Updated Vascular Flora of Pakihi Island, with notes on fauna, geology and some history, Hauraki Gulf, Auckland

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The privately owned Pakihi Island (114 ha) is located just over 1 km south of Ponui Island in the Hauraki Gulf. Vascular plant additions to the first published botanical account by Cameron et al. (2007) are presented. These additions were made during two further day trips: the Auckland Botanical Society (ABS) trip on 18 October 2008 (32 people); and a later visit by EKC on 29 January 2009. The new records from these two visits combined were 78 species. Comments on the fauna, geology and some history over the last 150 years (including quarrying and the associated boats) are also included. For the island's location refer to Cameron et al. (2007: fig. 1), Fig. 1 provides place names, and Fig. 2 a recent aerial view of the island.

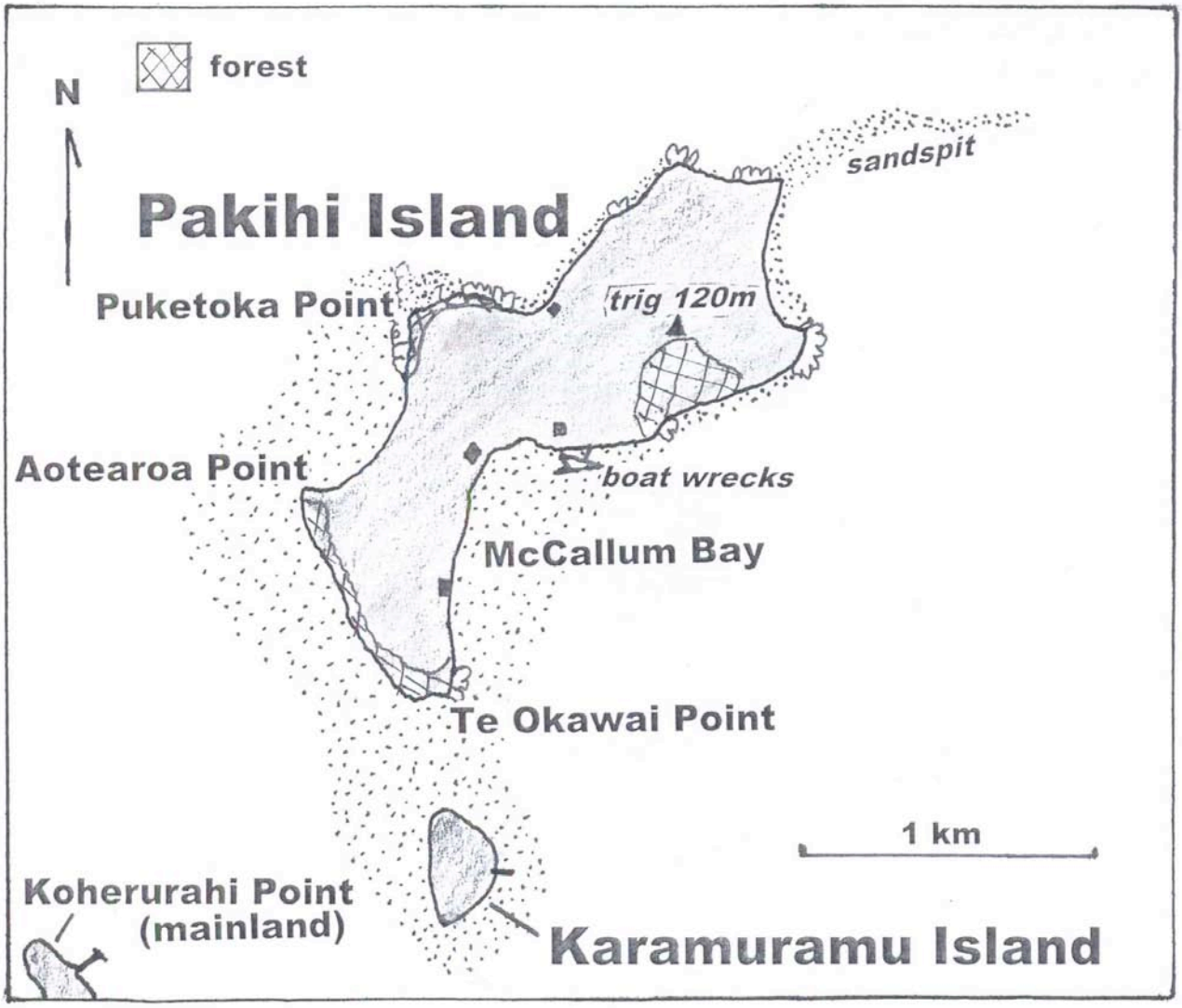

Fig. 1. Place names and outline of the privately owned Pakihi Island (114 ha), off Kawakawa Bay, Hauraki Gulf (drawn by EKC).

18 October 2008 – ABS visit (8.45 am – 5 pm)

The Department of Conservation (DoC) boat *Taikehu* ran the 32-strong ABS group across to McCallum (or East) Bay (Fig. 3) on Pakihi Island in two trips from the jetty at Kawakawa Bay – a distance of some 3.5 km. The first objective was the extensive fenced off pohutukawa (*Metrosideros excelsa*) forest on the northern end of McCallum Bay just below the summit (Fig. 1). This area has been fenced from stock since 1996 (the lower part for c.50 years). A large male mangeao (*Litsea calicaris*) was measured by Mike Wilcox: 95 cm dbh, height 22 m, crown spread 20 m; and a possibly taller, nearby pohutukawa had a trunk diameter of 1.8 m (Fig. 4). Under the emergent pohutukawa canopy the following broadleaf trees (Fig. 5) were noted: kohekohe (*Dysoxylum spectabile*),

puriri (*Vitex lucens*), mahoe (*Melicytus ramiflorus),* pigeonwood (*Hedycarya arborea*), rewarewa (*Knightia excelsa*), karaka (*Corynocarpus laevigatus*), tawapou (*Planchonella costata*), and a single large kowhai (*Sophora chathamica*).

From the forest we headed up a track through a pine plantation to the island's summit where a thick sward of the native grass, *Microlaena stipoides*, dominated – it was so common that a nurseryman member of our party returned to the island three months later to collect seed for sowing as trial cover for some of Auckland's volcanic cones. The elevated position gave us an excellent view into the pohutukawa forest below (Fig. 6) and splendid views of the Hauraki Gulf. Two local, woody adventives by the trig were added to the list: maritime pine (*Pinus pinaster*) and *Hakea salicifolia*. The grandparents of John McCallum (JMcC), a skilled naturalist, are buried here.

From the summit people headed different ways back to McCallum Bay – a group of us went via the western side of the main pohutukawa forest. Near the coast several new records were added: a low epiphytic filmy fern (*Hymenophyllum dilatatum*), *Blechnum discolor, Lycopodium volubile*, and *Drosera auriculata*. Also present here was an edible fig (*Ficus cairica*), c.2.5 m tall and suckering, and evidently planted in 1890s (JMcC pers. comm.).

At the coast most headed for the Te Kawai Point at the southern end, and then returned because of the time. However, Jonathan Boow and Paul Cashmore managed to complete a circuit of the SW cliffs and return via the bull paddock without harm. The SW coastal slopes were predominantly clothed in native bush fenced from stock. One of the best discoveries on the coastal cliffs was that of the threatened *Senecio scaberulus* by Rhys Gardner. Other additions from this coast included: a ngaio (*Myoporum laetum*), oioi (*Apodasmia similis*), *Disphyma australe*, and a single shrub of bone-seed (*Chrysanthemoides monilifera*) – the first for the island (removed)! *Pomaderris rugosa* (Fig. 7) – one of the localised Auckland region species was quite common here.

Mike Wilcox spent much of his time in the afternoon recording the intertidal marine algae (low water 4.30 pm). An interesting find by him was the exotic *Cutleria multifida* (AK 303861) - a bushy brown alga at the low tide cobbles near the shipwrecks. A recent naturalised exotic sea squirt (*Steyla clava*) was exposed attached to the chert by the extreme low tide mark along the main beach (Fig. 8). They were first recorded in the Hauraki Gulf in 2005 and are now known throughout the Gulf and other areas in New Zealand (Biosecurity New Zealand 2009, Hayward & Morley 2009). Evidently at times they can wash ashore on the island in plague proportions (JMcC pers. comm., Oct 2008).

The coast is virtually rubbish-free because the McCallum's annually collect and remove c.1 m^3 of rubbish per year from the island's coast. JMcC had separately arrived on the island and there was time for a quick catch up and thank you before being ferried out in the zodiac to *Taikehu* waiting in deeper water with the last trip home departing at 5 pm.

29 January 2009 visit (9.30 am – 4 pm)

I was very pleased to be offered a lift by Geoff Davidson when he re-visited Pakihi Island to collect *Microlaena stipoides* seed – because it offered an opportunity to search parts of the coast that I hadn't explored yet: from the bach east of Puketoka Point, then west around the point on the west coast down to Aotearoa Point, on down to the southern tip (Te Okawai Point), and returning along McCallum Bay to the wrecks (Fig. 1). There is a 1936 herbarium collection by Lucy Moore of the native cushion plant *Scleranthus biflorus* from "McCallum's Is" (AK 211331). JMcC (pers. comm.) informs me that "McCallum's Is" could refer to Pakihi or the much smaller adjacent Karamuramu Island. It was therefore nice to find two small patches of *S. biflorus* on the Pakihi coast in January 2009 (Fig. 9). Twenty-five new vascular plants were added to the list, including: *Epilobium pallidiflorum* and *Schoenoplectus tabernaemontani,* both in the farm dam wetland (Fig. 10) closest to woolshed; *Triglochin striata* on the SW coast; and several exotic grasses (*Bromus willdenowii, Cynosurus cristatus, Paspalum vaginatum, Phalaris aquatic* and *Stenotraphrum secundatum*) from various localities (see Appendix 1).

Flora

Vascular Flora

There are 78 vascular plant additions to Cameron et al. (2007); they are marked by "†" in Appendix 1. Thirty-seven percent of them are native species (see Table 1). There are also three deletions because I now consider they were based on misidentifications:

Brassica ?*rapa* – based on a previous scrap from the main beach, I now consider it was more likely to be *Raphanus raphanastrum*;

Coprosma grandifolia – a record by Barton (1996) that I now consider was based on *C. macrocarpa*; and

?*Melicope ternata* – which was based on a doubtful visual record which has not been confirmed in the recent visits.

Excluding the native hybrid, whose suspected parents are also present (*Pseudopanax*), the new grand total of recorded wild vascular plants for the island is 304 species (or species equivalents) with 51% being indigenous (Table 1 & Appendix 1). The high number of additions is a result of the recent visits being at a different time of year (spring and midsummer) to the previous two visits (late summer and autumn), to the new areas searched, and to the large number of

people looking during the ABS trip. With most areas on the island botanically searched, Pakihi Island is now one of the better explored islands of the Hauraki Gulf with respect to wild vascular plants. Additions to the list of the group of six adjacent Hauraki Gulf Islands of Cameron et al. (2007) are: six native (*Blechnum discolor, Hymenophyllum dilatatum, Coprosma macrocarpa* ×*C. propinqua*, *Gaultheria antipoda, Pittosporum crassifolium* ×*P. tenuifolium, Dichelachne micrantha*); and six naturalised species (*Cardamine flexuosa, Hakea salicifolia, Prunus* ×*domestica Verbascum creticum, Allium vineale, Cynosorus cristata*).

I was impressed by the extent and the stature of the pohutukawa forest-shrubland with a native understorey along the SW coast, crowned with planted pines along the cliff tops. In one place akeake (*Dodonaea viscosa*) was prominently fruiting (Fig. 11). Many of these slopes were too steep to easily traverse. Future surveys of the accessible parts of this coast will likely add further native plant additions.

From 1983 to 1994 mixed native tree species have been planted along many of the fence lines (Fig. 12) (see Cameron et al. 2007). Specimens that die have been replaced annually. Some of these planted species are otherwise absent from the island and are therefore excluded from Table 1 totals and Appendix 1 because they are not naturally wild. The two severe storms of July 2007 and July 2008 have caused significant die-back of the puriri fence line plantings and they may not recover (JMcC pers. comm.). Also JMcC has locally planted kauri (*Agathis australis*), parapara (*Pisonia brunoniana*) and totara (*Podocarpus totara*) in the native bush. An indication that kauri once grew naturally on the island is provided by the common occurrence of kauri gum in the ground in the valley with the two main stock ponds (JMcC pers. comm.).

Weeds

The island has no major environmental weed problems because the owner targets aggressive weed species (see Cameron et al. 2007). Boxthorn (*Lycium ferrocissimum*) was mistakenly omitted from that 2007 managed list. Localised boxthorn was seen during the ABS trip (a few adults, saplings and seedlings on the SW bushy slopes) and dealt to by Paul and Jonathan. Around Aotearoa Point there were some plants which had already been killed by JMcC. No adult pampas plants were seen during these recent trips – and the few young plants seen were uprooted. Woolly nightshade (*Solanum mauritianum*) is locally common amongst the planted pines. Agapanthus (*Agapanthus praecox*) along McCallum Bay and around the southern bach have recently been controlled (sprayed with 'Tordon') along with a few cultivated *Impatiens sodenii* by the same bach. There were small clumps of the sward-forming exotic sedge *Carex divisa* scattered around the coast (Fig. 13). Presumably this sedge is dispersed by floating seed, because it has now been recorded from the coast of Motutapu, Rotoroa, Pakihi, Ponui, Rangitoto and Waiheke Islands (AK herbarium specimens, and pers. ob.).

Bryophytes

Although not actively collected a few bryophytes were collected during my four visits and another by Anthony Wright in March 1982 – where present AK herbarium numbers are cited:

Liverworts: *Chiloscyphus semiteres* (286303, 295095), *C. subporosus* (286302), *Frullania scandens* (295094), *F. squarrosula* (286304).

Mosses: *Bryum* sp. (304283), *Polytrichadelphus magellanicus* (304282), *Thuidium furfurosum*, *Trichostomum* sp. (295096), *Triquetrella papillata* (162352).

Fauna

Mammals, birds and lizards of the island were reported by Cameron et al. (2007) – the two additional trips only added the following bird observations to the previous account: spur-winged plover, shining cuckoo (both in Oct 2008), and song thrush (Jan 2009). Other bird observations included variable oystercatcher (1 pr both trips); house sparrow, harrier, white-faced heron, and grey duck with 6 chicks by farm dam (all Jan 2009). Also JMcC observed a pair of Canada geese in 2008, and 4 individuals in spring 2009 (breeding); and on 24 May 2009 another kaka flying over Pakihi Island. Garden snails (*Cantareus aspersus*) are present on the island.

James Russell first saw a stoat on Pakihi Island in early 2006 and Norway rat numbers immediately plummeted (JMcC pers. comm.). JMcC believes that the stoats have now eliminated the rats and in turn he has eliminated the stoats (5 caught, last one in mid May 2009). Maintaining 40 Fenn traps should help prevent episodic reinvasions by stoats. JMcC has also poisoned all rats and mice from the adjacent Karamuramu Island, and maintains four Fenn traps there in case of stoat invasion. With the rats and stoats now believed to be eliminated from Pakihi and Karamuramu Islands, and with no other feral mammals present except mice on Pakihi, JMcC is hopeful that in the near future kiwi and pakeke (brown teal) can be released on Pakihi Island.

Geology (information provided by Bernhard Spörli, University of Auckland)

The island has exposures of greywacke mainly outcropping in the northeast, and of chert, in the southwest (Hutton 1869, Schofield 1979). Bernhard Spörli has an on-going project with a group of Japanese geologists studying the important boundary between the Triassic and Jurassic time periods (202 million years ago). This runs through Pakihi Island and they are sampling rocks for radiolarian fossils so that they can determine the ages of individual layers

Fig. 2. Aerial view of Pakihi and Karamuramu Islands showing pasture, plantation forestry, native bush areas on Pakihi, and quarry on Karamuramu Island. From Koherurahi Point (bottom left) to Pakihi Id is 1.5 km. Ignore island outlines in white. Image from: Auckland Local Government Geospatial Information group.

Fig. 3. Bot Soc members coming ashore 4-5 at a time in the DoC zodiac at McCallum Bay. Photo (looking SW): EKC, 18 Oct 2008.

Fig. 4. Large pohutukawa trees (largest with a trunk diameter of 1.8 m) in the fenced off pohutukawa-broadleaf forest, just south of the summit of Pakihi Island. Photo: EKC, 18 Oct 2008.

Fig. 5. Tall broadleaf native forest just south of the summit of Pakihi Island. Photo: EKC, 18 Oct 2008.

Fig. 6. From summit of Pakihi looking down on the broadleaf forest with emergent pohutukawa. Photo (looking just W of S): EKC, 18 Oct 2008.

Fig. 7. *Pomaderris rugosa*, a locally common 2-3 m tall shrub in coastal shrubby areas by the southern tip (Te Okawai Point). This species has its stronghold in the Coromandel Ranges and occurs across the Hauraki Gulf to Pakihi, Ponui, Rotoroa, Waiheke Islands and "Ruthe islet", and scattered localities along the Firth of Thames coast west to Waitawa Regional Park. Photo: EKC, 18 Oct 2008.

Fig. 8. The exotic sea squirt (*Steyla clava*) 10-15 cm long, at the low tide mark, southern McCallum Bay. First recorded in the Gulf in 2005. Photo: EKC, 18 Oct 2008.

Fig. 9. *Scleranthus biflorus* on a rocky partly shaded bank, mid SW coast (1 m a.s.l.). Another small patch seen just south of Puketoka Point. Photo: EKC, 29 Jan 2009.

Fig. 10. Main stock pond near the woolshed. The only raupo patch on the island is in the front right foreground. Photo: EKC, 29 Jan 2009.

Fig. 11. Tall shrubs of fruiting akeake (*Dodonaea viscosa*) stand out on a rather open steep slope on the SW coast; gorse in foreground. Photo: EKC, 29 Jan 2009.

Fig. 12. Mixed species of native trees have been planted (1983-94) along the fence lines with kanuka and cabbage trees visible along this section. Photo: EKC, 18 Oct 2008.

Fig, 13. Small patch of the exotic *Carex divisa* in stream mouth at McCallum Bay. Widespread, scattered small swards of this species occur around the Pakihi coast. Photo: EKC, 18 Oct 2008.

Fig. 14. Sharp eroded chert on SW coast, looking more like scoria. Note the fine tussocks of *Austrostipa stipoides* just above the high tide mark. Photo: EKC, 29 Jan 2009.

Fig. 15. Typical red and black banded chert on the SW coast. Photo: EKC, 29 Jan 2009.

Fig. 16. Prominent boat wrecks at the north end of McCallum Bay with *S.S. Rotomahana* being in the best condition. Photo: EKC, 18 Oct 2008.

Fig. 17. *S.S. Rotomahana* (38.6 m long) beached at McCallum Bay to form a breakwater in April 1924. This steel passenger ferry was built 1876 at Mechanics Bay; it was the second steel-hulled boat built in New Zealand and the first to be built in the North Island. Photo (low tide): EKC, 29 Jan 2009.

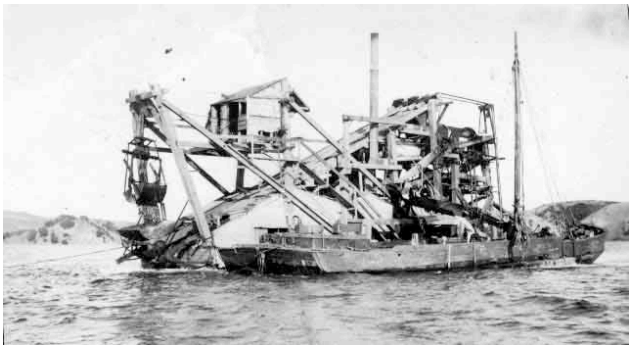

Fig. 18. *Rover* loading a barge on the southern side of Karamuramu Island. Large volumes of shingle were dredged from this side of the island from 1922 to 1949 by dredges *Rover*, *Kaupatai* and *Hazel Repton*. Photo: Tudor Collins, c. 1922.

Fig. 19. Quarry at the west side of the south point in operation in the 1920s. Photo: McCallum Bros. Ltd, 1920s.

Fig. 20. Some 80 years of regeneration over the old quarry face at south end of island (quarried 1906-1928, cf. Fig. 19). The last wharf pile (centre of photo) photo disappeared in the winter of 2007. Photo: Clare McCallum, Mar 2007.

Fig. 21. The scow *Thistle* loading shingle with wheelbarrows off McCallum Bay at Pakihi Island. Note the general bareness of the island. Photo: Tudor Collins, Sep 1931.

Fig. 22. View of the main pohutukawa forest below Pakihi Island's summit (pines on left side and skyline). Compare with the bare upper hill shown in Fig. 21. Many of the larger present day trees on this slope would have been present in 1931 in the rock fall area at the bottom of the steepest upper slope. Photo: EKC, from the southern tip (Te Okawai Point), 29 Jan 2009.

in detail (Spörli et al. 1989; B. Spörli pers. comm.). Puzzled by parts of the Pakihi coast which looked to me more like the rough scoria of Rangitoto Island (i.e. Fig. 14) than solid chert I asked Dr Spörli (pers. comm.) how this occurred. He kindly explained: "These rocks are deep-sea sediments deposited out in the open ocean far from any landmass, so the only material being deposited was residual iron- and manganese oxides plus the siliceous shells of the predominant plankton of that time – radiolarians. Just the fact that the rocks are very siliceous (80-90+% silica) makes them more resistant to erosion than the usual greywacke-type rocks that you get elsewhere. However, they are also subdivided into resistant siliceous layers and more erodible muddy layers, each usually 5-10 cm thick which give them the spiky appearance. The main colours are red and black (Fig. 15) – the red layers are the ordinary cherts due to high contents of iron oxides, whereas the black layers are manganese-rich layers. There are places on Pakihi where the rocks are almost completely black from manganese. The manganese layers contribute to the scoria-like appearance."

JMcC pointed out to me that the low weathering profile of chert (referred to above) results in a very thin soil layer. It lacks a zone of decomposing rock below the surface as occurs over greywacke – the resulting thin soils make it difficult for many plants to grow.

The four wrecks and quarry operations (from: Furniss 1977; McCallum Bros Ltd 2008; JMcC pers. comm.)
The rusting and rotting boat wrecks grouped together on the beach are quite a feature of the McCallum Bay (Fig. 16). The remains of the four boats rest here:

- *S.S. Rotomahana* – (Fig. 17), a steel passenger ferry built 1876, stripped and beached at Pakihi in Apr 1924 (Furniss 1977); George Fraser, who built it was John McCallum's great great grandfather. McCallum Bros Ltd bought the steamer for £10 after it was decommissioned as a hulk.
- *Koroi* – a steel steam tug (beached alongside the Rotomahana in c.1926);
- *Clio* – a wooden schooner, used as a hold-barge from July 1920 onwards and beached 1938;
- *Rover* – (Fig. 18), a wooden bucket dredge, converted to a steam-power in Nov 1923, then into a barge c.1926; and was beached March 1957.

The *Rotomahana* was beached as a breakwater, the others were placed there as the most convenient way of laying them up at the end of their working life – there was always the thought of re-commissioning them if work warranted. The *Rotomahana* was also beached for use as a platform to store wire ropes for the two steam dredges that worked the eastern bay at Pakihi Island. Many large coils of 30 mm wire are still present in the hulk today.
A quarry was operated from 1906 to 1928 on the west side of the southern point of the Pakihi Island and over 100,000 m^3 of rock was quarried (Fig. 19). Eighty years of natural regeneration has resulted in a stand of 10-15 m tall pohutukawa (Fig. 20) over this quarry site. Shingle was extracted from McCallum Bay until WW2, although very little shingle was removed from the intertidal beach and the material extracted was taken by wheelbarrow and shovel (Fig. 21). Larger volumes from this bay were extracted by the steam dredges *Kaiputai* and *Rover* from 1922 until

1928. Over one million m^3 of alluvial shingle was extracted by drag line between Karamuramu and Pakihi Islands from 1947 to 1957 – remains of this operation are a concrete structure and wharf at the southern end of Pakihi Island. Prior to this the two islands were joined together at mid-tide. The quarry on the adjacent Karamuramu Island started in 1908 and still continues today.

Figure 21 also shows how little forest was on the upper slope south of the summit in 1931 compared with the present-day (Figs. 21 & 22). That bareness is a reflection of the likely annual firing of the native pasture to encourage grass growth for sheep farming. Pakihi and Karamuramu Islands had feral livestock on them in 1893 when JMcC's great-grandfather purchased them from Logan Campbell. Prior to this Maori started substantial orchards (a peach tree of this provenance still remains) and kumara gardens in the 1860s on Pakihi to supply the garrison in Auckland. In 1993 JMcC moved out of sheep and cattle to only cattle being farmed on Pakihi Island.

Participants of the ABS visit on 18 Oct 2007 (32 people): Tricia Aspin, Steve Benham, Jonathan Boow, Jan Butcher, Ewen Cameron (leader), Paul Cashmore, Stella Christoffersen, Lisa Clapperton, Colleen Crampton, Neil Davies, Geoff Davidson, Jo Fillery, Rhys Gardner, Simon Grant, Shelley Heiss-Dunlop, Marcel Horvath, Peter Hutton, Sandra Jones, Mei Nee Lee, Helen Lyons, Joy Mace, Elaine Marshall, Carol & Garry McSweeney, Helen Preston Jones, Emily Roper, Hazel Speed, Alison Wesley, Mike Wilcox, Maureen Young; Lesley Haines & Bev Davidson only made the boat trip (not the island) because Lesley unfortunately gashed her leg.

Acknowledgments

John McCallum for allowing the visits, assisting with the many questions about the island, providing the historical boat images; all the ABS members for their plant additions and observations; Bernhard Spörli of the University of Auckland for the detailed description of the local geology; Rhys Gardner and Peter de Lange for comments on some of the more challenging vascular plant identifications; Jessica Beever, John Braggins and Matt von Konrat for identifying the bryophytes; John McCallum and Ross Beever for commenting on a draft of this article; DoC for providing boat access (*Taikehu*) for the ABS trip, especially the skipper James Emslies; and Geoff Davidson for inviting me to join his visit to the island on 29 Jan 2009.

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Table 1. Updated vascular plant totals for different plant groups for Pakihi Island, and nearby islands.

Plant Group	Updated Pakihi Island totals	Additions to the Pakihi Island 2007 list	Additions to the six Hauraki Gulf Islands 2007 list
Native ferns & fern allies	28	4	2
Native dicots	77	15	3
Native monocots	50	10	1
Naturalised conifers	3	1	-
Naturalised dicots	102	31	4
Naturalised monocots	44	17	2
Totals	**304**	**78**	**12**
% native	**51**	**37**	**50**

Appendix 1. Annotated list of the wild vascular flora of Pakihi Island.

Key

a = abundant
c = common
l = local
o = occasional
s = scarce (< 5 plants seen)
* = naturalised species
† = an addition to the list of Cameron et al. (2007)
AW = collected by AE Wright, 6 Mar 1982, and not recorded since
JM = record from John McCallum (pers. comm.)
Pl = planted

	Abund.	Comments and voucher numbers
Ferns & fern allies (28 + 0)		
Adiantum cunninghamii	lc	shrubland
Adiantum hispidulum	o-lc	bush margins & open coastal slopes
Asplenium flaccidum	o	including coastal rock faces
Asplenium haurakiense	l	coastal rock. AK 299530
Asplenium oblongifolium	o	shrublands & forest
Asplenium polyodon	o	low epiphyte mainly on pohutukawa in main forest
Blechnum chambersii	s†	a few plants, middle of main forest
Blechnum discolor	s†	W end of main forest near coast (5m asl)
Blechnum filiforme	l	patches in main forest
Blechnum novae-zelandiae	l	lower bush slopes, damp coastal slopes
Cyathea dealbata	o	gully shrublands & forest
Cyathea medullaris	lc	gully shrublands & forest
Dicksonia squarrosa	l	gully shrublands & forest
Doodia australis	lc	open coastal slopes & pasture
Doodia squarrosa	l	open area, by pohutukawa forest. AK 304378
Huperzia varia	s	forest epiphyte
Hymenophyllum dilatatum	s†	single epiphytic patch, W end main forest
Lastreopsis velutina	lc	main forest & on SW coast. AK 299473
Lycopodium volubile	l†	west end of main forest near coast (5m asl)
Microsorum pustulatum	o	forest epiphyte & terrestrial by coast
Microsorum scandens	l	forest
Pellaea rotundifolia	l	main forest area
Polystichum neozelandicum	o	main coastal forest & SW forested slopes. AK 295069 & 299543
Polystichum wawranum	l	main pohutukawa forest. AK 304377
Pteridium esculentum	lc	open coastal slopes
Pteris saxatilis	lc	lower slopes, pohutukawa forest. AK 299472
Pteris tremula	o	shrubland & forest openings & margins
Pyrrosia eleagnifolia	o-lc	especially on rocky outcrops & low epiphyte on pohutukawa
Conifers (0 + 3)		
*Cupressus macrocarpa**	l	wild seedlings & a few small trees by occasional planted adult trees. AK 299538
*Pinus pinaster**	l†	wild seedlings SE side of summit area, close to planted adults. AK 303740
*Pinus radiata**	o	wild seedlings, close to planted adults. AK 299509
Dicots (78 + 102)		
Acaena novae-zelandiae	o-lc	open coastal slopes, bush margins
Alternanthera nahui	l	creek bank near woolshed & creeks margins above adjacent farm dam; leaf margins rather toothed - hybrid with *A. denticulata*? AK 299535 & 304542
Anagallis arvensis var. *arvensis**	o-lc	open coastal slopes throughout

Anagallis arvensis var. *coerula**	lc†	open areas near summit
*Aphanes inexpectata**	o†	on bare open pasture sites throughout the island in Oct 08
Apium prostratum	l	rocky coast, N & S ends of McCallum Bay. AK 211731
*Araujia hortorum**	JM	controlled by JM, not seen during surveys
*Aster subulatus**	s	Single plant, back of beach, McCallum Bay. AK 299525
*Atriplex prostrata**	o-la	coastal rocks & back of shingle beaches throughout
Avicennia marina	o	small plants (≤0.6m tall) in sheltered rocky bays
Beilschmiedia tarairi	s	seedlings only
Beilschmiedia tawa (incl. *B. tawaroa*)	l	a few trees & many seedlings, main forest block
*Beta vulgaris**	x1†	20cm-tall seedling, fleshy leaves, on main beach, McCallum Bay
Brachyglottis repanda	o	bush areas
*Brassica ?rapa**		delete from previous record of Cameron et al. 2007 - because I now believe it was *Raphanus*
*Callitriche stagnalis**	l	wet pasture & farm dams
Calystegia ?soldanella ×C. tuguriorum	o	back of beaches. AK 299399
Calystegia sepium ssp. *roseata*	o†	coastal sites; narrow leaves & dark pink/white flowers. AK 304529
Calystegia soldanella	o-lc	back of beaches
*Capsella bursa-pastoris**	l	rough pasture. AK 299523
*Cardamine flexuosa**	l†	pine plantation near summit. AK 303743
*Carduus pycnocephalus /tenuiflorus**	o	rough pasture & back of beaches
*Carthamus lanatus**	AW	by woollshed & house in 1982. AK 159076-77
*Centaurium erythraea**	o	open coastal slopes & pasture
*Cerastium fontanum**	l	open costal slope. AK 295066
*Cerastium glomeratum**	lc	open coastal slopes & pasture
*Chrysanthemoides monilifera**	x1†	SW coast, fertile shrub, uprooted - first for the island (Oct 2008)
*Cirsium arvense**	l	pasture; controlled by owner
*Cirsium vulgare**	o	open cosatal slopes and pasture throughout
Clematis paniculata	o	forest & forest margins
*Conyza bonariensis**	lc	open coastal slopes & pasture. AK 299521
*Conyza sumatrensis**	o	open coastal slopes & pasture; some plant very setose. AK 304526
Coprosma arborea	x1	single plant 5m tall, main forest patch
Coprosma grandifolia		delete from previous record of Cameron et al. 2007 - based on an unconfirmed record in a report by Ian Barton (1996: table 4)
Coprosma macrocarpa	o-lc	shrubland & forest. AK 299542
Coprosma macrocarpa ×C. propinqua	x1†	coast, SW part of main forest block
Coprosma repens	s	NW coast natural; others planted
Coprosma rhamnoides	o-lc	shrubland & forest
Coprosma robusta	x1†	upper forest margin by summit
Coriaria arborea	x2	coastal shrubland, NE coast. AK 299541
Corynocarpus laevigatus	l	occasional trees in forest; seedlings common
Cotula coronopifolia	l†	creek margin, near main beach
*Crataegus monogyna**	JM	a single wild plant 4-5m tall above the woolshed, killed c.1993.
*Crepis capillaris**	lc	open coastal slopes & pasture
*Daucus carota**	l	back of beach, McCallum Bay near boat wrecks & S point
Dichondra repens	o	semi-shaded coastal slopes
Disphyma australe	l†	SW coast, on rocks
Dodonaea viscosa	o-lc	shrubland, especially on SW coast (trees >5m tall)
Drosera auriculata	o†	coastal, northern McCallums Bay by forest, and SW coast. AK 303747
Dysoxylum spectabile	o	canopy trees to 80cm diameter, saplings & seedlings in forest
Epilobium pallidiflorum	l†	farm dam wetland closest to woolshed. AK 304522
*Erodium moschatum**	o†	in open pasture throughout
Euchiton collinus	l	coastal slopes
*Euphorbia lathyris**	s	seedling back of beach (seed probably floated in), northern McCallum Bay. AK 295072

*Euphorbia peplus**	o	open coastal slopes & rank pasture. AK 299534
*Fumaria muralis**	l†	SW coast, and main beach by boat wrecks. AK 304376
*Galium aparine**	o†	pine plantations & open coastal slopes
*Galium divaricatum**	lc	dry coastal banks & open pine plantations. AK 295071
*Gamochaeta coarctata**	o	open coastal slopes & pasture
*Gamochaeta simplicicaulis**	lc	open coastal slopes & pasture
Gaultheria antipoda	x1†	near coast, SW part of main forest block
Geniostoma ligustrifolium	l	main forest areas
*Geranium gardneri**	lc	open coastal slopes & pasture. AK 299521
*Geranium homeanum**	lc†	openings in main forest patch
*Geranium molle**	l	open pasture
*Geranium purpureum**	lc†	cattle yards. AK 303746
*Hakea salicifolia**	l†	at least 6 plants to 3m tall, SE of summit area. AK 303741
Haloragis erecta	o	open coastal slopes
Hebe macrocarpa	l†	shrubby coastal slope, Puketoka Pt & SW forest. AK 304528
Hebe pubescens ×H. stricta	lc	coast to summit shrublands. AK 159074-75
Hebe pubescens ssp. *pubescens*	l	shrubland, S point. AK 299474
Hedycarya arborea	o	forest
*Helminthotheca echinoides**	o	open coastal sites
*Hypochaeris radicata**	o	open coastal slopes & pasture. AK 299521
Knightia excelsa	l	forest
Kunzea ericoides	lc	trees to 15m tall, 60cm diameter. AK 295067
*Lactuca virosa**	lc	open coastal slopes, forest gaps & pine plantations. AK 299524
*Leontodon taraxacoides**	c†	most open coastal sites
Leptecophylla juniperina	o	coastal shrublands. AK 159084
Leptospermum scoparium	lc	widespread, shrublands. AK 299514
Leucopogon fasciculatus	la	locally dominant shrubland species
*Ligustrum sinense**	x4	1-3m tall, all uprooted, main forest block; owner previously eradicated a stand in c.1993 at southern end of the island. AK 303744
*Linum bienne**	o†	open areas near summit
*Linum trigynum**	la	open coastal slopes & pasture. AK 299521
Litsea calicaris	l	in forest to c.18m tall, 40cm diameter
Lobelia anceps	l	coastal slopes
*Lotus angustissimus**	lc	open coastal slopes & pasture
*Lotus pedunculatus**	lc	open shrubland & pasture
*Lotus suaveolens**	o	open cosatal slopes
*Ludwigia palustris**	lc	wet pasture & farm dams
*Lycium ferrocissimum**	l	a few live adults & seedlings, mainly SW coast; but most dead - sprayed
Macropiper excelsum s.str.	o	shrublands; not the big-leaved Hauraki Gulf form of Gardner (1997)
*Malva neglecta**	o	open pasture. AK 299515
*Malva parviflora**	l†	behind beach on north coast. AK 304525
*Medicago arabica**	l	by cattle yards
*Medicago lupulina**	l	open SW coastal slopes
*Medicago nigra**	o	open coastal sites & back of main beach
Melicope ternata		delete from previous record of Cameron et al. 2007 - previous ? record unconfirmed by present surveys
Melicytus ramiflorus	o-lc	forest
*Meliolotus indicus**	lc†	coastal slopes, though absent from large areas
Metrosideros excelsa	c	main forest canopy species, some trees very large (to xxm tall)
*Modiola caroliniana**	o	open shrubland, pasture & coastal slopes
Muehlenbeckia complexa	o-lc	open coastal slopes & shrublands; absent from much of the coast
Myoporum laetum	x1†	coast margin of bush on SW slope (c.1m tall)
*Myosotis sylvatica**	l†	bush-pasture margin
Myrsine australis	o-lc	shrublands throughout
Nestegis lanceolata	o	forest
Olearia furfuracea	o	shrublands. AK 159103-04
*Orobanche minor**	o-lc	open coastal slopes
Oxalis exilis	o	forest & open pasture. AK 299537

*Oxalis pes-caprae**	l†	back of main beach
Oxalis rubens	o	open coastal slopes
*Oxalis thompsoniae**	l†	back of main beach. AK 304539
Parsonsia heterophylla	o	main forest patch
Peperomia urvilleana	o-lc	coastal rocks. AK 295169
*Pericallis ×hybrida**	x1†	SW coast
Persicaria decipiens	l	by creek & in raupo stand. AK 299533
*Physalis peruviana**	s†	open coastal slope
*Phytolacca octandra**	o-lc	shrublands & under pines
Pittosporum crassifolium	o-lc	coastal shrublands, throughout
Pittosporum crassifolium ×P. tenuifolium	x1†	2.5m tall, SW coastal bush. AK 304374
Plagianthus divaricatus	l†	SW coast
Planchonella costata	lc	canopy trees in forest to 16m tall, 30cm diameter, seedlings & saplings frequent. AK 299528
*Plantago lanceolata**	o-la	open coastal slopes & pasture
*Polycarpon tetraphyllum**	lc	open coastal slopes
Pomaderris amoena	s	in open, scrubland margins
Pomaderris rugosa	lc	≤3m tall in shrublands, throughout. AK 159099 & 295068
*Portulacca oleracea**	l	open pasture
*Prunella vulgaris**	o	open pasture
*Prunus ×domestica**	s†	Seedling recently collected in native bush north of McCallum Bay. AK 308749
*Prunus persica**	s	6m tree & smaller one
Pseudognaphalium luteoalbum	l†	back of beach, S end of McCallum Bay
Pseudopanax crassifolius	s	main forest
Pseudopanax crassifolius ×P. lessonii	o	shrublands & forest coastal fringe
Pseudopanax lessonii	o-lc	shrublands & forest coastal fringe
*Ranunculus parviflorus**	o†	bush margins & pine plantations. AK 303742
Ranunculus reflexus	o	main forest area
*Ranunculus repens**	l	wet pasture
*Ranunculus sceleratus**	l	creek margin, & wet pasture, McCallum Bay. AK 299522
*Raphanus raphanastrum**	l	back of main beach, flowers yellow (previously wrongly recorded as *Brassica* ?*rapa*). AK 304537
*Rosa rubiginosa**	o-lc	open shrublands & forest gaps
Rubus cissoides	x2	large vine near summit & another in main forest patch
Rubus fruticosus agg.*	lc	open pine plantations & bush margins
*Rumex acetosella**	lc	patches in pasture & pine plantations. AK 304521
*Rumex brownii**	l	open pasture
*Rumex conglomeratus**	o	wet areas in pasture & back of main beach. AK 304520
*Rumex pulcher**	l	damp pasture below raupo stand
*Sagina procumbens**	o†	coastal fringes
Samolus repens	l†	SW rocky coast
Sarcocornia quinqueflora	o-lc	coastal rocks
Scleranthus biflorus	l	small clumps at two places: SW coast & S of Puketoka Pt. AK 211331 & 304536
Selliera radicans	l	single mat, creek mouth, main beach, McCallum Bay
*Senecio bipinnatisectus**	o	bush margins & open coastal slopes
*Senecio esleri**	l	open pine plantation
Senecio hispidulus	o-lc	open coastal slopes
Senecio lautus	o	coastal rocks
Senecio scaberulus	l†	SW coastal scrubby slope. AK 303793
*Senecio skirrhodon**	lc	by boat wrecks, has increased rapidly over 4 years. AK 299389
*Sheradia arvensis**	l†	cattle yards, main beach
*Silene gallica**	lc†	sandy flats near boat wrecks
*Sisymbrium officinale**	l†	sandy flats near boat wrecks
Solanum aviculare	s	coastal shrublands & a seedling. AK 299470
*Solanum linnaeanum**	o	shrubby slopes, pine plantations & coast margins
*Solanum mauritianum**	lc	openings in pine plantations & bush margins

*Solanum nigrum**	s	shrublands. AK 159103-04
*Soliva sessilis**	s	by woolshed
*Sonchus asper**	s	pine plantation & coastal slope. AK 159094
*Sonchus oleraceus**	o	open coastal slopes
Sophora chathamica	s	single large tree in pohutukawa forest
*Spergularia rubra**	l	margin of farm dam
*Taraxicum officinale**	o†	pine plantations
*Trifolium dubium**	o†	open areas by summit
*Trifolium pratense**	JM	pasture
*Trifolium repens**	o-lc	pasture
*Trifolium subterraneum**	lc†	pasture, especially near summit
*Ulex europeaus**	lc	shrublands throughout
*Verbascum creticum**	l†	2 places on rocky W coast, in open. AK 304527
*Verbascum thapsus**	o	open sites throughout
*Veronica arvensis**	lc†	pine plantations. AK 304379
*Vicia tetrasperma**	o	open, grassy, coastal slopes. AK 299471
Vitex lucens	l	canopy trees in forest; saplings lc
Wahlenbergia littoricola	o	open coastal slopes. AK 304461
Wahlenbergia violacea	l†	open coastal slopes

Monocots (50 + 44)		
*Agrostis capillaris**	lc	open coastal slopes & pasture. AK 299516
Aira caryophyllea s.str.*	lc	dry, open banks, rocky outcrops, from coast to summit
*Agapanthus praecox**	l†	wildlings near planted specimens at south end of main bay - all now killed
*Allium vineale**	l†	single patch, grassy coastal area, S point by old jetty
*Anthoxanthum odoratum**	o	open coastal slopes & pasture
Apodasmia similis	l†	SW coast
Arthropodium cirratum	lc	rocky cliffs mainly by forest patches
Astelia banksii	o-lc	coastal forest on rock, especially SW coast where there are large tussocks
Astelia solandri	s	epiphyte in main pohutukawa forest
Austrostipa stipoides	lc	coastal rocks throughout. AK 159100
*Avena barbata**	lc	open coastal slopes throughout
Bolboschoenus fluviatilis	l	2 patches (largest 4 x 8m), in creek mouths back of McCallum Bay (previously recorded as *B.* ?*medians*). AK 304538
*Briza minor**	lc†	open areas throughout
*Bromus diandrus**	o-lc	open coastal slopes & back of beaches
*Bromus hordeaceus**	o†	pasture & back of beach
*Bromus willdenowii**	l†	scattered plants, open costal slopes
Carex breviculmis	o	open coastal slopes
*Carex divisa**	o†	small coastal swards, throughout. AK 303745
*Carex divulsa**	o†	bush margins in 3 widely separated areas
Carex flagellifera	lc	lower coastal slopes
Carex geminata agg.	l	single patch (10 x 4m) by coast in small gully, northern McCallum Bay. AK 299527
Carex inversa	l†	open coastal slope
Carex lambertiana	o	pohutukawa forest
Carex spinirostris	l†	main pohutukawa forest
Carex testacea	lc	pohutukawa forest. AK 295058
Carex virgata	l	main creek (grazed) by woolshed, & SW coast. AK 304531
Collospermum hastatum	l	Epiphytic on pohutukawa in main forest
Cordyline australis	s	single 6m-trunked one in pohutukawa forest, the rest are planted
*Cortaderia jubata**	s	coastal, most sprayed with herbicide, only young live plants seen. AK 299531
*Cortaderia selloana**	s	coastal, most sprayed with herbicide, only young live plants seen. AK 299397-98
Critesion murinum s.str.*	l	by woolshed & a single site on NW coast. AK 299536
*Cynodon dactylon**	o-lc	swards at back of beaches
*Cynosurus cristatus**	s†	wet pasture, farm dam fringe by raupo stand. AK 304524
*Cyperus brevifolius**	l	swampy pasture, below raupo stand. AK 299532
Cyperus ustulatus	l	several clumps, back of main beach McCallum Bay, & bush margins. AK 299559

*Dactylis glomerata**	o-lc	all open sites
Dianella latissima	s	main pohutukawa forest & SW coast. AK 286151
Dianella nigra	o	open coastal slopes & in forest. AK 295554
Dichelachne crinita	o-lc	open coastal slopes
Dichelachne micrantha	s†	open grassy-shrubby area near summit. AK 303794
Earina autumnalis	l	main forest
Earina mucronata	l	main forest
Echinopogon ovatus	l	bush edge
Eleocharis acuta	l	swampy pasture below raupo stand
Eleocharis gracilis	l	swampy turf by raupo stand. AK 304523
*Eleusine indica**	l	open pasture by farm gate near woolshed. AK 299517
Elymus multiflorus	l	dry, open, coastal slopes. AK 299540
Ficinia nodosa	o	coastal rocks & back of beaches
Gahnia lacera	o	coastal shrublands
*Gladiolus undulatus**	l†	bank, back of main beach, McCallums Bay
*Glyceria declinata**	lc†	wet hollows, creek beds in pasture & farm dam margins. AK 304519
*Holcus lanatus**	o	open grassy slopes & wet pasture
Isachne globosa	lc	swampy pasture & adjacent raupo stand by farm dam. AK 299673
Isolepis cernua	l†	SW coast
*Isolepis sepalcralis**	lc	swampy pasture, by farm dam
*Juncus acuminatus**	o	swampy pasture, below raupo stand. AK 299552
*Juncus articulatus**	o†	creek margin, main bay
Juncus australis	o	open pasture
*Juncus bufonius**	l†	open coastal pasture
Juncus edgariae	o	creek margin & swampy pasture
*Juncus effusus**	o-lc	creek margins & wet pasture
*Juncus flavidus**	o-lc	wet pasture & coastal slopes. AK 295073 & 299539
Juncus planifolius	l	wet pasture, below raupo stand. AK 299526
Juncus sarophorus	l	main wetland
Lachnagrostis billardierei	l†	open coastal slopes. AK 304530
Lemna minor	lc	swampy pasture
*Lolium perenne**	o-lc	pasture, locally dominant
*Lolium rigidum**	l	back of main beach, McCallum Bay. AK 299550
Microlaena stipoides	o-la	o, open coastal slopes; & la in pasture and summit
Microtis unifolia	l†	open bush margins
Oplismenus hirtellus	o-lc	best forest areas
*Paspalum dilatatum**	o-lc	open pasture & rank grasslands
*Paspalum distichum**	la	damp pasture, creeks & farm dams. AK 159089 & 299415
*Paspalum vaginatum**	l†	single intertidal rocky bay with small mangroves, mid SW coast
*Pennisetum clandestinum**	JM	sprayed when seen by JM
*Phalaris aquatica**	l†	coastal bank, S end main beach, McCallum Bay. AK 304533
Phormium tenax	Pl(lc)	No natural plants; widely planted around coast, especially McCallum Bay; now spreading
Poa anceps	o-la	coastal slopes
*Poa annua**	lc†	locally common in pasture, obvious in October
Rhopalostylis sapida	l	young trunkless plants in pohutukawa forest
*Rytidosperma penicillatum**	lc	open coastal slopes
*Rytidosperma pilosum**	lc	open coastal slopes. AK 299587
*Rytidosperma racemosum**	lc	open coastal slopes & pasture
*Schedonorus arundinaceus**	o†	back of gravel beaches
Schoenoplectus tabernaemontani	l†	margin of raupo, farm dam margin
*Sporobolus africanus**	o	open coastal slopes & pasture. AK 299416
*Stenotraphrum secundatum**	lc†	swards along backs of beaches
Thelymitra longifolia agg.	lc	mainly open coastal banks
Thelymitra sp. (narrow leaf)	l†	coastal slope, north McCallums Bay
Triglochin striata	s†	single patch, base of clay bank, high tide mark, SW coast
Typha orientalis	l	single dense stand c.20 x 20m, lightly grazed wetland

Uncinia uncinata	lc	forest
*Vulpia bromoides**	lc	dry, open, coastal banks & rocks
Winika cunninghamii	s	epiphyte in main forest

Rangitoto remembered at ninety

Eric Godley

Country and Veteran Member, Christchurch

Before World War II

I was born on 10 May 1919 at Devonport, Auckland, almost on Cheltenham Beach. Nurse Brown's nursing home fronted on to Vauxhall Road at the Vauxhall end of the beach, and backed on to the beach itself. Had I been precocious enough to climb to a back window my first view of the multiverse would have been of Rangitoto Island across the Rangitoto Channel.

Fig. 1. Eric Godley enjoying a joke at his 90th birthday party at the University of Canterbury Staff Club. Photo: R.E. Beever, 10 May 2009.

During the next few years I passed through the amphibious stage of my ontogeny, in and out of the water, either at Devonport Beach, Duder's, Cheltenham, or Narrow Neck; and I gradually explored my territory: "up the hill" (up Mt Victoria); "down the shore" (down to the Devonport shopping centre near the ferry wharf); "down the muddy" (down to see the mangroves on the mudflats that bounded Devonport on the north); and, further afield, "over to town" (across on the ferry to Auckland City); and then, when I was about 7 or 8, "down to Rangi".

The Devonport Wolf Cub pack, which I joined soon after entering Devonport District School, shared a hut on Rangitoto with the Devonport Boy Scouts, and at some time in *c.* 1926 or 1927 we Cubs went down there for a weekend. I cannot remember anything about this trip except that my mother made me a cake to take down, and that we were all so excited that we couldn't go to sleep and kept our two leaders awake for much of the night. But the visit itself was the same in outline as any of our weekend visits before the War. Soon after lunch on a Saturday we would assemble at the launch steps on the Devonport wharf (people still worked until midday Saturday at that time). Then, soon after 1 pm, in the distance up-harbour, we would make out a flotilla coming our way. Its "flagship" would be the little steamer *Onewa*, with its permanent list, belching smoke on its way to Waiheke; and there would be our own launch, either the *Olive Rose* or the *Olive Jean*, which would soon peel off to pick us up at Devonport and take us to the Rangitoto wharf. It then went on to Islington Bay, before returning to Auckland later that afternoon. In her book on Rangitoto, Mrs Woolnough (1987) notes that there was also a ferry boat service to Rangitoto. But this went from Auckland via Orakei, Kohimarama, and St Heliers.

The Scouts' hut nestled under a pohutukawa about 100 m from the wharf at the junction of the routes to the Beacon, Islington Bay, and the Summit. It was built in 1923 (Woolnough 1987) and as I remember it, was simply a single-doored bunkroom with a stove opposite the door. On either side of the door and the stove, and at one end were bunks in two tiers. At the other end was a window. There was a water tank and we used the public lavatory nearby.

After I graduated to the Scouts, visits to Rangitoto increased. I particularly remember the training camps for patrol leaders run during the May or August holidays by the District Scout Master, "Skipper" Marks. An undated clipping from the *North Shore Gazette* (Scribe 1933 or 1934) describes the third of these. We arrived at 10.15 am on Monday, 28 August and left on the afternoon launch on Wednesday 30 August. There were two leaders and 18 boys, all drawn from No.4 District which extended from Devonport to beyond Albany, where "Skipper" taught at Coatesville.

Each morning we would wave to the prisoners as their truck passed, taking them to work. I do not recall any instruction in natural history at these camps. Nor did I become greatly interested until 1935 when I began Botany for Matriculation in the 5th form at Takapuna Grammar School under Miss Adams. By that time I had left the Scouts but not Rangitoto. During 1937–1941 when I was at Training College and University,