

Field trip: Mangawhai Cliffs Walkway

Bream Tail, eastern Northland

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Introduction

The original Mangawhai Cliffs walkway featured in the *Lonely Planet* guide book as the “most spectacular seaside walkway in New Zealand” and it has been a popular walk for over 30 years. The walkway was upgraded with a legal easement for permanent public thoroughfare in December 2007, costing the developers of the adjacent *Breamtail* coastal Farm Estate about \$1 million for the upgrade of the track (partly re-routed) and associated native plantings (*NZ Herald*: A3, 1 Jan 2008). The advertising signage at the start of the Walkway for the land behind the coastal strip read: ‘Breamtail – coastal Farm Estate’: 40 house sites (439 ha), beach lodge with pool, tennis court with pavilion, stables, and amazing mature bush (186 ha). Surprisingly, the Auckland Botanical Society (ABS) appears not to have visited the Walkway for a field trip before.

The first part of the walk from the Mangawhai Heads car park is north along the exposed sandy beach for 20 minutes (normal pace) to the start of the Walkway proper – where we did a loop along the cliff top and returned via the coast. The Department of Conservation (DoC) sign says 2 hr 15 minutes return (we, unsurprisingly, took more than twice this long). The coast is a mix of rocky reefs and sand, with interesting geology of dacite, greywacke and limestone (basal Waitematas) (Hayward 2008).

The DoC Walkway is well formed and crosses private land through a mix of retired pasture, now rank kikuyu (*Pennisetum clandestinum*), with some native plantings, kanuka (*Kunzea ericoides*)-dominated areas, and lovely regenerating areas of coastal broadleaf forest with a scattering of large trees. Most of the northern coastal favourites are present, e.g.: karaka (*Corynocarpus laevigatus*), pohutukawa (*Metrosideros excelsa*), puriri (*Vitex lucens*), taraire (*Beilschmiedia tarairi*), kohekohe (*Dysoxylum spectabile*), tree coprosma (*Coprosma arborea*), tawapou (*Planchonella costata*), pigeonwood (*Hedycarya arborea*), nikau (*Rhopalostylis sapida*) (locally abundant) and locally lush *Pteris comans*. From the top of the Walkway the views out across the Hauraki Gulf are stunning, and include: Bream Head,

Poor Knights, Hen and Chickens, Sail Rock, Groper, Burgess, Great Barrier, and Little Barrier Islands.

Participants (29): Colleen & Warren Brewer, Stacey Byers, Ewen Cameron (leader), Stella Clyde, Bev & Geoff Davidson, Jerome Demmer, Frances Duff, Leslie Haines, Geoff Jackson, Margi Keys, Jacqueline Knight, John Lambert, Helen Lindsay, Gretta McLeay, John Millet, Philip Moll, Brenda Osborne, Juliet Richmond, Joshua Salter, Doug Shaw, Jonathon Shearer, Claire Stevens, Val Tomlinson, Harold Waite, Chris Wild, Dave Wilson, Maureen Young.

Our observations

We met at 10 am at the Mangawhai Heads ocean beach car park on 12 November 2011 – the second Saturday of the month so that we could have an afternoon low tide (3.15 pm) for the return loop of the Mangawhai Cliffs Walkway (Fig. 1) along the coast, because a couple of parts of the coast are only passable below mid tide. A draft vascular plant list, based on the recce of 17 October 2011, was given to all present. Recording started in the dunes by the Mangawhai Heads car park – these were dominated by native species of spinifex (*Spinifex sericeus*), pingao (*Ficinia spiralis*) and pohuehue (*Muehlenbeckia complexa*). Patches of the South African purple groundsel (*Senecio elegans*) were also present here, and north along the coast, but the colourful purple flower-heads which were obvious in October (Fig. 2) were now seeding. As we walked northwards along the beach we observed the adjacent headland clothed in gorse (*Ulex europaeus*) and pampas (*Cortaderis selloana*) – evidently the result of a fire caused by New Year’s Eve fireworks five to six years ago (Ian Crawshaw pers. comm.).

Just before the start of the Walkway proper we followed for a short distance up the dry creek bed running out on the beach through the low spinifex-dominated dunes, where a damp dune flat supported oioi (*Apodasmia similis*), alligator weed (*Alternanthera philoxeroides*), *Bolboschoenus medianus* and *Juncus articulata* – these were not observed elsewhere.

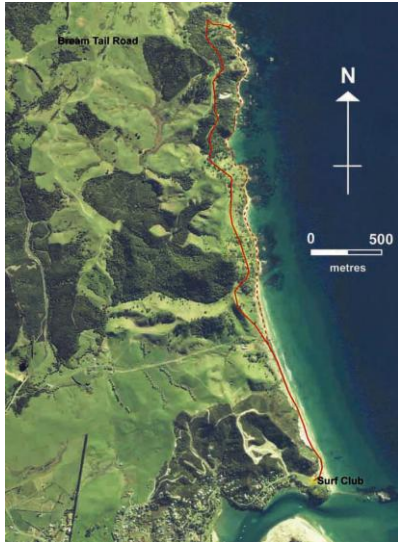


Fig. 1. Mangawhai Heads Walkway (red) (map: Maria Butcher & Josh Salter).



Fig. 2. Purple groundsel (*Senecio elegans*) invading the sand dunes north of Mangawhai Heads, 17 Oct 2012. All photos by: EKC.



Fig. 3. The start of the Walkway. Note Sentinel Rock nearly 2 km south, 12 Nov 2012.



Fig. 4. Taraire flowering at eye level on the Walkway, 17 Oct 2012.



Fig. 5. A coastal maire tree discovered overhanging the Walkway, 12 Nov 2012.



Fig. 6. The three parapara trees (arrowed) in a sea of kikuyu grass, 17 Oct 2012.



Fig. 7. The 'Giants Staircase' from the Walkway near high tide, capped with native bush, 17 Oct 2012.



Fig. 8. The dacite 'Giants Staircase' from the beach showing its wonderful columnar formations, 17 Oct 2012.



Fig. 9. The natural rock arch of dacite where the Walkway joins the coast, 12 Nov 2012.



Fig. 10. Tussocks of coastal snow tussock (*Chionochloa bromoides*) crowning an islet on the reef by the arch, 17 Oct 2012.



Fig. 11. Coastal snow tussock starting to flower, 17 Oct 2012.



Fig. 12. A recent large slip which has added c.2m in height of silt and rocky sediment to the beach. It occurred during a storm in May 2011 – note the dead trees at its base, 17 Oct 2012.

The start of the Walkway proper was in the open, leading up to the cliff tops via many steps (Fig. 3). In places midden shells hinted at past habitation of the area. The slope here was carpeted with rank kikuyu and native plantings of flax (*Phormium tenax*), karo (*Pittosporum crassifolium*), houpara (*Pseudopanax lessonii*), taupata (*Coprosma taupata*), and pohutukawa. Along the cliff tops we saw a few plantings of kapuka (*Griselinia littoralis*) – inappropriate because at this latitude it is only naturally found above 450 m asl. Before reaching a local high point the track wove through a small stand of windswept taraire on a steep slope partly sheltered by a ridge running parallel with the coast. The trees were mixed with a few puriri, karaka, totara (*Podocarpus totara*) and nikau. Much of the upper tree canopy had died back, but the lower taraire branches were at eye level, giving us a good view of the young fruit (it was flowering during the recce, Fig. 4).

From a local high point with wonderful views over the Hauraki Gulf, we could also look inland over a forested valley supporting a healthy native broadleaf forest canopy. The track then cut through a steep face of rank kikuyu pasture and little else – but the views were inspiring. It was here we discovered a coastal maire (*Nestegis apetala*) tree overhanging the track (Fig. 5), and looked down on the parapara (*Pisonia brunoniana*) trees (Fig. 6) that Maureen knew from 22 years before (see notes below). There were also scattered emergent mature pohutukawa trees (some of them dead) and then a view down northwards to a sandy beach with an exposure at the northern end of pale dacite referred to locally as the 'Giant's Staircase' because of its wonderful columnar formation with vertical cooling joints (Fig. 7, 8).

A little further on, the track, still retaining its altitude, then passed through regenerating native forest, with some local ricker kauri, but the largest trees were pohutukawa and puriri. Nikau palms were locally abundant, and then the track zigzagged steeply down to the coast c.1 km south of Bream Tail emerging on the northern side of a natural rock arch which is close to the contact between an intrusive dome of dacite and thick, concretion-bearing Waitemata Sandstone beds to the north (Hayward 2008) (Fig. 9).

From here we headed south along the coast after admiring clumps of the coastal snow tussock (*Chionochloa bromoides*) (Fig. 10, 11), along with

other coastal species of rengarenga lily (*Arthropodium cirratum*), *Peperomia urvilleana*, *Asplenium haurakiense*, *Apium prostratum*, and a few prostrate taupata, on the arch and associated reef islets in this area. A couple of plants of *Pimelea urvilleana* amongst a mat of low *Leucopogon fraseri* were spotted over low rocks just above the high tide mark a little to the south of the arch. We then passed a major recent raw slip face extending virtually from the coast up to the cliff top (Fig. 12). Surprisingly this wasn't obvious from the cliff top Walkway. The 'Giant's Staircase' was next, crowned with a nice mix of native coastal vegetation including karo, houpara, rengarenga lily and *Peperomia urvilleana*.

The three parapara viewed from the Walkway above were easily inspected from the coast, 20-30 m up from the shoreline in a sward of kikuyu grass (Fig. 6). The trees were some 20 m apart, 6-8 m tall, all multi-stemmed (Fig. 13) and the leaves rather tattered from the winter weather. Most people returned to their vehicles around 4 pm after covering some 8.4 km. Only four of us braved a low tide swim at Mangawhai Heads to complete the day.



Fig. 13. A multi-trunked parapara, the most southern of the three trees observed, 17 Oct 2012

Table 1: Species totals of the vascular flora in the different plant groupings and with native and naturalised status for the Mangawhai Cliffs Walkway, including the beach return, and the Mangawhai Heads dunes (three hybrid taxa are included).

Plant Group	Native	Naturalised	Totals
Ferns	28	-	28
Conifers	6	1	7
Dicots	68	50	118
Monocots	48	24	72
Totals	150	75	225

The vascular flora

Apart from the native revegetation plantings, which were about five years old, the vegetation of the coastal slopes was all wild, but modified, and in some places severely modified. However, some individual trees seemed to be relics of a former complete forest. The vascular flora we recorded totalled 225 taxa, of which 67% were native species (Table 1, Appendix). Apart from two earlier records, vouchered in AK herbarium (year cited in Appendix), all records are based on the field trip or the recce. Three special northern New Zealand native species which are scarce on the New Zealand mainland are highlighted separately below.

Coastal snow tussock (*Chionochoa bromoides*) (Fig. 10, 11) – is locally common on the coastal rocks (upper splash zone) at the northern end by the dacite arch and adjacent rocky reef islets (voucher specimen: AK 302162). Its distribution is interesting because its southern limit is 3.2 km SE of this area by Leigh Harbour (Cameron 2005) where there is a small population. This Bream Tail population is geographically the second most southern. I can't think why it is absent from the other rocky outcrops between these two populations, and also absent from both Barrier Islands, Hen & Chicken Islands and Bream Head.

Parapara (*Pisonia brunoniana*) (Fig. 6, 13) – three separate trees of this frost-tender species were admired – a relic of a former intact coastal forest? They were c.20 m apart, 6-9 m tall, all multi-stemmed, 20-30 m in from the shoreline and nearly halfway between Mangawhai Heads and the dacite arch. They were growing amongst rank kikuyu; flower buds were seen on the sheltered up-hill side of one tree by Josh Salter, but no fruit were observed. Because of suspected rat predation on seeds and seedlings (de Lange et al. 1995, Campbell & Atkinson

1999) this is one of very few extant natural populations of this species on the mainland. Its main habitat today is the rat-free northern offshore islands. Frank Hudson collected a specimen from this population with Maureen Young in May 1989 and recorded: "a grove of c.6 big trees, some of which have died" (voucher: AK 184308) – the kikuyu sward would prohibit any local future spread. The remaining three trees deserve some helpful management, i.e. adjacent native plantings to suppress the kikuyu, and rat trapping.

Coastal maire (*Nestegis apetala*) (Fig. 5) – a healthy old-looking coastal maire arching over the Walkway, was 'jointly' spotted separately by both Geoff and Maureen – is it another relic of a former intact coastal forest? It was directly upslope from the parapara, and measured c.6 m tall × 8 m across (AK 328850). Low kawakawa bushes (*Macropiper excelsum*) and a sward of kikuyu surrounded it. A nearly dead, exposed 8 m-tall tawapou stood close by. As with parapara, the present-day distribution of coastal maire in New Zealand is northern and mainly restricted to offshore islands. In the Auckland region its extant population is restricted to the Mokohinau and Great Barrier Islands – it has never been recorded in the inner Hauraki Gulf (New Zealand Virtual Herbarium website). However, coastal maire is locally common, and parapara is locally abundant on Hen Island (Taranga) (Wright 1978) only some 15 km distant – which looked so close from the Walkway and an easy flying distance for a pigeon or tui to traverse. Rather surprisingly both species are absent from the closer, but much smaller rat-free Sail Rock (Atkinson 1972).

Weeds – of the 75 naturalised species recorded wild (see Appendix) only a few require some management: kikuyu grass (large swards restricting regeneration of the native bush), buffalo grass (*Stenotaphrum secundatum*) (similar to kikuyu but the swards not as

large), pampas (restricting regeneration), bone-seed (*Chrysanthemoides monilifera*), gorse, mist flower (*Ageratina riparia*), and apple mint (*Mentha suaveolens*). The presence of apple mint through the sward of kikuyu for some 10 m × 10 m suggests a past European habitation site in this area above the natural rock arch.

Sentinel Rock – some 350 m out from the Mangawhai Harbour mouth, Sentinel Rock is clearly visible from the Walkway (Fig. 3) – 50 vascular species have been recorded there, 32 of which were native (Cameron & Taylor 1997), of which 13 were not recorded on the Walkway.

Fauna

Mammals – possum-browsing was evident on kohekohe and pohutukawa, and their faecal pellets were frequent on the Walkway during both the recce and field trip. Many of the largest pohutukawa were dead, presumably the result of possum browsing. Farm stock was well fenced out of all the coastal slopes.

Birds observed on the day (* = if seen only during the recce) Gannet, pied shag, little shag, white-faced heron, paradise shelduck* (a pair on a pohutukawa branch), mallard/grey duck* (3 flying by), pheasant*, California quail, pukeko, variable oystercatcher, black-backed gull, red-billed gull, Caspian tern, kereru*, rock pigeon* (flying), kingfisher, welcome swallow, silvereye*, grey warbler, blackbird, skylark*, pipit*, fantail, tui, house sparrow*, chaffinch, goldfinch*, yellowhammer, starling, myna, and magpie*. Sentinel Rock (Fig. 3) with no woody cover surprisingly has a population of grey-faced petrels nesting on its summit, and red-billed gulls and white-fronted terns have been recorded nesting there as well (Cameron & Taylor 1997).

Acknowledgements

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References

- Atkinson, I.A.E. 1972: Vegetation and flora of Sail Rock, Hen and Chicken Islands. *New Zealand Journal of Botany* 10: 545–558.
 Cameron, E.K. 2005: New Zealand geographical limits of native vascular plant species in the Auckland region: past & present. *Auckland Botanical Society Journal* 60: 123–129.
 Cameron, E.K.; Taylor, G.A. 1997: Flora and fauna of Sentinel Rock, Mangawhai Heads, northern New Zealand. *Tane* 36: 15–25.
 Campbell, D.J.; Atkinson, I.A.E. 1999: Effects of kiore (*Rattus exulans* Peale) on recruitment of indigenous coastal trees on northern offshore islands of New Zealand. *Journal of the Royal Society of New Zealand* 29: 265–290.
 de Lange, P.J.; McFadden, I.; Cameron, E.K. 1995: Preliminary report of the flora and fauna of Fanal Island, Mokohinau Islands Nature Reserve. Department of Conservation, Wellington, Science & Research Series 94. 20p.
 Hayward, B. 2008: 4, Mangawhai Cliffs Walkway (in part), in: Cameron, E.; Hayward, B.; Murdoch, G. *A field guide to Auckland*. Godwit, Auckland.
 New Zealand Virtual Herbarium (n.d.) *Nestegis apetala*. Retrieved 8 Mar 2012, from <http://www.virtualherbarium.org.nz>
 Wright, A.E. 1978: Vascular plants of Hen Island (Taranga), north-eastern New Zealand. *Tane* 24: 77–102

Appendix: Vascular Plant List for Mangawhai Cliffs Walkway based on recce of 17 Oct 2011, and ABS field trip 12 Nov 2011 (plus two earlier records)

Symbols

a – abundant	lc – locally common	Pl – planted
c – common	o – occasional	* – naturalised species
l – local	s – scarce (<5 plants seen)	

FERNS (28 natives + 0 naturalised)

<i>Adiantum cunninghamii</i>	o	<i>Asplenium oblongifolium</i>	o
<i>Adiantum hispidulum</i>	o	<i>Asplenium polyodon</i>	s
<i>Asplenium flaccidum</i>	o	<i>Blechnum ?chambersii</i>	s
<i>Asplenium haurakiense</i>	l	<i>Blechnum filiforme</i>	l
		<i>Blechnum membranaceum</i>	s

<i>Blechnum novae-zelandiae</i>	l	<i>Carduus tenuifolia*</i>	l
<i>Cyathea dealbata</i>	o	<i>Carmichaelia australis</i>	o
<i>Cyathea medullaris</i>	o	<i>Carpodetus serratus</i>	l
<i>Deparia petersenii</i>	l	<i>Centaurium erythraea*</i>	o
<i>Dicksonia squarrosa</i>	s	<i>Centella uniflora</i>	o
<i>Doodia australis</i>	o	<i>Cerastium fontanum*</i>	l
<i>Histiopteris incisa</i>	s	<i>Chrysanthemoides monilifera*</i>	c
<i>Hymenophyllum demissum</i>	l	<i>Ciclospermum leptophyllum*</i>	l
<i>Lindsaea trichomanoides</i>	s	<i>Cirsium vulgare*</i>	o
<i>Lygodium articulatum</i>	s	<i>Clematis cunninghamii</i>	l
<i>Microsorium pustulatum</i>	o	<i>Clematis paniculata</i>	o
<i>Microsorium scandens</i>	l	<i>Clinopodium vulgare*</i>	l
<i>Paesia scaberula</i>	l	<i>Conyza sumatrensis*</i>	o
<i>Pellaea rotundifolia</i>	s	<i>Coprosma arborea</i>	lc
<i>Pneumatopteris pennigera</i>	o	<i>Coprosma areolata</i>	l
<i>Polystichum neozelandiae</i>	l	<i>Coprosma repens</i>	l + Pl
<i>Pteridium esculentum</i>	o	<i>Coprosma rhamnoides</i>	o
<i>Pteris comans</i>	lc	<i>Coprosma robusta</i>	o + Pl
<i>Pteris tremula</i>	o	<i>Corynocarpus laevigatus</i>	o
<i>Pyrrhosia eleagnifolia</i>	o	<i>Crepis capillaris*</i>	o
<i>Tmesipteris elongata</i>	l	<i>Dichondra repens</i>	s
CONIFERS (6 + 1)			
<i>Agathis australis</i>	l	<i>Disphyma australe</i>	lc
<i>Dacrycarpus dacrydioides</i>	l	<i>Dysoxylum spectabile</i>	l
<i>Dacrydium cupressinum</i>	s	<i>Euchiton collinus</i>	l
<i>Phyllocladus trichomanoides</i>	l	<i>Euphorbia peplus*</i>	o
<i>Pinus radiata*</i>	l	<i>Galium aparine*</i>	c
<i>Podocarpus totara</i>	c	<i>Galium divaricatum*</i>	l
<i>Prumnopitys ferruginea</i>	l	<i>Galium propinuum</i>	l
DICOTYLEDONS (67 + 50)			
<i>Acaena anserinifolia</i>	l	<i>Gamochaeta coarctata*</i>	o
<i>Acaena novae-zelandiae</i>	o	<i>Gamochaeta simplicicaulis*</i>	o
<i>Ageratina adenophora*</i>	o	<i>Geniostoma ligustrifolium</i>	o
<i>Ageratina riparia*</i>	lc	<i>Geranium dissecta*</i>	l
<i>Alternanthera philoxeroides*</i>	l	<i>Geranium homeanum</i>	lc
<i>Anagallis arvensis</i> var. <i>arvensis*</i>	o	<i>Geranium molle*</i>	l
<i>Anagallis arvensis</i> var. <i>coerulea*</i>	l	<i>Gonocarpus incanus</i>	l
<i>Apium prostratum</i>	lc	<i>Griselinia littoralis</i>	Pl
<i>Araujia hortorum*</i>	s	<i>Griselinia lucida</i>	s
<i>Arctotheca calendula*</i>	l	<i>Haloragis erecta</i>	s
<i>Atriplex prostrata*</i>	s	<i>Hebe ?stricta</i>	Pl
<i>Beilschmiedia tarairi</i>	lc	<i>Hebe macrocarpa</i>	l
<i>Beilschmiedia tawa</i>	l	<i>Hedycarya arborea</i>	o
<i>Brachyglottis repanda</i>	o	<i>Hoheria populnea</i>	o
<i>Cakile maritima*</i>	l	<i>Hydrocotyle moschata</i>	s
<i>Calystegia soldanella</i>	lc	<i>Hypericum humifusum*</i>	s
<i>Calystegia soldanella</i> × <i>C. tuguriorum</i>	l	<i>Hypochaeris radicata*</i>	o
		<i>Jacobaea vulgaris*</i>	o
		<i>Knightia excelsa</i>	o
		<i>Kunzea ericoides</i>	a + Pl
		<i>Lactuca ?virosa*</i>	s

<i>Leontodon taraxacoides*</i>	o	<i>Pseudopanax lessonii</i>	o +Pl
<i>Lepidium didymum*</i>	l	<i>Ranunculus parviflorus*</i>	o
<i>Leptecophylla juniperina</i>	l	<i>Ranunculus reflexus</i>	l
<i>Leptospermum scoparium</i>	o +Pl	<i>Rumex acetosella*</i>	lc
<i>Leucopogon fasciculatus</i>	l	<i>Rumex brownii*</i>	o
<i>Leucopogon fraseri</i>	l	<i>Rumex crispus*</i>	l
<i>Linum bienne*</i>	o	<i>Samolus repens</i>	lc
<i>Linum trigynum*</i>	lc	<i>Sarcocornia quinqueflora</i>	l
<i>Lobelia anceps</i>	l	<i>Schefflera digitata</i>	s
<i>Lotus pedunculatus*</i>	o	<i>Selliera radicans</i>	s
<i>Lotus suaveolens*</i>	lc	<i>Senecio bipinnatisectus*</i>	o
<i>Lupinus arboreus*</i>	l	<i>Senecio diaschides</i>	o
<i>Macropiper excelsum</i>	lc	<i>Senecio elegans*</i>	lc
<i>Medicago nigra*</i>	l	<i>Senecio esleri*</i>	o
<i>Melicytus ramiflorus</i>	o	<i>Senecio hispidulus</i>	l
<i>Mentha suaveolens*</i>	l	<i>Senecio lautus</i>	l
<i>Metrosideros excelsa</i>	c +Pl	<i>Senecio minimus</i>	o
<i>Metrosideros perforata</i>	lc	<i>Senecio vulgaris*</i>	o
<i>Mida salicifolia</i>	s	<i>Sherardia arvensis*</i>	lc
<i>Modeola carolinensis*</i>	l	<i>Silene gallica*</i>	o
<i>Muehlenbeckia complexa</i>	c	<i>Solanum linnaeanum*</i>	s
<i>Myoporum laetum</i>	Pl	<i>Solanum nigrum*</i>	o
<i>Myosotis discolor*</i>	l	<i>Sonchus asper*</i>	o
<i>Myrsine australis</i>	o	<i>Sonchus oleraceus*</i>	o
<i>Nertera dichondrifolia</i>	l	<i>Spergularia rubra*</i>	1987
<i>Nestegis apetala</i>	s	<i>Streblus banksii</i> × <i>S. heterophyllus</i>	2006
<i>Nestegis lanceolata</i>	o	<i>Streblus heterophyllus</i>	o
<i>Oenanthe pimpinelloides*</i>	l	<i>Tetragonia implexicoma</i>	o
<i>Olearia furfuracea</i>	s	<i>Trifolium dubium*</i>	o
<i>Ornithopus pinnatus*</i>	lc	<i>Trifolium repens*</i>	o
<i>Orobanche minor*</i>	o	<i>Ulex europaeus*</i>	lc
<i>Oxalis exilis</i>	o	<i>Veronica arvensis*</i>	l
<i>Oxalis rubens</i>	s	<i>Veronica plebeia</i>	o
<i>Parsonsia</i> sp.	o	<i>Vicia sativa*</i>	lc
<i>Peperomia urvilleana</i>	lc	<i>Vicia tetrasperma*</i>	l
<i>Phytolacca octandra*</i>	s	<i>Vitex lucens</i>	o
<i>Pimelea urvilleanus</i>	s	<i>Wahlenbergia violacea</i>	s
<i>Pisonia brunoniana</i>	s		
<i>Pittosporum crassifolium</i>	o +Pl	MONOCOTS (23 + 1) (excl. grasses & orchids)	
<i>Pittosporum tenuifolium</i>	Pl	<i>Apodasmia similis</i>	l
<i>Planchonella costata</i>	s	<i>Arthropodium cirratum</i>	l
<i>Plantago australis*</i>	lc	<i>Asparagus scandens*</i>	l
<i>Plantago lanceolata*</i>	c	<i>Astelia banksii</i>	o
<i>Polycarpon tetraphyllum*</i>	o	<i>Astelia solandri</i>	l
<i>Potentilla indica*</i>	l	<i>Astelia trinervia</i>	s
<i>Prunella vulgaris*</i>	o	<i>Bolboschoenus medianus</i>	l
<i>Pseudognaphalium luteoalbum</i>	o	<i>Carex flagellifera</i>	o
<i>Pseudopanax crassifolius</i>	s	<i>Carex inversa</i>	l
<i>Pseudopanax crassifolius</i> × <i>P. lessonii</i>	o	<i>Carex pumila</i>	lc

<i>Carex solandri</i>	o	<i>Austroderia splendens</i>	Pl
<i>Collospermum hastatum</i>	o	<i>Austrostipa stipoides</i>	l
<i>Cordyline australis</i>	o	<i>Briza maxima*</i>	l
<i>Cordyline pumila</i>	s	<i>Briza minor*</i>	o
<i>Cyperus ustulatus</i>	l	<i>Bromus diandrus*</i>	lc
<i>Dianella latissima</i>	o	<i>Bromus hordeaceus*</i>	o
<i>Dianella nigra</i>	o	<i>Bromus willdenowii*</i>	o
<i>Ficinia nodosa</i>	l	<i>Chionochloa bromoides</i>	lc
<i>Ficinia spiralis</i>	lc	<i>Cortaderia selloana*</i>	la
<i>Freycinetia banksii</i>	l	<i>Cynodon dactylon*</i>	l
<i>Gahnia lacera</i>	o	<i>Dactylis glomerata*</i>	o
<i>Gahnia ?pauciflora</i>	l	<i>Holcus lanatus*</i>	o
<i>Gahnia xanthocarpa</i>	l	<i>Lachnagrostis billardierei</i>	o
<i>Gladiolus undulatus*</i>	l	<i>Lagurus ovatus*</i>	lc
<i>Isolepis cernua</i>	l	<i>Lolium perenne*</i>	o
<i>Isolepis prolifera</i>	l	<i>Microlaena stipoides</i>	o
<i>Juncus articulatus*</i>	lc	<i>Oplismenus hirtellus</i>	o
<i>Juncus australis</i>	l	<i>Paraphlois incurva*</i>	lc
<i>Lepidosperma australe</i>	s	<i>Paspalum vaginatum*</i>	o
<i>Lepidosperma laterale</i>	s	<i>Pennisetum clandestinum*</i>	a
<i>Phormium cookianum</i>	Pl	<i>Poa anceps</i>	o
<i>Phormium tenax</i>	c + Pl	<i>Poa trivialis*</i>	lc
<i>Rhopalostylis sapida</i>	a	<i>Polypogon fugax*</i>	l
<i>Ripogonum scandens</i>	l	<i>Rytidosperma biannulare</i>	lc
<i>Schoenus tendo</i>	l	<i>Rytidosperma racemosum*</i>	lc
<i>Uncinia uncinata</i>	l	<i>Spinifex sericeus</i>	lc
		<i>Schedonorus arundinaceus*</i>	lc
		<i>Sporobolus africanus*</i>	o
		<i>Stenotaphrum secundatum*</i>	lc
		<i>Vulpia bromoides*</i>	lc
		<i>Zoysia pauciflora</i>	l
ORCHIDS (3 + 0)			
<i>Microtis unifolia</i>	l		
<i>Pterostylis banksii</i>	l		
<i>Thelymitra longifolia</i>	l		
GRASSES (12 + 21)			
<i>Aira caryophyllea*</i>	lc		
<i>Anthoxanthum odoratum*</i>	lc		