

A visit to Tuhua (Mayor Island)

Mike Wilcox, Jennifer Shanks and Peter de Lange

The Auckland Anniversary Weekend Bot Soc camp for 2012 was held at Mayor Island (Tuhua) (Fig. 1) from 27-30 January 2012. We had a group of 28, as follows:

Colleen Brewer, Warren Brewer, Jan Butcher, Gillian Crowcroft, Peter de Lange, Finn de Lange, Theo de Lange, Gael Donaghy, Sharen Graham, Chris Green, Olwyn Green, Leslie Haines, Peter Hutton, Graeme Jane, Margi Keys, Shelley Heiss-Dunlop, Wolfgang Heiss, Franz Heiss, John Millett, Lyneke Onderwater, Helen Preston Jones, John Rowe, Stella Rowe, Jennifer Shanks, Diana Whimp, Mike Wilcox (leader), Philip Wrigley, Maureen Young. (Plate 1A)

Logistics

Our transport to and from Mayor Island was on the 18 m "Ohore" from Whangamata, run by Blue Ocean Charters Ltd of Tauranga, owned and skippered by Hugh Ensor. It was a 2 hour run, each way, with a slight to moderate sea. Departure was from Whangamata wharf. Landing on and departure from the island was accomplished smoothly by each person "walking the plank" from a ladder at the bow of the boat to the beach (Plate 1B). Accommodation was in cabins and tents at Opo (South East Bay) (Plate 1C), which we booked through the Department of Conservation (DoC), Tauranga. On arrival, George Pita checked all our baggage to ensure we hadn't brought any animal or plant life with us. George is the kaitiaki/ranger (guardian) for the Tuhua Trust Board, and helps authorised visitors with their accommodation and cooking arrangements, landing and departure, and planning the field activities. The social centre was an outdoor cooking shelter where we prepared and had our meals. We brought all our own cooking equipment (gas rings, gas, utensils), but there was also a very handy hot-plate available, with plenty of pohutukawa firewood to keep it fired up. The food was organised by Maureen Young, with assistance from Jan Butcher. There was ample drinkable fresh water, and George provided hot water for showers using a wood-fired boiler. The weather was fine and settled, so the camp set-up was most comfortable and convenient.

Activities

Friday 27th January: At 1 pm an afternoon walk from South East (Opo) Bay along the North West Bay

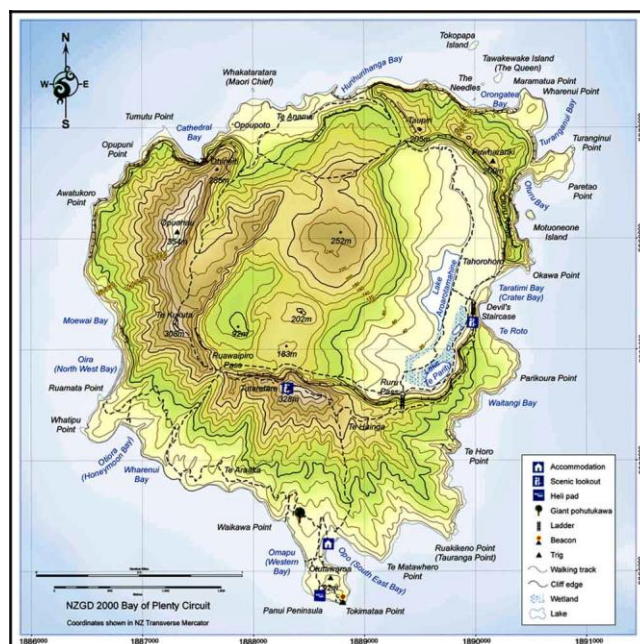


Fig. 1. Map of Mayor Island (from the Visitor Information brochure, courtesy of Department of Conservation, Tauranga).

(Oira) Track, with side trips to Lookout Point, and for some, a visit to Honeymoon (Otiora) Bay. The main trail is an old bull-dozed track, through forest the whole way.

Saturday 28th January: A full day walk from South East Bay up the fairly steep Rewi's Track (known by many as the "Gut Buster") to the crater rim, descending into the crater by Ruru (Hall's) Pass, travelling along the track east of Lake Te Paritu (Black Lake) and Lake Aroarotamahine (Green Lake), ascending via the Devil's Staircase, and returning along the crater rim track back to base. Peter, Theo and Finn de Lange did a somewhat similar circuit, but in reverse and including a swim/dive in Lake Aroarotamahine ("to see what was in it"), while Graeme Jane, Gael Donaghy and Lyneke Onderwater undertook the round-the-island circuit (walking east to west), including some coastal cliffs at the northern end. Ruru Pass was very steep, but safe enough thanks to wire ropes, while we readily got up the Devil's Staircase via the strongly-constructed ladders and hand-holds.

Sunday 29th January: A full day walk, starting up Rewi's Track, and then north-westwards up to Tutaretare Trig (328 m) (Plate 1D), continuing along

the crater rim to the turnoff to Ruawaihiro Pass, descending to the North West Bay coastal track, and on to North West Bay. Several people visited Honeymoon Bay on the return walk back to camp. Peter de Lange walked right around the island via Tutaretare Trig, exploring the northern end, and returning via the Devil's Staircase. Graeme Jane, Gael Donaghy and Lyneke Onderwater checked out the flora beside the two lakes, the crater forests from Ruru Pass to Ruawaihiro Pass, and also Honeymoon Bay.

Monday 30th January: A morning walk, exploring Panui Peninsula, including the beacon at Tokimataa Point, the old pa site at Otutawaroa Point, and Western Bay (Omapu), where a fur seal (*Arctocephalus forsteri*) adult (Plate 1E) and black-coated pup were seen. Peter de Lange, Theo de Lange and Lyneke Onderwater went around the island by boat with Peter Shanks, who had come over separately. We departed for Whangamata at 3.15 pm.

Other activities: The bird watchers (John and Stella Rowe, Shelley Heiss-Dunlop, Wolfgang Heiss and Franz Heiss) were active on land and sea, Chris Green checked out insect life, Peter de Lange (aided by his sons Theo and Finn and partner Gillian Crowcroft) collected bryophytes and lichens, and Peter Hutton and Peter de Lange snorkelled in the clear water of the bays and got some interesting seaweed samples for Mike. Peter Shanks took out two groups on evening fishing trips, with a few snapper and trevally caught for Saturday's dinner.

A brief account of Mayor Island

Location: Mayor Island (Fig. 1) is 1277 ha in area and is situated off the Bay of Plenty coast 32 km ESE from Whangamata. The highest point is Opuahau, at 354 m.

Geology: Mayor Island is an outlier of the Taupo Volcanic Zone, a region of Quaternary volcanism, and has been very well studied by geologists (Brothers 1957, Buck et al. 1981, Houghton et al. 1992, Wilson 2007, Lowe et al. 2008, Houghton et al. 2010). It represents the tip of a huge, 700 m high and 15 km wide submerged shield volcano. The earliest extrusions and eruptions leading to the formation of this island took place about 61,000-130,000 years ago. A great explosive eruption took place 35,000 years ago, forming the caldera. Another "big bang", producing what is known on the New Zealand mainland as the Tuhua Tephra Formation (Lowe et al. 2008), took place about 6500 to 7000 years ago,

giving Mayor Island its modern shape, caldera structure, and aerial pumice deposits. Further volcanic activity within the caldera was the extrusion of the tholoid or lava domes, the largest being Tarewakoura, and lava flows; these are mostly just 500-1000 years old. The rhyolitic rocks contain a unique mineral, tuhualite.

We were greatly impressed by the narrow crater rim, pumice beds on the sea cliffs, the headlands of solid rhyolite, and the seams of volcanic glass or obsidian, for which the island is famous. The soils are very pervious, with no streams, and the forest floor dries out considerably in summer. Considering the volcanic history it seems likely that Mayor Island has been open to colonisation by plants from the mainland for around 7000 years, following the last big eruption and stabilisation of the present sea level (Lowe et al. 2008).

Human history: The island is privately owned by Maori, being the ancestral home of Te Whānau a Tauwhao ki Tūhua, the last group to inhabit the island. Most of them left in 1875. Te Whānau a Tauwhao is a hapu of the Tauranga iwi, Ngai Te Rangī, who trace their ancestry to the Mataatua waka.

Tuhua is administered by the Tūhua Trust Board on behalf of its beneficiaries. Captain Cook sighted it in 1769 and he and Joseph Banks named it "The Mayor", following the sighting and naming of "The Court of Aldermen – The Aldermen Islands – (Mikaere 1989), but the Maori name is Tūhua, one of their names for obsidian. There are numerous old pa sites from various periods of occupation over several hundred years. Many parts of the island, but particularly the lower southern slopes, were cultivated for food crops (Gold-Smith 1884, Skegg 1965), pigs ran wild, and the vegetation was frequently burnt. Skegg (1965) and Mikaere (1989) tell of the many massacres that took place on Mayor Island, the last in 1842, with the few remaining inhabitants leaving about 1890.

There are now no exotic mammals on the island, allowing birdlife and plants to flourish. Pigs had been hunted out by 2000, and DoC eradicated kiore, Norway rat and wild cats in May 2000. The island was declared pest-free in May 2002.

Big-game fishing: Swordfishing started at Mayor Island in the 1920s. Prebble (1971) describes the activities during the heyday of 1950s and 60s, when it was a mecca for the catching of giant sharks and marlin. The Tauranga Big Game Fishing Club's lease expired in the 1990s, and the lodge is now derelict.



Plate 1A. Group photo, Auckland Bot. Soc. on Mayor Island. Photo: Gillian Crowcroft, 29 Jan 2012.



Plate 1B. "Walking the plank". Arrival on Mayor Island. Photo: Chris Green, 27 Jan 2012.



Plate 1C. Accommodation at Opo Bay. Photo: Mike Wilcox, 27 Jan 2012.



Plate 1D. Opo Bay from near Tutaretare Trig. Photo: Mike Wilcox, 29 Jan 2012.



Plate 1E. Fur seal, South Bay. Photo: Chris Green, 30 Jan 2012.

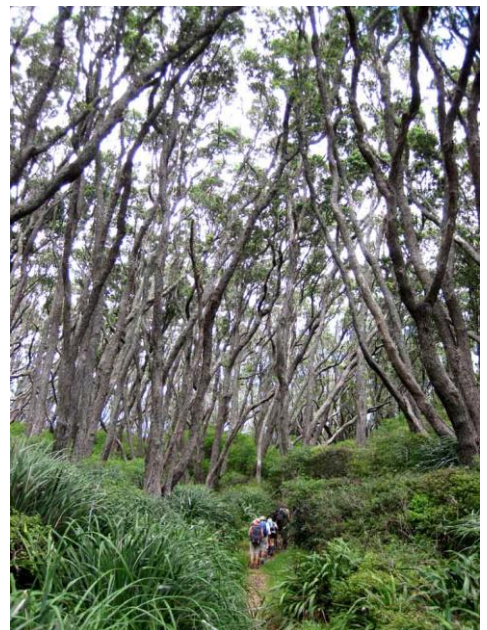


Plate 1F. Pohutukawa forest, North West Bay. Photo: Mike Wilcox 29 Jan 2012.



Plate 2A. Emergent rewarewa in kanuka and five-finger scrub forest, Lake Aroarotamahine. Photo: Mike Wilcox, 28 Jan 2012



Plate 2B. Mangeao forest, "Valley of the Giants". Photo: Mike Wilcox, 29 Jan 2012.



Plate 2C. *Sonchus kirkii*, South Bay. Photo: Mike Wilcox, 30 Jan 2012.



Plate 2D. *Euphorbia glauca*, Honeymoon Bay. Photo: Mike Wilcox, 27 Jan 2012.



Plate 2E. *Hibiscus richardsonii*, Te Panui Peninsula. Photo: Mike Wilcox, 30 Jan 2012.



Plate 2F. *Blechnum norfolkianum*, Western Bay. Photo: Mike Wilcox, 30 Jan 2012.

Animal life: The birds seen on our trip have been separately recorded and described by Stella and John Rowe, and Shelley-Heiss Dunlop. Suffice here to say that we were accompanied by robins throughout our bush walks – testimony to the resounding success of the 2003 translocation programme. Australian golden bell frogs (*Litoria aurea*) were heard in the crater wetlands. The sighting of fur seals at close quarters was a highlight of our visit to Western Bay. One morning there was a group of bottlenose dolphins (*Tursiops truncatus*) at the entrance to Opo Bay, and there was excitement about the sighting close to shore of a green turtle (*Chelonia mydas*) by fishermen. Chris Green kept a special lookout for insects; German wasps (*Vespula germanica*) were a major concern, but nobody got stung. A special moment was the discovery of giraffe weevils (*Lasiorynchus barbicornis*) in a rotting tree.

Vegetation: Past botanical studies provide a chronology of plant species recording and changes in the vegetation over a period of 100 years (Gold-Smith 1884, Allan & Dalrymple 1926, Sladden 1926, Atkinson & Percy 1956, Bayly et al. 1956, Hynes & Knowlton 1956, Heginbotham 1986). In this account we describe some of the botanical highlights of our visit, and append an up-to-date species list (Appendix), from a list compiled by John Hobbs (2011) of the Rotorua Botanical Society, which was derived in part from Beadel et al. (2009), and added to by our group. Forests cover most of the island and are of considerable beauty and interest – a big difference from the dismal fern and tea tree scrub observed by Gold-Smith 128 years ago. The present large size of the trees suggests that growth rates have been relatively rapid. The vegetation on the margins of the crater lakes was described in some detail by Bayly et al. (1956). Empson et al. (2002) showed from pollen cores taken from the crater lakes that Mayor Island was forested from around 1000 BC to 1550 AD. After that the forest was largely replaced by bracken, coinciding with widespread habitation of the island.

Trees

Pohutukawa (*Metrosideros excelsa*): Pohutukawa clothes the island from the coastal cliffs to the interior. It is the most abundant tree species. There is a mixture of sizes and age classes, with considerable areas of pure stands, some made up of huge multi-stemmed trees 30 m in height. Crowns are notably healthy and form a dense canopy. A few trees on the crater rim were in flower. Seedlings and saplings are confined to raw coastal sites. It is evident that

pohutukawa was the primary coloniser on volcanic substrates. Near the coast in pure pohutukawa forest (Plate 1F) the main understorey species are kawakawa (*Macropiper excelsum*), coastal astelia (*Astelia banksii*), coastal karamu (*Coprosma macrocarpa*) and houpara (*Pseudopanax lessonii*). Elsewhere, pigeonwood (*Hedycarya arborea*), mapou (*Myrsine australis*) and hangehange (*Geniostoma ligustrifolium*) were abundantly present.

"Nga-uri-apo" is a tapu burial tree, located at the southern end of Opo Bay. It is enclosed by a fence, and was the resting place for warriors who were lost in battles that took place on Mayor Island. This pohutukawa tree was once very large but was damaged by fire and is now only a shadow of its former glory.

Rewarewa (*Knightia excelsa*): Rewarewa is found over the entire island but is most plentiful on the outer slopes of the crater, the high ridges, and within the crater. It is co-dominant with pohutukawa in many places, and also forms pure stands (as in the tall grove at the foot of Ruru Pass, with trees measuring 57-65 cm in diameter). The extensive, young scrub forest of kanuka (*Kunzea ericoides s.l.*) and five-finger (*Pseudopanax arboreus*) east and north of Lake Aroarotamahine has abundant emergent rewarewa (Plate 2A). Like pohutukawa, rewarewa has wind-dispersed seed, enabling it to colonise bare sites after volcanic eruptions and fires. Dense clusters of rewarewa seedlings were commonly seen on the forest floor.

Puriri (*Vitex lucens*): The heaviest concentrations of puriri are on damp, sheltered sites, the most notable stands of big trees being on the eastern shore of Lake Te Paritu and Lake Aroarotamahine. We also saw it in the forests along the track to North West Bay and on the descent to this track from the Ruawaipiro Pass turnoff. Here the trees were comparatively young, with straight, clean, whitish boles.

Mangeao (*Litsea calicaris*): Several people remarked that Mayor Island had the biggest, healthiest and most abundant mangeao they had ever seen. It occurred widely in the forests, especially as saplings in the understorey, but we came across a remarkable concentration of big, mature trees in a glen on the lower part of the track from Ruawaipiro Pass to the coastal track (Plate 2B). We named this place the "Valley of the Giants". The mangeao trees were up to 28 m tall and 70 cm in diameter, with wide spreading crowns. The ground was carpeted with mangeao

seedlings. Māngeo is shade-tolerant and is able to regenerate freely within existing pohutukawa-rewarewa forest.

Wineberry (*Aristotelia serrata*): We commonly encountered wineberry along the tracks, usually forming dense thickets where there was a canopy gap caused by disturbance from a fallen pohutukawa tree. The wineberry in these thickets were slender saplings to 4 m in height, and with huge leaves, and were often accompanied by whau (*Entelea arborescens*) – a fast-growing short-lived pioneer. Nothing prepared us for the excitement and surprise of coming across a grove of big wineberry trees in the aforementioned “Valley of the Giants”. There were six of these big trees, 22 to 25 m tall, with spreading crowns and diameters of 40-50 cm – possibly the biggest known of this species (Fig. 2). Peter de Lange and Graeme Jane saw similarly-large wineberry trees on the Island Loop Track near the Opuhi Spring.



Fig. 2. Wineberry, “Valley of the Giants”. Photo: Mike Wilcox, 29 Jan 2012.

Mahoe (*Melicactus ramiflorus*): Mahoe ranks as one of the commonest and most widespread small trees or shrubs. We saw it everywhere, with the biggest trees being in the “Valley of the Giants” where they formed a canopy; we measured one with a height of 18 m and diameter of 44 cm. At this site every mahoe tree

had a cluster of erect water shoots (suckers) sprouting from the base of the trunk (Fig. 3).

Kohekohe (*Dysoxylum spectabile*): The biggest and most plentiful kohekohe trees we encountered were in the forest beside Lake Te Paritu, where it formed a subcanopy amongst puriri and pohutukawa. The biggest tree we found had a diameter at breast height of 64 cm.



Fig. 3. Mahoe, “Valley of the Giants”. Photo: Mike Wilcox, 29 Jan 2012.

Titoki (*Alectryon excelsus*): As observed by Graeme Jane, Gael Donaghy and Lyneke Onderwater, some of the finest forest on the island is within the crater along the track from the bottom of Ruru Pass to Ruawaipiro Pass. It is a tall, mixed forest of pohutukawa, rewarewa, māngeo, puriri, tawa and kohekohe, and also titoki. We did not see titoki anywhere else.

Kanuka (*Kunzea* aff. *ericoides* (b)): Earlier reports (e.g. Atkinson & Percy 1956) described extensive areas of kanuka forest. The two main areas where we saw kanuka in abundance were in the scrub forest west of Lake Aroarotamahine, and in the crater-rim forest. Incidentally the only *Kunzea* present on Tuhua corresponds to the narrow-leaved, pendulous eastern North Island race (see de Lange 2007) of the widespread, and as yet unnamed New Zealand

endemic *K. aff. ericoides* (b) of de Lange et al. (2005) and de Lange et al. (2010). This unnamed species is the largest in the genus and has been consistently confused with *K. ericoides* s.s. which is in fact a northern South Island endemic. Key differences between *K. aff. ericoides* (b) and *K. ericoides* s.s. include the branchlet hairs (on young emergent branchlets) which are distinctly appressed antrorse (sometimes antrorse/retrorse) in *K. aff. ericoides* (b) and clearly visible to the naked eye, vs. branchlets nearly glabrescent, with the hairs patent ($\times 20$ magnification) in *K. ericoides* s.s. Other key differences are elaborated in de Lange (2007).

Pigeonwood (*Hedycarya arborea*): Pigeonwood was generally abundant in all forest areas, and was one of the species that had noticeably larger leaves than we typically see on the mainland. This very shade-tolerant tree most commonly occurred as saplings in the understorey, with some bigger ones in the subcanopy.



Fig. 4. Mapou thicket, Te Panui Peninsula. Photo: Mike Wilcox, 30 Jan 2012.

Mapou (*Myrsine australis*): Mapou was abundant throughout the island in all types of forest and habitats. Mostly it was just an understorey shrub, but sometimes attained the subcanopy or the canopy, as in the short (5-8 m) ridge-top forest leading to Tutaretare Lookout. It is equally at home as a component of the forest understorey and as pioneer on open sites. In this latter role there were extensive thickets of pure mapou on Te Panui Peninsula (Fig. 4), with several stems having large, distinctively sculptured galls (Fig. 5); these thickets have arisen on sites previously cultivated as gardens and fruit orchards. There were thickets of dead mapou and other trees such as puriri beside Lake Te Paritu caused by an increase in the water level in 2011.

Karaka (*Corynocarpus laevigatus*): This was a surprise package, not for its abundance but for its scarcity, at least on the southern and south-eastern side of the island. One would have expected to see it there around old pa sites and gardens, cultivated as a food source by the Maori inhabitants, but this was not the case; however, it may still be re-establishing itself following burning and cultivation in the 19th century. A few small trees and seedlings were encountered in closed forest, the largest being down in the crater, where there is more moisture. Large trees were fairly common, however, on the northern side of the island near marked pa sites.



Fig. 5. Stem gall on mapou, Te Panui Peninsula. Photo: Mike Wilcox, 30 Jan 2012.

Tawa (*Beilschmiedia tawa*): Our main party came across just one tree in the forest on the track to South West Bay. Elsewhere, Graeme Jane reported it to be fairly plentiful in the crater forest from Ruawaiipiro Pass towards the foot of Ruru Pass.

Kamaha (*Weinmannia racemosa*): The only place we saw kamaha was in the wind-swept ridge forest leading to Tutaretare Lookout. Here there were several trees up to 8 m in height, and with seedlings as well. The forest association here comprised kamaha, rewarewa, heketara (*Olearia ran*), pohutukawa, mapou, kanuka and five-finger. We saw

no plants corresponding to the previously reported towai (*W. silvicola*) (Hobbs 2011).

Tawapou (*Planchonella costata*): The Department of Conservation (Tauranga) has recently (2009, 2010) done a census survey of tawapou on Mayor Island. It is a regionally threatened species in the Bay of Plenty, being known just from Mayor Island and Karewa Island. Only six adults are known from Mayor Island, and we saw three of them along the track beside Lake Te Paritu, together with seedlings on the forest floor. A further, apparently previously unrecorded, tree was observed by PdL growing on the cliff faces east of Opuhi Springs.

Kawakawa (*Macropiper excelsum* subsp. *excelsum*): This small, common tree deserves special mention. Mayor Island plants (Heginbotham 1986) have long been confused with *M. excelsum* subsp. *psittacorum* (known also as *M. excelsum* var. *majus*). This is where Sykes (1992) placed them. However, Gardner (1997) showed that *M. excelsum* subsp. *psittacorum* is not known from New Zealand proper, being found on Lord Howe, Norfolk and Raoul Islands. In the same paper Gardner recognised as new *M. excelsum* subsp. *peltatum* (and with it f. *delange*). His subspecies *peltatum* was distinguished by the occasional presence of peltate leaves (especially the case in f. *delange*). Plants on Mayor Island he included within *M. excelsum* subsp. *excelsum*, noting that they had prominently overlapping leaf bases, a feature shared with gatherings made from inner Hauraki Gulf islands such as The Noises. This is indeed the only race we saw on Mayor Island, though most of the specimens seen there had distinctly green rather than the more typical maroon-purple stems and trunks. Interestingly, the same race occurs with subsp. *peltatum* on Whenuakura Island near Whangamata. With that in mind, subsp. *peltatum* should be looked for on Mayor Island.

Tree ferns (*Cyathea* and *Dicksonia*): An attractive feature of Mayor Island's forest is the occurrence of tree ferns. The tallest and commonest of these by far is mamaku (*Cyathea medullaris*), attaining 15 m in height and being particularly frequent in the dense forests of the southern slopes. Silver tree fern (*C. dealbata*) is also common but much shorter than mamaku, while gully fern (*C. cunninghamii*) and soft tree fern (*C. smithii*) were seen in several places. Wheki (*Dicksonia squarrosa*) and wheki-ponga (*D. fibrosa*) were not particularly common. The extremely narrow trunks of many mamaku caused some confusion amongst our group as to their correct

identity, i.e., were they actually gully ferns? Interestingly *bona fide* gully tree fern seemed to be the most common in the mid slopes along the south-eastern side of Mayor Island, while soft tree fern was most commonly seen as adults within the damper valley system leading to Opuhi Springs.

Shrubs

The abundance of coastal karamu has already been mentioned. It is of widespread occurrence in the understorey of all types of forest, and is by far the commonest *Coprosma*. Taupata (*C. repens*) was typically seen as a semi-prostrate bush on coastal cliffs, shining karamu (*C. lucida*) was common in the more scrubby forests including those on the crater rim and high points, karamu (*C. robusta*) was infrequent, and kanono (*C. grandifolia*) was common in the taller forests, with carpets of seedlings in places – able to survive and freely develop in the now rat-free environment. A single plant of *C. rhamnoides* was found on the approach to Ruru Pass – seemingly a new record.

Five-finger, hangehange, houpara, kawakawa, mahoe, mapou, pigeonwood, whau and wineberry have already been remarked on. Five-finger is notable for its abundance throughout the forests of the island, and is a "feature" species worthy of special mention. Whau and wineberry are two species able to rapidly exploit a canopy gap. They both produce abundant seed, seedling growth is rapid in the disturbed soil and abundant light, and both form thickets of large-leaved saplings. As well as houpara and five-finger, the Araliaceae family was also represented by pate (*Schefflera digitata*).

Pittosporum is represented on Mayor Island by karo (*P. crassifolium*) and haekaro (*P. umbellatum*). We found karo to be not particularly common, except along the northern shoreline of Aroarotamahine and along the cliffs between the track and Te Paritu; otherwise, only a few small trees were seen in the coastal headland forests, either in the open or beneath pohutukawa, and also in the young scrub forest near Lake Aroarotamahine. Haekaro became one of our favourites. We first came across it on our way up Rewi's Track, and saw plenty of it during our circuit from Ruru Pass to Devil's Staircase and return to Rewi's Track. It was thus a species of the crater rim and crater floor forest.

Shrubs of the Ericaceae were likewise seen mostly on the drier, more impoverished sites on the crater rim, or crater floor. Mingimingi (*Leucopogon fasciculatus*)

and prickly mingimingi (*Leptecophylla juniperina*) were common and often grew together and were especially prominent in the young scrub forest by Lake Aroarotamahine. *Dracophyllum strictum* was confined to rock faces, and snowberry (*Gaultheria antipoda*) was present in the ridge forest approaching Tutaretare Lookout. We saw no sign of *Dracophyllum sinclairii* previously reported from the island and wondered if this record might stem from confusion with distinctly glaucous-leaved *D. strictum*.

On coastal cliffs we found and gathered samples of trailing *Pimelea*. These had glabrous leaves, a feature together with their decumbent habit clearly placing them in one or other (or both) of the species complexes described by Burrows (2009), *P. prostrata* and *P. urvilleana*. Most samples had a dense covering of silky white hairs on the young branchlets – a diagnostic feature of *P. urvilleana*, with the subspecies *nesica* being the most likely on account of its distribution, and habitat (and the designated type specimen is from Mayor Island), though some samples with smaller, ovate, obtuse-tipped leaves better matched subsp. *urvilleana*. However, another stated diagnostic feature of *P. urvilleana* is that stomata are borne only or primarily on the upper surface of the leaves (Burrows 2009) whereas our specimens had stomata on both the upper and lower surfaces – a feature of *P. prostrata*. Furthermore, one of our samples had dirty grey-white hairs of varying density, and was a reasonably good fit to *P. prostrata* subsp. *seismica*. On balance we have chosen to give most weight to the branchlet hairs, and accordingly include just *P. urvilleana* in the Species List.

Another nine species of native shrub can be more summarily mentioned. These are manuka (*Leptospermum* aff. *scoparium* (a) – see de Lange & Rolfe 2011), seen mainly near Tutaretare Lookout and on Devil's Staircase, but also said to have been once common in the Te Paritu swamps (Bayly et al. 1956); rangiora (*Brachyglottis repanda*), fairly common; akepiro (*Olearia furfuracea*) confined to rock faces; tutu (*Coriaria arborea*) seen on coastal slips and exposed rocky areas on the crater rim; akeake (*Dodonaea viscosa*), sparsely present in scrub forest; koromiko (*Hebe stricta* var. *stricta*) on coastal banks and the crater rim; tauhinu (*Pomaderris amoena*) near Tutaretare Lookout; *Melicytus novae-zelandiae* seen on Motuoneone Island and rock stacks, including the Maori Chief and Toropapa on the northern side of the island, and one plant at the camp ground in Opo Bay; *Korthalsella salicornioides* found, rarely, on kanuka along the ridgeline leading down to the Devil's

Staircase; and lastly and memorably, turepo (*Rhabdothamnus solandri*), with huge leaves and orange or yellow flowers (Taylor 1986) growing in thickets along the track between the two lakes.

Epiphytes and climbers

The paucity of epiphytes and climbers was a very noticeable feature of the vegetation, most likely because the forests are too young and too dry. No woody epiphytes were present, and the only high perching plants were tank lilies (*Collospermum hastatum*) on pohutukawa overhanging Lake Te Paritu in the crater, and occasionally on kanuka at Tutaretare Lookout. Coastal astelia (*Astelia banksii*) grew as a low epiphyte on pohutukawa, though it was more typically strictly terrestrial. By far the commonest liane was supplejack (*Ripogonum scandens*), the island form here of which had distinctly larger (Taylor 1986) and lighter green leaves reminiscent of the race present on the Chatham Islands (PdL. *pers obs.*). Common clematis (*Clematis paniculata*) and *C. cunninghamii* were only occasionally seen. Apart from these plants, the only other epiphytes or climbers were low perching or climbing ferns, namely *Asplenium flaccidum*, *A. polyodon*, *Blechnum filiforme*, *Loxogramme dictyopteris*, *Lygodium articulatum*, *Microsorium pustulatum*, *M. scandens*, *Pyrrosia eleagnifolia*, and *Tmesipteris lanceolata*; the club-moss *Huperzia varia*; and the orchids *Bulbophyllum (Ichthyostomum) pygmaeum*, *Dendrobium (Winika) cunninghamii*, *Drymoanthus adversus* and *Earina mucronata*. The orchids were mainly seen in the higher-altitude ridge forest near Tutaretare Lookout, with rewarewa the favoured host.

Native dicot herbs

The coastal banks and cliffs were the best places to see native herbs. Commonplace coastal species recorded were *Apium prostratum*, *Dichondra repens*, *Disphyma australe*, *Lobelia anceps*, *Samolus repens* and *Sarcocornia quinqueflora*. *Senecio hispidulus* formed dense colonies on rubble and is one of the first colonisers of fresh debris at the base of cliffs. At one site on Devil's Staircase the threatened *Senecio scaberulus* was also seen, growing amongst *S. hispidulus* and locally abundant *S. quadridentatus*. Being late in the season *Senecio lautus* was mostly seen as tiny plants or dried out on bare rocks. *Senecio banksii* was a new plant to many of us, and we found it fairly commonly on the coastal banks of the south and south-west coast, and also at the Devil's Staircase. It has coriaceous glaucous leaves, a decumbent habit, and yellow ray florets. Two other native composite herbs seen were *Lagenifera pumila*

and the threatened *Sonchus kirkii* (see de Lange et al. 2009), both at South-West Bay (Plate 2C). We were particularly glad to find *S. kirkii*; it grew in a colony of around ten plants, including some seedlings in the rosette stage, and appears to be a new record for Mayor Island.

Another exciting find was at Honeymoon Bay, where there was a fine patch of the native spurge, *Euphorbia glauca* (Plate 2D). Peter de Lange, Gael Donaghy, Graeme Jane and Lyneke Onderwater came across patches of *Rorippa divaricata* on a large slip on the track out of the northern end of the crater. This native cress is a threatened plant (de Lange et al. 2010), and PdL estimated the population to exceed 100 adults, some of which were 2.5 m tall! With it were *Solanum aviculare* and *Picris burbridgeae*.

Linum monogynum was seen on a cliff top at the end of a short side-track from the south coast track, *Wahlenbergia violacea* was found at Honeymoon Bay and *W. vernicosa* on the Devil's Staircase. New Zealand spinach (*Tetragonia tetragonioides*) was commonly recorded from rocks and on rubble at Opo Bay, and on slips there also grew kopati (*Pelargonium inodorum*). *Einadia trigonos* subsp. *trigonos* occurred in the lawn at Opo Bay, and on the cliffs off Tokimataa Point, and under the steps dropping down to Omapu Bay. *Oxalis exilis* was common on many open sites, and locally around Opo Bay campground and buildings grew *O. corniculata*. Two sundews, *Drosera auriculata* and *D. binata*, were seen locally around the island in suitable sites but especially at Ruawaipiro Pass. Shore bindweed (*Calystegia soldanella*) was frequent on the beach margins of the southern bays.

One of the trip's herbaceous highlights was seeing *Hibiscus richardsonii* (Plate 2E) (see de Lange et al. 2010; Craven et al. 2011). This upright herb is distinguished by its yellow petals which are basally blushed with pink or red striations. It is listed as threatened (de Lange et al. 2009). We saw twelve flowering and fruiting plants on an open, grassy site on Panui Peninsula. These plants probably originated from seeds sown here in November 2010 in DoC's translocation programme for this species on Mayor Island. To see them flourishing was an especial delight for one of us (PdL) who collected a capsule from Te Panui in May 1981 and grew it for years in Hamilton, at a time when this species had been incorrectly treated as the naturalised species *H. trionum*. Over the years seed and seedlings derived from that plant were given away to many people, and

in 2005 a jar of seed was given to DoC to initiate their translocation programme. It just goes to show what the careful nurturing of plants in gardens can do for future conservation measures, as that seed collected in 1981 was the last indisputable Mayor Island provenance left in New Zealand gardens by the time the correct taxonomic status of this hibiscus was finally resolved (Craven et al. 2011).

Apart from the coastal plants some other herbs we noticed were *Haloragis erecta* in disturbed forest gaps, *Gonocarpus incanus* in ridge-top scrubland, several colonies of *Peperomia urvilleana* on rock in the crater, and numerous patches of *Solanum nodiflorum* on fresh soil in openings – usually with inkweed (*Phytolacca octandra*) and *Senecio hispidulus*.

Monocots

Some monocots, namely some orchids, *Astelia*, *Collospermum* and *Ripogonum* have already been mentioned. *Astelia banksii* (coastal astelia) is the most prominent monocot on the island, being widespread on the ground in pohutukawa forest at all elevations, though at higher elevations it also grows with *A. solandri*. Wharariki (*Phormium cookianum*) was abundant on coastal cliffs, while rengarenga lily (*Arthropodium cirratum*) was a comparative rarity. *Phormium tenax* was seen at Opo Bay, on the crater rim, and beside Lake Aroarotamahine, but otherwise it was replaced by the much more abundant wharariki. In the forest, especially on the crater rim, turutu (*Dianella nigra*), in places with beautiful iridescent berries, was abundant along the tracks, while *D. latissima* was also found, as was *Libertia ixioides*. Cabbage tree (*Cordyline australis*) was mostly seen near the crater lakes, and *Landoltia punctata*, *Lemna minor* agg. (the plants seen and collected morphologically matched *L. disperma* in that the adaxial frond surface was minutely papillate, the frond cells were ≥ 0.3 mm long, and the roots were protuberant (i.e. not emergent from a groove-like depression), basally enclosed in a narrow cylindrical sheath, and had rounded apices (see description by Landolt 2011)), and *Wolffia australiana* were found on the lakes. Apart from raupo (*Typha orientalis*) which grows in abundance on the edge of Lake Te Paritu, most of the other native monocots we came across were sedges and grasses.

Sedges seen were *Morelotia affinis* on the upland ridges, notably near Tutaretare Lookout and on dry sites near Lake Aroarotamahine; *Ficinia nodosa* on coastal headlands and foredunes; *Carex flagellifera* and *C. testacea*, beside the tracks leading to the

coast; *C. spirostris*, *Uncinia banksii* and *U. uncinata* along forest tracks; pukio (*C. secta*) and *C. virgata* on the edge of Lake Te Paritu; *C. pumila* on sand at Honeymoon Bay; *Cyperus ustulatus* near the coast and on the edge of Lake Aroarotamahine; *Eleocharis acuta*, *E. sphacelata*, *Machaerina arthrophylla*, *M. articulata* and *M. juncea* on lake margins; and *Isolepis cernua* in turf near the coast.

The most obvious native grasses were the coastal species *Spinifex sericeus*, *Lachnagrostis billardierei*, *L. littoralis* subsp. *littoralis*, and a glaucous form of *Poa anceps*; swamp millet (*Isachne globosa*) beside the lakes; bristle grasses (*Rytidosperma gracile*, *R. unarede*) beside tracks; panic grass (*Oplismenus hirtellus*) in forest; and plume grass (*Dichelachne crinita*) on open banks, and *Microlaena stipoides* in the camp area and on Panui Peninsula.

Ferns and club mosses

Undoubtedly the highlight in this department was the fern *Pteris comans*. Not only was it abundant throughout the forests on the lower and middle slopes, but it grew to a large size, many people remarking on it being the best of this species they had ever seen. *Pteris macilentata*, *P. saxatilis* and *P. tremula* were also recorded. Another "feature" fern was rosy maidenhair (*Adiantum hispidulum*); it was abundant along most of the tracks, and is well known as a hardy species that thrives in drier sorts of forest. *Adiantum cunninghamii* and *A. diaphanum* were also seen.

The spleenworts were well represented, with *Asplenium bulbiferum*, *A. flaccidum* subsp. *flaccidum*, *A. gracillimum*, *A. oblongifolium*, *A. polyodon* all commonly seen, and Graeme Jane came across extensive *A. lamprophyllum* in rocky forest within the crater. On Tokopapa Island a small amount of *A. northlandicum* was seen by PdL. The hard ferns were prominent and the subject of some discussion, but we agreed that *B. blechnoides*, *B. chambersii*, *B. flaccidum*, *B. norfolkianum*, *B. novaezelandiae* were undeniably present. *Blechnum blechnoides* was on a rock face on the south coast, and fine patch of *B. norfolkianum* (Plate 2F) was seen beside the track leading up from the northern end of Western Bay – probably the same bank mentioned by Heginbotham (1986), and this species was abundant at Opuhi Spring. The other group to catch our attention were the shield ferns, *Polystichum wawranum*, *Lastreopsis glabella*, *L. hispida* and *L. microsora*, the latter three all growing abundantly in the "Valley of the Giants".

Bracken (*Pteridium esculentum*) once occupied large areas of the island (Gold-Smith 1884, Atkinson & Percy 1956) and is still fairly common on open sites.

Numerous other ferns were seen; in addition to those mentioned as climbers, we found *Arthropteris tenella* on boulders and the base of trees in the crater; *Schizaea dichotoma* and *Doodia australis* rather commonly in dry ridge forest; whisk fern (*Psilotum nudum*); *Cheilanthes sieberi* in shrivelled condition at the Devil's Staircase; *Pellaea rotundifolia* rarely, in the crater forest; *Pneumatopteris pennigera* and *Deparia petersenii* in tall forest; *Hypolepis dicksonioides* at Honeymoon Bay; *Hypolepis distans*; and the filmy ferns *Hymenophyllum bivalve*, *H. dilatatum*, *H. multifidum*, *H. sanguinolentum*, *H. scabrum*, and *Trichomanes (Crepdiomanes) endlicherianum* and *T. (Polypheblum) venosum* both at higher altitudes, in damp overhangs at Opuhi Spring and in boulder forest in the crater.

Introduced plants

We were very impressed with a general absence of forest weeds in the Mayor Island bush. The only woody exotic trees we saw were fruit trees such as apples (*Malus ×domestica*), apricots (*Prunus armenaica*), plums (*P. ×domestica*), and peaches (*P. persica*) in the vicinity of the Te Panui pa site, and a fig tree (*Ficus carica*) on the track to North West Bay. Peter de Lange found a sapling of maritime pine (*Pinus pinaster*) on the steep cliffs above Takitimi Bay - possibly a lingering progeny of the famous grove of these pines which used to grow beside Lake Aroarotamahine. Mikaere (1989) records that in the 1960s Pat Burstall of the Wildlife Service in Rotorua, with help from Rotorua Boy's High School, cut down all the pines. Near the former picnic site at Lake Aroarotamahine a single sapling apricot was found and ringbarked.

Control of invasive grey willow (*Salix cinerea*) has been ongoing for a decade in the crater lakes wetland, with very few still present.

At Opo Bay and Panui Peninsula there are some concentrations of introduced herbs and grasses, but aside from a serious infestation of veldt grass (*Ehrharta erecta*), nothing appeared to be very threatening to the bush. Monbretia (*Crococoma ×crococosiiflora*), periwinkle (*Vinca major*), grey sedge (*Carex divulsa*), fleabane (*Conyza sumatrensis*) and inkweed (*Phytolacca octandra*) were weeds to catch the eye. Inkweed, together with black nightshade (*Solanum nigrum*), *Erechtites hieraciifolia* and *E.*

valerianifolia, and the native *S. nodiflorum* and sometimes poroporo (*S. aviculare*) formed conspicuous bright green "gardens" under drowned mapou on the edge of Lake Te Paritu. Sea rocket (*Cakile maritima*) was abundant on the beaches, while beggars ticks (*Bidens frondosa*) was a prominent weed on the lake margins, and purple-backed duckweed (*Landoltia punctata*) grew in profusion as a floating plant in Te Paritu, together with *Callitriche stagnalis*.

Seaweeds, bryophytes and lichens

Mike Wilcox, with help from expert snorkellers Peter Hutton and Peter de Lange, made a study of the seaweeds, while Peter de Lange collected and recorded mosses, liverworts and lichens. These investigations have been separately reported in this issue.

New plant records

Plant species we found that were not on any earlier species lists or the list of Beadel et al. (2009), with Auckland Museum (AK) accessioned specimens, were: *Asplenium bulbiferum* × *A. gracillimum* (AK 330256), *Astelia trinervia* (AK 330263), *Azolla filiculoides* (AK 330282), *Bromus valdivianus* (AK 330254), *Coprosma rhamnoides* (AK 330284), *Dianella latissima* (AK 330265), *Dichondra brevifolia* agg. (AK 330257), *Dicksonia fibrosa* (sight records, PdL and MDW),

Echinopogon ovatus (AK 330258), *Hydrocotyle moschata* (AK 330267), *Hymenophyllum bivalve* (PdL 10699 (AK)), *Hymenophyllum multifidum* (AK 330270), *Hymenophyllum revolutum* (AK 330261), *Lachnagrostis littoralis* subsp. *littoralis* (AK 330901, AK330903), *Olearia furfuracea* (AK 330264), *Pellaea calidirupium* (AK 314546), *Picris burbridgeae* (AK 330273), *Pimelea urvilleana* s.l. (AK 330294, AK 330278), *Pimelea urvilleana* subsp. *nesica*, *Pteris saxatilis* (AK 330266), *Sagina apetala* (sight records, PdL and MDW), *Senecio esleri* (AK 330260), *Senecio scaberulus* (AK 330259), *Sonchus kirkii* (AK 330269), and *Wolffia australiana* (AK 330534). We also draw attention to an overlooked early record made by Leonard Cockayne of what is now *Atriplex hollowayi* (de Lange et al. 2000).

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Appendix: VASCULAR PLANT SPECIES LIST FOR MAYOR ISLAND

Based on John Hobbs' and Paul Cashmore's records, herbarium specimens and previous lists (including Beadel et al. 2009), and additions made by the Auckland Botanical Society on the visit to Mayor Island in January 2012.

* = exotic and/or naturalised species

+ = seen by Auckland Botanical Society, January 2012

Taxon	Jan 2012		
Lycophytes		<i>Blechnum filiforme</i>	+
<i>Huperzia varia</i>	+	<i>Blechnum membranaceum</i>	+
<i>Lycopodiella cernua</i>	+	<i>Blechnum minus</i>	
<i>Lycopodium deuterodensum</i>		<i>Blechnum norfolkianum</i>	+
<i>Lycopodium volubile</i>	+	<i>Blechnum novae-zelandiae</i>	+
Ferns		<i>Cardiomanes reniforme</i>	+
<i>Adiantum cunninghamii</i>	+	<i>Cheilanthes distans</i>	
<i>Adiantum diaphanum</i>	+	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	+
<i>Adiantum hispidulum</i> var. <i>hispidulum</i>	+	<i>Ctenopteris heterophylla</i>	+
<i>Arthropteris tenella</i>	+	<i>Cyathea cunninghamii</i>	+
<i>Asplenium bulbiferum</i>	+	<i>Cyathea dealbata</i>	+
<i>Asplenium bulbiferum</i> × <i>A. flaccidum</i>		<i>Cyathea medullaris</i>	+
<i>Asplenium bulbiferum</i> × <i>A. gracillimum</i>	+	<i>Cyathea smithii</i>	+
<i>Asplenium bulbiferum</i> × <i>A. lamprophyllum</i>		<i>Cyclosorus interruptus</i>	
<i>Asplenium flabellifolium</i>	+	<i>Deparia petersenii</i> subsp. <i>congrua</i>	+
<i>Asplenium flaccidum</i> subsp. <i>flaccidum</i>	+	<i>Dicksonia fibrosa</i>	+
<i>Asplenium flaccidum</i> subsp. <i>haurakiense</i> (syn. <i>A. haurakiense</i>)	+	<i>Dicksonia squarrosa</i>	+
<i>Asplenium flaccidum</i> × <i>A. gracillimum</i>	+	<i>Diplazium australe</i>	+
<i>Asplenium gracillimum</i>	+	<i>Doodia australis</i>	+
<i>Asplenium hookerianum</i>		<i>Gleichenia dicarpa</i>	
<i>Asplenium lamprophyllum</i>	+	<i>Gleichenia microphylla</i>	+
<i>Asplenium northlandicum</i>	+	<i>Grammitis ciliata</i>	+
<i>Asplenium oblongifolium</i>	+	<i>Histiopteris incisa</i>	+
<i>Asplenium polyodon</i>	+	<i>Hymenophyllum bivalve</i>	+
<i>Azolla filiculoides</i>	+	<i>Hymenophyllum demissum</i>	+
<i>Blechnum blechnoides</i>	+	<i>Hymenophyllum dilatatum</i>	+
<i>Blechnum chambersii</i>	+	<i>Hymenophyllum flabellatum</i>	
		<i>Hymenophyllum multifidum</i>	+
		<i>Hymenophyllum rarum</i>	+
		<i>Hymenophyllum revolutum</i>	+
		<i>Hymenophyllum sanguinolentum</i>	+

<i>Hymenophyllum scabrum</i>	+	<i>Coprosma macrocarpa</i> subsp. <i>minor</i>	+
<i>Hypolepis ambigua</i>	+	<i>Coprosma macrocarpa</i>	+
<i>Hypolepis dicksonioides</i>	+	subsp. <i>minor</i> × <i>C. propinqua</i>	
<i>Hypolepis distans</i>	+	<i>Coprosma repens</i>	+
<i>Hypolepis lactea</i>		<i>Coprosma rhamnoides</i>	+
<i>Lastreopsis glabella</i>	+	<i>Coprosma robusta</i>	+
<i>Lastreopsis hispida</i>	+	<i>Coriaria arborea</i> var. <i>arborea</i>	+
<i>Lastreopsis microsora</i> subsp. <i>pentangularis</i>	+	<i>Corynocarpus laevigatus</i>	+
<i>Lastreopsis velutina</i>		<i>Dodonaea viscosa</i>	+
<i>Leptopteris hymenophylloides</i>	+	<i>Dracophyllum strictum</i>	+
<i>Loxogramme dictyopteris</i>	+	<i>Dysoxylum spectabile</i>	+
<i>Lygodium articulatum</i>	+	<i>Entelea arborescens</i>	+
<i>Microsorium pustulatum</i> subsp. <i>pustulatum</i>	+	<i>Ficus carica</i> *	+
<i>Microsorium scandens</i>	+	<i>Gaultheria antipoda</i>	+
<i>Osmunda regalis</i> *		<i>Gaultheria oppositifolia</i>	+
<i>Paesia scaberula</i>	+	<i>Geniostoma ligustrifolium</i>	+
<i>Pellaea falcata</i>	+	var. <i>ligustrifolium</i>	
<i>Pellaea calidirupium</i>	+	<i>Hakea salicifolia</i> *	+
<i>Pellaea rotundifolia</i>	+	<i>Hakea sericea</i> *	
<i>Pellaea</i> aff. <i>rotundifolia</i>	+	<i>Hebe stricta</i> var. <i>stricta</i>	+
<i>Pneumatopteris pennigera</i>	+	<i>Hedycarya arborea</i>	+
<i>Polystichum neozelandicum</i>		<i>Knightia excelsa</i>	+
× <i>P. wawranum</i>		<i>Korthalsella salicornioides</i>	+
<i>Polystichum neozelandicum</i>	+	<i>Kunzea</i> aff. <i>ericoides</i> (b)	+
subsp. <i>neozelandicum</i>		<i>Leptecophylla juniperina</i> var. <i>juniperina</i>	+
<i>Polystichum wawranum</i>	+	<i>Leptospermum</i> aff. <i>scoparium</i> (a)	+
<i>Psilotum nudum</i>	+	<i>Leucopogon fasciculatus</i>	+
<i>Pteridium esculentum</i>	+	<i>Leucopogon fraseri</i>	+
<i>Pteris comans</i>	+	<i>Litsea calicaris</i>	+
<i>Pteris macilentia</i>	+	<i>Macropiper excelsum</i> subsp. <i>excelsum</i>	+
<i>Pteris saxatilis</i>	+	<i>Malus</i> × <i>domestica</i> *	+
<i>Pteris tremula</i>	+	<i>Melicytus novae-zelandiae</i>	+
<i>Pyrosia eleagnifolia</i>	+	subsp. <i>novae-zelandiae</i>	
<i>Schizaea bifida</i>	+	<i>Melicytus ramiflorus</i> subsp. <i>ramiflorus</i>	+
<i>Schizaea dichotoma</i>	+	<i>Metrosideros excelsa</i>	+
<i>Schizaea fistulosa</i>	+	<i>Metrosideros perforata</i>	+
<i>Tmesipteris elongata</i>	+	<i>Muehlenbeckia australis</i>	+
<i>Tmesipteris lanceolata</i>	+	<i>Muehlenbeckia complexa</i>	+
<i>Tmesipteris tannensis</i>		<i>Myoporum laetum</i>	+
<i>Trichomanes endlicherianum</i>	+	<i>Myrsine australis</i>	+
<i>Trichomanes venosum</i>	+	<i>Olearia furfuracea</i>	+
		<i>Olearia rani</i> var. <i>colorata</i>	+
		<i>Paraserianthes lophantha</i> *	+
		<i>Parsonsia heterophylla</i>	
		<i>Persea americana</i> *	
		<i>Pimelea tomentosa</i>	
		<i>Pimelea urvilleana</i> agg.	+
		<i>Pittosporum crassifolium</i>	+
		<i>Pittosporum umbellatum</i>	+
		<i>Pittosporum undulatum</i> *	
		<i>Planchonella costata</i>	+
		<i>Pomaderris amoena</i>	+
		<i>Pomaderris kumeraho</i>	+
		<i>Pomaderris rugosa</i>	
		<i>Prunus armeniaca</i> *	+
		<i>Prunus</i> × <i>domestica</i> *	+
		<i>Prunus persica</i> *	+
		<i>Pseudopanax arboreus</i>	+
		<i>Pseudopanax crassifolius</i> × <i>P. lessonii</i>	+
<hr/>			
Conifers			
<i>Pinus pinaster</i> *	+		
<i>Podocarpus totara</i> var. <i>totara</i>	+		
<i>Prumnopitys ferruginea</i>			
<hr/>			
Dicot trees, shrubs and woody climbers			
<i>Alectryon excelsus</i> subsp. <i>excelsus</i>	+		
<i>Aristotelia serrata</i>	+		
<i>Beilschmiedia tawa</i>	+		
<i>Brachyglottis kirkii</i> var. <i>angustior</i>	+		
<i>Brachyglottis repanda</i>	+		
<i>Clematis cunninghamii</i>	+		
<i>Clematis forsteri</i>			
<i>Clematis paniculata</i>	+		
<i>Coprosma</i> × <i>cunninghamii</i>	+		
<i>Coprosma grandifolia</i>	+		
<i>Coprosma lucida</i>	+		

<i>Pseudopanax lessonii</i>	+	<i>Digitalis purpurea*</i>	
<i>Rhabdothamnus solandri</i>	+	<i>Disphyma australe</i> subsp. <i>australe</i>	+
<i>Ricinus communis*</i>		<i>Drosera auriculata</i>	+
<i>Rosa gallica*</i>		<i>Drosera binata</i>	+
<i>Rosa multiflora*</i>		<i>Einadia trigonos</i> subsp. <i>trigonos</i>	+
<i>Rosa rubiginosa*</i>		<i>Epilobium ciliatum*</i>	+
<i>Rubus argutus*</i>		<i>Epilobium cinereum</i>	+
<i>Rubus cissoides</i> agg.		<i>Epilobium pallidiflorum</i>	
<i>Rubus fruticosus</i> agg.*		<i>Epilobium rotundifolium</i>	
<i>Salix cinerea*</i>	+	<i>Erechtites hieraciifolia*</i>	+
<i>Schefflera digitata</i>	+	<i>Erechtites valerianifolia*</i>	+
<i>Solanum aviculare</i> var. <i>aviculare</i>	+	<i>Euchiton audax</i>	+
<i>Ulex europaeus*</i>	+	<i>Euchiton collinus</i>	+
<i>Vitex lucens</i>	+	<i>Euchiton sphaericus</i>	+
<i>Vitis vinifera*</i>	+	<i>Euphorbia glauca</i>	+
<i>Weinmannia racemosa</i>	+	<i>Euphorbia peplus*</i>	+
		<i>Fumaria muralis</i> subsp. <i>muralis*</i>	+
		<i>Galium aparine*</i>	+
		<i>Gamochaeta coarctata*</i>	+
		<i>Gamochaeta simplicicaulis*</i>	+
		<i>Geranium gardneri*</i>	+
		<i>Geranium homeanum</i>	
		<i>Geranium molle*</i>	+
		<i>Geranium robertianum*</i>	+
		<i>Geranium solanderi</i>	+
		<i>Gonocarpus aggregatus</i>	
		<i>Gonocarpus incanus</i>	+
		<i>Gonocarpus micranthus</i>	+
		<i>Haloragis erecta</i> subsp. <i>erecta</i>	+
		<i>Hibiscus richardsonii</i>	+
		<i>Hydrocotyle microphylla</i>	+
		<i>Hydrocotyle moschata</i> var. <i>moschata</i>	+
		<i>Hypochoeris radicata*</i>	+
		<i>Jacobaea vulgaris*</i>	+
		<i>Lactuca serriola*</i>	
		<i>Lagenifera pumila</i>	+
		<i>Lapsana communis*</i>	+
		<i>Leontodon taraxacoides*</i>	
		<i>Lepidium didymum*</i>	+
		<i>Lepidium oleraceum</i> s.s.	
		<i>Lepidium pseudotasmanicum*</i>	
		<i>Linum bienne*</i>	+
		<i>Linum monogynum</i>	+
		<i>Lobelia anceps</i>	+
		<i>Lotus angustissimus*</i>	+
		<i>Lotus pedunculatus*</i>	+
		<i>Lotus suaveolens*</i>	+
		<i>Malva dendromorpha*</i>	+
		<i>Malva neglecta*</i>	+
		<i>Malva parviflora*</i>	+
		<i>Medicago lupulina*</i>	+
		<i>Mentha pulegium*</i>	+
		<i>Mentha spicata</i> subsp. <i>spicata*</i>	
		<i>Modiola caroliniana*</i>	+
		<i>Myosotis arvensis*</i>	+
		<i>Orobanche minor*</i>	+
		<i>Oxalis corniculata*</i>	+
		<i>Oxalis exilis</i>	+
		<i>Oxalis rubens</i>	

Dicot herbs

<i>Acaena agnipila*</i>			
<i>Acaena anserinifolia*</i>			
<i>Acanthus mollis*</i>			
<i>Ageratina adenophora*</i>			
<i>Amaranthus lividus*</i>			
<i>Anagallis arvensis</i>	+		
subsp. <i>arvensis</i> var. <i>arvensis*</i>			
<i>Apium prostratum</i> subsp. <i>prostratum</i>	+		
var. <i>filiforme</i>			
<i>Aptenia cordifolia*</i>			
<i>Aster subulatus*</i>	+		
<i>Atriplex hollowayi</i>			
<i>Atriplex prostrata*</i>	+		
<i>Bellis perennis*</i>	+		
<i>Beta vulgaris*</i>			
<i>Bidens frondosa*</i>	+		
<i>Bidens pilosa*</i>	+		
<i>Brassica oleracea*</i>			
<i>Brassica rapa</i> subsp. <i>sylvestris*</i>			
<i>Cakile maritima*</i>	+		
<i>Calendula officinalis*</i>			
<i>Calystegia sepium</i> subsp. <i>roseata</i>	+		
<i>Calystegia sepium</i> subsp. <i>roseata</i>	+		
× <i>C. soldanella</i>			
<i>Calystegia soldanella</i>	+		
<i>Calystegia tuguriorum</i>	+		
<i>Capsella bursa-pastoris*</i>	+		
<i>Carduus tenuiflorus*</i>			
<i>Centaureum erythraea*</i>	+		
<i>Centella uniflora</i>	+		
<i>Cirsium arvense*</i>	+		
<i>Cirsium vulgare*</i>	+		
<i>Conyza canadensis*</i>			
<i>Conyza sumatrensis*</i>	+		
<i>Cotula australis</i>	+		
<i>Crassula multicava*</i>	+		
<i>Crassula sieberiana</i>	+		
<i>Crepis capillaris*</i>	+		
<i>Daucus carota*</i>			
<i>Dichondra brevifolia</i>	+		
<i>Dichondra repens</i>	+		

<i>Dianella nigra</i>	+	<i>Morelotia affinis</i>	+
<i>Dichelachne crinita</i>	+	<i>Oplismenus hirtellus</i> subsp. <i>imbecillis</i>	+
<i>Dichelachne inaequiglumis</i>	+	<i>Orthoceras novae-zeelandiae</i>	
<i>Dichelachne rara</i> *		<i>Paspalum dilatatum</i> *	+
<i>Digitaria sanguinalis</i> *	+	<i>Paspalum orbiculare</i>	+
<i>Drymoanthus adversus</i>	+	<i>Phormium cookianum</i> subsp. <i>hookeri</i>	+
<i>Earina autumnalis</i>	+	<i>Phormium tenax</i>	+
<i>Earina mucronata</i>	+	<i>Poa anceps</i> agg.	+
<i>Echinopogon ovatus</i>	+	<i>Poa annua</i> *	+
<i>Ehrharta erecta</i> *	+	<i>Poa pratensis</i> *	
<i>Eleocharis acuta</i>	+	<i>Poa trivialis</i> *	+
<i>Eleocharis sphacelata</i>	+	<i>Polypogon monspeliensis</i> *	+
<i>Ficinia nodosa</i>	+	<i>Potamogeton cheesemanii</i>	
<i>Ficinia spiralis</i>		<i>Pterostylis banksii</i>	
<i>Gastrodia cunninghamii</i>		<i>Pterostylis puberula</i>	
<i>Gastrodia sesamoides</i> agg.		<i>Pterostylis trullifolia</i>	
<i>Gladiolus dalenii</i> *		<i>Ripogonum scandens</i>	+
<i>Holcus lanatus</i> *	+	<i>Rytidosperma biannulare</i>	
<i>Isachne globosa</i>	+	<i>Rytidosperma gracile</i>	+
<i>Isolepis cernua</i> var. <i>cernua</i>	+	<i>Rytidosperma racemosum</i> *	+
<i>Isolepis inundata</i>		<i>Rytidosperma unarede</i>	+
<i>Isolepis reticularis</i>	+	<i>Schedonorus arundinaceus</i> *	+
<i>Isolepis sepulcralis</i> *		<i>Schoenoplectus tabernaemontani</i>	
<i>Juncus flavidus</i>		<i>Schoenus maschalinus</i>	+
<i>Juncus planifolius</i>		<i>Schoenus tendo</i>	+
<i>Juncus usitatus</i>		<i>Setaria gracilis</i> *	
<i>Lachnagrostis billardierei</i> subsp. <i>billardierei</i>	+	<i>Spinifex sericeus</i>	+
<i>Lachnagrostis filiformis</i>		<i>Sporobolus africanus</i> *	+
<i>Lachnagrostis littoralis</i> subsp. <i>littoralis</i>	+	<i>Stenotaphrum secundatum</i> *	+
<i>Lagurus ovatus</i> *	+	<i>Thelymitra cyanea</i>	
<i>Landoltia punctata</i> *	+	<i>Thelymitra hatchii</i>	
<i>Lemna minor</i> agg.	+	<i>Thelymitra longifolia</i>	
<i>Libertia ixioides</i>	+	<i>Tradescantia fluminensis</i> *	
<i>Lolium multiflorum</i> *	+	<i>Triglochin striata</i>	
<i>Lolium perenne</i> *		<i>Trisetum arduanum</i>	
<i>Machaerina arthrophylla</i>	+	<i>Typha orientalis</i>	+
<i>Machaerina articulata</i>	+	<i>Uncinia banksii</i>	+
<i>Machaerina juncea</i>	+	<i>Uncinia ferruginea</i>	
<i>Machaerina rubiginosa</i>		<i>Uncinia uncinata</i>	+
<i>Machaerina tenax</i>		<i>Vulpia bromoides</i> *	+
<i>Machaerina teretifolia</i>		<i>Watsonia meriana</i> var. <i>bulbillifera</i> *	+
<i>Microlaena stipoides</i>	+	<i>Wolffia australiana</i>	+
<i>Microtis unifolia</i> agg.			

Excluded records

These species have been previously reported from Mayor Island but have been excluded from this latest list because their presence cannot be substantiated by herbarium specimens or reliable sight records: *Blechnum procerum*, *Cakile edentula*, *Coprosma parviflora*, *Digitaria ciliaris*, *Dracophyllum sinclairii*, *Einadia triandra*, *Gaultheria rupestris*, *Geranium dissectum*, *Geranium microphyllum*, *Gonocarpus montanus*, *Hebe stricta* var. *macroura*, *Lagenifera petiolata*, *Oenothera stricta*, *Pimelea xenica*, *Raukava simplex*, and *Weinmannia silvicola*.
