References

Edgar, E. & Connor, H. E. 2000: Flora of New Zealand Vol. 5. Gramineae. Manaaki Whenua Press, Lincoln.

Jacobs, S. W. L. & Hastings, S. M. 1993: *Cortaderia*. Pp**.** 565-566, G. J. Harden (ed.) Flora of New South Wales. Vol. 4. NSW University Press.

Knowles, B. & Ecroyd, C. 1985: Species of *Cortaderia* (pampas grasses and toetoe) in New Zealand. *Forest Research Institute Bull. 105.*

Morris, D. I. 1994: Cortaderia. Pp. 318-322 in W. M. Curtis & D. I. Morris, Student's Flora of Tasmania. Part 4B. St David's Park Publishing, Hobart.

Walsh, N. G. 1994: Cortaderia. Pp. 546-548 in N. G. Walsh & T. J. Entwisle (eds.), Flora of Victoria. Vol. 2. Inkata Press.

Zotov, V. 1963: Synopsis of the grass subfamily Arundinoideae in New Zealand. *New Zealand Journal of Botany 1*: 78-136.

What, no Maori name?

Jack Mackinder

Mike Wilcox ends his article on *Sigesbeckia orientalis* in the last Journal with the curious statement "It does not seem to have a Maori name".

But in Kirk's Students' Flora, 1899, on p. 318 the entry for *Siegesbeckia orientalis* gives the Maori name punawaru. And punawaru appears in Cheeseman's Flora, 1925, on p. 990; in Allan's Flora, 1961, on p. 1004; in H. W. Williams *A Dictionary of the Maori Language*, 7th edn 1975, on p. 310; in B. Biggs *Complete English-Maori Dictionary*, 1981, on p. 176; and in Jim Beever's *A Dictionary of Maori Plant Names*, 1st edn 1987, on p. 33 and p. 58, 2nd edn 1991, on p. 33 and p. 59.

Also curious is the spelling of the generic name, sometimes *Siegesbeckia*, sometimes *Sigesbeckia*. Linnaeus named the plant "after his bitter opponent Johann George Siegesbeck (1686-1755)" — Smith, Stearn, Smith *A Gardener's Dictionary of Plant Names*, 1972. Seems Linnaeus, not content to insult Siegesbeck with a small-flowered weedy plant, misspelt his name as well.

Coastal forest saved at Waikawau Bay, northeastern Coromandel

Ewen K. Cameron

In 2002 a prime piece of privately owned coastal property at northern Waikawau Bay, northeastern Coromandel, was advertised for sale as 'Jewel in the crown' (*NZ Herald* 12 Oct 2002: 16). On 18 Dec it was stated (*NZ Herald* feature: Environment) that American banker Paul Kelly had gifted this property worth $3.5 million to the Auckland University to help fund an expanded Business School and that it was the university who was selling it. There was a public plea for the Government to "Save a bit of coastal heaven" from the Thames Coromandel mayor, Chris Lux. This was followed on 16 Jan 2003 (*NZ Herald*) by Environmental Defense Society (EDS) warning off potential buyers of the university's land if they had intentions of subdivision because they would oppose it. EDS and the Conservation Minister Chris Carter pressurised the university, calling its intention to sell to the highest bidder "outrageous". On 10 Feb the Prime Minister asked the varsity to rethink (*NZ Herald*: A3), and 1 March it was announced that the Government's tender of $3.54m was the highest, with $2m coming from the Nature Heritage Fund - Waikawau forest was now in public ownership and everyone was happy (*NZ Herald*: A11). During the public debate I was asked in December by the Nature Heritage committee if I had any knowledge of the botanical values of the land. It was one of those unusual times when I had more data than I could supply in the short time frame so I passed on the salient points – see below. I am thrilled that the Department of Conservation will now be responsible for the management of this property.

Summary of northern Waikawau Bay vegetation values

The following observations are based on 12, almost annual, weeklong trips (family holidays) to the northern Waikawau area by the author from Jan 1991 to Sep 2002. A full vascular plant list for the area is held by the author and will be published in the future. So far I have only published on the flora of an adjacent rocky islet, Kawetoto Reef (Cameron 1992, 1999), adjoining to the Kelly property.

Introduction

The dissected property (here referred to as the Kelly property) at the north end of Waikawau Beach occupies 149 ha, a high ridge (to 203 m asl) and 2 main valleys that drain by small permanent streams to the south: one into the estuary and the other onto the northern part of the Waikawau Beach by Kawetoto Reef (Figs. 1 & 2). Both these catchments are totally within the property. There are also several smaller, steep valleys, with no permanent streams, directly draining to the east onto the rocky coast north of Kawetoto Reef. The vegetation of the property marked "bush" on Fig. 1 varies from rough pasture (c.20%), manuka (*Leptospermum scoparium*) and kanuka

(*Kunzea ericoides*) at different ages (c.50%), to advanced regenerating forest and mature coastal forest (c.30%). The property has had a long history of browsing by farmed cattle (few internal fences), feral goats (eradicated over the last two years) and feral pigs.

Vegetation and Flora

The Kelly property was main area surveyed by me, but I also included the adjacent estuary, dune areas south of the estuary and the forest a little north of the Kelly property. See Table 1 for the vascular plant diversity of this total area divided into habitats. Some two thirds of these records are vouchered in the herbarium of the Auckland Museum (AK). The diversity is exceptionally high for such a relatively small area. Virtually all the Forest, Coastal Cliffs and Pasture records came from the Kelly property. Some of the other records are also included because the property also contains a small amount of sand dune, estuarine margin and freshwater habitat.

The mature forest on the steep slopes on the north side of the estuary contains large emergent trees of pohutukawa (*Metrosideros excelsa*), above a canopy of kohekohe (*Dysoxylum spectabile*), puriri (*Vitex lucens*) with trunks up to 1.5m diameter, karaka (*Corynocarpus laevigatus*) with occasional taraire (*Beilschmedia tarairi*), tawa (*B. tawa*) and rewarewa (*Knightia excelsa*). Nikau palms (*Rhopalostylus sapida*), tree ferns (*Cyathea dealbata, C. medullaris, Dicksonia squarrosa*), and small trees like mahoe (*Melicytus ramiflorus*) and pigeonwood (*Hedycarya arborea*) usually dominate the understorey. Common shrubs include kawakawa (*Macropiper excelsa*), *Rhabdothamnus solandri*, rangiora (*Brachyglottis repanda*), *Coprosma rhamnoides*, mapau (*Myrsine australis*), hangehange (*Genistoma rupestre*) and by the coast haupara (*Pseudopanax lessonii*). Ferns and grasses form the main ground cover. Common vines include climbing rata (*Metrosideros diffusa, M. fulgens, M. perforata*), clematis (*Clematis cunninghamii, C. paniculata*), supplejack (*Ripogonum scandens*) and bushlawyer (*Rubus cissoides*). The main large epiphyte is *Collospermum hastatum.*

No mature kauri (*Agathis australis*) forest exists, but regenerating kauri is present in two areas with trees up to 0.8m in diameter. The usual kauri associates are also present: trees – tanekaha (*Phyllocladus trichomanoides*), rimu (*Dacrydium cupressinum*), white

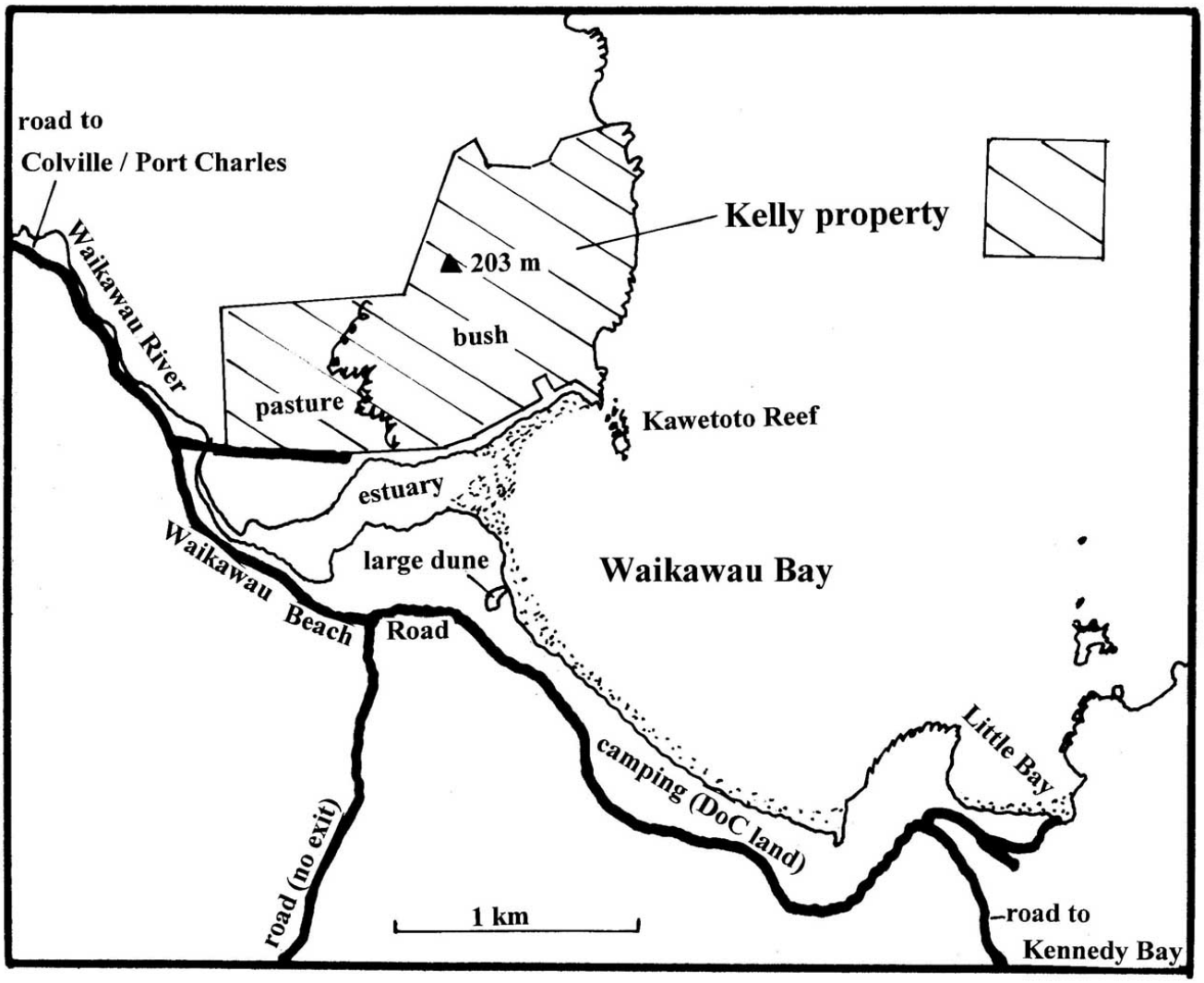

Fig. 1. Location of the Kelly property at northern Waikawau Bay.

Fig. 2. Portion of northern Waikawau Bay forest recently purchased by the Crown, looking down to Kawetoto Reef at low tide. Photo: Sep 1993.

maire (*Nestegis lanceolata*), mamangi (*Coprosma arborea*), hinau (*Elaeocarpus dentatus*); shrubs – toropapa (*Alseuosmia macrophylla*); ferns – mangemange (*Lygodium articulatum*), kidney fern (*Trichomanes reniforme*); ground tussocks – kauri grass (*Astelia trinervia*), *Gahnia pauciflora*; and orchids (*Acianthus sinclairii, Ichthyostomum pygmaeum, Diplodium alobulum* (*Pterostylis alobula*)*, Pterostylus banksii*). Kanuka is also present.

The coastal slope north of Kawetoto Reef locally contains steep slopes of tall kanuka, toro (*Toronia toru*), *Pittosporum umbellatum*, pohutukawa (regenerating), mahoe and tarata (*Pittosporum eugenioides*). Large pohutukawa also exist on mainly eaten out slopes now reduced to rough grassland.

The kanuka forest is very variable depending on the age, slope and aspect. Where it has a short stature (2-4m) the kanuka can be so dense little grows under it. But taller kanuka areas contain good regeneration of various canopy and shrub species. Where the areas have been heavily browsed shrubs such as mingimingi (*Leucopogon fasciculatus*), prickly mingimingi (*Cyathodes juniperina*) and *Coprosma rhamnoides* may dominate the understorey. The native iris, *Libertia grandiflora*, is locally common in such an area.

Along the NE boundary just below the ridge manuka dominates, 2-4m tall, on very poor clay soils. Here some 'gumland' species are present such as: *Pomaderris* (*P. kumeraho, P.* aff. *phylicifolia*), *Schoenus tendo*, *Morelotia affinis*, danthonia (*Rytidosperma* spp.), orchids (*Stegostyla atradenia, Orthoceras novae-zelandiae, Thelymitra* spp.) and *Lindsaea linearis*.

Small dunes at the back of the northern Waikawau Beach are dominated by spinifex (*Spinifex sericeus*) and pingao (*Desmoschoenus spiralis*). *Carex pumila* is common along the stream margins through the dunes, and further upstream is a small browsed freshwater wetland where *C. lessoniana* is common, and behind this are many adult cabbage trees (*Cordyline australis*) surviving the grazing. Just west of here at the back of the beach on a coastal slope (W-facing) is an unusual shrubland of pure *Corokia cotoneaster* covering c.30m x 30m containing c.100 adult plants.

Fauna

Mammals seen: farmed cattle, feral goats (eradicated 1-2 yrs ago), possums (during 2002 bait stations were placed along the main ridges for possums & rats), feral pigs and stoats. The cattle were eating out the forest understorey, pugging the soil and adding to the siltation of the streams. Possum browsing was particularly evident on pohutukawa, kohekohe and houpara, and some individual trees appeared to have been killed by possum browsing. Forest birds seen: kereru, tui, bellbird, grey warbler, fantail, morepork, kingfisher, shining cuckoo (seasonal), silvereye, harrier, eastern rosella, blackbird, song thrush, chaffinch and dunnock. Fish seen in the two permanent streams: giant bully, common bully, banded kokopu, inanga and eels. Koura and freshwater shrimps are also present.

Future

Most of the forest has been struggling to regenerate because it is being selectively browsed on all but the steepest slopes. The recent removal of goats and the addition of bait stations for possums and rats should greatly assist the native regeneration. Regeneration would also be assisted if the cattle could be removed. Naturalised exotic species have mainly established where browsing has damaged the native vegetation. Aggressive environmental weed species are mainly absent or very local and include pampas grass (*Cortaderia selloana*), *Cotoneaster glaucophyllus*, Mexican devil (*Ageratina adenophora*) and kikuyu grass (*Pennisetum clandestinum*).

Natural values

The property has the best accessible coastal forest in the area, which also possesses extremely high plant diversity and forms the backdrop to the popular beach. The Crown owns the adjacent beach, a camping ground (available to all) and some of the forested hinterland. But in the general area it doesn't own any mature coastal forest. The Kelly property would complement (visually and in terms of its biota) the adjacent Crown land of sand dunes, estuary and

freshwater wetlands. Coastal forest is one of the least protected habitats in New Zealand. It would be a great loss if this coastal forest isn't legally protected and managed for its natural values.

Table 1. Vascular flora totals for northern Waikawau forest and scrub (F), estuary (E), dunes (D), freshwater (FW), open coastal cliffs and open rocky outcrops on ridges (CC) including Kawetoto Reef, rough pasture adjacent to the other areas (P), and their combined flora (4 native hybrids excluded)

Plant group	F	E	D	FW	CC	P	Totals
Native ferns	60	-	3	2	11	3	62
Native conifers	6	-	-	2	-	-	7
Native dicots	97	24	15	8	36	25	129
Native monocots	62	21	15	17	23	7	92
Adventive conifers	-	1	2	-	1	-	3
Adventive dicots	38	25	42	14	36	57	112
Adventive monocots	8	17	17	8	24	21	48
TOTALS	272	87	94	51	131	93	453
% native	83	51	35	58	54	16	64

Footnote – in a recent article on the role of the Nature Heritage Fund by Keith Lyons (Forest & Bird 308: 24-27, May 2003) the purchase of the coastal forest at Waikawau Bay was given as an example of the usefulness of the fund. But note that the two accompanying colour photos: one clips off the eastern part of the purchased property (p.24); and the other (p.25) isn't of the right property.

Acknowledgements
To Des Osborne, former owner of the Kelly property, for permission to survey and collect herbarium specimens; Robert and Jamie Cameron for field assistance; Sandra Audley and Erica Doran for the use of their Waikawau bach.

References
Cameron, E.K. 1992: Vascular flora of Kawetoto Reef, Waikawau Bay, Coromandel Peninsula. *Auckland Botanical Society Journal 47(1)*: 29-31.
Cameron, E.K. 1999: Flora and fauna of a rocky islet, eastern Waikawau Bay, Coromandel Peninsula. *Tane 37*: 153-158.

The Awhitu Pohutukawa Tree

Graeme Platt

During late December of 1996 I was visiting Wayne and Trish Aspin's Farm at Matakawau north of Waiuku on the Awhitu Peninsula. The multitude of crimson – flowered pohutukawa trees (*Metrosideros excelsa*) located on the peninsula were ablaze with colour at the time.

During the course of the conversation regarding these trees the Aspins mentioned that the largest pohutukawa tree they had ever seen was located on a farm in Hamilton Road, Awhitu Central, a few kilometres up the road. It wasn't long before we were in the car heading in the direction of this tree. The topography of the land was like so much of New Zealand, completely unique to the locality. Much of the coastal land north of the Waikato and on the Awhitu Peninsula was formed in relatively recent times by drifting sand creating massive sand dunes now stabilised and covered in pasture with remnant patches of native bush in places.

Scattered groves of pohutukawa trees covered some of the hills in open forest more akin to Australian eucalypt forests than typical New Zealand native bush. After walking across grassy paddocks and through an open grove of superbly flowering trees, there was the giant, a tree fully deserving of a place amongst the nobility. With a branch spread of over 53 metres and a basal circumference of 15 metres (measured in December 2002) this tree clearly was no ordinary tree. The question is how do you measure these great old pohutukawa trees? Trees are normally measured at their highest point and the girth is measured at breast height. The Awhitu tree at breast height has massive spreading lateral branches. By bending the rules and measuring the girth at knee-cap height a more realistic measurement is achieved. With a height of 19 metres the Awhitu pohutukawa tree is not particularly tall tree by the normal standard of trees and yet it remains one of largest *Metrosideros excelsa* trees anywhere on earth. The total mass of this tree is enormous for any tree and most of its mass of radiating branches