

**NATURE NOT NURTURE; MINIMUM INTERFERENCE MANAGEMENT
AND FOREST RESTORATION ON HINEWAI RESERVE, BANKS
PENINSULA**

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Human effort involved in ecological restoration ranges from intensive and expensive manipulation of the local environment to doing nothing at all. Wellington's Karori Wildlife Sanctuary, for example, or Canterbury's Otamatua/Quail Island restoration project, include such things as predator-proof fences, extensive plantings, vigorous weedings, intensive trapping and poisoning, and large numbers of dedicated (and sometimes conflicting) people. In contrast, native forest has been quietly regenerating through gorse, broom, mānuka and kānuka on the hills around Wellington, for instance, or on Banks Peninsula, despite human activity, not because of it.

We often hugely underestimate the natural resilience of native ecosystems, and tend to believe that Nature is largely dependent on us to restore what we so busily ravaged in the first place. Sometimes this all-too-human hubris produces outlandish claims. I once heard an American scientist earnestly proclaiming that the future of the planet now rests on our shoulders; we must take on ourselves the role of captain of space-ship earth, he said, guiding and controlling its functioning and its destiny. At the time I thought one might just as well ask rabbits to become managers of the Mackenzie Country.

I don't want to ridicule intensive management. It is one end of the management spectrum and can be so important that the survival of some species (e.g. kākāpō and *Pennantia baylisiana*) almost certainly depend on it. But I want to use the example of Banks Peninsula, and in particular Hinewai Reserve (surprise! surprise!), to show how appropriate, practical and scientifically interesting it often is simply "leaving it to Nature".

I hasten to add that our policy on Hinewai is not "zero management". I like Ian McCracken's (1993) term "minimum interference management". It means the removal of the most deleterious factors militating against natural regeneration and restoration such as exotic herbivorous animals, fire, aerially sprayed herbicides and a few seriously invasive weeds — and watching Nature run her fascinating course.

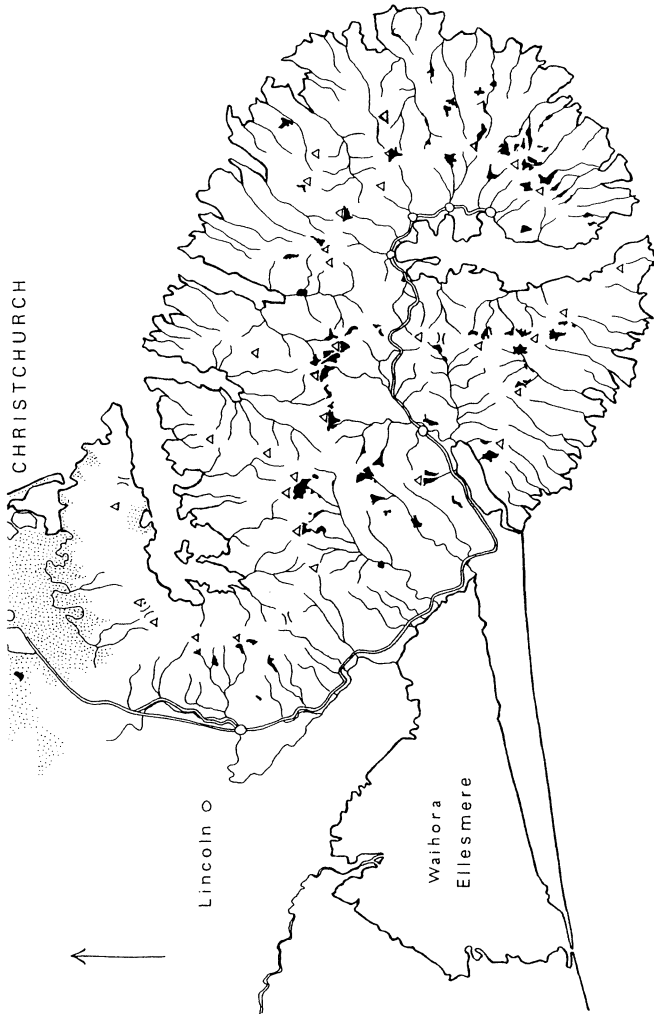


Fig. 1. Old growth native forest remnants around 1920 on Banks Peninsula.

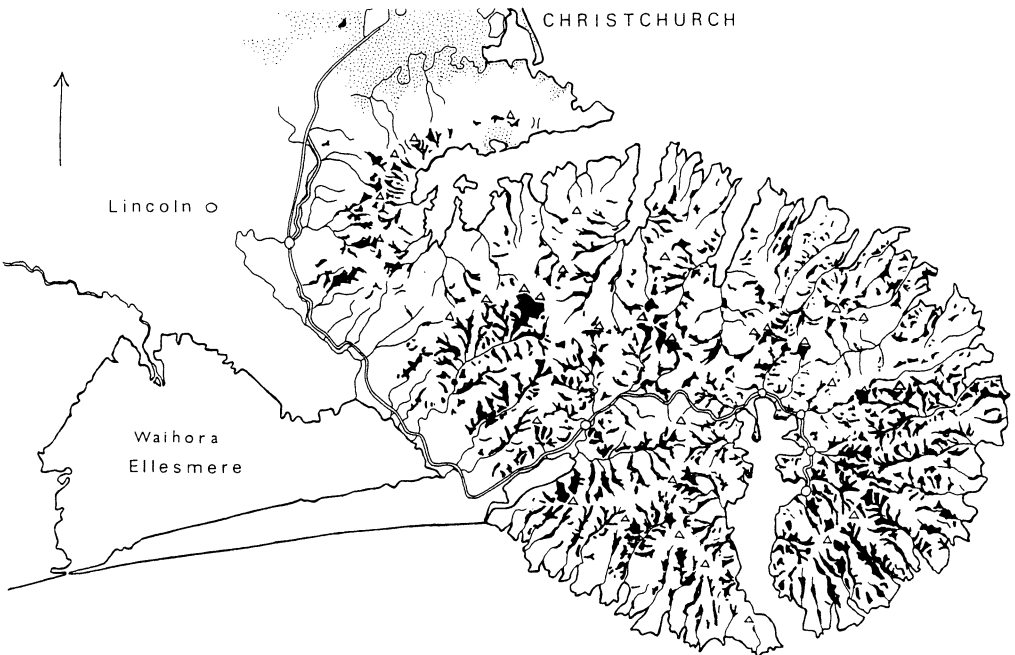


Fig. 2. Native forest cover around 2000 on Banks Peninsula.

It is instructive to consider what zero management has achieved. Before the arrival of human beings some 700 or 800 years ago Banks Peninsula was forested from side to side and from top to bottom, with a richly diverse fauna, including more than 100 bird species breeding here.

Polynesian settlement saw, over a few centuries, the loss of about one third of the forest cover, about 20 species of bird, unknown numbers of lizards, amphibians, fish and invertebrates, but perhaps no plant species.

European settlement saw the removal, within about 70 years, of nearly all the remaining forest, the extinction of a few plant species (surprisingly few though) and the loss of a further 26 or so birds. By 1920 less than one percent of the original old-growth forest remained (Fig. 1).

At the same time it is worth noting that the catastrophic transformation of the landscape benefitted some native wildlife (e.g. harrier, pipit, and blackbacked gull) just as it had some native plants (e.g. silver tussock, fescue tussock, snow tussock, bracken and kānuka) and favoured the establishment of breeding populations of birds that had previously appeared only as rare stragglers from Australia (e.g. silvereye, welcome swallow, white-faced heron and spur-winged plover).

Since 1920 the area occupied by native forest and scrub on the Peninsula has increased about 15-fold (Table 1, Fig. 2). I don't intend to undervalue the few people who actively encouraged or at least didn't hinder this trend. Some farmers fenced off bush from stock in those years and deliberately refrained from clearing kānuka and mixed native hardwoods that were taking over parts of their productive pasture. But virtually all of the increase in forest and scrub cover has happened without any human assistance at all. In fact it mostly happened in the face of some pretty determined attempts to arrest it or slow it down — using herbicides, burning, cutting, bulldozing, even goats set loose in the “scrub” to “clean it up”. In conservation terms, this was zero or even negative management.

One fascinating aspect of this natural regeneration is the reassertion of subtle patterns of plant distribution across the landscape. They are patterns that tell a rich and satisfying story — about the evolutionary history of this unique place, and about the interactions among all the ecological variables of a particular site: altitude, aspect, rainfall, soil fertility, drainage, landform, exposure to wind and drought, and competition with other organisms potentially able to occupy the same location.

Table 1. Banks Ecological Region. Proportions of native woody vegetation types calculated from systematic grid sampling on Hugh Wilson's botanical survey of Banks Peninsula 1983–1988. Total number of sample sites 1260. Areas are based on a rounded off figure of 100,000 ha for the whole region.

Vegetation	Number of sample sites	Percent of total	Area equivalent (ha)
A Old-growth podocarp hardwood forest	9	0.7	700
B Old-growth beech forest	1	0.1	100
C Regenerated hardwood forest	115	9.1	9100
[mixed canopy	[81	[6.4	
[kānuka dominant	[34	[2.7	
D Regenerated treeland (i.e. trees spaced across pasture or other short vegetation)	34	2.7	2700
E Regenerated native scrub	35	2.7	2700
Total area	194	15.3	15300



Tōi or broadleaved cabbage tree, *Cordyline indivisa*. The isolated natural population on Banks Peninsula is the only known Canterbury occurrence of this species. (del. Hugh Wilson).

Figs 3–5 illustrate a few out of innumerable examples of such patterns on Banks Peninsula. In these cases, some strongly determining environmental variables could be summed up as follows:

- (1) average rainfall along a line of same-altitude increases from a drier west to a wetter east.
- (2) average rainfall increases sharply with increasing altitude.
- (3) average temperature decreases with increasing altitude.
- (4) the oceanicity of the climate increases from a slightly more continental climate in the west (chiefly reflected in greater extremes of summer warmth and winter cold) to a slightly more oceanic climate (with slightly cooler summers and warmer winters) in the east.

Convolvulus waitaha is a low-growing, drought-resistant, patch-forming, shortly-trailing herb which thrives in drought-prone, short patchy grassland around the drier perimeter of Banks Peninsula, but which is unable to compete with taller vegetation under a higher rainfall regime. Thus its distribution is broad across the map in the drier west, but increasingly narrows to the drier coastline eastwards, until even the coast is mostly too damp for it in the extreme east (Fig. 3).

Cyathea dealbata (silver tree fern) shows an opposite pattern. Although the most drought-tolerant of the Peninsula's six tree fern species, it still requires moderately high rainfall. Thus in the drier west it is restricted to the highest, wettest parts, fanning out eastwards until in the extreme east even the coast is wet enough for it (Fig. 3).

Cyathea medullaris (mamaku or black tree fern) is near the edge of its climatic tolerance on Banks Peninsula. It is entirely restricted to the most oceanic of the three ecological districts of the Peninsula. Even here its limited distribution pattern makes manifest its precise requirements (Fig. 4). Increasing altitude provides enough rainfall but insufficient warmth. Decreasing altitude provides enough warmth but insufficient rainfall. Where these two opposing trends cross on the landscape, there mamaku grows, in a narrow band. The band is wider where valleys slope more gradually, such as in the Stony Bay Valley.

Rhopalostylis sapida (nīkau palm) has a similar distribution pattern (Fig. 5), except that because nīkau is slightly more drought-tolerant and slightly more warmth-dependent than mamaku, the band is a little closer to the coast.

My suggestion is that 'intrusive management' has the potential to scramble and blur these and a thousand other patterns. It is one of the things that worry me a little about planting programmes — at least anything other than programmes that

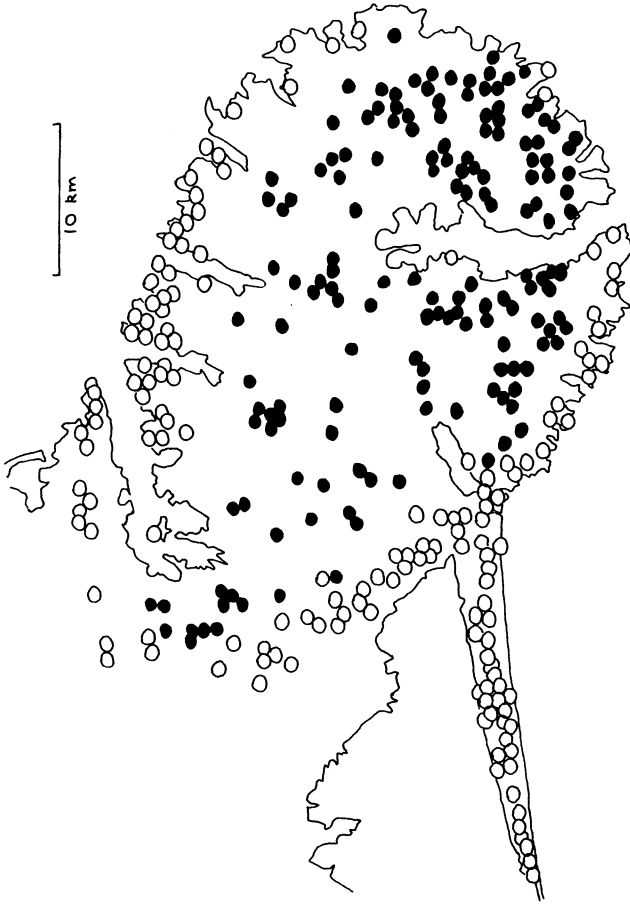


Fig. 3. Distribution of *Convolvulus waitaha* (open circles) and *Cyathea dealbata* (closed circles) on Banks Peninsula.

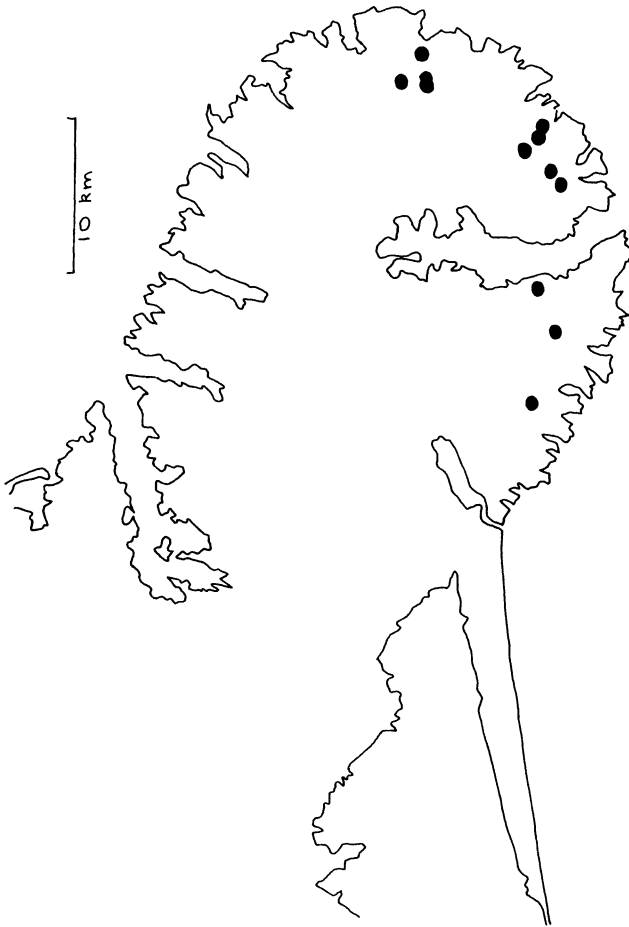


Fig. 4. Distribution of *Cyathea medullaris* on Banks Peninsula.

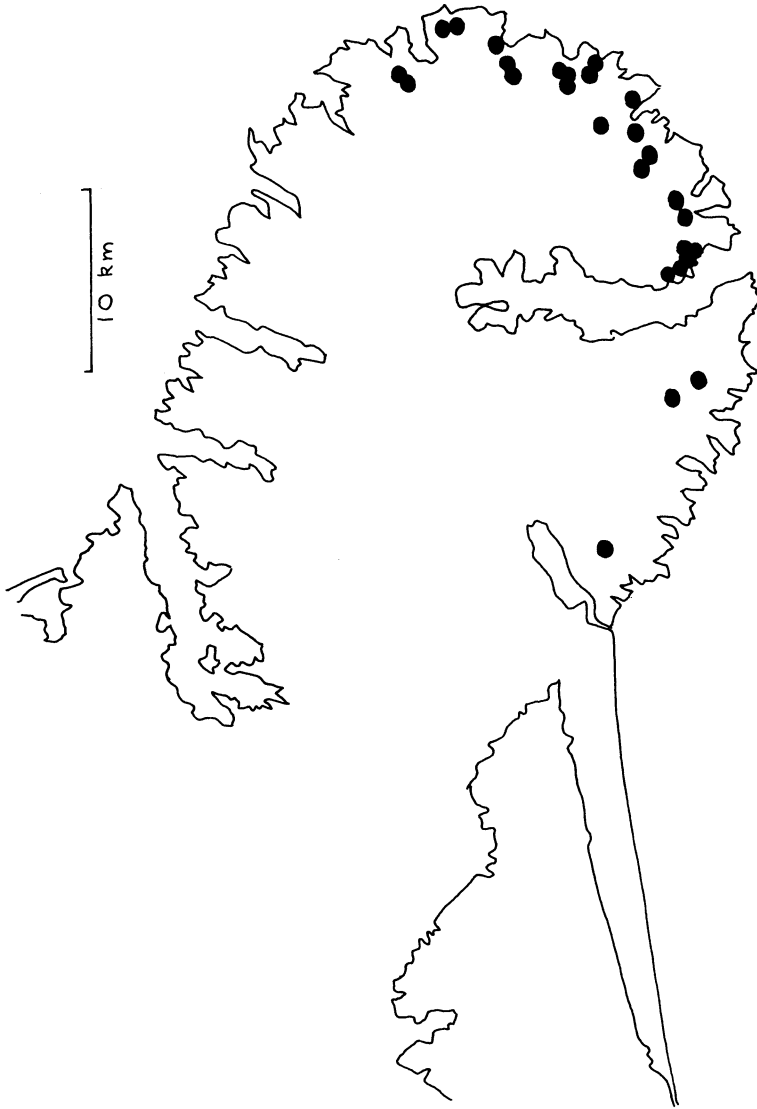


Fig. 5. Distribution of *Rhopalostylis sapida* on Banks Peninsula.

aim to establish a fast-growing successional canopy. Leaving it to Nature to put what she wants where, seems to me to be hugely more interesting and appropriate. The patterns of natural re-establishment are much more subtle than simply making sure you plant stock from the same ecological district or even within a kilometre of your site (see Eric Godley's (1972) excellent cautionary article in *Forest and Bird*). There's a risk that planting can be a bit like adding misplaced notes to a beautiful piece of music, or random words to a precisely crafted poem, or the odd indulgent paragraph to a carefully constructed novel. Plantings, introductions, and other intensive manipulations can spoil a good story, or jar a lovely melody. We might think we know what we are doing, but, alas, what we are best at is blundering! That's one good reason for erring on the side of not interfering with natural regeneration.

Here's another consideration. Intensive management must always be local and limited; we will never have the resources to do it on a big scale even if we did think that would be a good idea. How, for example, could we hope to plant native forests on a big enough scale to be in any way significant for carbon sequestration under the Kyoto Protocol, (especially given our reluctance to tackle our obsessive, drug-like addiction to the squandering of fossil fuel?). It is a relief to know that Nature is a million times better at planting a forest than we are!

Hinewai Reserve is, I think, a refreshing example of the practicality and the scientific interest of a minimum interference management approach (Wilson 1994).

Beginning in 1987 we (the Maurice White Native Forest Trust) began to buy up land in the SE corner of Banks Peninsula to "manage" for conservation goals. We stated these goals simply in our Management Guidelines: "*to foster the protection and restoration of indigenous vegetation across the whole block for reasons of botanical value and interest, biological diversity, genetic conservation, wildlife habitat, beauty, science, heritage and recreation*". Management principles are equally simply stated: "*The basic philosophy is to allow natural succession to run its course towards a vegetation cover similar to that prevailing before human disturbance. It is as important to know when not to interfere with the natural course of things as to know when a degree of interference or manipulation might help. Our overall guideline is "minimum interference"*".

Obviously, restoration to pre-human condition is an ideal unattainable for several reasons, not the least of which is the extinction of many bird and insect species and at least a few plants, fish, reptiles and mammals (bats). Furthermore, the elimination of many introduced biota is probably impossible.

So, always trying to err on the side of “minimum interference”, we simply work towards removing or reducing the really obvious impediments to natural restoration of a vegetation and fauna as close as is now possible to its ‘pre-human-arrival’ state. Thus we go all out to remove introduced grazing and browsing mammals, both wild and farmed, because the benefits are relatively simple and clear-cut. Conversely, at our present level of understanding, we don’t target introduced predators. The consequences of doing so are much more complex than targetting possums, goats and sheep. We can easily catch a few cats, ferrets and stoats, for example, but even if we did have the resources to make a significant impact on their numbers (which we don’t), it is dubious whether that would produce any benefit. Most of the cat and ferret scat we find contains fur, not feathers; these predators prey much more heavily on mice and rats than on the surviving bird species, which seem to be in some sort of equilibrium with the predators. (Those bird species that couldn’t achieve this equilibrium, like piopio, saddleback and mōhua, are long gone, alas!) We don’t actually know, but strongly suspect, that if we did hammer the cats, ferrets and stoats, one result might be more numerous rats, which could well be more detrimental to some birds and invertebrates than an ‘unmanaged’ cat-rat balance. Until we know more, or until we have the resources to tackle the rats at the same time, it seems better not to interfere. An exception to this conclusion involves ferrets, cats, stoats and penguins along the coast, beyond Hinewai’s current boundaries; here, local predator control seems unequivocally positive for penguin populations.

Planting is another interesting case. We have planted specimen trees and shrubs in ‘arboreta’ close to the two homesteads, and these have developed in to excellent scientific and aesthetic assets. We have also planted fast-growing colonising trees in to small areas of ungrazed exotic grasses where natural invasion by woody plants is slow. And we’ve planted similarly along some boundaries where the law demands that we keep a 10 m strip (threatened to increase to an absurd 20 m for no known practical or scientific reasons) clear of gorse and broom in deference to farming neighbours. But let’s be honest. For every tree we laboriously propagate from strictly local sources, plant out (possibly in an unsuitable place), protect with exclosures, and weed, Nature is planting millions. Just as we overestimate our importance as managers, how we underestimate the quantity and efficiency of Nature’s production and dispersal of seeds and spores! One surviving kāmuka tree could easily repopulate our entire valley. One mamaku tree fern produces something in the order of 800 million spores each year; they undoubtedly reach every corner of Banks Peninsula and would readily reoccupy all sites suitable for this species if the progeny were not being constantly eaten by grazing mammals.



Fig.6. Vegetation Plot 3 at 230 m in the Ōtānerito Valley, Hinewai Reserve, in January 1989, immediately after removal of mammalian browsing in 1988, under gorse canopy.



Fig.7. Vegetation plot 3, Hinewai Reserve, in January 1992, three years after the removal of mammalian browsing in 1988, showing natural regeneration of shade-tolerant native forest species under 15-19 year-old gorse canopy. The two most obvious regenerating species are *Melicytus ramiflorus* and *Solanum aviculare*.

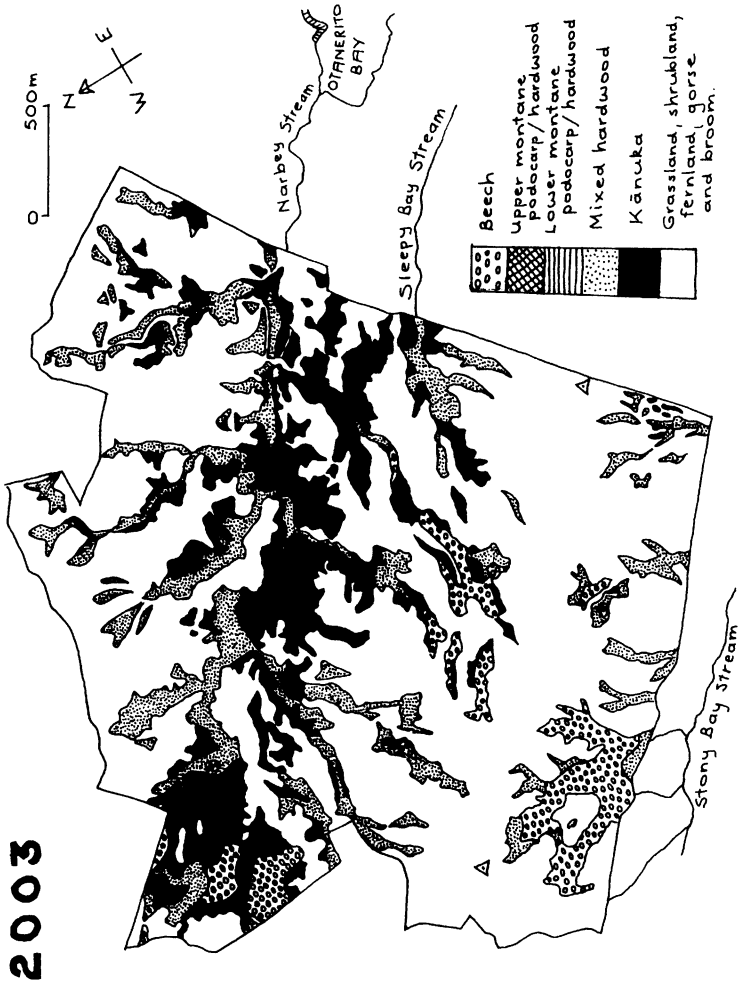


Fig. 8. Vegetation map of Hinewai Reserve, 2003.

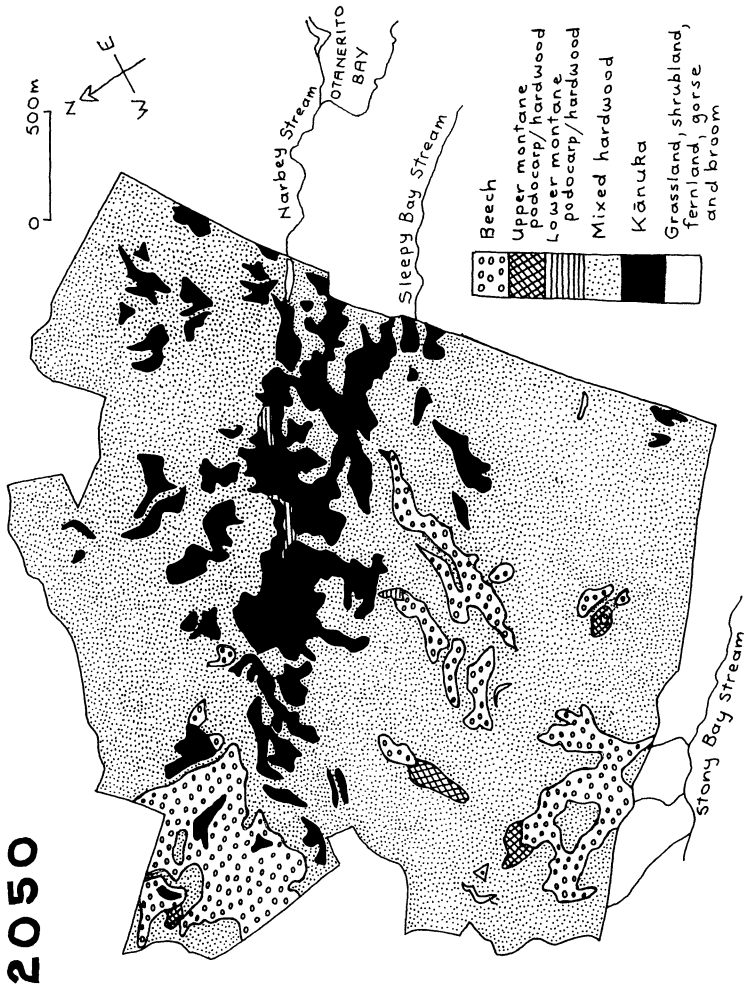


Fig. 9. Predicted vegetation pattern on Hinewai Reserve, 2050.

Compared with natural regeneration, our laboured efforts to help are puny at best, negative at worst. The time and effort involved in propagating, planting, protecting and weedpulling are really much better spent on herbivorous mammal control.

Huge amounts of time and effort could be wasted on weeding. Again, our management guidelines are simple: “*where exotic species assist in the reestablishment of native vegetation they will be left undisturbed, except where we are bound by requirements of noxious plants legislation along boundaries. Exotic species which threaten native vegetation or wildlife long-term will as far as possible be removed, but not if removal creates a worse disturbance than the presence of the exotic species itself*”. Gorse and broom are the outstanding examples. Left undisturbed over wide expanses of Hinewai, exotic gorse and broom are rapidly giving way to native species regenerating in their shade and shelter (Figs 6 and 7). Present vegetation patterns are shown in Fig. 8. The vegetation pattern predicted for 2050 is shown in Fig. 9.

Meanwhile we are constantly alert for any appearance of a handful of species on a black list, notably sycamore (*Acer pseudoplatanus*), Monterey pine (*Pinus radiata*) and old man’s beard clematis (*Clematis vitalba*); these are removed on sight. We thought that Himalayan honeysuckle (*Leycesteria formosa*) might prove a problem, but our monitoring shows that, while still abundant, this species is being steadily out-competed by native wineberry, fuchsia and māhoe on our relatively fertile soils.

We did put in a major weeding effort after we harvested about 11 hectares of mature *Pinus radiata* plantation in the summer of 1997–98. We used cable-logging to minimise soil disturbance, and asked the loggers to leave as much slash as possible across the steep slopes, to form favourable conditions for the establishment of natives. Regeneration of both gorse and natives is abundant, but so too were hundreds of thousands of pine saplings. *Pinus radiata* does not regenerate under shade — there was only one main flush of germination immediately after the ground was opened up to light — but it grows fast enough to keep its head above most of the competition, and it is a tall, long-lived tree which would have formed the canopy for more than a century. So we decided to interfere and eliminate it. It has taken us five years to complete the job, and you can judge whether you think this exercise was minimum or intensive management!

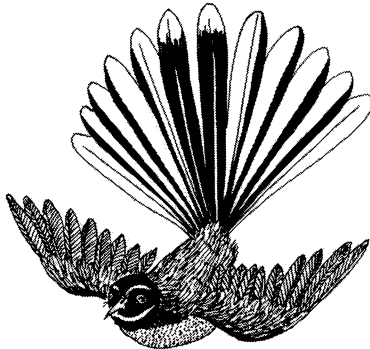
Minimum interference management might sound like a relaxing programme, in which we can retire to the verandah and watch the forest grow. Why then am I working as hard now as I have ever done in my life? In reality, Nature still seems to leave us an awful lot to do. Our biggest tasks are:

- (a) keeping boundary strips clear of gorse and broom along our 17 km frontiers;
- (b) maintaining more than 12 km of foot tracks through the reserve, a network primarily for management access but open to the public and used by about 6000 people a year;
- (c) controlling numbers of grazing and browsing mammals (currently possum-trapping uses up most of this effort);
- (d) managing our interface with the public and with our wide human support base (a newsletter is posted out to about 900 addresses twice a year) and,
- (e) monitoring and recording.

Nevertheless, Nature is doing all the serious work of ecological restoration. The trouble is, human beings have a sort of fetish for control, a lust to manage and manipulate and interfere. It is not always easy to step back and admit that Nature can do it a lot better on her own.

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Fantail, Pīwakawaka, *Rhipidura fuliginosa*. One of the most common, widespread and best-loved birds in New Zealand, the fantail thrives in both natural and modified habitats but is particularly at home in regenerating native forest. (del. Hugh Wilson).