

Anniversary Weekend Camp, Northland, 28–30 January 2017

Geoff Davidson (editor)

Based at the Kerikeri Holiday Park and Motels, we numbered 39 from Auckland, Tauranga and Northland: Colleen and Warren Brewer, Jan Butcher, Bruce Calvert, Cheryl Taylor and Ewen Cameron, Helen Cogle, Bev and Geoff Davidson, Chris and Olwen Green, Leslie Haines, Shelley Heiss-Dunlop, Richard Hursthouse, Gael Donaghy and Graeme Jane, John Millet, Philip Moll, Barbara Parris, Colleen Pilcher, Helen Preston-Jones, Carol and CJ Ralph, Juliet Richmond and Alan Foubister, John and Stella Rowe, Mike and Sue Rowledge, Joshua Salter, Jenni Shanks, Doug Sheppard, Archie, Ian, Lydia and Molly Smith, Claire Stevens, Alison Wesley, Maureen Young. We were accompanied on various days by Paul and Enid Asquith, Dan O'Halloran, Ian Wilson and staff of Moturoa Island.

Day 1 - Moturoa Island, western Bay of Islands (See Appendix 1)

Carol Ralph

In contrast to the weather during the previous visit by Bot Soc to Moturoa (6 days in August 1990) (Young 1991), this Saturday was summer-perfect. The water crossing by barge and boat was peaceful; the temperatures encouraged swimmers but didn't discourage hikers; gentle air allowed comfortable sitting in the Ralphs' garden. Bot Soccers proved themselves brilliant at following instructions, and all arrived on time, in two shifts, at two boat departure sites, Opito Bay, where the multipurpose *The Ark* ferried 15 passengers in a style above what sheep get on the same vessel (Fig. 1), and Kerikeri Cruising Club, where *El Pescador* whisked a load half that size across the water to Moturoa. CJ organized the two boats, 3 skippers, and 45 Bot Soccers. Moturoa is near the mouth of the Kerikeri Inlet, so the cruise was only 15 minutes.

Paul and Enid Asquith welcomed our groups to Moturoa, introducing Linda and Stu Crothers, the caretakers of this private island, and giving an overview of the island history and layout—157 ha, 3 km long, designated wildlife refuge, sheep paddocks on the more level parts (2/3 of the area), fenced-off, regenerating bush on the steep parts (1/3), 17 houses sprinkled on the western quarter of the island, 7 species of native birds translocated there.

Most people then walked the western half of the South Face Track, which traverses part of the steep, south-facing, bush-clad slope, the first area to exclude stock in the 1970s. Barbara Parris, who had spent much time on the islands in the eastern Bay of Islands, where grazers and rats have only recently been removed (Parris 2015), envied the good

diversity of ferns and lack of invasive plants. The canopy of large kanuka (*Kunzea linearis*) sheltered a good understory of *Pittosporum umbellatum*, *Olearia furfuracea*, *Leucopogon fasciculatus*, and *Alseuosmia quercifolia*. People commented on the “weird” leaves of *Coprosma spathulata* (Fig. 2). It looked normal to me! The track crossed gentle gullies hosting groves of ponga (*Cyathea dealbata*) and often a large puriri (*Vitex lucens*) and kohekohe (*Dysoxylum spectabile*). Kohekohe seedlings were ubiquitous. We found the *Pittosporum pimelioides* that Enid found after Ross Beever discovered the first of this species during the 1990 field trip. The three shaded, trail-side plants were tall and scraggly, lacking fruit. The two nicely rounded, 1.5-m plants under a shorter, open canopy had both old, open and new, green fruit. Keen eyes spotted a small *Pittosporum undulatum*, a potentially bad interloper from Australia that is being removed as found. Although I find that the *Brachyglottis kirkii* ssp. *angustior* on Moturoa Island, eastern Bay of Islands, blooms later than the *Brachyglottis kirkii* on Moturoa, Maureen thought this must also be ssp. *angustior*. She has not seen ssp. *kirkii* in Northland.

At lunch time people from various groups came together at Pohutukawa Bay (Fig. 3), ate, swam, botanized, and enjoyed the view of the back side of Russell. Then three fast-moving botanizers set off planning to circle the east end of the island along the shore during low tide (Fig. 4), while others returned via scenic paddocks to the west end, where they visited at Asquiths' cottage or relaxed at the Ralphs'. A small group took the ridge track to the eastern end, where they encountered a sizeable pohutukawa doing its best to camouflage one of the WWII gun emplacements (Fig. 5). A fourth group, seen here scrambling around rocks on the southern coast (Fig. 6), continued at relaxed pace up through Ponga Hollow, down through Trout Valley, along the shore through Orchid and Paua Bays, and up Morepork Valley to return west through the paddocks.

In Ponga Hollow this group saw a large, old puriri and associated grove of taraire (*Beilschmiedia tarairi*) and tawa (*Beilschmiedia tawa*, incl. *B. tawaroa*)¹. In Trout Valley they encountered a North Island robin and on a ponga trunk an impressively large *Phlegmariurus varius*. Along the shore they added *Lachnagrostis billardiarei* to the island list, appreciated graceful *Chionochloa bromoides* on the rocks, saw a small, anemic *Lobelia physaloides* in the bottom of a slip, and nearby a *Lycopodiella cernua*, a

¹ Most people today sink *B. tawaroa* into *B. tawa* – but the few trees of it on the island are all of the *B. tawaroa* form which has a wider leaf than *B. tawa*. (comment from EKC).



Figs. 1–6: **1.** Embarking on 'The Ark' for the Moturoa adventure. Photo: GD. All photos taken during the Weekend Camp by Geoff Davidson (GD), Bev Davidson (BD), Phillip Moll (PM), Carol Ralph (CR) or Joshua Salter (JS). Figs. 1-7, Moturoa Island visit, 28 Jan 2017; Figs. 8-18, north Puketi Forest, 29 Jan 2017; Figs. 19-24, south Puketi Forest, 30 Jan 2017. **2.** "Weird" *Coprosma spathulata* with unusually large leaves (to us Aucklanders), leaf blades to 20 x 20 mm, with shortish winged petioles. South Track, Moturoa. Photo: JS. **3.** Lunch in the shade, Pohutukawa Bay. Photo: JS. **4.** Rock platform, eastern end of Pohutukawa Bay. Photo: JS. **5.** WWII gun emplacements with pohutukawa camouflage, east end of Moturoa. Photo: JS. **6.** Makeshift bridge to reach a rock platform, south coast of Moturoa. Photo: CR.



Figs. 7–13: **7.** Moturoa residents and Bot Soc guests at the Moturoa Island BBQ at the Ralphs'. Photo: PM. **8.** The pink rock quarry, north side of Puketi Forest. Photo: GD. Hugh Grenfell comments: "It's the Puketi Unit (within the Caples Terrane, Late Permian age) which includes cherts and siliceous argillites probably akin to McCallum's red chip as a lithology hence the colour." **9.** The ripe fruit of *Rubus australis* glowed like gems in the morning light, north Puketi. Photo: JS. **10.** A rata-clad stump and a tawa sapling in sunlight, north Puketi. Photo: JS. **11.** Very tall *Pterostylis banksia*, north Puketi. Photo: JS. **12.** Maureen explaining characters of *Dicksonia lanata* subsp. *hispida*, north Puketi. Photo: JS. **13.** Bev beneath some proud kauri missed by the loggers, north Puketi. Photo: JS.

new species for the island. At Paua Bay alongside a large, prostrate pohutukawa they found a handsome, dark green coastal maire (*Nestegis apetala*) sporting quite inconspicuous flowers, and up a steep bank were penguin feathers spilling out of a burrow, wherein was a little penguin, embarrassed to be seen molting.

Meanwhile, back at the Ralph cottage, a dedicated crew barbecued quantities of meat and assembled spectacular salads and vast piles of sticky concoctions (that fed us for 3 days). After the group photo (Fig. 7), a prompt dinner at 6 p.m. was dictated by the need to shuttle two loads of people back across the water and along the road to the Kerikeri Holiday Park before dark. A colorful, peaceful, evening sky treated the second load as they crossed the quiet water.

For me the day pointed out the dilemma of "enrichment planting," which has been undertaken energetically by the island's various owners, both in their gardens and in the wildlife areas. "Apologizing" for plants that were planted, as though they didn't really belong ... answering the question "Was it planted?", or "apologizing" before the question that it was. That kauri and those kowhai with tiny leaves along the South Face Track, the conifers in Ponga Hollow, ... these plantings were done to "hurry up" succession, to bring species that offer benefits to wildlife.

No apology for all the more recent planting, done with plants produced from seeds of naturally occurring plants on the island, but the truth is, even that is not really a "natural" process. We grow the species that are easy to grow (coprosmas), or that we like (*Melicope*) or that come our way (pohutukawa from Project Crimson), not the species that most abundantly seed (kanuka); but before that process was developed, plants were sourced from elsewhere. Some species might have occurred previously on Moturoa (*Coprosma robusta*, kauri); others not (rimu, kahikatea). Recent taxonomic studies have pointed out the risks of bringing in plants from elsewhere, which might turn out to be different species e.g. kowhai. We are the dispersal agent, distributing young plants instead of seeds. However, we may be un-natural, but natural dispersal is limited. Many of the source plants are gone and some of the dispersers (moa for example) have also gone.

Day 2 - Onekura Track and the 'Shirley Guildford Puketi Mokau Reserve' (See Appendix 2)

Geoff Davidson

Driving in convoy to the northern access into Puketi Forest, we assembled before the gate at the beginning of the Puketi Mokau Ridge Road. Dan

O'Halloran, Department of Conservation ranger and honorary ranger for the Native Forests Restoration Trust (NFRT), was there to meet us and act as our guide for the day. Our destination was the start of the Onekura Track.

The old clay road that was seasonally impassable, even for the most ardent 4-wheel driver, has been upgraded to a well metalled 'pink' logging road, so smooth that even the two-wheel-drive vehicles travelled effortlessly. The pink roading was reminiscent of Auckland's more brightly coloured cycle trail.

The start of the track led through some rather weedy patches past an old quarry site which was the source of the 'pink' road metal (Fig. 8). Then the real bush and the real track started with an astonishing display of *Rubus australis* in full fruit. The long lianes had climbed well up into the surrounding bush and the panicles of fruit were cascading down in a glorious display of luscious translucent colours, green, yellow, orange, red and black (Fig. 9). From there the track sloped on a gentle, even gradient, following an abandoned logging road, before dropping steeply down to the Waipapa River.

In deference to the combined age of all the participants we turned before the steep descent began. On the way we enjoyed the rich botany of a northern rain forest (Fig. 10). Despite the drought Northland was enduring, the forest, for the most part, was lush and healthy, exemplified by the size of some *Pterostylis banksia* which exceeded 40 cm tall (Fig. 11).

Dicksonia lanata subsp. *hispida* was the next surprise as they stood with 2 m tall trunks in groves, obviously connected underground by creeping rhizomes (Fig. 12). They are confined to northern kauri forests and, learning that their southern-most spread is the Tararu Valley, Coromandel Peninsula (http://www.nzpcn.org.nz/flora_details.aspx?ID=1790), it suggested to me a Bot Soc trip, to see if they are sympatric with *Dicksonia lanata* subsp. *lanata* in the NFRT reserve up the Tararu Valley.

Obviously the loggers had not completed the job as further along the track there were some wonderful, proud specimens of kauri (Fig. 13) emerging from an understory of *Astelia trinervia*, *Gahnia xanthocarpa* and *Dianella nigra*.

The scars of the logging road construction have healed with time and the cut banks no longer resemble a man-made artifice. The steep slopes have long-since been covered over with many colonising species, among them a strikingly healthy *Pittosporum kirkii* that clearly thrived on what had once been a freshly exposed clay surface,

allowing it to establish on the ground rather than its normal epiphytic perch.

It was as though we were walking in Kirk's footsteps as we were surrounded by *Halocarpus kirkii* (formerly *Dacrydium kirkii*) (Fig. 14); *Brachyglottis kirkii*, (formerly *Senecio kirkii* and briefly *Urostemon kirkii*); and *Pittosporum kirkii* (Fig. 15) which has, thus far, escaped being so ignominiously reclassified.

After a late lunch we reluctantly returned back up the gentle incline to the cars.

A few hundred metres back along the pink road, and we stopped for a quick reconnaissance of the Shirley Guildford Puketi Mokau Reserve purchased by the NZ Native Forests Restoration Trust in 1987 (NZNFRT 2017). Shirley was the force behind the establishment of the Restoration Trust in 1980, and it was her energy and enthusiasm that ensured that the fund-raising for our first land purchase was a success, and set the Trust on its course of land-banking reserves for protection².

The Shirley Guildford Puketi Mokau reserve is 319 ha and it was chosen for its strategic protection of the northern boundary of the Puketi Forest. Formerly, goats were farmed on adjacent land, threatening the integrity of the state forest. Walking the rough track was akin to bush-whacking, with the assurance of our guide, Dan O'Halloran, giving us comfort that we were not lost. From my memory of previous visits, the bush is much improved and the main access track, once choked with weeds, is now free of mist flower (*Ageratina riparia*), thanks to the effects of the biocontrol white smut fungus (*Entyloma ageratinae*).

Near our exit point back to the road we passed through a colony of *Polytrichum juniperinum* emergent on a mound of *Sphagnum* sp. (Fig. 16).

The convoy of vehicles scattered on the return to Kerikeri, each choosing the least dusty route according to its driver. After external and internal liquid refreshments, we shared a catered meal organised by CJ Ralph in the cavernous BBQ area, meeting other campers and socialising, and looking over a display of species samples from the day's trip (Figs. 17 & 18).

Day 3 - Puketi Forest Waihoanga Gorge Walk (See Appendix 3)

Alison Wesley

After an approximately 40 min drive from our base in Kerikeri we were welcomed on to the farm of Ian Wilson, a long-time member of the Auckland Botanical Society and a founding trustee of the Puketi Forest Trust - Oho Mai Puketi (Awaken Puketi) (Puketi 2017).

Before setting out on our walk, Ian gave us an excellent talk (Fig. 19) about the history of the trust and how he became the instigator of the trust which was formed in 2003 with the purpose of restoring Puketi Forest to complete healthy forest. The total size of Puketi Forest is 15,000 ha and the trust aims to control pests over an area of 5,500 ha on the southern side of the forest. He reported that from 2003 until the end of 2016 there have been more than 57,500 pests trapped, including stoats, cats, weasels, ferrets, rats, hedgehogs, possums and mice.

In direct contrast to all those pests, there were remarkably few weeds to be seen along the track. While there may well have been work done to remove some, it appeared that the worst species in Northland had never established along the gorge track.

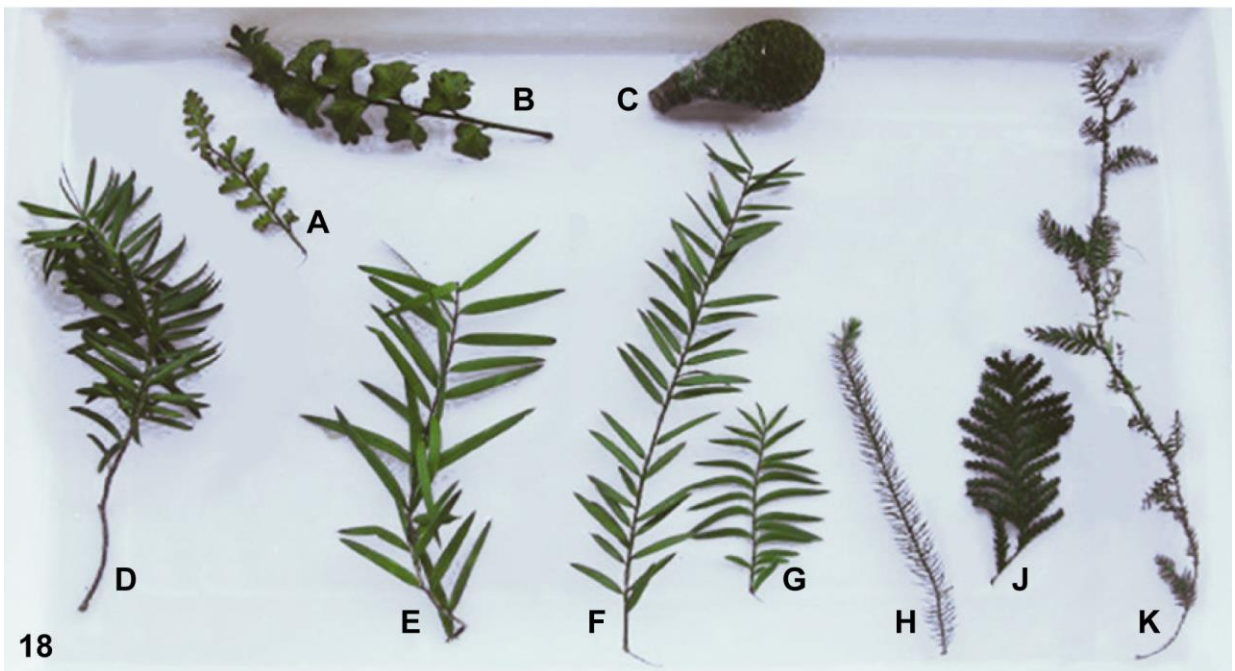
This trail was advertised as a well-developed track and it lived up to that description. Although the loop track of the Waihoanga Gorge is not particularly long we walked it at typical botanical society pace, admiring and identifying as many plants as possible. Of course the most stunning were the large kauri up on the ridge (Figs. 20 & 21).

Starting with a preliminary species list we were able to add eight more ferns. It was a particular pleasure for me to see all four northern species of *Tmesipteris* and, in particular, become much more familiar with *Tmesipteris sigmatifolia* which is uncommon in the Auckland area where many Bot Soc trips occur. The uncommon fern *Loxosoma cunninghamii* was seen right beside the bridge we first crossed to access the track.

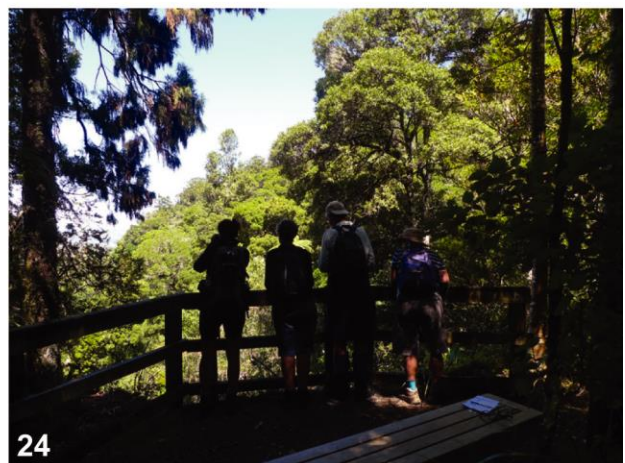
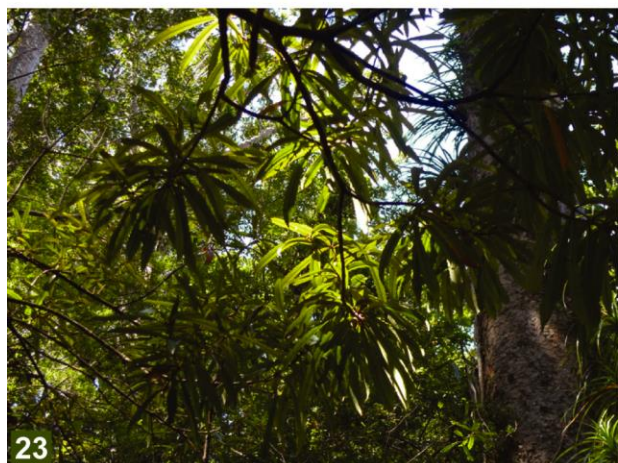
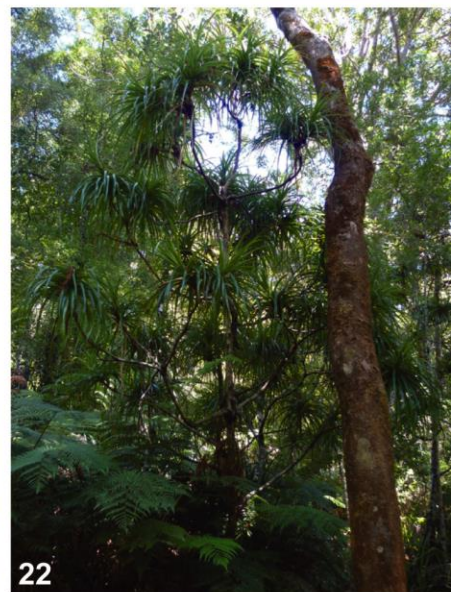
The common associates of kauri, such as taraire, northern rata (*Metrosideros robusta*), rimu (*Dacrydium cupressinum*), towai (*Weinmannia silvicola*), and makamaka (*Ackama rosifolia*), were all seen, and also *Dracophyllum latifolium* was prominent (Fig. 22).

In contrast to the walk we did in the more northerly part of Puketi Forest the day before, where many *Alseuosmia* were generally recognised as *A. quercifolia*, in this southern part of the bush,

² That first land purchase was the 20 ha Ernest Morgan Reserve at Riverhead, now owned by the QEII Trust, the site of the 2007 discovery of the Auckland endemic species, *Parahebe jovellanoides*.



Figs. 14–18: **14.** *Halocarpus kirkii* seedling amongst rimu seedlings, north Puketi. Photo: JS. **15.** *Pittosporum kirkii* apparently growing on the ground, north Puketi. Photo: JS. **16.** *Sphagnum* mound with emergent *Polytrichum* ? *juniperinum*, north Puketi. Photo: JS. **17.** Examining specimens from the Onekura Track and Guildford Reserve. Photo: CR. **18.** A display of the conifers seen on the Onekura Track and Shirley Guildford Puketi-Mokau reserve: *Phyllocladus trichomanoides* (A), *Phyllocladus totoa* (B), *Agathis australis* (C), *Halocarpus kirkii* (D), *Podocarpus laetus* (E), *Podocarpus totara* (F), *Prumnopitys ferruginea* (G), *Dacrydium cupressinum* (H), *Libocedrus plumosa* (J), *Dacrycarpus dacrydioides* (K). Some people also saw *Manoao colensoi*. Photo: CR.



Figs. 19–24: **19.** Ian Wilson relating the story of the Puketi Forest Trust, south side of Puketi Forest. Photo: BD. **20.** One of the many stately kauri on the Waihoanga Track, south Puketi. Photo: BD. **21.** Kauri with three trunks, Waihoanga Track, south Puketi. Photo: JS. **22.** *Dracophyllum latifolium* approx. 10 m tall, Waihoanga Track, south Puketi. Photo: JS. **23.** *Ixerba brexioides* approx. 5 m tall, Waihoanga Track, south Puketi. Photo: JS. **24.** Lookout on Waihoanga Track, south Puketi. Photo: JS.

where *Alseuosmia* plants were less common, they were identified as *A. macrophylla* or *A. banksia*.

Other plants more common in the northern North Island than elsewhere that we found along the Waihoanga Gorge Track included *Halocarpus kirkii*, *Dicksonia lanata* var. *hispida*, *Metrosideros albida*, *Ixerba brexioides* (Fig. 23), and *Quintinia serrata*.

References

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Appendix 1. List of wild vascular plants for Moturoa Island in the western Bay of Islands, and additional planted indigenous species.

Ewen K. Cameron

Herbarium collections

In the Auckland Museum herbarium (AK) there are 378 herbarium specimens collected from Moturoa Island and its adjacent (≤ 1 km) islets. The earliest are 27 algae from 1938-1975, and in 1985 the first two angiosperms were collected (see Table 1). The largest collections from the island were made in 1990, mainly by Anthony Wright, firstly associated with the Offshore Islands Research Group (OIRG) visit 21-27 Jan 1990, and then followed by the Auckland Botanical Society (ABS) visit 25-31 Aug 1990. (Note – some of the mosses collected during these visits are still to be accessioned). Since 1990 there has been the occasional additional collection, mainly by Enid Asquith, and usually involving a suspected new record for the island. Eight additional vouchers were collected during this recent ABS January 2017 visit. Forty-one percent of the wild vascular flora is vouchered and these proved to be invaluable for supporting the literature records, especially where the taxonomy has changed.

The track had occasional lookouts (Fig. 24) from where we could view the regenerating forest in the valley below and see farmland in the distance.

Acknowledgements

Thank you to the landowners and trip leaders for a great weekend, and to Hugh Grenfell for his comments on Figure 8.

Source of the records

This vascular plant list (see Table 3) has been compiled from: (a) two unpublished species lists by Wright et al. (1990) and Wright (1990); (b) a species list held by the owners which includes all native plantings and whether they were locally or externally sourced; (c) the 285 vascular voucher specimens in AK; and (d) the observations by myself and the ABS members on 28 January 2017. The list is divided into: Table 3A – wild vascular plants; and Table 3B – cultivated / planted species (excluded if also wild). A few exotic plantings are included in Table 3B, but this is in no way comprehensive. Plant names from the 1990 lists have been updated to what is most likely.

The vascular flora

The wild vascular flora of Moturoa Island (157 ha), including the peninsula known as ‘Alcatraz’ (for map see Young 1991: p.19), is 440 taxa (60 % native). The adjacent islets add another 28 species, bringing the combined total to 468 taxa

Table 1: AK herbarium collections from Moturoa Island, adjacent islets and reefs.

Date of collection	Plant group	Collector	total
1938 and 1948	Algae	[Herb. V.W. Lindauer]	5
1974-1975	Algae (subtidal)	Karl A. Johnson	25
1985	Angiosperms	Tim G. Lovegrove	2
1990	Vascular, lichens, mosses	Anthony Wright et al.	312
1994-2008	Vascular, algae	Enid Asquith	28
1991-2010	various	various	4
2017	Vascular	ABS	8

Table 2: Vascular flora totals for Moturoa, its adjacent islets, combined totals, and a comparison with Tiritiri Matangi Island.

Plant group	Moturoa & 'Alcatraz'	Only on the Moturoa islets	Combined totals	Tiritiri Matangi Island
Native ferns and lycopods	62	2	64	44
Native conifers				2
Native dicots	126	6	132	139
Native monocots	76	10	86	76
Naturalised ferns	2		2	1
Naturalised conifers	4		4	4
Naturalised dicots	113	6	119	181
Naturalised monocots	57	4	61	65
Totals	440	28	468	512
% native	60%	64%	60%	51%

(60 % native) (see Tables 2 and 3A). Another 32 native species within their geographical range have been planted on the island as part of a revegetation project (see Table 3B). The ABS January 2017 visit added 12 herbaceous species to the Moturoa flora, eight of them native species, and one of them, *Polypogon monspeliensis*, had been previously recorded only on the outer Black Rocks.

A comparison with Tiritiri Matangi Island

A comparison of the Moturoa flora with the slightly larger island, Tiritiri Matangi Island (197 ha), in the Hauraki Gulf, which has had a similar history with past farming, revegetation plantings (on a much smaller scale), and the introduction of native bird species, makes an interesting comparison (Table 2). Although the Tiritiri Matangi Island flora is larger (Cameron & Davies 2013), the native component is 18 species fewer (when the Moturoa islets are included). The largest difference with the natives is

the more abundant ferns on Moturoa – perhaps a reflection that the bush remnants of Moturoa survived in better condition and consequently were moister. The markedly smaller naturalised flora of Moturoa can perhaps be explained by the markedly less human visitation to that island.

Acknowledgements

I thank: Enid Asquith (Moturoa Shareholder) for a file on the native plantings of Moturoa and for many new records post 1990; Anthony Wright for a copy of the two unpublished 1990 botanical survey reports; ABS members for additional records of what they observed during the 2017 ABS visit, especially Shelley Heiss-Dunlop and Graeme Jane; Rhys Gardner and Peter de Lange for confirming a few of the identifications; C.J. Ralph, Bev and Geoff Davidson for organising the 2017 visit; and the Moturoa Shareholders for supporting the visit and for their hospitality.

References

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Key to abbreviations in Table 3

First column:

- * = naturalised (Wild list A)
 * = exotic (Cultivated / Planted list B)
 ** = native planting out of its natural geographical zone
 M = a managed species on Moturoa Island
 pl. = planted

- +pl.e = wild and also planted from an external Moturoa Island source
 +pl.l = wild and also planted from a local Moturoa Island source
 ? = some doubt about the identification

Second Column (Pre-2017):

- a compilation of Wright et al. (1990) and Wright (1990), with additions mainly by Enid Asquith (1991-present).
 ABS = additions to WBT (see below), compiled by Anthony Wright (1990) based on field work by the ABS 25–31 Aug 1990 (see Young 1991)
 [ABS] = where an Aug 1990 voucher exists, but is absent from the 1990 list

WBT = recorded by Wright et al. (1990) based on field work 21-27 Jan 1990

X = present

YYYY = where known the year of the first wild collection on Moturoa Island for records other than 1990

islet = absent from Moturoa and 'Alcatraz' but recorded on the islets within 1 km of them; based on AK herbarium vouchers mainly collected by AE Wright in 1990

Third Column (Jan 2017):

X = plants seen during the ABS visit to Moturoa Island on 28 Jan 2017

Fourth Column (Voucher):

V = Moturoa Island or 'Alcatraz' herbarium voucher in AK

Vi = herbarium voucher from one of the islets (uninhabited) within 1km of Moturoa Island, collected in 1990

Table 3A. Moturoa Island Vascular Wild Plants

	Pre- 2017	Jan 2017	Voucher				
FERNS & LYCOPHYTES				<i>Microsorium pustulatum</i>	WBT	X	V
<i>Adiantum cunninghamii</i>	WBT	X		<i>Microsorium scandens</i>	X		
<i>Adiantum hispidulum</i>	WBT	X	V	<i>Nephrolepis cordifolia</i> *	X		
<i>Asplenium flaccidum</i>	ABS	X		<i>Notogrammitis ciliata</i>	ABS		V
<i>Asplenium haurakiense</i>	ABS		V	<i>Paesia scaberula</i> +pl.l	WBT	X	
<i>Asplenium northlandicum</i> × <i>A. oblongifolium</i>	islet		Vi	<i>Pellaea rotundifolia</i>	[ABS]		V
<i>Asplenium oblongifolium</i>	WBT	X	V	<i>Phlegmariurus varius</i>	WBT	X	Vi
<i>Asplenium polyodon</i>	WBT	X		<i>Pneumatopteris pennigera</i>	WBT	X	
<i>Azolla pinnata</i> *	X			<i>Polystichum</i> sp.	WBT		
<i>Blechnum chambersii</i>	WBT	X	V	<i>Psilotum nudum</i>	X		
<i>Blechnum chambersii</i> × <i>B. membranaceum</i>	[ABS]		V	<i>Pteridium esculentum</i>	WBT	X	
<i>Blechnum filiforme</i>	WBT	X		<i>Pteris comans</i>	WBT	X	V
<i>Blechnum membranaceum</i>	WBT			<i>Pteris macilenta</i>	X	X	
<i>Blechnum minus</i>	WBT			<i>Pteris saxatilis</i>	X		
<i>Blechnum norfolkianum</i>	ABS		V	<i>Pteris tremula</i>	WBT	X	Vi
<i>Blechnum novae-zelandiae</i> +pl.l	WBT	X		<i>Pyrrosia eleagnifolia</i>	WBT	X	V
<i>Cheilanthes distans</i>	ABS		V	<i>Schizaea bifida</i>	islet		Vi
<i>Cheilanthes seiberi</i>	WBT		V	<i>Schizaea dichotoma</i>	X		
<i>Cyathea dealbata</i> +pl.e, +pl.l	WBT	X		<i>Tmesipteris elongata</i>	ABS		V
<i>Cyathea medullaris</i>	WBT	X	V	<i>Tmesipteris lanceolata</i>	WBT	X	
<i>Deparia petersenii</i>	WBT	X	V	<i>Tmesipteris sigmatifolia</i>	ABS		
<i>Dicksonia squarrosa</i> +pl.e	WBT	X		<i>Tmesipteris tannensis</i>	ABS		V
<i>Diplazium australe</i>	WBT	X		<i>Trichomanes elongatum</i>	2001		V
<i>Doodia australis</i> +pl.l	WRT	X	V	<i>Trichomanes venosum</i>	X		
<i>Gleichenia microphylla</i>	ABS			CONIFERS			
<i>Histiopteris incisa</i>	WBT	X		<i>Araucaria heterophylla</i> * +pl	ABS		V
<i>Hymenophyllum demissum</i>	ABS	X		<i>Cupressus</i> ? <i>macrocarpa</i> * +pl	X		
<i>Hymenophyllum dilatatum</i>	ABS			<i>Pinus pinaster</i> * +pl	WBT	X	
<i>Hymenophyllum multifidum</i>	ABS		V	<i>Pinus radiata</i> * +pl	WBT	X	
<i>Hymenophyllum nephrophyllum</i>	ABS			DICOTS			
<i>Hymenophyllum rarum</i>	WBT		V	<i>Acacia mearnsii</i> *	[ABS]		V
<i>Hymenophyllum revolutum</i>	[ABS]		V	<i>Ageratina adenophora</i> *M	ABS		
<i>Hymenophyllum sanguinolentum</i>	WBT			<i>Ageratina riparia</i> * M	WBT	X	
<i>Hypolepis ambigua</i>	1996		V	<i>Alseuosmia quercifolia</i>	WBT	X	V
<i>Hypolepis dicksonioides</i>	1999		V	<i>Alternanthera nahui</i>	2004		V
<i>Hypolepis distans</i>	X			<i>Alternanthera philoxeroides</i> * M	[ABS]		V
<i>Lastreopsis glabella</i>	ABS		V	<i>Amaranthus deflexus</i> *	WBT		V
<i>Lindsaea linearis</i>	X			<i>Amaranthus lividus</i> *	WBT	X?	V
<i>Lindsaea trichomanoides</i>	WBT			<i>Anagallis arvensis</i> var. <i>arvensis</i> *	WBT	X	
<i>Lycopodiella cernua</i>		X		<i>Anthemis cotula</i> *	WBT		
<i>Lycopodium deuterodensum</i>	X			<i>Apium graveolens</i> *	X		
<i>Lycopodium volubile</i>	1994		V	<i>Apium prostratum</i> var. <i>filiforme</i>	ABS	X	Vi
<i>Lygodium articulatum</i>	WBT	X	V	<i>Araujia hortorum</i> * M	X	X	
				<i>Atriplex prostrata</i> *	WBT	X	
				<i>Avicennia marina</i>	WBT		

Table 3A cont.

<i>Beilschmiedia tarairi</i> +pl.e, +pl.I	WBT	X		<i>Dysphania ambrosioides</i> *	X		
<i>Beilschmiedia tawa</i> (incl. <i>B. tawaroa</i>) +pl.I	WBT	X	V	<i>Dysphania pumilio</i> *	WBT		V
<i>Bellis perennis</i> *	WBT			<i>Elaeagnus</i> × <i>reflexus</i> *	WBT		
<i>Berberis glaucocarpa</i> *	WBT			<i>Entelea arborescens</i> +pl.e	WBT	X	V
<i>Blackstonia perfoliata</i> *	islet		Vi	<i>Epilobium nummulariifolium</i>	ABS		
<i>Brachyglottis kirkii</i> var. <i>angustior</i> +pl.I	WBT	X		<i>Epilobium rotundifolium</i>	WBT		V
<i>Brachyglottis repanda</i> +pl.I	ABS	X	V	<i>Erechtites valerianaefolia</i> *	WBT		
<i>Brugmansia candida</i> *	WBT			<i>Erigeron sumatrensis</i> *	WBT	X	
<i>Cakile edentula</i> *	WBT			<i>Erodium cicutarium</i> *	WBT		
<i>Cakile martima</i> *		X		<i>Euchiton japonicus</i>	WBT		
<i>Callitriche muelleri</i>	WBT			<i>Euchiton sphaericus</i>	WBT		V
<i>Callitriche stagnalis</i> *	WBT			<i>Euphorbia peplus</i> *	WBT		
<i>Calystegia marginata</i> +pl.I	WBT		V	<i>Foeniculum vulgare</i> *	ABS		
<i>Calystegia sepium</i> subsp. <i>roseata</i>	X	X		<i>Galium aparine</i> *	WBT		
<i>Calystegia soldanella</i>	ABS	X		<i>Galium divaricatum</i> *	WBT		
<i>Cardamine debilis</i>	WBT			<i>Galium mollugo</i> *	X		
<i>Carmichaelia australis</i> +pl.e, +pl.I	ABS	X	V	<i>Galium propinquum</i>	WBT		
<i>Cassytha paniculata</i>	1985	X	V	<i>Gamochaeta coarctata</i> *	WBT		Vi
<i>Centaurium erythraea</i> *	WBT	X	Vi	<i>Gamochaeta simplicicaulis</i> *	WBT		Vi
<i>Centella uniflora</i> +pl.I	WBT	X		<i>Gaultheria antipoda</i>	1994		V
<i>Centipeda aotearoana</i>		X	V	<i>Geniostoma ligustrifolium</i>	WBT	X	V
<i>Cerastium fontanum</i> *	WBT			<i>Geranium gardneri</i> *	WBT	X	
<i>Cerastium gomeratum</i> *	ABS			<i>Geranium homeanum</i>	WBT	X	V
<i>Chenopodium murale</i> *	[ABS]		V	<i>Geranium molle</i> *	ABS		
<i>Chenopodium trigonon</i>	islet		Vi	<i>Gonocarpus incanus</i>	ABS		
<i>Ciclospermum leptophyllum</i> *	WBT			<i>Hakea salicifolia</i> * M	WBT		
<i>Cirsium vulgare</i> *	WBT	X		<i>Hakea sericea</i> * M	WBT		
<i>Clematis cunninghamii</i>	ABS	X		<i>Haloragis erecta</i>	WBT	X	
<i>Clematis paniculata</i>	X	X		<i>Hebe ligustrifolia</i> +pl.I	WBT	X	V
<i>Coprosma grandifolia</i> +pl.I	WBT			<i>Hebe stricta</i> +pl.I	WBT	X	Vi
<i>Coprosma lucida</i> +pl.I	X			<i>Hoheria populnea</i> +pl.e, +pl.I	WBT	X	
<i>Coprosma macrocarpa</i> +pl.I	WBT	X	V	<i>Hydrocotyle moschata</i>	WBT		
<i>Coprosma macrocarpa</i> × <i>C. propinqua</i>	1996		V	<i>Hypericum pusillum</i>	ABS		
<i>Coprosma repens</i> +pl.e, +pl.I	X			<i>Hypochaeris radicata</i> *	WBT	X	
<i>Coprosma repens</i> × <i>C. rhamnoides</i>	[ABS]		V	<i>Ipomoea cairica</i> +pl.I	X	X	
<i>Coprosma rhamnoides</i>	WBT	X		<i>Jacobaea vulgaris</i> *	WBT		
<i>Coprosma robusta</i> +pl.e, +pl.I	WBT			<i>Knightia excelsa</i> +pl.e, +pl.I	WBT	X	
<i>Coprosma spathulata</i>	WBT	X	V	<i>Kunzea linearis</i> +pl.I	WBT	X	V
<i>Coriaria arborea</i> +pl.e	WBT			<i>Lactuca serriola</i> *	WBT		
<i>Corynocarpus laevigatus</i> +pl.e, +pl.I	WBT	X		<i>Lagenophora lanata</i>	ABS		V
<i>Cotoneaster glaucophyllus</i> *	ABS		V	<i>Lagenophora pumila</i>	ABS		
<i>Cotula australis</i>	ABS		V	<i>Leontodon saxatilis</i> *	WBT		
<i>Crassula decumbens</i> *	ABS		V	<i>Lepidium didymum</i> *	WBT		
<i>Crassula sieberiana</i>	WBT		V	<i>Leptocophylla juniperina</i>	ABS	X	
<i>Crepis capillaris</i> *	WBT			<i>Leptospermum scoparium</i> +pl.I	WBT	X	Vi
<i>Cuscuta epithymum</i> *	islet		Vi	<i>Leucopogon fasciculatus</i>	WBT	X	V
<i>Daucus carota</i> *	WBT			<i>Leucopogon fraseri</i>	ABS		
<i>Daucus glochidiatus</i>	WBT		V	<i>Lilaeopsis novae-zelandiae</i>	ABS		
<i>Dichondra brevifolia</i>	[ABS]		V	<i>Limosella lineata</i>	islet		Vi
<i>Dichondra repens</i> +pl.I	WBT	X	Vi	<i>Linum monogynum</i> +pl.I	ABS		Vi
<i>Digitalis purpurea</i> *	ABS			<i>Lobelia anceps</i>	ABS	X	
<i>Disphyma australe</i>	WBT			<i>Lobelia physaloides</i> +pl.I	ABS	X	V
<i>Dodonaea viscosa</i> +pl.e, +pl.I	ABS	X		<i>Lotus angustissimus</i> *	WBT		
<i>Drosera auriculata</i>	ABS		V	<i>Lotus pedunculatus</i> *	WBT	X	
<i>Dysoxylum spectabile</i> +pl.I	WBT	X		<i>Lotus suaveolens</i> *	WBT		
				<i>Ludwigia palustris</i> *	2001	X	V
				<i>Ludwigia peploides</i> subsp. <i>montevidensis</i> *	ABS		
				<i>Lycium ferocissimum</i> *	WBT		
				<i>Lythrum hyssopifolia</i> *	islet		Vi

Table 3A cont.

<i>Malva nicaeensis</i> *	islet		Vi	<i>Pseudopanax arboreus</i> +pl.e, +pl.l	ABS	X	
<i>Malva neglecta</i> *	WBT	X?	V	<i>Pseudopanax crassifolius</i> × <i>P. lessonii</i>	ABS		
<i>Medicago arabica</i> *	WBT			<i>Pseudopanax lessonii</i> +pl.l	WBT	X	
<i>Medicago lupulina</i> *	WBT	X		<i>Ranunculus acaulis</i>	X		
<i>Melia azedarach</i> *	X			<i>Ranunculus amphotrichus</i>	X	X	
<i>Melicope ternata</i> +pl.l	WBT	X	V	<i>Ranunculus reflexus</i>	WBT		
<i>Melicytus novae-zelandiae</i> +pl.l	ABS		Vi	<i>Ranunculus sardous</i> *	WBT		
<i>Melicytus ramiflorus</i> +pl.l	WBT	X	V	<i>Raphanus sativus</i> *	WBT	X	
<i>Melilotus indica</i> *	ABS			<i>Rumex brownii</i> *	ABS		V
<i>Mentha pulegium</i> *	WBT			<i>Rumex conglomeratus</i> *	WBT	X	V
<i>Metrosideros excelsa</i> +pl.e, +pl.l	WBT	X		<i>Rumex crispus</i> *	WBT		
<i>Metrosideros perforata</i>	WBT	X	Vi	<i>Sagina procumbens</i> *	WBT		
<i>Modiola caroliniana</i> *	WBT			<i>Samolus repens</i> var. <i>strictus</i>	WBT	X	Vi
<i>Muehlenbeckia complexa</i>	WBT	X		<i>Sarcocornia quinqueflora</i>	ABS		
<i>Myoporum laetum</i> +pl.e, +pl.l	ABS	X		<i>Schefflera digitata</i> +pl.l	ABS	X	
<i>Myriophyllum propinquum</i>	2004		V	<i>Selliera radicans</i>	ABS		
<i>Myrsine australis</i> +pl.l	WBT	X		<i>Senecio bipinnatisectus</i>	WBT	X	
<i>Nasturtium officinale</i> *	WBT			<i>Senecio esleri</i>		X	V
<i>Nertera depressa</i>		X		<i>Senecio glomeratus</i>	[ABS]		V
<i>Nertera dichondrifolia</i>	ABS			<i>Senecio hispidulus</i>	WBT	X	V
<i>Nestegis apetala</i> +pl.l	WBT		V	<i>Senecio lautus</i>	ABS		V
<i>Nestegis lanceolata</i>	X		V	<i>Senecio minimus</i>	ABS		
<i>Oenanthë pimpinelloides</i> *	1991		V	<i>Senecio quadridentatus</i>	X		
<i>Olearia furfuracea</i> +pl.l	ABS	X		<i>Senecio scaberulus</i>	ABS		
<i>Orobanchë minor</i> *	ABS			<i>Senecio skirrhodon</i> *		X	V
<i>Oxalis exilis</i>	WBT		Vi	<i>Senecio sylvaticus</i> *	ABS		V
<i>Oxalis incarnata</i> *	X			<i>Silene gallica</i> *	ABS		
<i>Oxalis latifolia</i> *	X			<i>Silybum marianum</i> *	ABS		
<i>Oxalis pes-caprae</i> *	X		V	<i>Sison amomum</i> *	X	X	V
<i>Oxalis rubens</i>	WBT			<i>Sisymbrium officinale</i> *	WBT		
<i>Paraserianthes lophantha</i> *	ABS			<i>Solanum linnaeanum</i> * M	WBT		
<i>Pelargonium inodorum</i>	ABS		Vi	<i>Solanum mauritianum</i> * M	WBT	X	
<i>Peperomia urvilleana</i>	WBT	X	V	<i>Solanum nigrum</i> *	WBT	X	
<i>Persicaria decipiens</i>	WBT	X		<i>Solanum nodiflorum</i>	WBT		
<i>Persicaria maculosa</i> *	WBT			<i>Soliva sessilis</i> *	WBT		
<i>Physalis peruviana</i> *	ABS			<i>Sonchus asper</i> *	WBT		
<i>Phytolacca octandra</i> * M	WBT	X		<i>Sonchus oleraceus</i> *	WBT		
<i>Pimelea tomentosa</i>	islet		Vi	<i>Sophora chathamica</i> +pl.e, +pl.l	ABS	X	
<i>Pimelea urvilleana</i> +pl.e	ABS		Vi	<i>Spergularia tasmanica</i>	islet		Vi
<i>Piper excelsum</i> +pl.l	WBT	X	V	<i>Stellaria media</i> *	ABS		V
<i>Pisonia brunoniana</i>	X			<i>Streblus banksii</i>	islet		Vi
<i>Pittosporum crassifolium</i> +pl.e	WBT	X	V	<i>Streblus heterophyllus</i> +pl.l	X		
<i>Pittosporum pimelioides</i>	WBT	X	V	<i>Taraxacum officinale</i> *	WBT		
<i>Pittosporum tenuifolium</i> +pl.e	2005		V	<i>Tetragonia implexicoma</i>	ABS		V
<i>Pittosporum umbellatum</i> +pl.l	WBT	X	V	<i>Tetragonia tetragonioides</i> +pl.e	ABS		
<i>Pittosporum undulatum</i> *	1985	X	V	<i>Trifolium cernuum</i> *	islet		Vi
<i>Plagianthus divaricatus</i>	ABS		V	<i>Trifolium dubium</i> *	WBT		
<i>Planchonella costata</i> +pl.l	WBT	X	Vi	<i>Trifolium glomeratum</i> *	WBT		
<i>Plantago australis</i> *	ABS		Vi	<i>Trifolium repens</i> *	WBT		
<i>Plantago lanceolata</i> *	WBT	X		<i>Tropaeolum majus</i> *	WBT		
<i>Plantago major</i> *		X		<i>Ulex europaeus</i> * M	WBT	X	
<i>Polycarpon tetraphyllum</i> *	WBT			<i>Urtica dioica</i> subsp. <i>gracilis</i> * M	2004		V
<i>Polygala myrifolia</i> *	WBT	X	Vi	<i>Urtica urens</i> * M	WBT		V
<i>Pomaderris amoena</i>	WBT	X		<i>Vellereophyton dealbatum</i> *	islet		Vi
<i>Pomaderris kumeraho</i> +pl.l	WBT		V	<i>Verbena litoralis</i> *	X		
<i>Portulaca oleracea</i> *	WBT		Vi	<i>Veronica arvensis</i> *	X		
<i>Prunella vulgaris</i> *	WBT			<i>Veronica plebeia</i>	WBT		
<i>Pseudognaphalium luteoalbum</i>	ABS		Vi	<i>Vicia sativa</i> *	[ABS]		V
				<i>Vicia tetrasperma</i> *	WBT		

Table 3A cont.

<i>Vinca major</i> *	WBT				<i>Cynodon dactylon</i> *	WBT	X	
<i>Vitex lucens</i> +pl.e, +pl.l	WBT	X			<i>Cyperus brevifolius</i> *	WBT		
<i>Wahlenbergia vernicosa</i>	WBT?	X	Vi		<i>Cyperus eragrostis</i> *	ABS		V
<i>Wahlenbergia violacea</i>	islet		Vi		<i>Cyperus ustulatus</i> +pl.l	WBT	X	
<i>Weinmannia silvicola</i> +pl.l	WBT	X			<i>Cyrtostylis oblonga</i>	ABS		V
MONOCOTS					<i>Dactylus glomerata</i> *	WBT	X	
<i>Acianthus sinclairii</i>	ABS		V		<i>Dendrobium cunninghamii</i>	ABS		
<i>Agapanthus praecox</i> *	ABS				<i>Dianella latissima / nigra</i> +pl.l	WBT	X	
<i>Agave americana</i> *	WBT	X			<i>Dichelachne crinita</i>	WBT	X	
<i>Agrostis capillaris</i> *	WBT	X			<i>Dichelachne micrantha</i>	1996		V
<i>Aira caryophyllea</i> *	WBT				<i>Dichelachne rara</i> *	[ABS]		V
<i>Aira praecox</i> *	islet		Vi		<i>Digitaria sanguinalis</i> *	WBT		
<i>Alisma plantago-aquatica</i> *	X				<i>Earina autumnalis</i>	ABS		
<i>Allium vineale</i> *	ABS	X			<i>Earina mucronata</i>	ABS		
<i>Aloe maculata</i> *	WBT				<i>Echinopogon ovatus</i>	WBT	X	V
<i>Anthoxanthum odoratum</i> *	WBT	X			<i>Eleocharis acuta</i>	2001		V
<i>Apodasmia similis</i>	ABS	X			<i>Eragrostis brownii</i> *	islet		Vi
<i>Aristea ecklonii</i> * M	2015				<i>Ficinia nodosa</i>	WBT	X	
<i>Arthropodium cirratum</i> +pl.e, +pl.l	WBT	X			<i>Gahnia lacera</i>	ABS	X	
<i>Asparagus asparagoides</i> *	WBT	X	V		<i>Gahnia setifolia</i>	ABS		
<i>Astelia banksia</i> +pl.l	WBT	X			<i>Gastridium ventricosum</i> *	WBT		
<i>Astelia hastata</i>	WBT				<i>Gladiolus undulatus</i> *	ABS		
<i>Austroderia splendens</i>	islet		Vi		<i>Hedychium gardnerianum</i> *	WBT		V
<i>Austrostipa stipoides</i>	WBT	X			<i>Holcus lanatus</i> *	WBT		
<i>Avena barbata</i> *	WBT		Vi		<i>Iris foetidissima</i> *	X		
<i>Axonopus fissifolius</i> *	islet	X	Vi		<i>Isachne globosa</i>	WBT		V
<i>Bolboschoenus ?medianus</i>		X			<i>Isolepis cernua</i>	WBT	X	
<i>Bothriochloa macra</i> *	WBT	X	V		<i>Isolepis prolifera</i>	ABS	X	
<i>Briza minor</i> *	WBT				<i>Isolepis reticularis</i>	WBT	X	V
<i>Bromus hordeaceus</i> *	WBT				<i>Isolepis sepulcralis</i> *	WBT		V
<i>Bromus willdenowii</i> *	WBT				<i>Juncus acuminatus</i> *	islet		Vi
<i>Caladenia alata</i>	islet		Vi		<i>Juncus articulatus</i> *	WBT	X	
<i>Carex banksiana</i> +pl.l	X	X			<i>Juncus bufonius</i> var. <i>bufonius</i> *	WBT		V
<i>Carex breviculmis</i>	ABS				<i>Juncus edgariae</i>	WRT	X	V
<i>Carex dissita</i> +pl.l	X	X			<i>Juncus effusus</i> *	WRT	X	V
<i>Carex divulsa</i> *	WBT				<i>Juncus flavidus</i> *	WBT		
<i>Carex flagellifera</i> +pl.l	islet	X	Vi		<i>Juncus kraussii</i>	islet	X	Vi
<i>Carex geminata</i> agg. +pl.l	WBT	X			<i>Juncus pallidus</i>	WBT	X	V
<i>Carex inversa</i>	WBT				<i>Juncus planifolius</i>	ABS		
<i>Carex pumila</i>	X				<i>Juncus prismatocarpus</i>		X	
<i>Carex secta</i> +pl.l	X				<i>Juncus tenuis</i> subsp. <i>dichotomus</i> *	islet		Vi
<i>Carex spinirostris</i>	WBT		V		<i>Juncus tenuis</i> subsp. <i>tenuis</i> *	WBT		
<i>Carex testacea</i>	islet		Vi		<i>Juncus usitatus</i>	WBT	X	V
<i>Carex uncinata</i> +pl.l	X	X			<i>Kniphofia uvavia</i> *	WBT		
<i>Carex virgata</i> +pl.l	WBT	X	V		<i>Lachnagrostis billardiarei</i>		X	
<i>Carex zotovii</i>	X				<i>Lachnagrostis filiformis</i>	WBT		
<i>Catapodium rigidum</i> *	WBT		V		<i>Lachnagrostis littoralis</i>	islet		Vi
<i>Cenchrus clandestinus</i> *	WBT	X			<i>Lemna minor</i>	[ABS]		V
<i>Chasmanthe floribunda</i> *	ABS		V		<i>Lepidosperma australe</i>	ABS		Vi
<i>Chionochloa bromoides</i> +pl.l	ABS	X	V		<i>Lepidosperma laterale</i>	WBT		
<i>Cordyline australis</i> +pl.e, +pl.l	WBT	X			<i>Lolium perenne</i> *	WBT	X	
<i>Cordyline banksia</i> +pl.e, +pl.l	ABS				<i>Machaerina articulata</i>	islet		Vi
<i>Cordyline pumilio</i>	ABS				<i>Machaerina juncea</i>	[ABS]		V
<i>Cortaderia selloana</i> *	WBT	X			<i>Microlaena avenacea</i>	X		
<i>Corybas cheesemanii</i>	ABS		V		<i>Microlaena stipoides</i>	WBT	X	
<i>Corybas oblongus</i>	X				<i>Microtis unifolia</i>	ABS		
<i>Corybas trilobus</i>	X				<i>Morelotia affinis</i> +pl.l	ABS		Vi
<i>Critesion murinum</i> *	WBT				<i>Narcissus pseudonarcissus</i> *	X		
					<i>Narcissus tazetta</i> *	ABS		V

Table 3A cont.

<i>Oplismenus hirtellus</i>	WBT	X	Vi	<i>Rytidosperma gracile</i>			X
<i>Paspalum dilatatum</i> *	WBT	X		<i>Rytidosperma penicillatum</i> *	WBT		
<i>Paspalum distichum</i> *	WBT			<i>Rytidosperma racemosum</i> *	WBT		
<i>Paspalum orbiculare</i>	ABS		V	<i>Rytidosperma unarede</i>	WBT		
<i>Paspalum vaginatum</i> *	ABS		Vi	<i>Schoenoplectus tabernaemontani</i>	WBT		
<i>Phormium tenax</i> +pl.l	WBT	X		<i>Schoenus apogon</i>	islet		Vi
<i>Poa anceps</i>	WBT	X		<i>Schoenus maschalinus</i>	WBT		
<i>Poa annua</i> *	ABS		V	<i>Schoenus tendo</i>	ABS	X	Vi
<i>Poa pusilla</i>	islet		Vi	<i>Setaria parviflora</i> *	WBT		
<i>Poa trivialis</i> *	WBT			<i>Sisyrinchium rostratum</i> *	WBT		
<i>Polypogon monspeliensis</i> *	islet	X	Vi	<i>Sporobolus africanus</i> *	WBT	X	
<i>Potamogeton cheesmanii</i>	2001		V	<i>Stenotaphrum secundatum</i> *	WBT	X	
<i>Pterostylis alobula</i>	ABS		V	<i>Thelymitra longifolia</i>	ABS		V
<i>Pterostylis banksii</i>	X			<i>Thelymitra malvina</i>	islet		Vi
<i>Pterostylis trullifolia</i>	ABS		V	<i>Thelymitra pauciflora</i>	islet		Vi
<i>Rhopalostylis sapida</i> +pl.e (+ wild seedlings)	X	X		<i>Typha orientalis</i> +pl.l	ABS		
<i>Rytidosperma biannulare</i>	WBT			<i>Vulpia bromoides</i> *	WBT		
				<i>Zantedeschia aethiopica</i> *	WBT		
				<i>Zoysia pauciflora</i>	islet		Vi

Table 3B. Moturoa Island Cultivated / Planted Species (excluded if also wild)

	Pre-2017	Jan 2017	Voucher				
CONIFERS				<i>Hibiscus rosa-sinensis</i> (hybrids) *	WBT		
<i>Agathis australis</i>	WBT	X		<i>Hibiscus syriacus</i> *	WBT		
<i>Cryptomeria japonica</i> *		X		<i>Lagunaria patersonia</i> *	WBT		
<i>Dacrycarpus dacrydioides</i>	ABS	X		<i>Laurelia novae-zelandiae</i>	X		
<i>Libocedrus plumosa</i>	X			<i>Linum monogynum</i>	X		
<i>Dacrydium cupressinum</i>	WBT			<i>Lophomyrtus bullata</i>	X		
<i>Phyllocladus trichomanoides</i>	X			<i>Melicytus novae-zelandiae</i>	X		
<i>Podocarpus totara</i>	WBT	X		<i>Metrosideros collina</i> 'Tahiti' *	WBT		
<i>Prumnopitys ferruginea</i>	X	X		<i>Metrosideros robusta</i>	X		
<i>Prumnopitys taxifolia</i>	X			<i>Myoporum insulare</i> *	WBT	X	
				<i>Meryta sinclairii</i> **		X	
				<i>Myosotidium hortensium</i> **	X		
DICOTS				<i>Nerium oleander</i> *	WBT	X	
<i>Alectryon excelsus</i>	X			<i>Nestegis cunninghamii</i>	X		
<i>Annona cherimola</i> *	2005		V	<i>Olea europea</i> subsp. <i>europaea</i> *	WBT	X	
<i>Aristolelia serrata</i>	X			<i>Parsonsia heterophylla</i>	WBT		
<i>Callistemon</i> sp. *	WBT			<i>Piper excelsum</i>	WBT		
<i>Coprosma propinqua</i>	X			<i>Pittosporum eugenioides</i>	WBT		
<i>Corokia buddleioides</i>	X			<i>Plagianthus regius</i>	X		
<i>Corokia cotoneaster</i>	WBT			<i>Pomaderris prunifolia</i> **	X		
<i>Dysoxylum spectabile</i>	WBT			<i>Pseudopanax crassifolius</i>	ABS		
<i>Elaeocarpus dentatus</i>	X			<i>Pseudopanax laetus</i> **	WBT		
<i>Elatostema rugosa</i>		X		<i>Quercus</i> sp. *	X		
<i>Erythrina xyskiesii</i> *		X		<i>Schefflera digitata</i>	WBT		
<i>Escallonia bifida</i> *	1996		V	<i>Sophora fulvida</i> **	X		
<i>Eucalyptus</i> spp. *		X		<i>Streblus smithii</i> **	X		
<i>Ficus carica</i> *	WBT			MONOCOTS			
<i>Fuchsia excorticata</i>	X			<i>Cordyline obtecta</i> **	WBT		
<i>Fuchsia procumbens</i>	X			<i>?Furcraea</i> *	WBT		
<i>Gomphocarpus physocarpus</i> *		X		<i>Phoenix canariensis</i> *		X	
<i>Griselinia littoralis</i> **	X			<i>Phormium cookianum</i>	X		
<i>Griselinia lucida</i>	X			<i>Vetiveria zizanioides</i> *	2006		V
<i>Hebe speciosa</i> **	X			<i>Yucca ? elephantipes</i> *		X	
<i>Hedycarya arborea</i>	X						

Appendix 2. Indigenous vascular plant list for the Shirley Guildford Puketi Mokau Reserve, NZ Native Forest Restoration Trust. Compiled by Val Hollard (27 Mar 1998), Dan O'Halloran and Maureen Young (30 Nov 2002). Map ref. NZMS 260 P05 785690. + = additions by ABS (29 Jan 2017).

Lycophytes

Lycopodiella cernua
Lycopodium deuterodensum
Lycopodium volubile
Phlegmariurus varius

Ferns

Adiantum cunninghamii
Adiantum diaphanum
Asplenium bulbiferum
Asplenium flaccidum
Asplenium lamprophyllum
Asplenium oblongifolium
Asplenium polyodon
Blechnum chambersii
Blechnum discolor
Blechnum filiforme
Blechnum fraseri
Blechnum membranaceum
Blechnum novae-zelandiae
Cardiomanes reniforme
Cyathea cunninghamii
Cyathea dealbata
Cyathea medullaris
Cyathea smithii
Deparia petersenii subsp. *congrua*
Dicksonia lanata
Dicksonia squarrosa
Diplazium australe
Doodia australis
Gleichenia dicarpa
Gleichenia microphylla
Histiopteris incisa
Hymenophyllum demissum
Hymenophyllum dilatatum
Hymenophyllum franklinae
Hymenophyllum flabellatum
Hymenophyllum rarum
Hymenophyllum revolutum
Hymenophyllum sanguinolentum
Hymenophyllum scabrum +
Lastreopsis glabella
Lastreopsis hispida
Leptopteris hymenophylloides
Loxogramme dictyopteris
Loxsoma cunninghamii
Lygodium articulatum
Microsorium pustulatum
Microsorium scandens
Notogrammitis heterophylla
Paesia scaberula
Pellaea rotundifolia
Pneumatopteris pennigera

Pteridium esculentum
Pteris macilenta
Pyrrosia eleagnifolia
Rumohra adiantiformis
Schizaea fistulosa
Sticherus cunninghamii
Tmesipteris elongata
Tmesipteris lanceolata
Tmesipteris sigmatifolia
Trichomanes elongatum
Trichomanes venosum

Gymnosperms

Agathis australis
Dacrycarpus dacrydioides
Dacrydium cupressinum
Libocedrus plumosa
Phyllocladus trichomanoides
Podocarpus laetus
Podocarpus totara
Prumnopitys ferruginea
Prumnopitys taxifolia

Dicotyledons

Ackama rosifolia
Alectryon excelsus
Alseuosmia banksii
Alseuosmia macrophylla
Alseuosmia quercifolia
Aristotelia serrata
Beilschmiedia tarairi
Beilschmiedia tawa
Brachyglottis kirkii var. *angustior*
Brachyglottis repanda
Callitriche muelleri
Cardamine debilis
Carmichaelia australis
Carpodetus serratus
Centella uniflora
Clematis cunninghamii
Clematis paniculata
Colensoa physaloides
Coprosma arborea
Coprosma grandifolia
Coprosma lucida
Coprosma rhamnoides
Coprosma robusta
Coprosma spathulata
Coriaria arborea
Corokia buddleioides
Corynocarpus laevigatus
Dracophyllum latifolium
Dracophyllum lessonianum

Drosera auriculata
Dysoxylum spectabile
Elaeocarpus dentatus
Elatostema rugosum
Epilobium nerteroides
Euchiton japonicus
Gaultheria antipoda
Geniostoma ligustrifolium
Gonocarpus incanus
Gonocarpus micranthus
Griselinia lucida
Gunnera monoica
Haloragis erecta
Hebe stricta
Hedycarya arborea
Hoheria populnea
Hydrocotyle dissecta
Knightia excelsa
Kunzea ericoides
Laurelia novae-zelandiae
Leionema nudum
Leptecophylla juniperina
Leptospermum scoparium
Leucopogon fasciculatus
Lophomyrtus bullata
Melicope simplex
Melicytus macrophyllus
Melicytus micranthus
Melicytus ramiiflorus
Metrosideros albiflora
Metrosideros diffusa
Metrosideros fulgens
Metrosideros perforata
Metrosideros robusta
Muehlenbeckia australis
Myrsine australis
Myrsine salicina
Nertera depressa
Nertera dichondrifolia
Nestegis lanceolata
Olearia furfuracea
Olearia rani
Parsonia capsularis
Passiflora tetrandra
Piper excelsum
Pittosporum cornifolium
Pittosporum tenuifolium
Pittosporum umbellatum
Pseudopanax arboreus
Pseudopanax crassifolius
Ranunculus reflexus
Raukaua edgerleyi

Rhabdothamnus solandri
Rubus australis
Rubus cissoides
Schefflera digitata
Streblus heterophyllus
Syzygium maire
Toronia toru
Vitex lucens
Weinmannia silvicola

Monocotyledons

Acianthus sinclairii
Astelia hastata
Astelia microsperma +
Astelia solandri
Astelia trinervia
Bulbophyllum pygmaeum
Caladenia chlorostyla
Carex dissita
Carex lambertiana
Carex lessoniana

Carex ochrosaccus +
Carex virgata
Cordyline australis
Cordyline banksii
Cordyline pumilio
Cortaderia fulvida
Corybas oblongus
Corybas rivularis
Dendrobium cunninghamii
Dianella nigra
Drymoanthus adversus
Earina autumnalis
Earina mucronata
Freycinetia banksii
Gahnia setifolia
Gahnia xanthocarpa
Isolepis reticularis
Juncus edgariae
Juncus pallidus
Juncus planifolius

Microlaena avenacea
Microlaena stipoides
Microtis unifolia
Morelotia affinis
Oplismenus hirtellus subsp. *imbecillis*
Orthoceras novae-zeelandiae
Phormium cookianum
Phormium tenax
Pterostylis agathicola
Pterostylis banksii
Pterostylis trullifolia
Rhopalostylis sapida
Ripogonum scandens
Schoenus apogon
Schoenus maschalinus
Schoenus tendo
Thelymitra longifolia
Typha orientalis
Uncinia uncinata

Appendix 3. Waihoanga Track, Puketi Forest - Checklist of Vascular Plants, compiled by Auckland Botanical Society, 30 Jan 2017 (co-ordinated by Maureen Young). * = naturalised species

Lycophytes

Lycopodium volubile
Phlegmariurus varius

Ferns

Asplenium bulbiferum
Asplenium flaccidum
Asplenium oblongifolium
Asplenium polyodon
Blechnum chambersii
Blechnum discolor
Blechnum filiforme
Blechnum fluviatile
Blechnum fraseri
Blechnum novae-zelandiae
Blechnum procerum
Cardiomanes reniforme
Cyathea cunninghamii
Cyathea dealbata
Cyathea medullaris
Cyathea smithii
Deparia petersenii
Dicksonia lanata var. *hispida*
Dicksonia squarrosa
Diplazium australe
Histiopteris incisa
Hymenophyllum demissum
Hymenophyllum dilatatum
Hymenophyllum flabellatum

Hymenophyllum frankliniae
Hymenophyllum rarum
Hymenophyllum revolutum
Hymenophyllum sanguinolentum
Hymenophyllum scabrum
Lastreopsis glabella
Lastreopsis hispida
Leptopteris hymenophylloides
Lindsaea trichomanoides
Loxogramme dictyopteris
Lygodium articulatum
Loxosoma cunninghamii
Microsorium pustulatum
Microsorium scandens
Notogrammitis heterophylla
Paesia scaberula
Pneumatopteris pennigera
Pteridium esculentum
Pteris tremula
Pyrrosia eleagnifolia
Rumohra adiantiformis
Schizaea dichotoma
Tmesipteris elongatum
Tmesipteris lanceolata
Tmesipteris sigmatifolia
Tmesipteris tannensis
Trichomanes elongatum
Trichomanes venosum

Gymnosperms

Agathis australis
Dacrycarpus dacrydioides
Dacrydium cupressinum
Halocarpus kirkii
Libocedrus plumosa
Manoao colensoi
Phyllocladus trichomanoides
Podocarpus laetus
Podocarpus totara
Prumnopitys ferruginea
Prumnopitys taxifolia

Dicotyledons

Ackama rosifolia
Alseuosmia banksii
Alseuosmia macrophylla
Aristotelia serrata
Beilschmiedia tarairi
Beilschmiedia tawa
Brachyglottis kirkii var. *angustior*
Brachyglottis repanda
Clematis cunninghamii
Clematis paniculata
Coprosma arborea
Coprosma grandifolia
Coprosma lucida
Coprosma rhamnoides
Coprosma robusta

Coprosma spathulata
Coprosma tenuicaulis
Coriaria arborea
Corokia buddleioides
Corynocarpus laetus
Dracophyllum latifolium
Dysoxylum spectabile
Elaeocarpus dentatus
Elatostema rugosum
Fuchsia excorticata
Gamochaeta simplicicaule *
Gaultheria antipoda
Geniostoma ligustrifolium
Griselinia lucida
Hebe stricta
Hedycarya aborea
Hoheria populnea
Ixerba brexioides
Knightia excelsa
Kunzea robusta
Laurelia novae-zelandiae
Leucanthemum vulgare *
Leucopogon fasciculatus
Litsea calicaris
Melicope simplex
Melicytus macrophyllus
Melicytus micranthus
Melicytus ramiflorus
Metrosideros albiflora
Metrosideros carminea

Metrosideros diffusa
Metrosideros fulgens
Metrosideros perforata
Metrosideros robusta
Mida salicifolia
Myrsine australis
Myrsine salicina
Nestegis lanceolata
Nestegis montana
Olearia furfuracea
Olearia rani
Parsonsia sp.
Piper excelsum
Pittosporum cornifolium
Pittosporum tenuifolium
Prunella vulgaris *
Pseudopanax arboreus
Pseudopanax crassifolius
Quintinia serrata
Raukawa edgerleyi
Rubus australis
Schefflera digitata
Toronia toru
Weinmannia silvicola

Monocotyledons

Acianthus sinclairii
Astelia hastata
Astelia microsperma
Astelia solandri

Astelia trinervia
Bulbophyllum pygmaeum
Carex solandri
Carex vulpinoidea *
Cordyline australis
Cordyline pumilio
Dendrobium cunninghamii
Dianella nigra
Drymoanthus adversus
Earina autumnalis
Earina mucronata
Freycinetia banksii
Gahnia setifolia
Gahnia xanthocarpa
Glyceria striata *
Juncus tenuis *
Microlaena avenacea
Microlaena stipoides
Pterostylis agathicola
Pterostylis banksii
Pterostylis graminea
Rhopalostylis sapida
Ripogonum scandens
Rytidosperma gracile
Tradescantia fluminensis *
Uncinia banksii
Uncinia uncinata
Uncinia zotovii

Botany of the Hillsborough coast bush reserves, Manukau Harbour, Auckland

Mike Wilcox and Jack Warden



Fig. 1. Map showing the reserves on the north coast of Manukau Harbour, between Onehunga foreshore and Aldersgate Road. Auckland City Council website.

Introduction

The northern coastal land of the Manukau Harbour from Hillsborough to Green Bay is the largest area of indigenous forests remaining in urban Auckland (Esler 1983, 1990; Wilcox 2012). It lies in the Tamaki Ecological District. The biodiversity management plan for the 26 Auckland Council reserves in this network of Manukau coastal reserves, from Bamfield Reserve in the east to Taunton Terrace in the west, records a total of 110 ha of more or less continuous vegetation (Forbes 2012). In this present article are described the reserves of Hillsborough as far west as Aldersgate Point (Fig. 1). It is the third in a series covering the vegetation and flora of the Manukau Harbour's northern urban forest margin (Wilcox and Kowhai 2015; Wilcox 2016).