated that the proposed Waipa Networks Limited

¹ Falconer Road, Pohara, RD1 Takaka, New Zealand; philipsimpson@xtra.co.nz

transmission line would cause the loss at one site of 24 kahikatea and matai trees which were potential bat roost trees (Fig. 2). He defined the loss as a “moderate ecological effect”. Waipa Network’s new transmission line couldn’t be routed to entirely avoid this area of treeland (the route had already been designed to avoid other larger natural areas along the corridor), and it was proposed to remove up to 24 trees to clear the line route. Neither the Otorohanga nor Waitomo District Plans listed these tree stands as SNAs (Significant Natural Areas), nor were there plan provisions affording protection to individual trees, but Wildlands’ assessment was that the treeland did have ecological significance, and this was accepted by all parties. One of the consent conditions is that their removal will be mitigated by planting sufficient kahikatea and matai at a similar site elsewhere within the Mangapu catchment to achieve the total basal area of the trees removed within 20 years.

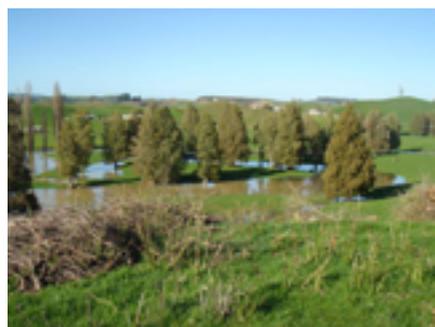


Fig. 2 Transmission line damage to this iconic Waikato kahikatea (*Dacrycarpus dacrydioides*) treeland was minimised and mitigated by replanting nearby because the landscape value and potential as a bat roosting site was recognised. Photo: Richard Gillies, Wildlands.

This example is evidence of an increasing awareness of the significance of treeland.

There are economic benefits of treelands. The annual carnage of lambs might well be reduced if adequate shelter was available. Animal health in general must surely improve if animals are contented in their environment. Perceived health and well-being can at least attract premium prices, in keeping with our country’s international appeal for its environmental attractiveness, sadly, often undeserved. Treelands provide timber and firewood and some species are bee forage trees. Trees can reduce water runoff, the roots can

hold soil together and their presence can reduce wind impacts during times of drought. Tourism, one of the main money earners to New Zealand, depends on landscape quality.

No matter what your thoughts are on climate change, trees store carbon and participate in the most fundamental process that enables us to survive, the taking in of CO₂, and the releasing of O₂. Environment Canada has stated that on average, a single tree can produce 117 kg of oxygen in a year, enough for two people, and absorb 22 kg of carbon dioxide.

All these functions are important, but the most important to me is the aesthetic role of treelands: their contribution to the quality of the landscape in which we live. Native trees add an indigenous overlay to an often global perspective of production, marketing and recreation. They are long-lived and a local landscape can be part of a person’s experience throughout life. Trees add to the diversity of a traveller’s experience and demonstrate to passers-by that the owners of the land care for it. There is a universal feeling of gratitude and identity when farm animals are seen resting beneath trees in the hot sun, cold, rain or wind. That we ‘do not live by bread alone’ is a hallowed biblical cornerstone of human existence.

Do treelands need management?

Expressing these sentiments in policies and regulations is very difficult. The reason why I am making this presentation is because treelands are vulnerable and survive for the most part because the landowner leaves them alone. However, over time they diminish. Natural events such as windstorms topple isolated trees. Farm animals are continually damaging the trees by camping under them and in times of hunger and boredom damage the trunks and branches. Furthermore, changes in farming practice can cause the trees to be felled, as for instance the intensification of dairying and the introduction of centre-pivot irrigation technology that is incompatible with trees in the paddock. It was one of these last events, following a change in ownership, in a paddock that I have driven past all my life, in a valley nationally favoured for its beauty,

and within a community that depends on tourism for survival, that is the stimulation behind this presentation (Fig. 3). I want to try to save the native treelands of New Zealand.



Fig. 3 Tōtara trees cleared in the Takaka Valley, where tōtara treeland is a major landscape attraction, in order to install centre-pivot irrigation after a farm changed hands and sheep farming was replaced by dairying. Photo: Philip Simpson.

How do treelands form?

There are several ways in which treelands develop. The simplest, and probably the most increasingly rare, results when original forest trees are left standing when the bush is cleared. It is not easy to do this because falling trees all around damage those that are left behind, and few species can survive the transition from dense forest to open farmland, or the subsequent fires used to clear the land of debris. The pre-eminent example of this kind of treeland involves kahikatea and is a feature today of the northern West Coast and inland Nelson regions. Groves of nīkau are also left in this way (Fig. 4).



Fig. 4 Nīkau treelands are particularly evocative and usually result when surrounding bush is cleared and the attractive nīkau are left. Photo: Geoff Walls.

A variation of this type of treeland results when a wetland is drained and the scattered trees within it remain. Again kahikatea is one of the species remaining but the main one is the cabbage tree. Dense or open groves of cabbage trees are characteristic of some areas such as Hauraki and Wairarapa.

Another variation, perhaps the most tragic way in which treelands form, is by attrition. If a small patch of original bush is left in a paddock and remains unfenced, which is the fate of virtually all of them, stock will live in the patch eating first the ground plants (ferns, seedlings, mat-forming natives), then the shrubs (especially *Coprosma* species). Eventually all the tall shrubs will die from bark damage, soil compaction and drought induced by the opened interior, and what remains are small trees and the larger canopy trees. Some species are more capable than others of surviving the changed soil conditions, temperature and root damage. The broadleaved species like pukatea (*Laurelia novae-zelandiae*), tawa (*Beilschmiedia tawa*), tarātā (*Pittosporum eugenioides*), tītoki and maire may be the first trees to die leaving the kahikatea, tōtara and kōwhai, now isolated individuals forming not a forest but a treeland.

Probably the most common way that treelands have developed is through native trees regenerating after bush clearance. For many years after clearance the land is covered with branches and trunks and stumps of the trees from the original forest. It is a stark landscape and there are many images, both photographs and paintings, of the settler's cottage, surrounded by post and rail or picket fences (Fig. 5). This was the heroic phase of New Zealand European settlement, when people hand broadcast grass seed among the smouldering trunks, and families eked out existence from tiny patches of useable soil. Amidst this chaos the many catastrophe-liking species that characterise the New Zealand bush were busily germinating in the crevices, and new forest was getting underway. The trunks protected the seedlings from stock, and the rotting trees fed the soil. As time went on the landowners selectively removed young trees, sometimes all of them, and sometimes none of them. We see the consequential pattern in many landscapes today: a mosaic of forest patches, scattered trees and open treeless fields. Many species are characteristic of this process, but perhaps the most prominent is tōtara. However, north to south, and east to west the species involved change, as described below.

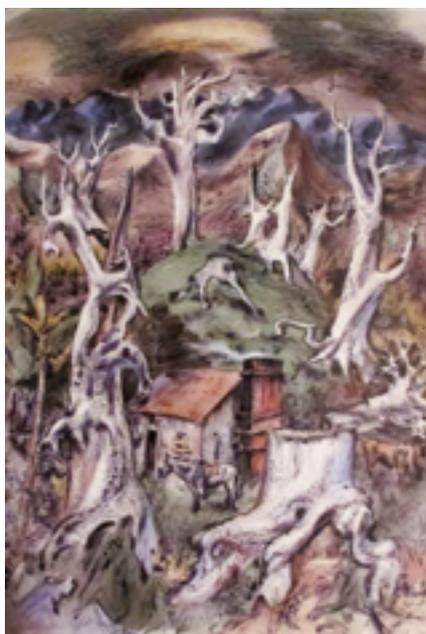


Fig. 5 Most treelands form by trees regenerating in the rubble after forest clearance. "In the backblocks" (King country), by Eric Lee Johnston. Reproduced with permission from the Auckland Art Gallery.

A variation on this mode of regeneration is that which occurs when farmland is abandoned. Generally this kind of treeland is temporary, involving scattered trees coming up through pasture, bracken fern and gorse. The exact combination varies with the soil conditions. Whiteywood (*Meliccytus ramiflorus*) and kānuka are perhaps the best known examples, but lancewood (*Pseudopanax crassifolius*) is also a common species, the narrow juveniles well suited to the confined spaces through which they need to grow. Eventually the canopies of the trees spread out, suppressing the light-demanding original cover and then new generations follow. The infilling process can readily be seen with multi-trunked trees with broad crowns scattered within dense and narrow single-trunked trees that now dominate.

There are a few examples of treelands in New Zealand that appear to be entirely natural and largely the result of frost flat conditions coupled with dry summers. The main species involved is matagouri (*Discaria toumatou*). Some will say that this is not a tree, but sometimes one finds really old individuals with trunks 20 cm diameter and the canopy over 5 m tall. These are remarkable treelands which enable stock (usually hardy beef cattle) to

graze beneath them. They occur in the upper reaches of Marlborough and Canterbury river valleys. Also in Marlborough are rare treelands of tree brooms and tree daisies such as akiraho (*Olearia paniculata*) and *Olearia hectorii*, being drought and cold resistant trees usually growing in discontinuous rocky habitats.

Types of treelands through the country

There is infinite variation in the composition of treelands. The species seem to share some features in common owing to the open nature of the ecosystem: they are usually high light tolerant, they often have features of the bark that reduce animal damage (e.g., the texture of tōtara or the chemical toxicity of kōwhai bark), some are able to repair injuries (like the cabbage tree), deep roots are an advantage (not a common feature of New Zealand trees), and they are often drought resistant or at least tolerant, for instance the leaves of most are either small like kānuka or quite tough and leathery, like pūriri.

The following north to south, and east to west review is based mainly on my own experience and is by no means comprehensive. The northern New Zealand flora is very distinctive with many forest species extending south to approximately Latitude 38°S. Examples are kauri (*Agathis australis*), pōhutukawa (*Metrosideros excelsa*), pūriri (*Vitex lucens*) and taraire (*Beilschmiedia tarairi*). Pōhutukawa treelands are distinctive for two reasons. They can form a discontinuous band along the coast growing on the edge of the coastal scarp, whether volcanic, sandstone or softer mudstone. Although pōhutukawa usually forms a closed forest sometimes the conditions are so rugged that only scattered trees are possible, and with tree clearance for boat building, farming and urban development it is often now impossible for the tiny seeds to germinate and establish because grasses and other weeds occupy the habitat. The other situation is on sand dunes. Pōhutukawa can form massive spreading trees that could never cover the whole dune because it is mobile or otherwise too dry. Or, they can be partially cleared for farming, on older dunes and create very attractive landscapes, such

as the Awhitu dunelands forming the southern spit of the Manakau Harbour.

Pūriri is a very common treeland species. Although a broadleaved tree, the leaves are tough and the wood in the trunk and roots is dense and decay resistant. Through parts of Northland and South Auckland pūriri often occurs as scattered trees or small groups with taraire, usually secondary following original clearance, but sometimes surviving as large very old original forest trees. By attracting tūi to the flowers, pūriri serves a valuable ecological role.

Tōtara regeneration is extremely widespread in parts of Northland, so much so that there is a local organisation seeking to facilitate sustainable logging so that landowners are not forced to clear the regeneration. Tōtara and kōwhai are commonly associated along streamsides.

Groves of kahikatea and cabbage trees are characteristic of the Waikato region, especially the Hauraki Plains. They represent drained wetlands. Riparian bands of tōtara are also a distinctive feature of the Hauraki Rivers. The East Cape and Hawke's Bay regions have treelands of cabbage trees scattered through the hills. The hills south of Hastings are noted for tītoki treeland. Further south into Wairarapa the treelands are frequently of mixed species – tōtara, kahikatea, tītoki, kōwhai, white maire (*Nestegis lanceolata*), tawa, rewarewa (*Knightia excelsa*), and others. Drier areas have kānuka treeland especially along temporary water channels. Along the coast of Wairarapa, treelands of cabbage trees and karaka (*Corynocarpus laevigatus*) are characteristic, the latter regenerating from groves planted by Māori inhabitants to grow the fruit as a nut (Fig. 6). The central North Island around Taihape have very attractive treelands of kōwhai, a feature of the Rangitikei Valley as well. I was involved in fencing a cabbage tree area, mixed with kaikōmako (*Pennantia corymbosa*) in the Wainuiomata Valley and it was astonishing to see the resprouts growing from the bases of these injured trees, or trees that survived as only a stump.



Fig. 6 This karaka treeland regenerated from seed trees originally planted by Māori inhabitants as a crop. Photo: Bill Wallace, QEII, Tararua.

Wetter soils in Marlborough carry kahikatea, and along the Pelorus River treelands of pukatea occur, still carrying their astelia epiphytes. A Recreation Reserve at Koromiko is a tōtara, black beech (*Fuscospora solandri*; with yellow mistletoe) and white maire treeland, now fenced and replanted into incipient forest. Up in the climatically extreme inland valleys frost flats grow large treelands or woodlands of old man matagouri, too large to be called shrubs.

Golden Bay in Western Nelson is home to beautiful tōtara treeland on the dairy farms, and sometimes near the coast northern rātā (*Metrosideros robusta*) trees have been left. Rātā can be seen at Karamea too where nīkau treelands occur along the sandy coast. In one place at Brightwater narrow-leaved maire – four trees – form the southern limit of this species in a treeland with kōwhai, tōtara and tītoki, sometimes with ribbonwood and narrow-leaved lacebark (*Hoheria angustifolia*) as well.

Inland Nelson (around Murchison) through to Westland is the home of kahikatea treeland, the trees left standing from the original bush.

On the east coast the Canterbury plains are softened just slightly by scattered cabbage trees (Fig. 7) and inland by black beech and tōtara, especially around Geraldine. At Mt Peel there are huge tōtara, southern rātā (*Metrosideros umbellata*), broadleaf (*Griselinia littoralis*) and kaikōmako treelands. Along the inland rivers matagouri can sometimes reach tree size (Fig. 8). Broadleaf is a feature of rocky slopes all the way down eastern South Island, reflecting an uncommon ability to survive fire. Rather few New Zealand trees have an ability to resprout from damaged trunks, but broadleaf, whiteywood and pigeonwood (*Hedycarya arborea*) are three that can and all feature in treelands.



Fig. 7 Cabbage tree treelands occur throughout New Zealand but are particularly important in drier eastern regions like South Canterbury. They gradually decline from animal damage to the trunk and need periodic fencing. (Photographer unknown).

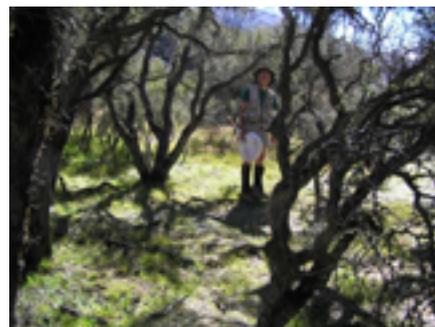


Fig. 8 Although most New Zealand treelands have a human origin, some, like matagouri and *Olearia hectorii* are natural and generally relate to dry summers and frosty winters. Photo: Geoff Walls.

In Central Otago small treelands and thickets of Hall's tōtara (*Podocarpus laetus*) are gradually spreading from ancient seed trees that were protected from fires by growing in the crevices of schist tors. Southland treelands often include silver beech (*Lophozonia menziesii*) but kōwhai is common and sometimes ribbonwood, a deciduous treeland species scattered through fertile flats throughout South Island (Fig. 9).

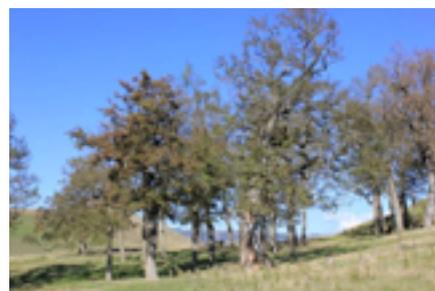


Fig. 9 A ribbonwood treeland; a widespread but uncommon treeland composed of deciduous trees growing in fertile soil, usually in frosty places. Photo: Mike Harding.

This review suggests that there are many species that can form treelands, although there are several common species. Some species, like kānuka and mānuka (*Leptospermum scoparium*), while probably present in most regional treelands usually form

forests, and isolated trees of these species are short-lived and the roots are easily damaged by stock.

What problems do treelands face?

My colleague, Geoff Walls, has written: "Native trees in the rural landscape of New Zealand are often the last vestiges of the former forests ... There is no tradition of nurturing native treelands in New Zealand ... They are taken for granted, but they are dwindling. I have witnessed the crumbling and complete disappearance of many native treelands in my lifetime, and have long wished to help reverse this trend." Furthermore, Michael North in his Tasman District Significant Natural Habitats report (Moutere Ecological District Report, Tasman District Council, 2015) says: "Without regeneration, all the treeland SNHs are doomed in the longer term."

Why are they doomed? With the exception of cabbage trees all treeland species are susceptible to windthrow. Damaging winds feature every year in all parts of New Zealand, and without a forest structure to give mutual support among trees the shallow root systems are simply inadequate to safeguard trees growing out in the open (Fig. 10). This is especially true for tall residual trees left standing from land clearance.



Fig. 10 A South-Westland tōtara succumbs to the wind, a hazard faced by all the shallow rooted trees of New Zealand. Photo: Brian Butterfield.

Likewise, virtually all parts of New Zealand, at least in lowland areas, are exposed to serious drought every few years. In Takaka the last major drought occurred in the summer of 2000–2001. Numerous tōtara trees died or the canopies were partially killed during this drought. On the gravel ridges of Rarangi, innumerable kānuka and mānuka trees died. The opposite, flooding, can also be damaging especially if

siltation occurs and the lower trunks are buried. Beech trees and kahikatea are regularly killed in this way.

Trees that are normally part of a forest or wetland system are more prone to disease when growing alone in the open. The most dramatic example of this was, and is, Sudden Decline in cabbage trees. Countless thousands of trees have died since about 1990. The disease rapidly spread throughout all North Island and the northern part of South Island. It was traced to a bacterium carried by native sap sucking insects. In a natural setting these insects are controlled by flooding in wetlands. Wetland drainage, bush clearance and the growth of edge species like mānuka and karamu (*Coprosma robusta*) has increased the habitat for these insects and they are infected with the bacterium throughout all the developed rural and urban landscape. Cabbage trees occupy these same habitats. The only way to protect the trees is to maintain populations in wetlands where insect and bacterium populations are minimised. Canopy decline in pūriri and beech is also widespread and probably reflects fungal infection from damaged roots.

Tree damage caused by livestock is the most ubiquitous problem that treelands face. The soil is greatly impacted by being churned up in wet conditions and compacted when dry. The natural nutrient layers are disrupted and natural humus cannot accumulate and decay. This means that mycorrhiza cannot establish on or in the roots. On the one hand, the trees are starved of nutrient, but on the other they are periodically overloaded with animal manure, and this also inhibits beneficial mycorrhizal infection. Any roots that are close to the surface are damaged by trampling. Small roots are broken and large roots are damaged, root bark being much softer than trunk bark. Damaged tissues are avenues for harmful fungal and bacterial infection, spreading to decay at the base of the trunk, hollowing of the trunk, weakening of branches and dieback of the canopy (Fig. 11).

Damage to the trunk is almost universal in treeland trees. Certain trees are attractive to stock. The bark of lacebark for instance is stripped off in layers to expose the cambium.

Cabbage trees have soft spongy bark and a sweet cambium beneath. All herbivorous animals including horses and mice nibble off the bark and eat the cambium, and indeed the actual 'wood' as well which is fibrous and fleshy in cabbage trees. Such wounds do not heal and eventually a column of decay forms. I have watched a cow wrap its tongue around a hanging leaf and pull off a whole branch. Repeat wounding of the stem over many years cause areas of decay to coalesce into large cavities until all that remains of the trunk is a partial shell. Cabbage trees in paddocks are frequently hideously scarred and hollowed this way.

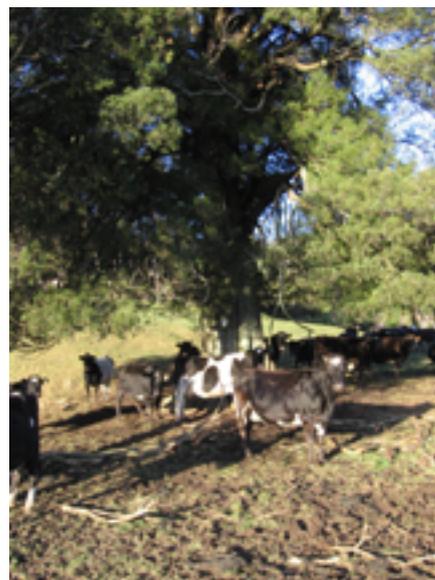


Fig. 11 Despite the value of treelands to livestock, almost every tree is damaged unless protected; the roots, the bole and trunk, the bark, and the lower canopy. Eventually stock will kill the trees and others need to be planted to replace the losses. Photo: Brad Cadwallader.

Even pigs eat tree bark to get to the cambium. Quite often a tōtara tree has one to two metres of bark shredded all around the tree. Without tree protection death is inevitable, and is especially rapid in young trees.

Many farmers limb up their treeland trees, that is they remove the lowest branches. This is especially common with tōtara because in the open habitat the trees branch close to the ground and grow more or less rounded canopies. Some landowners are skilled with their chain saws, but others are absolutely shocking (Fig. 12). I've seen company workers use the digger to smash off branches, such is their boss's lack of arboricultural awareness. Farmers are keen to minimise the loss of pasture

through shading, which is fair enough, but some have no regard for the appearance or recovery of the tree.



Fig. 12 Very poor limbing up, and very unsympathetic ploughing mean that pathogenic fungi can enter the cut branches and damaged roots. Photo: Brad Cadwallader.

Most pastures in intensively farmed areas are periodically renewed or crops are established. Ploughing too close to the drip line of trees will damage the root extremities and lead to canopy die back.

The complete removal of trees is the most dramatic cause of tree loss. Sometimes this is along the fence-lines where trees formerly served as shelter. In recent years, centre pivot irrigation has been a feature of conversion to dairying, and trees obstruct the pathway of the giant, wheeled structures. Matagouri and kānuka treelands have been cleared by aerial spraying. In other areas, treelands are often 'buried' within a plantation of pine trees.

How have some treelands been protected and how can things be improved?

Attention has been bestowed on treelands through surveys (usually by the Department of Conservation) of ecological districts under the Protected Natural Areas (PNA) Programme through which areas are recommended for protection. There are innumerable examples throughout the country. The Natural Heritage Fund has been used to purchase and protect many places identified in PNA surveys (1.3% of New Zealand). Although these are mostly forest, grasslands and wetlands, there are a few treelands. Of the Recommended Areas for Protection, RAP 9 is a Hall's tōtara treeland on Ben Ohau Range in Central Otago.

Regional, District and City Councils are responsible for the management of heritage features in their areas. In their Plans the councils have

brought together an extraordinary amount of information and planning philosophy. Quite often the results of natural heritage surveys are included as Appendices – long lists of natural places and habitats, lists of trees, and usually short lists of so-called Outstanding Landscapes. For the first time, every landowner in New Zealand can identify whether or not any natural features are regarded by the wider community as significant, and generally speaking the site is included with the landowner's permission. On the positive side with regard to treelands there is often specific mention of places that can only be modified if a resource consent is granted. Here are some examples:

- Gisborne identifies Protected Management Areas, including kānuka-cabbage tree treeland, pōhutukawa treeland.
- Hastings District Council Plan, Appendix 56, RAP 23, Haronga Road tītoki treelands (Fig. 13) and also coastal dune kānuka, and ngaio (*Myoporum laetum*).
- Horizons Regional Council identifies an outstanding landscape along the Rangitikei River from the Mangarere Bridge to Putorino, that includes terrace flat tōtara and kōwhai trees.
- Kaikoura – a clump of karaka trees near a grave, a clump of nīkau trees at Rakautara, the site of the southernmost narrow-leaved maire.
- Hurunui – the Skull Peak SNA has kōwhai treeland around the edge, a Medland kānuka 'woodland' of 45 ha and a Pahau Downs terrace with matagouri.
- Clutha – southern rātā trees with scenic and botanical interest, and beech and tōtara trees at the Toms Creek picnic area.

This is, of course, just a sample, but it is significant that the sample is so small. There are hundreds of remnant forest sites identified and innumerable notable trees. The latter are nearly all exotic and often confined to urban areas. I could find no specific mention of treelands in a rural environment in any Plan, in either a biodiversity context or a landscape context. This is surprising.



Fig. 13 These tītoki treelands in southern Hawke's Bay were identified in a PNA survey and the RAPS were appended to the Hastings District Plan, requiring a resource consent if any changes are requested by the several landowners. Photo: Hastings District Council.

When you read the criteria for landscape selection, some of the sentiments include:

- Transient qualities – the experience of landscape can be heightened by the consistent and repeated occurrence of transient features ... for instance the flowering of kōwhai, or pōhutukawa.
- Shared and recognised values – natural landscapes can be widely recognised and valued by the immediate and wider community for their contribution to a sense of place, leading to a strong community with, or high public esteem for, the place.

When you read the high ideals of a Plan, such as these, and compare with what actually happens on the ground, there appears to be an apparent disharmony. Here are some statements either from the Plans or from Council staff familiar with them:

- Priority Areas Habitat loss has been greatest in lowland areas. For many habitat types only small remnants remain and some have been lost completely. Furthermore these habitat types are under-represented in the network of legally protected areas and face the greatest threat of further loss. These habitats warrant greater management effort than habitat types that make up large areas of the public estate. (Waikato plan).
- We struggle a bit with treeland in that they tend to not rate highly for indigenous biodiversity values as they often lack that full forest structure and function. (Bay of Plenty staff).

- The operative Chapter 14G protected all remnant nīkau palms on the Valley Floor and the Eastern Bays of the City. The Resource Management Amendment Act 2013 introduced new requirements and definitions associated with tree protection. These amendments invalidated (from 4 September 2015) the current Plan provisions that protected nīkau palms that are not individually identified and are located on urban environment allotments as defined in the RMA. (City of Lower Hutt staff).

- I think we would struggle to see such scattered trees protected in farm landscapes until the message of their benefit can be adequately communicated. I think one of the key missing pieces is research and/or communication of the findings on the benefits of such trees to farm economics. I've seen past research that suggested shading for stock provided up to 15% increases in productivity – which is significant – and that there are also production benefits to be had from provision of shelter from weather etc., as well as health benefits from browsing on particular species (not to mention managing water in the landscape and ecosystem services of erosion reduction/soil protection etc.). If all these aspects could be put in terms of benefits to farm productivity, in addition to ecological and landscape benefits, I think we would tip the scale and see more voluntary uptake of protection of such trees and planting of more. (Tasman staff).

- We are looking, through a public process, to restrict all indigenous vegetation removal in those parts of the region identified by MFE as “Threatened Environments” – where less than 10% indigenous cover remains, i.e., lowland areas and valley flats. (Marlborough staff).

I think that these statements all indicate a high level of understanding by the Councils. But, despite the evidence and the information available, there is a low level of acceptance by the landowners and a low level of support from central government. In part this is a reflection of economics, that there is simply

little incentive for landowners to protect their treelands. The broader community needs to inform Councils that protection is desirable.

Queen Elizabeth II National Trust open space covenants

There is one programme however, where landowner support has been forthcoming for treeland protection: QEII covenanting. Their records produce the following Table, which although somewhat generous in its summation indicates that treelands are indeed a valued element within the landscape.

Table 1 New Zealand treeland estimates by region.

Region	Number of blocks	Approximate area of treeland (ha)
Auckland	21	20
Bay of Plenty	10	15
Canterbury	80	260
Gisborne	7	20
Hawke's Bay	44	470
Manawatu-Whanganui	37	100
Marlborough	12	30
Northland	47	75
Otago	18	65
Southland	37	60
Taranaki	7	10
Tasman	12	1300
Waikato	66	230
Wellington	36	55
West Coast	3	10
Grand Total	437	2,720 ha

In these areas the species that often occur as small clusters or scattered trees are kahikatea, kōwhai (sometimes riparian along small streams), cabbage trees and kāmuka.

The success of the QEII covenanting process is that, from the beginning, it is conducted at the request of the landowner, although the areas concerned have usually been identified in a DOC or Council led survey. Furthermore, the QEII organisation attracts the support of highly regarded leaders, often in the farming world, and they employ representatives who have standing in the regional communities. By branding its interest as “Open Space” QEII underscores the importance of the rural landscape, and while there is a clear biodiversity function, a primary concern is aesthetic. QEII offers financial assistance, malleable rules and local kudos.

There is a major consequence however. The areas identified usually require fencing to exclude stock. This means that regeneration will eventually take place and if weeds are removed along the way, the treeland will eventually become a forest (Fig. 14). Often the landowner will assist this process by planting new trees. Hence, the aesthetic character of native trees in paddocks with stock grazing beneath them is replaced by biodiversity and ecological process goals. This is of course admirable but it does little to help appropriate management of the many treelands that are slowly declining.



Fig. 14 A treeland protected as a QEII covenant, featuring the northern limit of rātā (*Metrosideros robusta*) in the Wairarapa. The area is now fenced and replanting is planned, so the current treeland will eventually become forest. Photo: Bill Wallace.

Planting and protecting trees

There is nothing more soul destroying than to see an animal decimating the trunk of a tree while the landowner, figuratively speaking, looks on. As a passer-by I feel too intimidated to stop, seek the owner and express my view that this is happening unnecessarily to the loss of all of us. I also would need to put my money where my mouth is. But it is equally heartening to see trees that are well protected on the farm (Fig. 15): a simple three post rail barrier, a wire fence around a small corner cluster of trees, or even an old drum.



Fig. 15 Trees on farms need to be protected, either elaborately or simply, to protect the trunk from physical damage, and ideally including the soil out to the drip line. Photo: Philip Simpson.

Sometimes the health of a treeland could be maintained by temporary fencing, say for a period of a few years. Examples might be karaka groves that regenerate in grassland between existing trees, or cabbage trees that quickly resprout into a cluster of trunks.

Planting new trees into a treeland as older trees die is an expensive, time-consuming and ecologically difficult task. Michael North writes in the Tasman report: "Without regeneration, all the treeland SNHs are doomed in the longer term. [They] hinge on future landowner interest in restoration through stock removal and revegetation or, at least, replanting in gaps to retain treelands. This is not easily achieved on the free-draining and summer drought-prone floodplains, with summer watering often required in the early years of any new planting."

Where an economic benefit has been demonstrated the treelands are cherished. Think of Rimu Grove winery, Totara Park suburbs in Wellington and Auckland, Kowhai Park in Whanganui, Totaradale Golf course in Wakefield (Fig. 16), the pōhutukawa coast, and of course the real estate world of life style blocks with names like Totara Estate. Oddly enough the economic benefit of a clean and green image is an international marketing tool and Fonterra, New Zealand's largest Company, is at the forefront of landscape planning on farms especially with regard to protecting waterways by riparian planting. It is remarkable that government throughout New Zealand has not seen a similar light with regard to tourism.

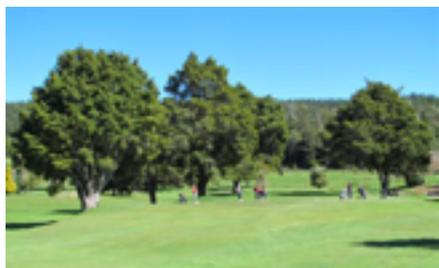


Fig. 16 When treelands are recognised as valuable they are cherished, as here at the Wakefield Totaradale Golf Course. Demonstrating their value to farmers is the key to the survival of this indigenous feature of the rural landscape. Photo: Philip Simpson.

Conclusions

Treelands are a minor element in the biodiversity of the country, with some important exceptions, and for this reason have not figured prominently in natural area surveys or implementation of protected areas. Their survival and replacement largely rest in the hands of landowners.

On the other hand, they are very conspicuous to the public and give special character to many places. They have landscape values, but protecting landscape is not an area that New Zealand is very experienced at. We may be good at protecting our National Parks, and landscaping in urban areas, along motorways, or in amenity areas, but we are poor at landscape maintenance throughout the rural lowlands. Despite the value of tourism there is little government interest in landscape, whether central or local, and the Outstanding Landscapes programme is focused on not disrupting majesty, rather than maintaining local attraction.

Education, advice and resources to assist in landscape maintenance, is probably the most needed management package to protect treelands on private land. The wider community shares the landscape with current owners, who are the temporary custodians of the land for future generations. Education about the economic value of treelands, both directly, in terms of animal health, production and land value, and indirectly through the market, should be a research priority.

Important also are ways and means to protect trees on farms. The epidemic of tree loss caused by animals is entirely unnecessary. If there is a collective community value to treelands then there is a community role in funding their protection and determining practical ways of tree protection. Likewise, there is a technical and advisory need for replanting trees to maintain a treeland, requiring ecosourced plants established to withstand the rigour of farm life.

I think times are changing. It is wonderful to have the farming industry supporting conservation. The recent success of the Aorere catchment programme, winning an international award, is not only thrilling in itself but a signal to others that it is time for a change. The Taranaki Riparian Programme is another example where almost 100% buy-in has been achieved from the hundreds of farmers around the mountain. The Waipa Networks case shows that ecological consultants know of the importance of treelands even if some councils do not. Federated Farmers is lifting its vision, especially because Fonterra is making it essential to do so (Fig. 17). I salute the farmers of New Zealand for maintaining the treelands that do exist. But the momentum needs to continue to build and I hope that this essay is a step in the right direction.



Fig. 17 The author (left) meets with Robin Manson (originator of the 'Trees on Farms' programme in Golden Bay) and Mirka Langford, Environmental Compliance Officer for Fonterra. Mirka is organising farmers to prepare riparian plans to plant trees supplied by Transpower through the Cobb Mitigation Fund. This business-farmer alliance is a key requirement to maintain treelands throughout rural New Zealand.

Philip Simpson delivered the Tāne Mahuta Public Lecture on 1st October 2015, at the Rutherford Hotel in Nelson.

The Tāne Mahuta Public Lecture Series was first introduced in 2009 by the NZ Notable Trees Trust and the NZ Arboricultural Association. The lectures are named after the most significant tree in New Zealand – the giant Tāne Mahuta (Lord of the Forest) kauri in the Waipoua Forest of Northland.