

Tatangarau, Awhitu - vegetation and flora

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On 8 February 1994 I surveyed the vegetation and flora of part of the north side of the Tatangarau Valley, mainly on the property of Garth & Vivienne Cumberland, which is part of "Boiler Gully Farm" on the Awhitu Peninsula. The reason for this survey was to record the value of the native vegetation in the hope that the owners would be persuaded not to clear part of it for exotic forestry. Although the Forestry Resource Consent was granted in March, no clearing has occurred yet (July 1994). I spent four hours in the field accompanied by Waatara Black and Tania Cumberland.

Introduction

The Auckland Region is divided into 11 Ecological Districts. Awhitu Ecological District is one of the smallest by area and has one of the lowest amounts of natural cover at only 9% (ARC, 1994). Eighty four percent of this native cover is scrub (generally < 6 m tall) and only 16% is forested (ARC, 1994). Less than 20% of the total native cover has any form of legal protection.

Northern Awhitu Ecological District (partly from McEwen 1987)

The geology is mainly terraced Pliocene, Pleistocene and Holocene fixed dunes with local drifting Holocene sand dunes. At Manukau Heads the altitude reaches 285 m above sea level and many valleys are deep and dissected. There is little published information on the vegetation but the original forest would have been mainly broadleaf (taraire/puriri/kohekohe) with nikau and varying amounts of podocarps (kahikatea/totara/tanekaha). Kauri was and is locally common. Areas of kawaka forest (G. H. Campbell pers. comm.) and gullies with para, king fern (pers. ob.) are present. Some very large examples of pohutukawa are found near the coast and on exposed ridges. In the west there are dune communities and to the east there are mangroves.

Unusual fauna include frequent fernbirds and banded rails, and there is an extremely high diversity of small land snails in the bush remnants.

The District has been highly modified by Polynesian clearances, timber milling, gum digging and clearances for farms.

Tatangarau Valley Vegetation

The large Tatangarau Valley is some 6.5 km long, draining from west to east, and contains one of the few running streams of the peninsula, the Tatangarau Stream (unnamed on the topographical map R12). The forest cover varies but the steeper northern side contains the most extensive cover whereas the south side has pasture, gorse (Latin names for common or Maori names are given in the Appendix) and teatree areas with forest mainly limited to two tributaries. A raupo wetland important for wildlife is known to exist in the catchment (just above the surveyed area).

The forest surveyed was adjacent to and west of Tram Gully Road extending up the stream some 1.5 km and to the top of the escarpment on the north side of the stream (Fig. 1). (Map reference 260 R12 530566 to 547571, 20-120 m asl). The other forest areas in this catchment are under different tenure and were not examined, but a report by Green (1991) covers the three forest areas on Awhitu Farm Settlement which is contiguous with and due south of the area I surveyed (Fig. 1).

The area surveyed was: (a) a river-flat with a small stream and a mixture of mainly low natives, shrubby weeds and pugged pasture; (b) steep south-facing slope (escarpment) with regenerating native forest; and (c) upper slope mainly dominated with wildling pines.

(a) River-flat

The small meandering stream is 1-2 m wide. At least two tributaries feed into it from the surveyed block. The rather narrow river-flat contains extensively modified vegetation varying from: cattle-pugged pasture (on south side of stream); blackberry, Himalayan honeysuckle and bracken; low regenerating native vegetation, 1.5-3.5 m tall, commonly consisting of manuka, koromiko, mahoe, wheki, harakeke, putaputaweta and scattered emergent species of ti and kahikatea. Locally along the northern boundary of the river flat are groups of regenerating kahikatea and the occasional totara and pukatea, 8-16 m tall. Local areas of sedgeland also exist close to the stream where *Baumea rubiginosa*, *Carex* spp., *Isachne globosa* and kiokio dominate. The aquatic weeds of water celery and *Potamogeton* were only seen close to Tram Gully Road. Green (1991) records a small area of mature kahikatea river-flat forest with pukatea, rimu, puriri and totara slightly further up the river (R12 526565).

(b) Escarpment

The escarpment is predominantly steep and covered with regenerating forest on consolidated sand. The canopy is extremely varied in height (c. 3-5 m tall) and species composition with a wide variety of emergent species up to ca. 16 m tall. The common emergents are kahikatea, rewarewa and toru. Kauri, tanekaha, totara, titoki and maritime pine are more local emergents. The dominant canopy species are mahoe, kanuka, wheki and tawheowheo.

In the damper areas mamaku, putaputaweta and pate are common, along with the climber kiekie and ground fern species such as pakau, nini and *Blechnum membranaceum*. In one small group of regenerating kauri, many of the species usually associated with kauri are present, for example: tanekaha, shiny karamu, toru, tawheowheo, toropapa and the ferns mangemange, waewaekaka and common maidenhair.

(c) Upper slope

This area is relatively steep and is dominated by dense to medium dense wildling pine trees up to 23 m tall. The upper boundary is marked by a sharp change to a band of grazed pasture on a plateau. North of this band is a recently established radiata pine plantation. By far the majority of the trees on the upper slope are maritime pines with a few radiata. This belt of pines is very narrow (or non-existent) on the steepest slopes and over 75 m wide on the lesser gradients. Under the pines is a low canopy, 2-3 m tall, where manuka, mingimingi, prickly mingimingi, gorse and *Coprosma rhamnoides* dominate. Two species of *Hakea* shrubs are local. Cattle damage is frequent (the whole area is unfenced) and the soil is dry and crumbly sand. Despite this, seedlings of karamu, hangehange, toru and mapou are common. In the damper areas mamaku, putaputaweta and wheki are common.

The Flora

The total vascular flora for the surveyed block is 114 species (Table 1). For the total species list with abundances see the Appendix. Although 20% are adventive (non-native), most of these are herbaceous and are a minor element to the vegetation. The exception to this is the pines.

Table 1: Vascular flora

Plant group	Native	Adventive	Totals
Ferns & fern allies	20	-	20
Gymnosperms	5	2	7
Dicotyledons	39	11	50
Monocotyledons	27	10	37
TOTALS	91	23	114

The flora is quite diverse and with more field work the number of species recorded would increase. Without surveying most of the Awhitu forest remnants, it appears that this forest type is unusual in the District because the four commonest species (taraire, tawa, puriri, karaka) seen in roadside forest remnants a little to the south, were not recorded in the surveyed block.

The abundance of tawheowheo at such a low altitude is unusual and toru is rather local in its distribution around Auckland.

Discussion

The local absence of the four large-seeded tree species (taraire, tawa, puriri, karaka) is probably related to the scarcity in the area of its only seed vector, the kereru (NZ pigeon). A less-likely explanation is that the coolness of this south-facing slope deters the establishment of these not-so-hardy species.

The presence of tawheowheo and toru is probably a reflection of this valley being kauri forest in the past. The south-facing escarpment would be cool and damp which would account for the low altitude, at this latitude, for the presence of tawheowheo and kiwakiwa.

The Tatangarau Valley, including the area surveyed, is part of the most extensive native cover remaining in the Awhitu Ecological District. Wherever possible all remaining native cover should be protected because so little remains in this Ecological District.

Pines will only establish in the open, so most of the non-pine bush is no longer susceptible to pine invasion. To aid native regeneration back to a healthy forest, ring-barking of the lower isolated pines on the escarpment is recommended. Attempting to extract these isolated trees would be damaging to the existing bush for a very small financial return. The pines on the upper slope could be extracted from above with a minimum of damage. This would open the area up and make it susceptible to reinvasion of pines. To combat this I suggest a combination of weeding wildling pines and assisting local native regeneration by laying manuka slash on the bare surfaces in the autumn-winter period directly post harvest. Ideally the upper boundary fence could be established at the top of the escarpment to exclude stock.

The lower boundary also requires fencing, ideally on the south side of the river flat. Fencing would allow the wetland to regenerate, complementing the important raupo wetland further up the catchment. Protecting the vegetation indirectly protects the fauna (birds, landsnails, freshwater fish, etc.) and the precious running water of this valley system.

Consideration should be given to legally protecting all the native vegetation with a Queen Elizabeth II Trust covenant. This land would then be eligible for rate relief from Franklin District Council and QEII may subsidise the desired fencing.

To maintain the integrity of the vegetation and its scientific value, it is important that no native plantings are propagated from plants outside the Awhitu Peninsula. Note a very diverse native seed source is already present. Once the regeneration has covered over the extraction scars the area should be fairly resilient to future pine invasion.

Most of Awhitu Peninsula has lost its native cover. The forest surveyed most likely only exists because it is on steep, south-facing land which is not suitable to develop. In an Ecological District where native cover is so limited, it would be good to extend and unite one of the largest concentrations of forests and wetlands remaining, e.g. in the Tatangarau Valley.

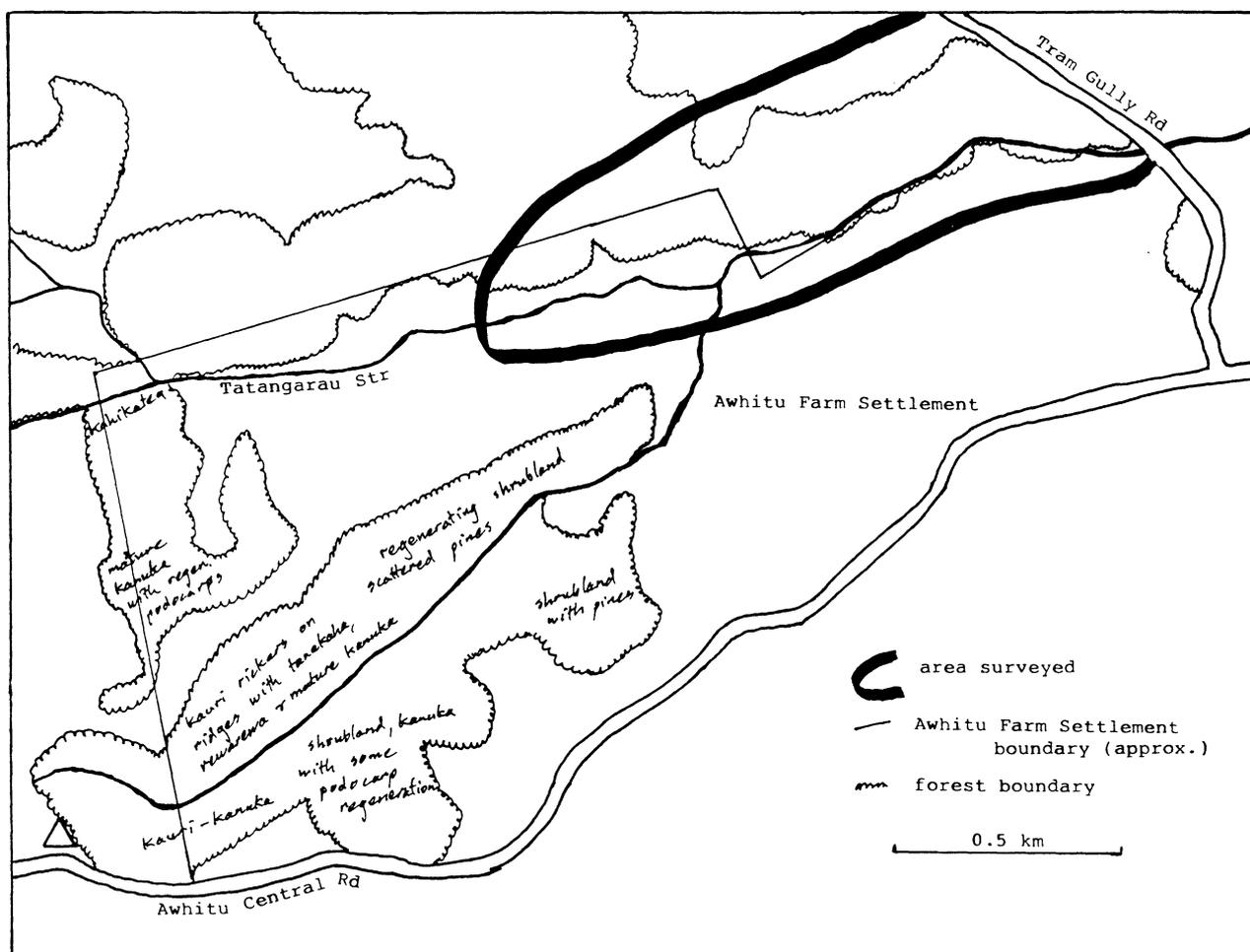
Acknowledgments

I thank Chris Green for allowing me to cite information from his unpublished report and bringing to my attention the existence of T. Dunsbee's survey sheet (which appears to have been drawn for the Department of Lands and Survey); and Marjorie Cutting for useful comments.

References

- Auckland Regional Council 1994: *Proposed Auckland Regional Policy Statement*. Table 7.1, p.7-2.
- Green, C. 1991: Ecological values of Awhitu Farm Settlement. Unpublished report to Manager Protection, Department of Conservation, Auckland. 5pp.
- McEwen, W. M. (editor) 1987: *Ecological Regions and Districts of New Zealand*. NZ Biological Resources Centre, Wellington. Publication No. 5.

Figure 1: Tatangarau Valley showing part of Boiler Gully Farm surveyed and Awhitu Farm Settlement. Forest boundaries and streams are shown; annotations are copied from a survey sheet prepared by T. Dunsbee in 1985.



Appendix: Vascular Flora of the surveyed Tatangarau south facing escarpment, Awhitu

a = abundant	A = adjacent to survey area
c = common	CG = reported by C. Green (1991), south side of catchment
o = occasional	1 = present on River Flat
l = local	2 = present on Escarpment
r = rare (< 5 plants seen)	3 = present on Upper slope
* = naturalised species	AK = herbarium voucher number

Ferns and fern allies (20)

<i>Adiantum cunninghamii</i>	common maidenhair	o	2	
<i>Blechnum chambersii</i>	nini	l	2	
<i>B. fluviatile</i>	kiwakiwa	l	2	AK 218557
<i>B. membranaceum</i>		l	2	
<i>B. sp. "1"</i>	kiokio	o	1	
<i>Cyathea dealbata</i>	ponga	o	2	
<i>C. medullaris</i>	mamaku	lc	1, 2, 3	
<i>Deparia petersenii</i>		o	2	
<i>Dicksonia squarrosa</i>	wheki	c-la	1, 2, 3	
<i>Doodia media</i>	pukupuku	o	2	
<i>Gleichenia microphylla</i>	waewaekaka	l	2	
<i>Lastreopsis glabella</i>		o	2	
<i>Leucopogon deuterodensum</i>	puakarimu	l	2	
<i>Lygodium articulatum</i>	mangemange	l	2	
<i>Paesia scaberula</i>	matata	l	2, 3	
<i>Pneumatopteris pennigera</i>	pakau	o	2	
<i>Pteridium esculentum</i>	rahurahu	lc	1	
<i>Pteris tremula</i>	turawera	o	1, 2	
<i>Pyrrosia eleagnifolia</i>	leather-leaf fern	o	2	
<i>Tmesipteris elongata</i>		o	2	

Gymnosperms (7)

<i>Agathis australis</i>	kauri	l	2	
<i>Dacrycarpus dacrydioides</i>	kahikatea	o-lc	1, 2	
<i>Dacrydium cupressinum</i>	rimu	CG		
<i>Phyllocladus trichomanoides</i>	tanekaha	o	2	
<i>Pinus pinaster</i> *	maritime pine	l	2, 3	
<i>P. radiata</i> *	radiata pine	c	3	
<i>Podocarpus totara</i>	totara	o	1, 2	

Dicotyledons (50)

<i>Acacia mearnsii</i> *	black wattle	l	2	
<i>Ageratina riparia</i> *	mist flower	l	1, 2	
<i>Albizia lophantha</i> *	brush wattle	l	2	
<i>Alectryon excelsus</i>	titoki	o	2	
<i>Alseuosmia macrophylla</i>	toropapa	lc	2	
<i>Apium nodiflorum</i> *	water celery	l	1	
<i>Brachyglottis kirkii</i>	kohurangi	o	2	
<i>B. repanda</i>	rangiora	o	2	
<i>Calystegia sepium</i>	pohue	lc	1	
<i>Carmichaelia cunninghamii</i>	makaka	o	2	
<i>Carpodetus serratus</i>	putaputaweta	c-la	1, 2, 3	
<i>Centella uniflora</i>		o	2	
<i>Clematis paniculata</i>	puawanaga	o	2, 3	
<i>Coprosma arborea</i>	mamangi	r	2	

<i>C. lucida</i>	shiny karamu	o	2	
<i>C. rhamnoides</i>		o-lc	2, 3	
<i>C. robusta</i>	karamu	o	1, 2, 3	
<i>Cyathodes juniperina</i>	prickly mingimingi	o-lc	2, 3	
<i>Fuchsia excorticata</i>	kotukutuku	r	2	AK 218554
<i>Geniostoma rupestre</i>	hangehange	o-lc	2, 3	
<i>Hakea gibbosa*</i>	downy hakea	l	3	
<i>H. sericea*</i>	needlebrush	l	3	
<i>Hebe stricta</i>	koromiko	lc	1, 2	AK 218552
<i>Knightia excelsa</i>	rewarewa	o-lc	2	
<i>Kunzea ericoides</i>	kanuka	o-lc	2, 3	
<i>Laurelia novae-zelandiae</i>	pukatea	r	1	
<i>Leptospermum scoparium</i>	manuka	lc	1, 2, 3	
<i>Leucopodium fasciculatus</i>	mingimingi	o-lc	2, 3	
<i>Leycesteria formosa*</i>	Himalayan honeysuckle	c	1	
<i>Litsea calicaris</i>	mangeao	r	3	
<i>Lotus pedunculatus*</i>	lotus	lc	1	
<i>Macropiper excelsum</i>	kawakawa	o	2	
<i>Melicytus ramiflorus</i>	mahoe	c	1, 2	
<i>Metrosideros excelsa</i>	pohutukawa	CG		
<i>M. perforata</i>	aka	o	2	
<i>Myrsine australis</i>	mapou	o	2, 3	
<i>Nertera depressa</i>		o	2	
<i>N. dichondrifolia</i>		o	2	
<i>Olearia furfuracea</i>	akepiro	o	2, 3	
<i>Parsonsia sp.</i>	NZ jasmine	o	2	
<i>Pittosporum tenuifolium</i>	kohuhu	CG		
<i>Pseudopanax arboreus</i>	whauwhaupaku	o	2	
<i>P. crassifolius</i>	horoeka	o	2	
<i>Quintinia serrata</i>	tawheowheo	lc	2	AK 218555
<i>Rubus fruticosus agg.*</i>	blackberry	la	1	
<i>Schefflera digitata</i>	pate	lc	2, 3	
<i>Solanum mauritianum*</i>	woolly nightshade	o	2	
<i>Toronia toru</i>	toru	o-lc	2, 3	AK 218644
<i>Ulex europaeus*</i>	gorse	o-l	3	
<i>Vitex lucens</i>	puriri	A, CG		

Monocotyledons (37)

<i>Anthoxanthum odoratum*</i>	sweet vernal	lc	1	
<i>Baumea rubiginosa</i>		lc	1	
<i>B. tenax</i>		l	1	AK 218553
<i>Carex dissita</i>		o	2	
<i>C. lessoniana</i>	rautahi	lc	1	
<i>C. secta</i>	purei	l	1	
<i>C. virgata</i>	purei	lc	1	
<i>Cortaderia jubata*</i>	purple pampas grass	o	2	
<i>Cordyline australis</i>	ti	o	1, 2	
<i>C. australis x C. banksii</i>		r	1	
<i>C. banksii</i>	ti ngahere	o	2	
<i>Crocosmia x crocosmiiflora*</i>	montbretia	l	1	
<i>Dianella nigra</i>	turutu	o-lc	2, 3	
<i>Cyperus congestus*</i>		o	1	
<i>Eleocharis acuta</i>		lc	1	
<i>E. gracilis</i>		l	1	AK 218551
<i>Festuca arundinacea*</i>	tall fescue	lc	1	
<i>Freycinetia banksii</i>	kiekie	o	2	
<i>Gahnia lacera</i>	tarangarara	o-lc	2	

<i>G. setifolia</i>	mapere	l	2, 3	
<i>Glyceria striata</i> *		lc	1	AK 218556
<i>Isachne globosa</i>		lc	1	
<i>Juncus effusus</i> *	wiwi	lc	1	
<i>J. prismatocarpus</i>	wiwi	o	1	
<i>Lepidosperma laterale</i>		lc	3	
<i>Machaerina sinclairii</i>	tuhara	A		
<i>Microlaena stipoides</i>	patiti	o	2	
<i>Morelotia affinis</i>		l	3	
<i>Oplismenus imbecillis</i>		o	2	
<i>Paspalum dilatatum</i> *		lc	1	
<i>P. distichum</i> *		lc	1	
<i>Phormium tenax</i>	harakeke	c	1	
<i>Potamogeton crispus</i> *		l	1	
<i>Schoenus maschalinus</i>		l	2	
<i>S. tendo</i>	wiwi	lc	2	
<i>Typha orientalis</i>	raupo	A		
<i>Uncinia uncinata</i>	kamu	o	2	

On pampas grass (*Cortaderia*)

R. O. Gardner

A vigorous description by Ponsonby meadow-gardener John Holloway (pers. comm.) of his difficulties with local populations of these plants has led to my considering the subject in a brief and academic way.

As probably everyone knows, the two South American species so unwelcome in northern New Zealand look very different from their native relatives, having much denser hummocks with numerous erect culms standing among a mass of dry old leaf sheaths like coarse shavings. Visitors to this country often speak about silver and purple pampas plumes enhancing our coasts and motorways – more realistic, though, to think of the pampas vista as one of rat-ridden cosy castles protected by the natural equivalent of razor-wire, silver and purple flags brazenly flying, etc, etc.

But the plants themselves, in particular their leaf sheaths, are not without botanical interest. As a leaf senesces and dies the apical part of its sheath begins to spiral and curl inwards. Such behaviour is not found in our native *Cortaderia* species so it might well have some adaptive significance, a possibility that gets encouragement from the fact that prematurely plucked leaves remain straight when dried.

Mr Holloway's drawn-out struggle brings to mind the idea that the mass of dry sheaths could be protecting the basal meristems; this obviously would be handy in South America, home of the guinea pig and other grazing mammals. But the sheaths are not toothed, nor even especially harsh. Alternatively, it might be their resilience that is crucial, the means of preventing inflorescences from being flattened by the notorious winds of the pampas. Or it might be their very inflammable nature that requires explanation. Or perhaps the "castle" idea has merit, and there exists a coevolutionary association between the plant and some insect or larger animal that lives among the sheaths – a piece of ecology which, probably luckily for us, has not been transferred to New Zealand.

In 1984 the Auckland Conservancy of the Forest Service spent at least \$388,000 controlling pampas grass in its pine plantations (Knowles and Ecroyd 1985), where it is hated on account of its bloodthirsty leaves and fire-carrying capacity. At the other end of the scale, Mr Holloway has proposed to his clients a kind of siege-tactic, suggesting that individual hummocks be trimmed, then draped with a sheet of black plastic, with a stone or old telephone book or dead possum sitting at the top over a water entry slit – thus, continually wet and deprived of sunlight, the castle should