

The botany of Kopuahingahinga Island, Pahurehure Inlet, Auckland

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Kopuahingahinga Island is located within the Pahurehure Inlet of the Manukau Harbour, south Auckland. The island covers 11.3ha and is situated near the mouth of Drury Creek, immediately to the south of larger Pararekau Island (Fig. 1). Both islands are connected to the mainland by way of a causeway that runs through the middle of Kopuahingahinga Island. Although private land, both islands can be viewed from the southern motorway near Karaka.



Fig. 1. Location of Kopuahingahinga Island, Pahurehure Inlet, Manukau Harbour. Map produced by Kristy Hall, Mei Nee Lee and Joshua Salter. 2010 aerials sourced from Auckland Council GIS.

A botanical survey of Kopuahingahinga Island was undertaken on the afternoon of 16 June 2010 to assess the potential effects of widening the existing access road through the island. For the purposes of this investigation, a 20m wide zone on either side of the existing road was demarcated as the area of particular interest. The botanical survey focused on the area immediately adjacent to the road and causeways, although additional transects were undertaken through the island in order to ascertain the botanical significance of the wider site.

Most of the island is dominated by mature emergent *Pinus radiata* (Fig. 2). These appear to have been planted as a woodlot over 30 years ago, but have not been maintained or thinned. Some of the trees are now beginning to fall, and others are subject to erosion around the coastline. Beneath the pines is a regenerating native shrub tier of plants that are tolerant of acidic soil conditions beneath these trees. Species comprise *Myrsine australis*, *Cyathea dealbata*, *Geniostoma ligustrifolium* and *Leptocophylla juniperina*, with some *Coprosma lucida* and

Leucopogon fasciculatus. In places *Cyathea dealbata* tree ferns form exclusive stands.

Beneath the shrub layer, much of the ground is cloaked in pine needles and ponga fronds, which prevent groundcover species from establishing. Patches of *Lepidosperma laterale* and *Baumea tenax* occur, although they are being shaded out in many places. *Gleichenia dicarpa* was conspicuous, particularly along the eastern coast, growing with *Pteridium esculentum* and *Blechnum novae-zelandiae*. Other ferns were uncommon, limited to *Asplenium flaccidum*, *A. polyodon*, and *Paesia scaberula*, with *Pyrrosia eleagnifolia* on trees, and one patch of *Adiantum cunninghamii* by the coast. Small patches of native grasses, *Microlaena stipoides* and *Oplismenus hirtellus* were observed. A large area of bryophytes was present in boggy, less free draining soil located south of the access road.



Fig. 2. Kopuahingahinga Island viewed from Pararekau Island. Note cleared mangroves in the foreground. Photo: P. Kensington, 18 June 2010.

Kanuka (*Kunzea ericoides*) have densely colonised open areas where there is sufficient light for them to grow, including the edges of the access road (Fig. 3), old walking tracks and a power line route. Manuka (*Leptospermum scoparium*) is much less common. Mature trees are present near the north-west coastline and some younger trees occur on old walking tracks to the north. Some of the mature manuka are parasitized by dwarf mistletoe (*Korthalsella salicornioides*) (Fig. 4). This plant was first discovered on the Island by Andrea Julian in 2007 where it was reported "by the causeway" to the island (Cameron 2008: p. 37). No mistletoe plants were located on or immediately adjacent to the causeway in 2010.

Korthalsella salicornioides is a nationally At Risk species classified as Naturally Uncommon (de Lange



Fig. 3. The road through Kopuahingahinga Island showing dense kanuka with emergent pine trees. Photo: K. Hall, 16 June 2010.

et al. 2010), recognising that the plants occur within naturally small and widely scattered populations (Townsend et al. 2008). The favoured host of dwarf mistletoe in Auckland is manuka, although it also occurs on kanuka (Cameron 2001). Dwarf mistletoe plants are generally only present on one species at a particular site (E. Cameron, pers. comm.) and disperse over short distances by explosive dehiscence, with longer distance dispersal possibly provided by birds (Burrows 1996). On Kopuahingahinga Island,



Fig. 4. *Korthalsella salicornioides* on manuka, Kopuahingahinga Island. Photo: K. Hall, 16 June 2010.

the host manuka trees are mature and some appear to be dying. The lack of successional habitat and young manuka in the immediate vicinity poses a threat to the long-term survival of this species on the island. Perhaps this warrants seed collection and transfer to protected sites around the Manukau Harbour? The Project Manukau foreshore restoration project on former Watercare land provides one possible location, where more than 300,000 eco-sourced native seedlings have been established, including manuka (Spellerberg & Frey 2011).

Alternatively, dwarf mistletoe could be used as a catalyst to motivate a local community restoration project.

Another unusual species found on Kopuahingahinga Island is *Epacris pauciflora*. This species usually occurs in poor soils in open shrubland, fernland and bog (Allan 1961). Although not nationally threatened, it is rare in Auckland, known only from Great Barrier Island, the Tomarata Lakes and historic records by Waiuku (E. Cameron, pers. comm.). Only one mature plant was located during the survey, situated on the southern coast.



Fig. 5. Areas of saltmarsh occur along the north-eastern side of Kopuahingahinga Island. Photo: K. Hall, 16 June 2010.

In the inter-tidal zone, the island is fringed by a wide band of mangroves (*Avicennia marina*). Historic aerial photographs show that the mangroves established in the latter part of the 20th century, being largely absent until at least the 1960s. Their establishment around the island may be associated with the construction of State Highway 1 and the island's causeway, which would have restricted water flows through Pahurehure Inlet. Today, the local community wishes to remove the mangroves from much of the inlet (ARC & PDC 2006), and consent has been granted to clear nearly 30 ha of the plants (Nash 2010) (Fig. 2). Complementing the mangroves, Kopuahingahinga Island has very small areas of saltmarsh, consisting of *Juncus kraussii*, *Baumea juncea* and *Apodasmia similis*. The saltmarsh is largely confined to the north-eastern coastline (Fig. 4). On other parts of the island, eroding clay cliffs fall vertically into the sea.

Weed abundance on the island is relatively low, with most weeds restricted to the road and causeways. Pampas grass (*Cortaderia selloana*), gorse (*Ulex europaeus*) and *Asparagus asparagoides* are the most widespread weeds, with Japanese honeysuckle (*Lonicera japonica*) in a few locations. Most of the weeds along the roadside have been planted or dumped but are spreading, including *Agapanthus*

praecox, *Jasminum polyanthum*, periwinkle (*Vinca major*), and even Mauritius hemp (*Furcraea foetida*). The limited distribution of weeds on the island currently makes control relatively straightforward and warranted, before they spread further. Pampas grass and gorse already occupy habitat that would otherwise benefit *Gleichenia* fernland or kanuka/manuka scrub.

The presence of isolated patches of *Gleichenia dicarpa*, *Lepidosperma laterale*, *Baumea tenax*, and species such as *Epacris pauciflora* and *Pomaderris amoena* indicate that the island was once covered by shrubland vegetation consistent with low fertility soils or pakihi. Curiously, all of the above species apart from *B. tenax* are absent from nearby Orona Island (Cameron 2008). It is unknown whether this was the natural vegetation type on Kopuahingahinga Island, or the result of historic vegetation clearance and/or fire. Vestiges survive around the coast and in fading light gaps in the interior of the island. This vegetation requires specific soil types, high light conditions and disturbance. The habitat is likely to continue to contract in range on the island as the vegetation matures.

The small size and isolation of Kopuahingahinga Island has helped to limit vegetation clearance and

farming which has occurred on the mainland and adjacent Pararekau Island. The future for the island is uncertain. There is residential development proceeding in both directions, on the mainland and Pararekau Island. Kopuahingahinga Island is proposed to remain as a reserve (Neale 2010), however with increasing vehicle and pedestrian traffic, and a public walk and cycleway planned through the island, this will no doubt affect the vegetation.

A total of 100 vascular plants were identified (Appendix). Of these, 81 species were recorded on the island and causeways, comprising 52 native and 29 exotic species. An additional 15 species were found confined to the causeways. Thirteen of these were exotic garden plants and aggressive weeds, highlighting the need for weed control before these spread further. An additional four native species (*Apodasmia similis*, *Baumea juncea*, *Juncus kraussii* and *Triglochin striata*) were present within the intertidal zone of the estuary.

It would be interesting to revisit the island to spend more time botanising, particularly if timed at low tide to circumnavigate the coastal fringe. It is hoped that weeds and development do not reduce the botanical gems that are present on the island today.

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Appendix: Species List for Kopuahingahinga Island and Causeways

* = exotic; § = presumed cultivated; c. = found only on the causeways.

Ferns & fern allies

Adiantum cunninghamii
Asplenium flaccidum
Asplenium polyodon
Blechnum novae-zelandiae
Cyathea dealbata
Cyathea medullaris
Doodia australis
Gleichenia dicarpa
Microsorium pustulatum
Paesia scaberula
Pteridium esculentum
Pyrrosia eleagnifolia

Gymnosperms

Agathis australis §
*Cupressus macrocarpa** §
*Pinus pinaster**
*Pinus radiata**
Podocarpus totara

Dicotyledons

*Acacia longifolia**
*Acacia mearnsii**
*Acanthus mollis** c.
*Asparagus asparagoides**
Avicennia marina
Calystegia sepium subsp. *roseata*
*Chrysanthemoides monilifera**
Clematis paniculata
Coprosma lucida
Coprosma robusta
Corynocarpus laevigatus §
Cotoneaster sp.*
Epacris pauciflora
*Eucalyptus cinerea** §
Geniostoma ligustrifolium
Geranium sp.*
Haloragis erecta
Hebe stricta
*Helminthotheca echioides**
*Hydrangea macrophylla** §
*Jasminum polyanthum** § c.
Korthalsella salicornioides
Kunzea ericoides
Leptecophylla juniperina
Leptospermum scoparium
Leucopogon fasciculatus
*Ligustrum lucidum**
*Ligustrum sinense**
Lobelia anceps
*Lonicera japonica**
*Lotus pedunculatus**
Metrosideros excelsa §

Myrsine australis
Olearia furfuracea
Olearia ranii
Oxalis sp.*
*Paraserianthes lophantha**
Parsonsia heterophylla
*Phytolacca octandra**
Plagianthus divaricatus
*Plantago lanceolata**
Pomaderris amoena
*Quercus robur** § c.
*Ranunculus repens**
Rosa sp.* c.
*Rosmarinus officinalis** § c.
*Rubus fruticosus**
*Rumex obtusifolius**
*Rumex sagittatus** c.
Sarcocornia quinqueflora
*Solanum mauritianum**
*Tropaeolum majus** c.
*Ulex europaeus**
*Verbena bonariensis** c.
*Vinca major** c.
Vitex lucens §

Monocotyledons

*Agapanthus praecox**
*Allium triquetrum** c.
Apodasmia similis
Astelia banksii c.
Baumea juncea
Carex flagellifera
Cordyline australis
*Cordyline rubra** §
*Cortaderia selloana**
Dianella nigra
*Dietes grandiflora** § c.
Ficinia nodosa
*Furcraea foetida** c.
Gahnia lacera
Gahnia setifolia
Juncus kraussii
Lepidosperma laterale
Baumea tenax
Microlaena stipoides
Morelotia affinis
Oplismenus hirtellus
*Pennisetum clandestinum**
Phormium cookianum § c.
Phormium tenax
Schoenoplectus tabernaemontani
Triglochin striata
*Zantedeschia aethiopica** c.