

Core Eudicots (26)

Apiaceae	<i>Hydrocotyle pterocarpa</i>	uncommon	AK 330826
Asteraceae	<i>Bidens frondosa</i> *	common	
Asteraceae	<i>Cotula coronopifolia</i>	locally common	AK 345886
Asteraceae	<i>Hypochaeris radicata</i> *	uncommon	
Asteraceae	<i>Leontodon taraxacoides</i> *	uncommon	
Caryophyllaceae	<i>Stellaria alsine</i> *	locally common	AK 345895
Caryophyllaceae	<i>Stellaria graminea</i> *	uncommon	AK 345887
Convolvulaceae	<i>Calystegia sepium</i> subsp. <i>roseata</i>	uncommon	
Fabaceae	<i>Trifolium repens</i> *	uncommon	
Fabaceae	<i>Lotus pedunculatus</i> *	locally common	
Fabaceae	<i>Ulex europaeus</i> *	one plant	AK 335119
Haloragaceae	<i>Myriophyllum propinquum</i>	common	AK 251622
Haloragaceae	<i>Myriophyllum ? variifolium</i> *	locally common	AK 335105
Lamiaceae	<i>Mentha pulegium</i> *	locally common	
Onagraceae	<i>Epilobium insulare</i>	uncommon	AK 345897
Onagraceae	<i>Epilobium pallidiflorum</i>	locally common	AK 330803
Onagraceae	<i>Ludwigia peploides</i> subsp. <i>montevidensis</i> *	common	
Onagraceae	<i>Ludwigia palustris</i> *	common	AK 345890
Plantaginaceae	<i>Callitriche stagnalis</i> *	uncommon	
Plantaginaceae	<i>Gratiola sexdentata</i>	uncommon	AK 348734
Plantaginaceae	<i>Veronica anagallis-aquatica</i> *	uncommon	AK 335103
Polygonaceae	<i>Persicaria decipiens</i>	dominant	AK 330801
Polygonaceae	<i>Persicaria maculosa</i> *	common	
Polygonaceae	<i>Rumex conglomeratus</i> *	locally common	
Polygonaceae	<i>Rumex obtusifolius</i> *	locally common	
Rubiaceae	<i>Galium palustre</i> *	locally common	

Mosses (1)

Ptychomniaceae	<i>Ptychomnion aciculare</i>	uncommon	AK 335150
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Liverworts (1)

Ricciaceae	<i>Ricciocarpos natans</i>	uncommon	AK 345889
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Total Taxa 77

Plants of Lake Tāngonge, Kaitaia, Northland

Mike Wilcox, Maureen Young and Lisa Forester

Introduction

Lake Tāngonge west of Kaitaia (Figs. 1, 2) attracted the attention of early resident botanists, particularly R.H. Matthews, H.B. Matthews and H. Carse (Carse 1911) and also T.F. Cheeseman (Cheeseman 1896). It was once an expanse of 1000 ha comprising a large shallow lake fringed by wetlands and bogs and was renowned for its rich assemblage of plants. There are historical records, most with supporting herbarium specimens, of (a) Pteridophytes: *Lycopodiella serpentina*, *Cyclosorus interruptus*, *Hypolepis ambigua*, *Thelypteris confluens*; (b) Orchids: *Anzybas carsei*, *Pterostylis micromega*, *Spiranthes novae-zelandiae*, *Thelymitra mathewsii*;

(c) Other monocots: *Carex brownii*, *Carex maorica*, *Empodisma robustum*, *Isolepis fluitans* var. *lenticularis*, *Sporadanthus ferrugineus*; and (d) Dicots: *Centella uniflora*, *Centipeda minima*, *Elatine gratioloidea*, *Epilobium billardioreanum* subsp. *billardioreanum*, *Epilobium pallidiflorum*, *Euchiton involucreatus*, *Glossostigma elatinoidea*, *Hydrocotyle novae-zelandiae*, *H. pterocarpa*, *Limosella lineata*, *Pittosporum obcordatum* and *Utricularia australis*.

A drainage scheme supported by settlers and the government from the 1920s resulted in the lakebed being exposed, and the waters being drained away into the Awanui River (Fig. 3). A large boggy flood

plain was formed which remains to this day (Fig. 2). The vegetation is now much modified by an influx of exotic plants, fluctuating water levels, and periodic grazing and burning. Gum digging also took place there.

As indicated in the Deed of Settlement between Te Rarawa and the Crown (2012), Te Uri o Hina Marae and Te Rarawa Marae in Pukepoto represent the Ngāti Te Ao, Tahāwai and Te Uri O Hina hapū. Hapū interests in land include Tāngonge (Te Rarawa 2012). The neighbouring iwi, Ngāi Takoto, also has a shared interest in this land. With the combined land of the original lake bed reserved in the 1930s, and the adjoining land returned under the Treaty Settlement (former Department of Conservation and Landcorp land), there is a strong interest and commitment to “bring Tāngonge back to life” through a balanced concept of restoration, conservation and development.

Botanical investigation

On 27 and 28 March 2014, we visited the area (Fig. 4), our group being *Lisa Forester* (Biodiversity Specialist - Land & Rivers, Northland Regional Council); *Nan Pullman* (Wetland contractor to Northland Regional Council); Auckland Bot Soc members *Mike Wilcox*, *Maureen Young*, *Kevin Matthews* (also The Bushland Trust, Awanui) and *Bill Campbell*; *Steven Yuretich*; and Te Rarawa iwi members: *Wendy Herwood*, Ngai Tupoto te Hapū, te Marae, Motukaraka (Whāriki Research Group); *John Walsh*, Te Uri O Hina te Hapū, te Marae, Pukepoto; and *Waikarere Gregory*, *UiraKohu Matthews*, *Te Oranoa Matthews*, *Rima Eruera* and *Kotai Eruera*, Ngati Te Ao te Hapū, Te Rarawa te Marae, Pukepoto.

We traversed the area thoroughly on foot, checking the plants, our point of entry being from the Bonnett Rd/Gill Rd junction near the outfall of the large drain (Waihoe Channel). The vegetation occurs more or less in zones according to the water table.

Vegetation types

Deep artificial drain (Waihoe Channel): Hornwort (*Ceratophyllum demersum*), oxygen weed (*Lagarosiphon major*) and blunt pondweed (*Potamogeton crispus*) grew as submerged aquatics in the water. The main drain is around 6 m wide (Fig. 3), and steep-sided. Water plantain (*Alisma plantago-aquatica*) occurred at the water’s edge while the berm of the drain in places was covered in pampas grass (*Cortaderia selloana*). The Waihoe Channel was completed by dredge in 1924 as a measure to alleviate severe flooding that periodically overwhelmed the adjoining farmland (Lands & Survey Department 1925). It flows via a floodgate into the Awanui River under Bonnett Road.

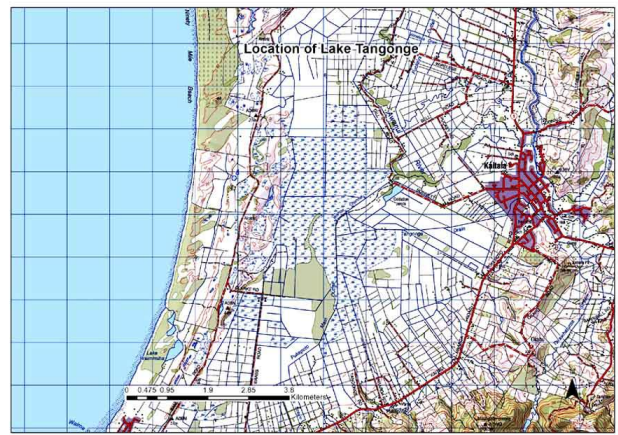


Fig. 1. Location of Lake Tāngonge. NZMS 260 at 1:50,000, from ArcMap.

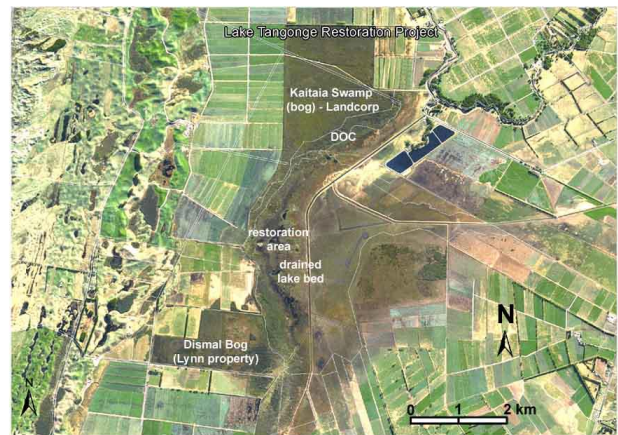


Fig. 2. Northland Regional Council map of Lake Tāngonge Restoration Project, modified by J. Salter.



Fig. 3. Waihoe Channel, Lake Tāngonge, Kaitiaki. Photo: Mike Wilcox , 28 March 2014..



Fig. 4. Our group, Lake Tāngonge, Kaitiaki. Photo: Mike Wilcox, 27 March 2014.



Fig. 5. Tall sedgeland with marginal scrub at back, Lake Tāngonge.. Photo: Lisa Forester, 4 Sep 2013.



Fig. 6. Rushland and willow-herb vegetation, Lake Tāngonge. Photo: Lisa Forester, 27 Mar 2014.



Fig. 7. *Persicaria strigosa*, Lake Tāngonge. Photo: Mike Wilcox, 27 March 2014.



Fig. 8. *Ludwigia peploides* subsp. *montevidensis*, Lake Tāngonge. Photo: Mike Wilcox, 27 March 2014.

Weedy fringes: Kikuyu grass (*Cenchrus clandestinus*) formed a thick cover along the bund (derived from spoil) of the drain and on the fringe of the wetlands. Cocksfoot (*Dactylis glomerata*) was also present. Damp areas had patches of penny royal (*Mentha pulegium*), *Anthemis cotula*, *Cyperus eragrostis*, *Lythrum junceum* and *Lotus pedunculatus*, *Polygonum arenastrum*, *Oenanthe pimpinelloides*, *Sonchus asper*, *Leontodon saxatilis* (syn. *L. taraxacoides*) and *Rumex conglomeratus*. A single clump of white rain lily (*Zephyranthes candida*) was recorded.

Tall sedgeland: *Machaerina articulata* occurred commonly in dense stands, with very local clumps of *Bolboschoenus fluviatilis*, *Schoenoplectus tabernaemontani* and *Machaerina rubiginosa* (Fig. 5). Although dry during our visit, these sites become inundated in winter. Kuta (*Eleocharis sphacelata*) occurred in only a few places, and raupo (*Typha orientalis*) and *Carex virgata* were likewise also very uncommon.

Rushland and willow-weed beds: This is the dominant vegetation of much of the area (Fig. 6). Tall rushes present were *Juncus edgariae*, *J. effusus*, and *J. sarophorus*. Abundant sedges were *Eleocharis acuta*, *Isolepis prolifera*, and *Carex longii*. Species of *Persicaria* formed a dense cover over large areas, and are also part of the plant assemblage in the tall sedgeland. The indigenous *Persicaria decipiens* was the most abundant species, and the other ones, also common, were *P. hydropiper*, *P. maculosa* and *P. strigosa* (Fig. 7). Alligator weed (*Alternanthera philoxeroides*) and primrose willow (*Ludwigia peploides* subsp. *montevidensis*) (Fig. 8) were prominent, while beggar's ticks (*Bidens frondosa*) and annual saltmarsh aster (*Symphotrichum subulatum*) had a scattered presence. Two grasses, creeping bent (*Agrostis stolonifera*) and freshwater paspalum (*Paspalum distichum*), were very common throughout this vegetation type, with Yorkshire fog (*Holcus lanatus*) also present. Pink bindweed (*Calystegia sepium* subsp. *roseata*) scrambled and



Fig. 9. *Calystegia sepium* subsp. *roseata*, Lake Tāngonge. Photo: Mike Wilcox, 27 March 2014.

twined among the taller plants (Fig. 9), and marsh bedstraw (*Galium palustre*) and water plantain (*Alisma plantago-aquatica*) occurred sparsely.

Dry lake bed: There are here just a few small lakelets which have standing water for most of the year (Fig. 10). At the time of our visit these had all completely dried out to a cracked-mud substrate, and had become colonised by plants (Fig. 11). The barnyard grasses (*Echinochloa crus-galli* and *E. crus-galli*) occurred abundantly near the margins, while the centre had sneezeweed (*Centipeda aotearoana*) (Fig. 12), *Myriophyllum propinquum*, *Persicaria hydropiper*, *Persicaria lapathifolia* (tall plants with thickish stems and prominent green/red crease), water purslane (*Ludwigia palustris*) and abundant seedlings of black nightshade (*Solanum nigrum*).

Marginal shrubland: With only a slight elevation, the western margins of the main basin (Fig. 5) had open stands of manuka (*Leptospermum scoparium*) to 7 m tall, dense thickets of swamp coprosma (*Coprosma tenuicaulis*) up to 2 m in height, cabbage tree (*Cordyline australis*), flax (*Phormium tenax*), *Muehlenbeckia australis*, and the sedges *Machaerina rubiginosa* and *Carex longii* (the latter very common over large areas). Herbaceous species recorded were *Centella uniflora*, *Lobelia anceps*, *Nertera scapanioides*, *Gonocarpus incanus*, *Hydrocotyle pterocarpa* (Fig. 13), *Senecio glomeratus*, *Erechtites valerianifolia*, and *Hypericum mutilum*, together with the sedge *Schoenus maschalinus*.

Some parts have been penetrated by quad bikes, creating a trail of weeds including upright blackberry (*Rubus ostryifolius*), gorse (*Ulex europaeus*), tobacco weed (*Solanum mauritianum*), inkweed (*Phytolacca octandra*), narrow-leaved carpet grass (*Axonopus fissifolius*), pampas (*Cortaderia seloana*), fleabane (*Conyza sumatrensis*) and paspalum (*Paspalum dilatatum*). A few small plants of crack willow (*Salix fragilis*) were noted. Vasey grass (*Paspalum urvillei*) was also present here and commonly interspersed in the tall sedgeland and rushland. Six kinds of fern featured in the shrubland. The tallest was water fern (*Histiopteris incisa*), reaching 2 m in height. *Hypolepis distans* grew in spectacular abundance, blanketing the ground beneath the taller manuka (Fig. 14), while the taller, upright *H. ambigua* occurred only sparsely, as did *Paesia scaberula* and *Blechnum minus*. Tangle fern (*Gleichenia dicarpa*) was found only on the outer margin.

Kanuka/kahikatea: At the northern end of Lake Tāngonge we entered an area of former Department of Conservation land where kanuka (*Kunzea ericoides*) had developed into tall, open stands in which *Coprosma parviflora* was a very prominent shrub. Several groups of pole kahikatea (*Dacrycarpus dacrydioides*) survive precariously, and some trees



Fig. 10. Ephemeral winter lakelets, Lake Tāngonge. Photo: Lisa Forester, 4 Sep 2013.



Fig. 11. Dry lakelet, Lake Tāngonge. Photo: Lisa Forester, 27 Mar 2014.



Fig. 12. *Centipeda aotearoana*, dry lakelet, Lake Tāngonge, 27 March 2014. Photo: Lisa Forester.



Fig. 13. *Hydrocotyle pterocarpa*, in marginal shrubland, Lake Tāngonge. Photo: Mike Wilcox, 27 March 2014.

bore abundant crops of ripe fruit at the time of our visit. Seedling regeneration near the parent trees was very sparse, however, as Chinese privet (*Ligustrum sinense*) has taken over. Other plants in this vegetation type included *Dicksonia squarrosa*, *Doodia australis*, *Haloragis erecta* and *Dianella haemata*.

Raised peat bog: Kaitaia Swamp, 129 ha, formerly under QEII management (Landcorp Sweetwater Farms), is an extensive raised peat bog at the northern end of Lake Tāngonge. Its vegetation is dominated by a very dense cover of tangle fern (*Gleichenia dicarpa*), bracken (*Pteridium esculentum*), wirerush (*Empodisma robustum*), *Schoenus brevifolius* and *Machaerina teretifolia*. *Dianella haemata* is also common, looking like miniature flax plants emerging above the tangle fern. Rushes seen on the road edge margins were *Juncus pallidus*, *J. acuminatus* and *J. tenuis* subsp. *dichotomus*. On previous visits here, Kevin Matthews and Bill Campbell have observed abundant *Thelymitra aemula*, and also the sundews *Drosera binata* and *D. spatulata*.

The Dismal Bog

At the southern end of the Lake Tāngonge basin is a privately-owned wetland known locally as the Dismal Bog. It was previously owned by Bob Fryer, and later purchased by Murray Lynn. It adjoins the area we were investigating and its vegetation and flora has much in common with the marginal shrubland type of Lake Tāngonge itself (Whaley et al. 2008, Beadel

2012). Some plants recorded there, but not seen in our Lake Tāngonge survey, were akeake (*Dodonaea viscosa*), mapou (*Myrsine australis*), *Coprosma propinqua*, *Carex vulpinoidea*, *Drosera hookerii*, *Gonocarpus micranthus*, and *Microtis unifolia*.

Acknowledgements

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Fig. 14. *Hypolepis distans* under manuka, western margin, Lake Tāngonge. Photo: Lisa Forester, 27 Mar 2014.

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Wild sea beet (*Beta vulgaris* subsp. *maritima*) on Waiheke Island

Mike Wilcox

Introduction

Wild sea beet (*Beta vulgaris* subsp. *maritima* (L.) Arcang.), Amaranthaceae, is a well-known coastal plant in the UK and Europe (Stace 2010; Biancardi et al. 2012). It is regarded as the ancestor of the various cultivated beets including *Beta vulgaris* L.

subsp. *vulgaris* – the root beets (beetroot, sugar beet, fodder beet or mangolds); *Beta maritima* subsp. *cicla* (L.) Alef. – the foliage beets, which comprise var. *cicla* L. (spinach beet or perpetual spinach) and var. *flavescens* (Lam.) Lam. (silver beet or Swiss chard).