

Understanding the value of our heritage trees

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In his New Zealand Forest Service 'Forest Mensuration Reports', Bob Burstall stated (under Growth Potential, p. 4):

"...in New Zealand we have the second biggest poplar in the world, the thickest and tallest Radiata pine, the thickest and tallest Monterey cypress, the biggest of at least five eucalypts ... and the tallest Norfolk Island pine. It would appear to be a safe prediction that in say 50 years time, a large and impressive international list could be compiled of 'Notable Exotic Trees of New Zealand'." Burstall (1970–1974).

In 2000 the Wintec Diploma in Arboriculture students began reviewing the Burstall reports of approximately 1500 native and exotic trees. It has now been more than 30 years since Burstall compiled his list, and since then much has changed – although much has also remained the same.

Burstall's reviews came some 30 years after a list prepared by Dr H. H.

Allan and at that time only 2 of the 48 native trees surveyed by Allan (1940) had been lost to attrition (4.2%), while the overall attrition rate for all trees was somewhat larger (44% by the time of Burstall and Sale, 1984). Our Wintec survey uncovered similar loss rates – although up to 11% in some areas among natives compared to 34% for all trees. This may be because natives are often situated on conservation or reserve land and therefore not subject to the same pressures as other trees. Or perhaps because they are more resilient and longer lived in our climate? Or, perhaps more interestingly, because they are more revered by the public? Or maybe a combination of all three scenarios?

Surveys of 'veteran' trees in Britain show that natural attrition in woodland conservation areas can be as high as 16.6% per annum (although 1.8% is more common). In the 1600s Burnham Beeches (220 hectares of wooded common) contained 3000 pollarded trees. By 1957 1300

remained, in 1990 there were 555, and by 2000 463 trees were left. This represents an attrition rate of 74.5% over 400 years (Fay, 2004). In comparison, Spain has lost 80% of their notable trees during the 20th century.

Our intention when we began this survey was to do more than just re-measure and locate the Burstall trees (relocating the original trees was not always easy, so we resolved to GPS and photograph all the trees in our review). We also saw it as a prime opportunity to survey societal attitudes towards the trees and to look for links that may have had an impact on the trees' retention. We therefore surveyed private tree owners on their attitudes towards the trees, and considered such things as tree protection, tree ownership, development/growth rates and reasons for tree removal.

The Bay of Plenty is an interesting microcosm of our findings and I present here some sample data from that survey:

TREE OWNER	% TREES LOST	% TREES PROTECTED
Tauranga City Council	22%	59%
Western BoP District Council	33%	17%
Private Residence	62%	
Commercial	22%	
Schools	0%	
URBAN PRIVATE RESIDENCE QUESTIONNAIRES (SAMPLE)		
Did you know you had a protected tree on your property?	Yes	100%
How did you know?	Council informed them	30%
	Previous owners	53%
	Local History	17%
Did knowing the tree was notable change your view of the tree?	Yes	47%
	No	50%
	Don't know	3%
Did the tree influence you in purchasing the property?	Yes / Don't know	19%
	No	81%
What monetary value would you place on the tree?	None	86%
	Some (but don't know how much)	14%
If the tree had been removed: <i>Do you know why the tree was removed?</i>	Yes	63%
	No	37%
TREE CONDITION	SPECIES REMOVED	
Lightning strike	2%	<i>Pinus radiata</i> 100%
Topped	3%	<i>Castanea sativa</i> 100%
Serious reduction in condition	4%	<i>Cupressus macrocarpa</i> 75%
Decline	5%	Natives 2.5%

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So how do the trees in New Zealand fit into the international picture? How do our trees compare to the worlds best?

This may be somewhat easier to determine now than it would have been for Burstall. The internet has allowed access to a vast array of information on trees variously referred to as 'champion', 'monumental', and 'notable' from throughout the western world at least. Most countries now post schedules of their notable trees with their associated dimensions. This may be through a wide range of agencies from enthusiastic volunteer groups to academic registries and government departments. What these lists often lack is information regarding those 'other factors', beyond a trees size and dbh (diameter at breast height), that make a tree 'notable'.

Caramiello and Grossoni (2004) refer to 'monumental' trees as "not so much one which reaches the maximum dimensions as such but rather one which ... has been able to exceed the time limits ... which man puts on the life of trees and thus appears to be 'outsize' compared to the standards of our cultural models."

Furthermore, they describe a 'notable tree' (in their words a 'very noticeable plant') as one "which for age, habit, size, rarity, cultural, historical or geographical value or for a specific connection with decorative or structural features (buildings statues, fountains, etc.) has an intrinsic value...". They concur that "the title 'monumental' [or 'notable'] still remains a subjective one linked above all to the emotion that a certain tree creates in the observer."

We can assume fairly confidently that New Zealand is home to the world's largest of our indigenous species – 'Tane Mahuta' (Fig. 1; the largest kauri by volume), the 'Pouakani totara' (Fig. 2; the largest known living totara), a puriri from Taketakerua (Fig. 3) and 'Te Waha-o-Rerekohu' (Fig. 4; a giant pohutukawa tree near Te Araroa).

However, New Zealand is also host to a vast array of exotic species (Brockerhoff et al., 2004) including species on the IUCN red-list of endangered plants. In fact research conducted by Marion MacKay and postgraduate students (Massey

University) found more than 300 threatened woody species in New Zealand collections, including two that are 'extinct in the wild' and others that are 'critically endangered' (Jamil, 1998; MacKay, 1995; MacKay, 1996).



Fig. 1 'Tane Mahuta', a giant kauri (*Agathis australis*) from Waipoua National Forest, Northern North Island, New Zealand. This is one of the most famous trees in New Zealand and the largest kauri by volume (245 cubic metres). Estimated age = 2100 years, height = 51.5 m, circumference = 13.7 m.



Fig. 2 'Pouakani' near Lake Taupo, the largest known living totara (*Podocarpus totara*). Height = 40 m, dbh = 3.8 m.

About 5% of the rare species were of known wild source (Jamil, 1998). More recent work on *Rhododendron* also reports the presence of threatened exotic species in New

Zealand collections (MacKay, pers. comm. 2009), underscoring the need for more formal protection of important species (Fig. 5). A large number of these trees are held in private collections – an assessment of biodiversity showed that seven of the top 10 collections were privately owned (MacKay in Brockerhoff et al., 2004).



Fig. 3 A giant puriri (*Vitex lucens*) from Taketakerua. Height = 20 m, crown spread = 26.75 m, diameter at G.L. = 3.598 m



Fig. 4 'Te Waha-o-Rerekohu', a giant pohutukawa (*Metrosideros excelsa*) tree near Te Araroa. Image sourced with permission from a contributor to www.waymarking.com/waymarks/WM49CO.



Fig. 5 *Picconia excelsa*, a scheduled tree at Auckland City Council. Despite its protection this tree was still severely pruned.

Furthermore, the study showed that 52% of the 2500 taxa studied were

below the 'risk threshold' of presence in three or less sites (as calculated by British collection managers) so for example, 81% of *Fraxinus taxa* in New Zealand were at risk because they were found on three or less sites (MacKay, 1996). The rare and endangered species were also at risk, with Jamil (1998) reporting that only 5% were found in 10 or more collections ('10 or more' being the British yardstick for safety).

To add to the issue, most of the species were not available commercially. MacKay (1996) found that 50% of taxa in the Eastwoodhill collection had no commercial source, with individual genera being more extreme (74% of *Quercus*, 79% of *Malus* and 81% of *Ilex* had no trade source). For example, removal of New Zealand's largest *Quercus ellipsoidalis* in Nelson some years ago removed not only New Zealand's largest Northern pin oak but, much to the chagrin of the local nurseries, the source tree for their propagation.

If we accept the concept of New Zealand being a 'Noah's Ark' for the preservation of endangered exotic trees then not only are notable trees important for retention in their own right, but they need to be identified and protected for future propagation (Fig. 5–7).



Fig. 6 A South African coral tree (*Erythrina caffra*) from New Plymouth. "Believed to have been planted by Robert Snell in 1871 near the site of a blockhouse. A rare tree in New Zealand and the largest recorded" (Burstall, 1973, Report No. 19, p. 20).

The establishment of a national seed bank for New Zealand (managed by the Margot Forde Centre at AgResearch, Palmerston North) in 2007 may be a step towards ensuring the preservation of our native seed stock. Seed banks at Kew in England and numerous national seed bank

organisations throughout the world (including the Svalbard 'Doomsday' vault in Norway – eventual home for a proposed 100 million plant seeds) may also add to the opportunities for plant preservation. But preservation of seeds is not conservation and does not replace the emotional and wondrous experience discussed earlier.



Fig. 7 A–B A dawn redwood, *Metasequoia glyptostroboides*. "According to our measurements (which were not taken lightly) this is now the tallest *Metasequoia* in New Zealand" (Cory Smith). Height = 27.7 m, dbh = 80.6 cm.

Since we began the review in 2000, we have updated the data from most of Burstall's trees from the North Island. At this rate we will have completed the 'mission' in the 50-year timeframe that Burstall mentioned in his mensuration report introduction (although of course the first measurements and records taken

by us are already out of date).

Initially our review began as a purely 'tree mensuration' exercise – we measured the height, dbh, and crown spread. In the process we confirmed whether the tree still existed and tried to establish what led to its demise if it had been removed.

However, we also found a more interesting insight into the communities' perception of what made a tree notable. Trees have come to form an inextricable link within our culture – a thread that binds history, custom, myth, spirituality and society. It is perhaps more in the culture that the trees represent, than in the magnitude or rarity of the species, that our trees have come to be so significant. It is in the stories that they tell about us and our place in the world.

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Wilderness to wine: Otago's garden

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In this article I explore human influences on Central Otago, as an isolated wilderness in the past, and as the garden it is today and beyond.

New Zealand's history is littered with examples of extractive industries. In simple terms, these industries aim to extract as much of whatever resource one wants as possible without worrying too much about replacing it or what effect the extraction has on the environment.

People of all cultures have been pillaging their environment in this way for as long as we have been human. In New Zealand it started with Maori exploitation of the moa. Maori burned large areas of bush in places like Central Otago to limit the birds' cover and perhaps even wiped out a couple of other large avian species that were not used to predation by humans. Still, bad as that was, there is only so much damage people can do with wood and stone tools. The technologies developed in the Northern Hemisphere over the past 1000 years enabled Europeans to cause damage on a much wider scale. From the 1700s onwards, sealers and whalers led the charge around the New Zealand coastline,

slaughtering several species almost to extinction. Central Otago was late in being exploited, although ironically for centuries before European contact, Maori had traversed the region on their way to the West Coast looking for pounamu/greenstone, another extractive industry. The first Europeans moving into Central Otago and intending to stay were sheep herders, but they only just managed to beat the ultimate extractors, the gold prospectors. From 1861 onwards a swarm of human 'maggots' burrowed under Central Otago's rivers and streams, tunnelled into its hillsides and valley bottoms and spewed up heaps of tailings and waste in their wake. They made a hell of a mess, some of which ironically is now preserved as historic remains, a 19th century heritage.

Among those earliest Europeans, only the farmers could be said to literally put down roots. They (or in many cases probably their wives) planted gardens and home orchards as it became clear that the climate and land suited certain fruits and vegetables. And it does; the clear cold snaps definitely affect the flavours produced there. This is received knowledge in that part of the world.

I was brought up in Southland and there it is accepted that root crops like swedes, potatoes, and even carrots and parsnips are not at their best until they have had a touch of frost. It is interesting that the region in the North Island best known for carrots is Ohakune, right under a ski-field. It seems that the climatic extremes in Central Otago, both diurnal and seasonal, play a big part in the excellence of fruit grown there.

The first fruit trees planted as a commercial crop in Central Otago are credited to Jean Desire Feraud, a French gold miner and first mayor of Clyde. He developed a garden and orchard near Clyde and, although it might be an apocryphal story, he is also credited with introducing wild thyme (*Thymus vulgaris*), that ubiquitous lavender-blue herb now cloaking Central Otago's hillsides (Fig. 1).

However, Feraud is best known for apparently planting the first grapevines in Central Otago in 1864. He made wine from his grapes and went on to win prizes for those wines at the Melbourne Royal Show.

Now you could say that Feraud's planting marked the transition from a largely exploitative or extractive

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