

The Vascular Flora of Maunganui (Casnell) Island, Scott's Landing, Mahurangi Harbour

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Introduction

On the 10 December 1995 and 9 June 1996 we surveyed the flora of Casnell (Maunganui) Island Scenic Reserve (NZMS 260 R10 651220, Figure 1). The island is accessible at low tide from Scott's Landing (Mahurangi Regional Park) via a rock platform (Figure 1). Casnell (hereafter Maunganui) Island was once an important pa defending the Mahurangi river mouth from possible invaders, with much of the upper part of the island once occupied by the earthworks of 2 separate fortifications (R. Brassey *pers. comm.* 1996). Today much of the pa is overgrown with forest and rank grassland, however several prominent ditches and terraces are still clearly evident as one traverses the island.

Maunganui Island preserves a diverse flora and is particularly notable for the large number of regionally scarce indigenous, and unusual adventive taxa recorded from there.

Herbarium acronyms follow those recommended by Holmgren *et al.* (1990).

Physiography

Maunganui Island at 6.8 ha (maximum elevation c. 20 m. a.s.l.) is the largest island within the Mahurangi Harbour (Figure 1). Geologically the island consists of interbedded sandstone and mudstones of the Waitemata Group (Markham & Crippen 1981), which have weathered to produce an unstable regolith of soft yellowish brown clay. As a result of this instability, the exposed eastern, southern and south-western margins of the island are steeply cliffed, and fringed with a broad wave cut platform, which is best seen at low tide (Figure 1). The platform and cliff bases are littered with numerous slumps and boulder falls. On the north-western side of the island, the relief is more subdued, in the form of a gently sloping hummocky slump, at the base of which drains a small ephemeral stream. The wave platform on this side of the island is partially covered in a small cobble beach (Figure 1). The soils of the island are yellow brown earths analogous to Puhoi Clay Loam (Gibbs *et al.* 1968:56, Plate 44; Gibbs 1980).

Vegetation Types

The following vegetation types are broadly modelled on the system of classification devised by Atkinson (1985). Figure 1 provides an approximate distribution for each vegetation type.

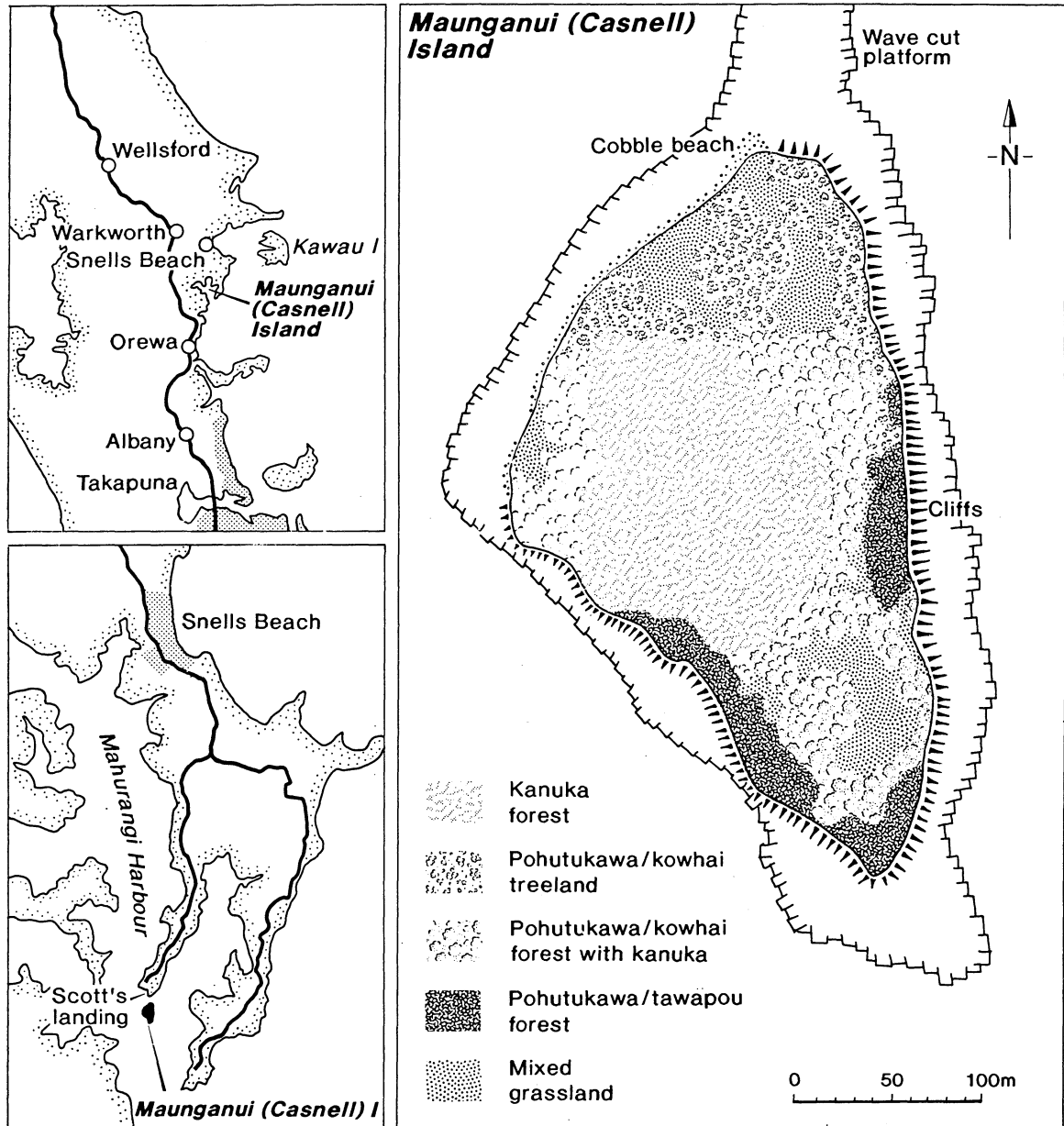
Beaches

In general, the steep cliffs of the Waitemata Group which make up Maunganui Island have not been conducive to the formation of beaches. However, on the more sheltered north-western margin of the island, a small cobble beach has developed, which during our visit supported occasional plants of native spinach (*Tetragonia tetragonioides*). This ephemeral species is also present on the adjacent beach of Scott's Landing.

Cliff Faces and Slumps

The exposed and unstable nature of the cliffs means that they support few but the hardiest of vascular plants. On the actual cliff faces, in dry sites, blue wheat grass (*Elymus multiflorus*), plume grass (*Dichelachne crinita*) and rats tail (*Sporobolus africanus*) are common. Toward the southern end of the island the cliff faces are covered in small wildling macrocarpa (*Cupressus macrocarpa*). Seepages exposed along these cliff faces support a low vegetation dominated by *Gahnia lacera* and *Doodia media*. In some sites this vegetation has been partially replaced by small kanuka (*Kunzea ericoides*), pampas grass (*Cortaderia selloana*), koromiko (*Hebe stricta*) and *Hebe macrocarpa*. Beneath the cliffs, on the more recent slumpages and boulder field, a patchy grassland dominated by pampas grass (*Cortaderia selloana*), prairie grass (*Bromus willdenowii*), rip gut brome (*B. diandrus*), scabiosa (*Scabiosa atropurpurea*), vetch (*Vicia sativa* and *V. tetrasperma*), oxtongue (*Helminthotheca*

Figure 1. Location of Maunganui (Casnell) Island, Mahurangi Harbour Mouth, and detail of island physiography and generalised distribution of major vegetation types.



echioides), catsear (*Hypochoeris radicata*), hawksbeard (*Crepis capillaris*) and hawkbit (*Leontodon taraxacoides*) is invariably present. On the older talus a low shrubland of *Coprosma macrocarpa*, koromiko, and *Gahnia lacera* is present. Both vegetation types, depending on the season, may also have dense tangles of spotted bur medick (*Medicago arabica*), bur medick (*Medicago nigra*), and the fireweeds *Senecio hispidulus* and *S. glomeratus*.

Mixed Grassland

Consisting of a heterogeneous assemblage of grasses and broad-leaved herbs; species composition appears to vary in relation to the availability of moisture and the degree of exposure. In the drier exposed sites, prominent grasses include cocksfoot (*Dactylis glomeratus*), bristle grasses (*Rytidosperma* spp.) and paspalum (*Paspalum dilatatum*), with lesser amounts of rye grass (*Lolium perenne*) and the sedge *Carex divulsa*. Broad-leaved herbaceous co-associates include narrow-leaved plantain (*Plantago lanceolata*), hairy lotus (*Lotus suaveolens*) and lotus (*Lotus pedunculatus*). In the more shaded sites, such as in the vicinity of pohutukawa (*Metrosideros excelsa*) trees and under low scrub along the cliff edges, a dense sward of *Microlaena stipoides* dominates. Within this sward co-associates are sparse, and include occasional plants of cocksfoot, the bristle grass *Rytidosperma unarede* and vetch (*Vicia tetrasperma*).

Pohutukawa / Kowhai Treeland

Associated with the grassland, and probably a remnant of pre-European settlement forest cover, the northern end of Maunganui Island supports occasional pockets of pohutukawa and kowhai (*Sophora microphylla*). Beneath this sparse canopy a low shrubland of privet (*Ligustrum sinense*), mapou (*Myrsine australis*) and cotoneaster (*Cotoneaster glaucophyllus*) is often present. The ground cover is typically a rank growth of cocksfoot, thistle (*Cirsium vulgare*) and the carices (*Carex divulsa*, *C. flagellifera* and *C. solandri*).

Pohutukawa / Kowhai Forest with Kanuka

Presumably derived through the regeneration of the latter forest type, pohutukawa/kowhai forest with kanuka ultimately gives way to pure kanuka forest on the flatter ground or pohutukawa/tawapou (*Pouteria costata*) forest within the gullies fringing the cliffed margin of the island. Aside from one taraire (*Beilschmiedia tarairi*) and the occasional puriri (*Vitex lucens*) and karaka (*Corynocarpus laevigatus*), this forest type has a uniform canopy structure. The understorey is generally a dense cover of mapou, through which occasional mahoe (*Melicactus ramiflorus*), cabbage tree (*Cordyline australis*) and stripling kanuka are present. The ground cover is typically dense, being dominated by *Carex lambertiana*, *Gahnia lacera*, the moss *Ptychomium aciculare* and hook sedge (*Uncinia uncinata*).

Pohutukawa / Tawapou Forest

Confined to the gullies draining onto the cliffs ringing the island. This vegetation type consists of sparse, large and often senescent pohutukawa through which a dense canopy of tawapou is emerging. Aside from tawapou, occasional specimens of cabbage tree, kanuka and karaka also occur within this type. In contrast to the latter vegetation type, the understorey is considerably more diverse. Species such as *Coprosma macrocarpa*, *C. rhamnoides*, *C. areolata*, *Gahnia lacera*, hangehange (*Geniostoma rupestre*) and mapou are prominent, while nearer the cliff edges *Astelia banksii*, rangiora (*Brachyglottis repanda*), koromiko and *Hebe stricta* are conspicuous.

Kanuka Forest

Forming the dominant vegetation type on the western side of the island. The type consists of a dense, virtually monospecific canopy of kanuka. Nearer the cliffs this monotony is broken by occasional kowhai and cabbage tree. The understorey of this forest comprises a dense thicket of *Coprosma areolata*, *C. rhamnoides* and mapou, under which a ground cover of the carices *C. lambertiana*, *C. flagellifera* and *C. inversa*, hook sedge and *Doodia media* are prominent.

Flora

A total of 178 taxa was recorded during our visits to the island. Of this total 93 taxa (52 %) are indigenous and 85 (48 %) adventive. Only one nationally threatened species was observed during our visit, however several taxa are either regionally uncommon in the Auckland area (P. J. de Lange

unpubl. data) or unusual adventives worthy of further comment. For a detailed description of the Ecological Districts mentioned below see McEwen (1987).

Bromus arenarius

sand brome

The distribution and ecology of this seasonally abundant annual grass was reviewed by de Lange & McFadden (1995) and Forde and Edgar (1995). Sand brome has subsequently been found to be not uncommon during the appropriate time of the year within the islands and islets of the Hauraki Gulf and in this regard Maunganui Island proved no exception. Despite the late time of the year for this grass (cf. de Lange and McFadden 1995), occasional, partially dried off specimens were encountered along the cliffs edges and on some of the less vegetated slumps. These suggest that earlier in the season this grass was probably a conspicuous component of the more open vegetation of the island. Oddly, despite the close proximity and similarity of habitat, this species was not encountered in similar sites on nearby Scott's Landing (Figure 1).

Chloris truncata

windmill grass

What appears to be the first Auckland regional record of this distinctive Australian grass was made from the eastern side of Maunganui Island, where several specimens were collected from a poorly vegetated slump (AK 227000). In New Zealand, windmill grass is otherwise known only from the Three Kings (Great and South West Islands), Bay of Islands, Hawkes Bay and Nelson (Edgar *et al.* 1991).

Elymus multiflorus

blue wheat grass

Although this grass is locally common on some of the outer Hauraki Gulf Islands (E. K. Cameron *pers. comm.*, 1996), and can at times be common within the Inner Gulf Ecological District Islands e.g., David Rocks, The Noises (AK 224376, P.J. de Lange 2309, Feb. 1994), it is otherwise locally distributed and often absent from large parts of the western margin of the Hauraki Gulf. On Maunganui, blue wheat grass was common (AK 224958), especially on the drier cliff faces along the eastern side of the island. Elsewhere within the Mahurangi Harbour, blue wheat grass has also been collected from Tungutu Point (AK 218572, E. K. Cameron 7432, Jan. 1994) where it was noted as a "sparse" component of cliffside vegetation.

Geranium solanderi "large petals"

native geranium

This distinctive taxon is locally common in the rank grassland developed within the pohutukawa/kowhai treeland, and along some of the more exposed cliff margins (AK 229098). As with sand brome, the Inner Gulf Island Ecological District distribution of this taxon was reviewed by de Lange & McFadden (1995). As noted there, this species has proved not uncommon on islands, islets and other land free from the influence of rabbits (*Oryctolagus cuniculus*). Presumably then, rabbits are either absent or present in low numbers on Maunganui. In the North Island, on the mainland at least, this herb is undergoing a marked decline (Gardner 1984), and because of this *G. solanderi* "large petals" is listed as regionally threatened in the Department of Conservation (Auckland Conservancy) Conservation Management Strategy (DOC 1995).

Linum monogynum

rauhua

One plant of rauhua was observed during the December 1995 visit, amongst seepage vegetation on the southern cliff margin of the island. In June 1996, this plant had apparently vanished. This is the only record of rauhua from the Rodney Ecological District (based on a search of AK, AKU), a species which appears to be naturally scarce in the greater Auckland area. At present, most records come from the Inner Gulf Ecological District, where the species is locally common on some of the Noises (AK!), and present on unnamed islet (Cameron & Taylor 1992) and Tarahiki (AK!) Islands.

Mycelis muralis

wall lettuce

Occasional plants of wall lettuce grew within the heavily shaded understorey of the kanuka forest on the island. This is apparently the first record of wall lettuce from the Auckland area (AK!; AKU!; cf. Esler 1987; E. K. Cameron *pers. comm.* 1996). The near absence of wall lettuce from Auckland is unusual, as this rampant weed is common south of the Bombay Hills and grows around Kaitaia (P. J. de Lange unpubl. data).

Picris burbridgei

native oxtongue

A few plants of this nationally local species (Cameron *et al.* 1995) were noted during June 1996 growing in low scrub along the eastern cliff margin (AK 228847). Native oxtongue is now an extremely uncommon species on the mainland of New Zealand. Its present stronghold appears to be islands on the western side of Great Barrier Island, and the Mokohinau and Hen & Chicken Islands (A. S. Holzapfel and P. J. de Lange unpubl. data). Aside from one 1975 record from Goat Island (AK 218168, A. E. Esler) there are no other recent records of this species from the Rodney, Inner Gulf or Tamaki Ecological Districts.

Poa imbecilla

This tiny short-lived grass is probably more overlooked rather than uncommon in the Auckland area (cf. Edgar 1986). However, because there are so few recent (i.e. last 20 years) records from the Auckland area, we include it here in the hope that our commentary may stimulate further discoveries. On Maunganui, occasional tufts (AK 228079) grew amongst stones within a maori trench under dense *Coprosma rhamnoides*. Elsewhere in the Auckland area this species has been collected once from Little Barrier (AK 15781, J. Adams, Jan. 1901), from "Auckland" (AK 11166, T. Kirk, n.d.), twice from "scoria terrains" near Mt Wellington (AK 110561-562, H. Carse & H.B. Matthews, Sept. 1922) and from Rangitoto Island (AK 110563, N. Mackie, July 1932) where it is still locally common (P.J. de Lange & R.O. Gardner unpubl. data).

Scabiosa atropurpurea

scabiosa

This colourful herb is abundant on the cliff faces and slumps along the eastern margin of Maunganui (AK 226834). Within the Mahurangi Harbour *Scabiosa* appears to be locally common, as is confirmed by other herbarium records from nearby Tungutu Point (AK 218574, E. K. Cameron 7430, Jan. 1994) and Otuaawao (Meter) Bay (AK 218593, E. K. Cameron 7429, Jan. 1994). Elsewhere within the Auckland Region it has been collected from Motuora Island (AKU 21011, G. A. S. Taylor, 1987) and from Milford in the Waitemata Harbour (AK 149300, E. B. Bangerter 5404, Jan. 1979), and so it is possibly more widespread than these collections indicate. Webb *et al.* (1988) record this species as having a scattered North Island distribution, with one occurrence in the South Island. Maunganui plants displayed a range of flower colours from white through to pink, to purple and purple-black, a colour display also seen elsewhere throughout its New Zealand range (Webb *et al.* 1988).

Tetragonia tetragonioides

New Zealand spinach

Occasional plants grew within a small cobble beach on the western margin of the island (see Physiography). Although not a nationally threatened species, New Zealand spinach is an ephemeral plant, often absent or scarce over large parts of the New Zealand coastline (P. J. de Lange unpubl. data). This behaviour has led some people to propose its inclusion in the National Threatened Plant List (C. C Ogle *pers. comm.*, 1992), and in Auckland it is listed as a regionally threatened plant by the Department of Conservation, Conservation Management Strategy (DOC 1995). However because it is widely cultivated as a pot herb, spontaneous occurrences are often encountered near urban dwellings, and where these occur near water ways, they can give the impression of being indigenous. Because of this, it is usually difficult to ascertain which populations are truly indigenous. However one of us (PdeL) has observed that genuinely wild plants are usually of smaller vegetative stature (this is maintained in cultivation), and, as a rule, occur in sites well outside the reach of most garden discards. The Maunganui plants were of this smaller form, and together with those seen on nearby Scott's Landing (AK 218629, M. E Young, Dec. 1993, and AK 226835, P.J. de Lange, Dec. 1995), are one of the few recent records of this species from the Auckland area. Elsewhere within the Auckland Region, the only other recent records we accept as indigenous come from two sites on the Whangaparaoa Peninsula e.g., Big Manly Beach (AK 215084, G. Hambly, Mar. 1993) and Stanmore Bay (AK 22081, G. Hambly, April 1994), and from one location on Rangitoto Island, McKenzie Bay, (CHR!, P.J. de Lange, Nov. 1993).

Trisetum sp. cf. *antarcticum* (T. "ordinary" of Druce 1993)

This distinctive unnamed grass has a patchy distribution in the northern North Island. From Auckland north it is only occasionally collected, and usually then from remote locations such as Great Barrier Island (AK 160837, A. E. Wright 5324, Jan. 1983). This grass was once present in some parts of the Waitemata Harbour e.g., Orakei Basin (AK 1556, T. F. Cheeseman, Oct. 1878) and Waitemata (AK 14342, T. F. Cheeseman, Oct. 1898), but recent searches suggest that it may now be extinct at these

locations. On the west coast of Auckland it may still survive in the Waitakere Ranges, where the most recent collection was made from Destruction Gully in 1983 (AK 166049, *R.O. Gardner 5387*). On Maunganui, *Trisetum* grew with blue wheat grass in one site on the eastern cliff face of the island (AK 224957). Further specimens were also seen in a similar habitat on nearby Scott's Landing, and this species was also recorded by Cameron & Taylor (1991) from nearby Pudding Island (AKU 22506, *E. K. Cameron 6263*, Nov. 1990), located at the southern entrance to the Mahurangi Harbour.

Uncinia uncinata

hook sedge

This ubiquitous species, while not in itself a regionally significant plant, exists in two distinct forms on Maunganui, the widespread "typical form" with greenish yellow leaves and broad inflorescences, and a peculiar narrow-leaved, glaucous form, with an unusually narrow inflorescence (AK 226837). The latter form was noted twice under dense kanuka near the north-western end of the island. Based on a search of AK holdings of this species, plants of this type have not been collected from elsewhere in the country.

Veronica plebeia

A small patch of *Veronica plebeia* occurs under low scrub near the centre of Maunganui Island (AK 224960). Based on herbarium evidence (AK!, AKU!) this species is extremely local elsewhere in the Rodney Ecological District. We discuss it here if only because we believe it is indigenous. *Veronica plebeia* was first discovered in New Zealand near Kerikeri by Richard Cunningham in 1834 (Cunningham 1837-1840), since then its native status has been under considerable doubt, ranging from those who accepted it as indigenous (Hooker 1867; Bentham 1869; Cheeseman 1906; 1925; Oliver 1944; Heads 1994) to those who thought otherwise (Allan 1937; Healy 1946; Webb *et al.* 1988). We believe that the arguments offered to refute the native status of *Veronica plebeia* (see Allan 1937; Healy 1946) are rather selective with regard to their conclusions, and are clearly influenced by what was, for these authors at least, the then relatively new segregation of our woody veronicae into *Hebe* and *Parahebe* (see Oliver 1925; Cockayne and Allan 1926; Cockayne 1929). The indecision over this taxon's native status was more recently discussed by W. R. Sykes in his treatment of *Veronica* for Flora 4 (Webb *et al.* (1988). Sykes while preferring an adventive status for *V. plebeia*, advanced the possibility that the species could be indigenous. Within New Zealand, *Veronica plebeia* is a local species primarily of northern North Island (with one recent record from Takaka Hill, *P. G. Simpson*, 3 Sept. 1993, AK 228393 cf. Webb *et al.* (1988)), where it is generally confined to predominantly indigenous habitats. Within this range *V. plebeia* prefers less disturbed habitats and seems to occur in greatest abundance in particularly remote locations, e.g., Three Kings, Poor Knights Islands and on some of the least modified rock stacks and islets of the Mokohinau Islands. While it is possible that *V. plebeia* is an early introduction whose range has contracted through competition with other introduced species (cf. *Bidens pilosa*, *Siegesbeckia orientalis*), its adventive status is hard to accept when one considers that its natural habitat preferences in Australia (see Bentham 1869; Cunningham *et al.* 1981) are so similar to those occupied within New Zealand. Furthermore, the New Zealand distribution of the species is not anomalous or even singular; it overlays well with other Australian taxa presently accepted as indigenous, e.g., some orchids, *Muellerina celastroides* and *Picris* (de Lange & Molloy 1995; B. P. J. Molloy *pers. comm.* 1996; A. S. Holzappel & P.J. de Lange unpubl. data). Also, the species relatively early discovery date within the recorded history of our flora, and the fact that it is a host for the indigenous rust *Aecidium disciforme* are compelling reasons to discount its presumed adventive status. Indeed, the presence of *Aecidium* rust on *V. plebeia* is particularly significant, as *A. disciforme* is an uncommon rust otherwise only known to parasitise koromiko (*E. H. C. McKenzie pers. comm.* 1996). *Aecidium* rusts are quite host specific, so if *V. plebeia* were truly adventive, we are left with the problem of why this rust has never been found on any other of our more common adventive veronicae, and yet has chosen to parasitise *Hebe*.

Discussion

Maunganui Island supports a diverse and interesting flora characteristic of the regenerating coastal forest elsewhere in the Mahurangi Harbour. Obviously its larger size (6.8 ha) and range of habitats accounts for this floristic diversity, and a direct comparison with the nearby and much smaller Pudding Island (0.7 ha) - the only other island from the harbour entrance for which we are aware of a published flora (Cameron and Taylor 1991) - would be pointless. However, despite the size

difference and restriction of habitat types, Pudding Island supports four taxa (taupata (*Coprosma repens*), tutu (*Coriaria arborea*), *Pimelea* cf. *urvilleana* "northern" and *Calystegia soldanella*), whose absence from Maunganui is surprising, particularly as all of these occur on nearby Scott's Landing. We can only guess that their absence from Maunganui is the result of gross habitat modification of the island, possible rodent predation (cf. Cameron and Taylor 1991), or other anthropogenic factors, resulting in the subsequent failure of these species to recolonise the island. As with Cameron and Taylor (1991), we were also surprised at the absence of horokaka (*Disphyma australe*), and glasswort (*Sarcocornia quinqueflora*) from the island. Cameron and Taylor (1991) attributed the absence of these taxa from Pudding Island as evidence of rodent predation. It is interesting to note that both species are locally present on the adjacent mainland to Maunganui Island and even extend a considerable distance up the Mahurangi River.

The adventive flora of the island contains few significant problem species. Pampas grasses pose a minor threat to the vegetation along the cliff faces and within the rank pasture on the north-western side of the island. *Cotoneaster* may become a problem over time within the low scrub vegetation covering the cliff margins. The introduced oxtongue (*Helminthotheca echioides*) could pose a threat to the small population of native oxtongue (*Picris burbidgei*), particularly as there is some evidence that competition from this aggressive northern hemisphere weed is at least partly responsible for the decline of native oxtongue populations in Australia (Holzapfel 1994) and from the mainland of northern New Zealand (P. J. de Lange and A. S. Holzapfel unpubl. data).

We assume that rodents are present on the island. However, they may occur in low numbers, as there is healthy regeneration of rodent-susceptible species such as karo (*Pittosporum crassifolium*) and tawapou (see de Lange *et al.* 1995). Unfortunately, the accessibility of the island at low tide means that Maunganui will probably always remain susceptible to rodent invasion from the mainland, and for this reason the control of rodents on the island is probably pointless.

Acknowledgments

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Appendix: Vascular Flora of Maunganui (Casnell) Island, Scott Point, Mahurangi Harbour.

Abbreviations

(+) = less than 10 individuals noted in survey area

Adventive = A & *: Indigenous = I

Ferns (12)

Adiantum cunninghamii

A. hispidulum

Asplenium flaccidum (+)

A. oblongifolium (+)

Cyathea dealbata (+) (juveniles only)

Doodia media subsp. *australis*

D. squarrosa (+) AK 224959

Phymatosorus pustulatus subsp. *pustulatus*

Polystichum richardii agg.

Pteridium esculentum

Pteris tremula

Pyrrhosia eleagnifolia

Gymnosperms (2) (A:1 I:1)

**Cupressus macrocarpa*

Podocarpus totara (+) (1 adult, 2 seedlings)

Monocot Trees & Shrubs (1)

Cordyline australis

Dicotyledon Trees & Shrubs (35) (A:5 I:30)

Avicennia marina subsp. *australasica* (+)

Beilschmiedia tarairi (+) (1 adult)

Brachyglottis repanda

Coprosma areolata

C. macrocarpa subsp. unnamed

C. rhamnoides

C. robusta

C. macrocarpa subsp. unnamed x *C. propinqua* var. *propinqua* (+) (1 plant)

Corynocarpus laevigatus (+) (4 adults)

**Cotoneaster glaucophyllus* f. *serotinus*

Dysoxylum spectabile (+) (1 seedling)

Geniostoma rupestre var. *ligustrifolium*

Griselinia lucida (+) (1 adult - unhealthy)

Hebe macrocarpa var. *macrocarpa*

H. stricta var. *stricta*

H. macrocarpa var. *macrocarpa* x *H. stricta* var. *stricta* (*H. xaffinis*) (+)

Hoheria populnea (+)

Kunzea ericoides s.l.

Leucopogon fasciculatus

**Ligustrum sinense*

**Lyceum ferocissimum* (+)

Melicytus ramiflorus subsp. *ramiflorus*

Metrosideros excelsa

Myoporum laetum (+)

Myrsine australis

Olearia furfuracea (+)

Pittosporum cornifolium (+)

Pittosporum crassifolium

Pouteria costata

Pseudopanax lessonii

**Rosa rubiginosa* (+) (1 adult)

Solanum aviculare (+) (1 adult)

Sophora microphylla s.s.

**Ulex europaeus*

Vitex lucens (+) (3 adults)

Dicotyledonous Lianes and Scrambling Plants (2)

Clematis paniculata (+) (1 juvenile)

Tetragonia tetragonioides (+)

Grasses (42) (A:31 I:11)

**Agrostis capillaris*

**Aira caryophylla*

**A. praecox*

**Anthoxanthum odoratum*

**Avena barbata*

**Briza maxima*

**B. minor*

**Bromus arenarius*

**B. diandrus*

**B. lithobius* (+)

**B. willdenowii*

**Chloris truncata* (+) AK 227000

**Cortaderia jubata* (+)

**C. selloana*

**Cynosurus cristatus* (+)

**Dactylis glomerata*

Dichelachne crinita

Elymus multiflorus AK 224958

**Festuca arundinacea*

**Holcus lanatus*

Lachnagrostis billardierei (+)

L. littoralis subsp. *littoralis* (+)

**Lolium perenne*

**L. rigidum* (+)

Microlaena stipoides

Oplismenus imbecillus

**Paspalum dilatatum*

**Phalaris minor*

Poa anceps subsp. *anceps*

**P. annua*

P. imbecilla (+) AK 228079

**P. trivalis*

**Polypogon fugax*

Rytidosperma biannularis

**R. pilosum*

**R. racemosum*

R. unarede

**Sieglingia decumbens* AK 226838

**Sporobolus africanus*

Trisetum cf. *antarcticum* (*T.* "ordinary") (+) AK 224957

**Vulpia bromoides*

**V. myuros* var. *myuros*

Orchids (1)

Drymoanthus adversus (+)

Rushes (7) (A:3 I:4)

Juncus australis

**J. bufonius* var. *bufonius*

**J. effusus* var. *effusus*

J. gregiflorus

J. sarophorus (+)

**J. tenuis* var. *tenuis*

Luzula picta s.s. (+)

Sedges (14) (A:2 I:12)

* *Carex divulsa*
C. breviculmis (+)
C. inversa
C. flagellifera
C. lambertiana
C. solandri
C. spirostris (+)
* *Cyperus eragrostis*
C. ustulatus
Gahnia lacera
Isolepis nodosa
Schoenus maschalinus
Uncinia banksii
U. uncinata AK 226837

Monocot Herbs (Other than Grasses, Orchids Rushes & Sedges) (4)

Arthropodium cirratum
Astelia banksii
Collospermum hastatum
Dianella nigra

Dicotyledon Composite Herbs (21) (A:15 I:6)

* *Aster subulatus*
* *Bellis perennis* (+)
* *Cirsium vulgare*
* *Conyza albida*
* *Crepis capillaris*
* *Helminthotheca echioides*
* *Hypochoeris radicata*
* *Leontodon taraxacoides*
* *Leucanthemum vulgare*
* *Mycelis muralis* (+)
Picris burbridgei (+) AK 228847
Pseudognaphalium luteo-album agg. (P. "lowland") (+)
* *Senecio bipinnatisectus* (+)
* *S. esleri* (+)
S. glomeratus
S. hispidulus
* *S. jacobaea* (+)
S. lautus var. *lautus* (+)
S. glomeratus x *S. hispidulus* (+)
* *Sonchus asper* (+)
* *S. oleraceus*

Dicotyledon Herbs (Other than Composites) (37) (A:28 I:9)

* *Anagallis arvensis* var. *arvensis*
* *Cerastium glomeratum*
* *Daucus carota*
Dichondra repens agg.
* *Galium aparine*
* *G. divaricatum*
* *G. murale*
* *Geranium dissectum*
G. solanderi "large petals" AK 229098
Haloragis erecta subsp. *erecta*
* *Linum catharticum*
* *L. marginale*
L. monogynum (+)
* *Lotus pedunculatus*
* *L. suaveolens*
* *Medicago arabica*

**M. lupulina*
 **M. nigra*
 **Melilotus indicus*
 **Modiola caroliniana*
 **Orobanche minor*
 **Oxalis corniculata*
O. exilis
O. rubens (+)
 **Phytolacca octandra*
 **Physalis peruviana*
 **Plantago lanceolata*
 **Rumex conglomeratus*
 **Scabiosa atropurpurea* AK 226834
Solanum americanum
 **S. nigrum*
 **S. physaloides*
 **Veronica arvensis*
V. plebeia (+) AK 224960
 **Vicia sativa*
 **V. tetrasperma*
Wahlenbergia "violacea" (+)

Total Taxa:	178
Indigenous Taxa:	93
Adventive Taxa	85

Auckland Botanical Society Field Visit to Motu Hawere (Goat Island), Rodney District, Auckland 16th March 1996

Steve Benham

Without doubt the life of a botanist is unique in so much as combining the meticulous attention to detail in the herbarium and on the other end of the scale leading like-minded enthusiasts on full blown adventures.

One such adventure ably led by Ewen Cameron and followed by a score and five relentless members and friends took us to Motu Hawere, a bush-covered islet of 9 hectares and approximately 500 m offshore from the East Coast of Rodney District between Cape Rodney and Okakari Point (Ecological Region: Auckland. Ecological District: Rodney 09.01). The day was one of boisterous rain squalls, spin drift and surf, conditions more familiar to the west coast than to the normally balmy east coast! However, undaunted by the vagaries of an early autumn morning the 'master mariner' Doug Rogan ferried the rather apprehensive group across to the south facing leeward rocky shores of Motu Hawere. With the surf soaked group safely landed on shore the boat was hastily hauled out of the sea and secured on a rocky ledge out of reach from the incoming tide.

The islet has the advantage in that it lies within a marine reserve, an area of 526 hectares and designated as such in October 1975. New Zealand's first marine reserve.

The main objective of the day was to update the species list compiled by Ewen Cameron and based on a list by Esler, Parris and Rawlings (c.1971), a visit by EKC 22nd June 1973 and voucher specimens in AK & AKU herbaria.

The vegetation gradation on the islet was most apparent as we traversed south to north, indicating how topography, geology and shelter can influence the species diversity found in these defined plant communities.