

The Vascular Flora of Motuihe Island Recreation Reserve

P.J. de Lange and G.M. Crowcroft

INTRODUCTION

Motuihe Island (179 ha) is currently administered as a Recreation Reserve by the Auckland Conservancy, Department of Conservation. Although a brief and historically significant account of the vegetation and vascular flora of Motuihe was published by Kirk (1879), it was Esler (1980), who provided the first comprehensive listing of vascular plants for the island. During November 1993 and for 7 days during January/February 1994 we undertook a further investigation of the islands vascular flora (de Lange 1994). These initial forays were supplemented by several visits to the island during July 1994, November 1994 and September 1995.

As a result of these visits we compiled a checklist of the vascular plants encountered. The Auckland Conservancy has held this list on file; from where it has been used as an unpublished resource for other written accounts of the islands vegetation and flora, e.g., Stubbs (1996) and Wilcox (1999). As a result of increasing interest in the botany of this island, and also with a view toward updating the original work we have recently revised the list. This list we now publish here in the hope that it will provide a new benchmark for future botanical visits to the island.

THE LIST

A total of 493 taxa (species, subspecies, varieties, cultivars and hybrids) have been recorded from Motuihe Island. Of this figure 153 taxa are considered indigenous to the island, 182 are naturalised exotics, and the rest are present as garden relicts, which as yet have not spread themselves. During our survey we failed to locate 10 taxa recorded by Kirk (1879) and Esler (1980), and at least two of these are now considered extinct on Motuihe (see below).

NATIONALLY THREATENED SPECIES

Motuihe Island has had a long history of human occupation (Kirk 1879; Hayward 1980; Cameron et al., 1997; Brassey 1999) and the indigenous vegetation is now heavily modified. Therefore it comes as no surprise that the island supports few indigenous plants of regional significance and only one extant population of a nationally threatened species, the vulnerable *Senecio scaberulus* (de Lange et al., 1999a), a species which favours modified habitats. This endemic fireweed is only known from the mouth of von Luckner's gully, where 5 adults and a few seedlings were noted in 1994 and 1995.

Kirk (1879) reported two other nationally threatened plants, aute-taranga (*Pimelea arenaria* sens. str.) and mawhai/ambush vine (*Sicyos* aff. *australis*), neither are extant on Motuihe, and of the two, aute-taranga is classified as regionally extinct by de Lange et al. (1999b).

REGIONALLY THREATENED AND UNCOMMON SPECIES

Of the 172 regionally threatened and uncommon taxa listed for the Auckland Conservancy (de Lange et al., 1999b), only one, *Geranium solanderi* "large petals" is known from Motuihe. On the island, this *Geranium* has a precarious existence, persisting as a small patch within pasture along the cliffs above Waihaorangatahi Bay.

Although not threatened, the presence of *Spinifex sericeus* on Motuihe may be worth noting in lieu of the comments made about it by Gardner (1999). Similarly, a small vascular flora of species more typical of the outer Hauraki Gulf is also present on Motuihe, e.g., coastal mahoe (*Melicytus novaezelandiae* subsp. *novaezelandiae*), and the ferns *Blechnum norfolkianum*, and *Pteris* aff. *comans*.

UNUSUAL NATURALISED SPECIES

Motuihe Island supports a number of unusual and noteworthy historic plantings dating from its varied usage since European settlement, as a farm, quarantine settlement, site of internment for prisoner's of war and other "undesirables", and a Naval base (Cameron et al., 1997; Brassey 1999). Some of the plantings associated with these activities, e.g., the olive (*Olea europaea* subsp. *europaea*) grove, are of tremendous historical significance (R. Brassey pers. comm. 1999). Several of these plantings have been the source of spontaneous spread and naturalisation. With the exception of evergreen buckthorn (*Rhamnus alaternus*) whose significance and weed potential has been well documented (Fromont 1997) we provide a preliminary listing of what we consider to be some of the more interesting of these naturalisations.

Norfolk Island pine (*Araucaria heterophylla*)

Norfolk Island pine is commonly planted throughout northern coastal New Zealand. So in this regard the presence of this species on Motuihe is not that significant. However, what we feel makes the Motuihe Norfolk pines unusual is that the trees have readily naturalised

themselves on the cliffs and sand dunes adjacent to the main stand. This is interesting because Webb et al. (1988) record this species as naturalised in only two places, Raoul Island, and from Motukiki Island (Bay of Islands). As far as we can ascertain Motuihe is apparently the most southerly occurrence of naturalised specimens of this species in New Zealand. We also echo the view of Wilcox (1999) that the Motuihe stand shows excellent form and health, adding a further rider, that according to Graeme Platt (pers. comm.), Motuihe pines produce better quality seed than even those pines he has sampled on Norfolk Island.

Eucalyptus leucoxylon

Several planted specimens of *E. leucoxylon* are present on Motuihe. These exist as two colour morphs; white-flowered and red-flowered. In one place near Te Tumurae Point, a single tree protruding from a cliff face appears to have naturally established from a seeding adult tree planted above the cliff. This is of interest, as this species, although commonly cultivated in New Zealand, has not been reported as naturalising before (Webb et al., 1988; Webb et al., 1995; Heenan et al., 1998; Heenan et al., 1999).

Euphorbia depauperata* var. *pubescens

Reported from Motuihe Island by Webb et al. (1995), this *Euphorbia* seems to have originated from the movement of garden material from nearby Motutapu Island to Motuihe. We have been told that when the Lands & Survey Department administered these islands, the farmers regularly took garden plants from Motutapu and planted these on Motuihe (P. Macdonald pers. comm.). On Motutapu, where this *Euphorbia* is also naturalised (Heenan et al., 1999) it was common in most gardens surveyed during 1995 and 1996 (P.J. de Lange & R.O. Gardner unpubl. data).

Rose of Sharon (Hibiscus syriacus)

This commonly cultivated species frequently establishes itself from seed in the vicinity of parent shrubs. Naturalisation was achieved on Motuihe by virtue of the positioning of a planting above the Ocean Bay cliffs. Seed derived from these specimens fall down the cliff tops facilitating the casual spread of the species (Heenan et al., 1999). The form on Motuihe Island seems to correspond to the cultivar 'Blue Bird'.

Bushy Peppergrass (Lepidium desvauxii)

This peppergrass has hitherto only been reported from the South, Stewart and Chatham Islands (Webb et al. 1988). On Motuihe it is occasionally found in damp sandy ground at the back of the beach at Otamarau (Calypso) Bay.

European Olive (*Olea europaea* subsp. *europaea*)

The identity of naturalised olives in New Zealand has been fraught with difficulties. These issues are summarised by Heenan et al. (1999), who demonstrates that the most commonly naturalised olive in New Zealand is *O. europaea* subsp. *europaea* rather than subsp. *cuspidata* (subsp. *africana* in Webb et al., 1988). On Motuihe Island, olives are abundantly naturalised along the cliff faces, forest and rough pasture. Naturalisation is most prolific in the vicinity of the old olive grove discussed by Wilcox (1999), although the cliffs above Waihaorangatahi Bay also support numerous wildings.

Allepo/Gallipoli Pine (*Pinus halepensis*)

Allepo or "Gallipoli Pine" is locally common along the cliffs above Te Tumurae Point, and Waihaorangatahi Point. The abundance of this species on Motuihe is considered noteworthy, for allepo pine is generally acknowledged to be a scarce species in New Zealand (Webb et al., 1988). How this Mediterranean species got to the island is uncertain, one plausible origin relates to the islands' use as a Quarantine Station for returning World War 1 veterans, many of whom were stationed there as a result of the 1918 Influenza outbreak. Although we are not aware of any evidence to confirm this, it is a popular view (T. White, G. Platt & R. Brassey pers. comm.) that some of these veterans planted allepo pine on the island from seed they carried from Gallipoli. Further research into this subject is desired. For although our own visits to Gallipoli disclosed that the main pine present there now is *P. halepensis* subsp. *brutia*, we cannot be certain that the subsp. *brutia* specimens we saw at Gallipoli are truly relicts dating from that horrible tragedy, or of more recent origin. This is because subsp. *brutia* is now routinely planted at Gallipoli, as it is throughout northern Turkey for timber and ornament (T. Ortokoy pers. comm.). Nor can we be certain whether the Motuihe pine is not that subspecies after all, particularly as the taxonomic distinction of subsp. *brutia* from subsp. *halepensis* is somewhat confused and controversial (R.O. Gardner pers. comm.).

Scotch pine (*P. sylvestris*)

On the main ridge leading from the trig to Otamarau (Calypso) Bay grow two specimens of Scotch Pine (*Pinus sylvestris*). Their presence on the island is considered unusual as Auckland is not climatically suited for this pine (R. O. Gardner pers. comm.). This observation could explain the remarkably small stature (2 m tall) and ill thrift of the trees.

Brown pine (*Podocarpus?elatus*)

A single specimen of what is presumed to be a golden yellow colour variant of brown pine grows on the path leading from the olive grove to the old parade grounds and barracks of the former naval base. Opinions on the correct identity of this tree

vary with some (e.g., R. O. Gardner pers. comm.) considering it to be brown pine, and others (e.g., G. Platt pers. comm.) emphatic that it is not. The main bone of contention seems to be the leaf length, shape, glossiness and colour, of this solitary tree. Some further assessment may be warranted.

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APPENDIX: Vascular Flora of Motuihe Island (Including Tern Rocks)

Abbreviations

- A = Adventive (182 spp.)
I = Indigenous (153 spp.)
Ab = Abundant (>50 individuals seen)
C = Common (20 - 50 individuals seen)
O = Occasional (10 - 20 individuals seen)
R = Rare (< 10 ten individuals seen)
S = Only one individual noted
juv = juveniles only seen
p = Planted, species either exotic or indigenous and may or may not be naturalised(122 spp.)
n = Species indigenous to the island but also known from deliberate plantings of unknown provenance e = eradicated
* = Denotes adventive species
Ex = Extirpated from within survey area
= Exotic species not naturalised
(Esler 1980) = Recorded by Esler and not seen during this survey (8 spp.)
(Kirk 1879) = Recorded by Kirk and not seen by Esler (1980) or during this survey (2 spp.)
ζ Addition to Esler (1980) (268 spp.)
σ = Species Indigenous to New Zealand but not known in a natural state within the survey area

Ferns (38) (A: 0 I: 36)

ζ <i>Adiantum aethiopicum</i>		true maidenhair fern	C	
<i>A. hispidulum</i>		rosy maidenhair fern	C	
ζ # <i>A. raddianum</i>	p	maidenhair fern	R	AK 232827
ζ <i>Asplenium bulbiferum</i>		hen and chicken fern	S	
ζ <i>A. diaphanum</i>		tuberous maidenhair fern	R	
ζ <i>A. flaccidum</i>		hanging spleenwort	R	AK 232800
<i>A. oblongifolium</i>		shining spleenwort	C	

ζ <i>Blechnum chambersii</i>			O	AK 220528
ζ <i>Blechnum filiforme</i>			Ab	
ζ <i>B. norfolkianum</i>			O	
<i>B. novae-zelandiae</i> (Esler 1980)		kiokio		
ζ <i>Cheilanthes distans</i>		woolly cloak-fern	R	AK 230212
<i>Cyathea dealbata</i>		silver fern, ponga	R	
<i>C. medullaris</i>		mamaku	C	
ζ <i>Deparia petersenii</i> subsp. <i>congrua</i>			C	
ζ <i>Dicksonia squarrosa</i>		wheki	R	
ζ <i>Diplazium australe</i>			S	
<i>Doodia australis</i>			Ab	
<i>Histiopteris incisa</i>		bat-wing fern	S	
ζ <i>Hypolepis ambigua</i>			C	
ζ <i>H. dicksonioides</i>			S	
<i>Lastreopsis glabella</i>			Ab	
<i>L. microsoria</i> subsp. <i>pentangularis</i>			R	
ζ <i>L. velutina</i>			R	
<i>Microsorium pustulatum</i> subsp. <i>pustulatum</i>			Ab	
ζ <i>M. scandens</i>		hounds-tongue fern	R	
ζ# <i>Nephrolepis cordifolia</i>	p	Japanese ladder fern	S	
<i>Paesia scaberula</i>		pig fern	R	
ζ <i>Pellaea rotundifolia</i>		button fern	R	
<i>Pneumatopteris pennigera</i>			Ab	
ζ <i>Polystichum richardii</i> sens. lat.			R	
<i>Pteridium esculentum</i>		bracken	C	
ζ <i>Pteris</i> aff. <i>comans</i>			C	AK 219006
ζ <i>P. maclienta</i> (<i>P. pendula</i>)			R	
ζ <i>P. saxatilis</i> (<i>P. maclienta</i>)				
<i>P. tremula</i>		trembling brake	Ab	
ζ <i>P.</i> aff. <i>comans</i> × <i>P. saxatilis</i>			R	
<i>Pyrosia elaeagnifolia</i>		leather fern	Ab	

Gymnosperms (18) (A:4 I:0)

ζ# <i>Araucaria columnaris</i>	p	Cook pine	S	
ζ# <i>A. cunninghamii</i>	p	hoop pine	S	
ζ* <i>A. heterophylla</i>	p	Norfolk Island pine	Ab	AK 232801
ζ# <i>Cryptomeria japonica</i>	p	Japanese red cedar	S	
ζ# <i>C. japonica</i> 'Elegans'	p	Japanese plum cedar	R	AK 232799
ζ* <i>Cupressus macrocarpa</i>	p	monterey cypress	Ab	
ζ# <i>C. macrocarpa</i> 'Aurea'	p	golden monterey cypress	R	
ζ# <i>C. sempervirens</i>	p	Italian cypress	S	AK 223576
ζ# <i>Pinus canariensis</i>	p	Canary Island pine	S	AK 219004
* <i>P. halepensis</i>	p	allepo pine	Ab	AK 218996
* <i>P. pinaster</i>	p	maritime pine	Ab	
ζ# <i>P. nigra</i>	p	Austrian pine	R	AK 223577
ζ# <i>P. radiata</i>	p	monterey pine	S	AK 224345
ζ# <i>P. sylvestris</i>	p		R	AK 223575
ζ# <i>P. muricata</i>	p	bishop pine	R	
ζ# <i>Podocarpus ?elatus</i>	p	brown pine	S	AK 220535
ζ ^σ <i>P. totara</i>	p	totara	R	
ζ# <i>Thuja plicata</i> 'Old gold'	p	western red cedar	S	AK 232798

Monocotyledonous Trees (1) (A:0 I:1)

<i>Cordyline australis</i>	p	cabbage tree, ti kouka	R	
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Dicotyledonous Trees and Shrubs (115) (A:26 I:41)

ζ* <i>Acmena smithii</i>	p	monkey apple	C	AK 230208
ζ# <i>Agonis flexuosa</i>	p		S	
ζ# <i>Ailanthus altissima</i>	juv p	tree of heaven	S	

ζ# <i>Alnus cordata</i>	p	Italian alder	R	AK 219008
ζ* <i>Argyranthemum frutescens</i>	p	marguerite	R	
ζ# <i>Artemisia arborescens</i>	p	hedge artemisia	S	
ζ <i>Avicennia marina</i> ssp. <i>australasica</i>	juv	mangrove	S	
<i>Beilschmiedia tarairae</i>		tarairae	Ab	
ζ <i>B. tawa</i> (incl. <i>B. tawaroa</i>)		tawa	S	AK 232816
ζ# <i>Berberis glaucophylla</i>		barberry	S	
<i>Brachyglottis kirkii</i>	(Esler 1980)	kohurangi		
<i>B. repanda</i>	(Esler 1980)	rangiora		
ζ# <i>Buddleja salvifolia</i>	p	South African buddleia	S	
ζ* <i>Carica pubescens</i>		mountain pawpaw	R	
<i>Carmichaelia australis</i>			R	
ζ* <i>Casuarina glauca</i>	p	river oak	C	AK 232812
ζ# <i>Chaenomeles japonica</i>	p	japonica	S	
ζ* <i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>		boneseed	R	AK 232814
ζ# <i>Citrus limon</i>	p	lemon	R	
ζ# <i>C. paradisi</i>	p	grapefruit	R	
ζ# <i>C. sinensis</i>	p	orange	R	
ζ# <i>Clethra arborea</i>	p		S	
ζ <i>Coprosma arborea</i>		mamangi	S	
ζ <i>C. lucida</i>		shining karamu	R	
<i>C. aff. macrocarpa</i>		coastal karamu	Ab	
ζ <i>C. propinqua</i>		mingimingi	S	
<i>C. repens</i>		taupata	Ab	
ζ <i>C. rhamnoides</i>			S	
ζ <i>C. robusta</i>		karamu	R	
<i>Coriaria arborea</i>		tutu	O	AK 24485
<i>Corynocarpus laevigatus</i>	n	karaka	Ab	
* <i>Cotonester glaucophylla</i> f. <i>serotinus</i>			S	AK 232833
ζ* <i>Crataegus monogyna</i>		hawthorn	R	
ζ* <i>Cyphomandra betacea</i>		tamarillo	S	
ζ <i>Dodonaea viscosa</i>	p	akeake	R	
<i>Dysoxylum spectabile</i>	n	kohekohe	Ab	AK 230213
* <i>Elaeagnus</i> × <i>reflexus</i>		elaeagnus	C	
<i>Entelea arborescens</i>		whau	R	AK 232832
ζ* <i>Eucalyptus botryoides</i>	p	southern mahogany	C	AK 232808
ζ# <i>E. ficifolia</i>	p	red-flowering gum	R	
ζ# <i>E. globulus</i> subsp. <i>pseudoglobulus</i>	p	Victorian eurabbie	S	AK 232810
ζ* <i>E. leucoxylon</i> (form 1)	p		R	AK 230211
ζ# <i>E. leucoxylon</i> (form 2)	p		S	AK 232803
ζ* <i>E. pilularis</i>	p	black butt		AK 230210
ζ# <i>E. ?propinqua</i> var. <i>propinqua</i>	p		S	AK 228360
ζ* <i>E. saligna</i>	p	Sydney blue gum	C	AK 232809
* <i>Euonymus japonicus</i>	p	japanese spindleberry	Ab	
ζ# <i>Fatsia japonica</i>	p	fatsia	R	
ζ# <i>Feijoa sellowiana</i>	p	feijoa	S	
ζ# <i>Ficus elastica</i>	p	rubber plant	S	
ζ# <i>F. macrophyllus</i>	p	Moreton Bay fig	R	AK 220523
ζ# <i>F. rubiginosa</i>	p	Port Jackson fig	S	
ζ# <i>Forsythia</i> × <i>intermedia</i>	p	forsythia	S	
ζ# <i>Fraxinus excelsior</i>	juv	mountain ash	S	
ζ# <i>Fuchsia</i> × <i>hybrida</i> 'Pink darling'	p	fuchsia	R	
<i>Geniostema ligustrifolium</i> var. <i>ligustrifolium</i>		hangehange	C	
ζ# <i>Grevillea robusta</i>	p	silky oak	S	
<i>Hebe stricta</i> var. <i>stricta</i>		koromiko	O	
<i>Hedycarya arborea</i>		porokaiwhiri	O	AK 232829
ζ <i>Hibiscus syriacus</i> 'Blue bird'	p	rose of sharon	S	AK 230206
ζ# <i>Jasminum mesnyi</i>	p		S	
<i>Knightia excelsa</i>		rewarewa	R	AK 232817
<i>Kunzea ericoides</i> sens. lat.		kanuka	O	
<i>Leptospermum scoparium</i>		manuka	O	
<i>Litsea calicaris</i>		mangaeo	R	

<i>Macropiper excelsum</i> subsp. <i>excelsum</i>		kawakawa	Ab	
ζ# <i>Malus × domestica</i>	p	apple	R	
<i>Melicope ternata</i>		wharangi	R	
ζ <i>Meliccytus novae-zelandiae</i> subsp. <i>novaezelandiae</i>		coastal mahoe	R	AK 230204
<i>M. ramiflorus</i> subsp. <i>ramiflorus</i>		mahoe	Ab	
<i>Metrosideros excelsa</i>		pohutukawa	Ab	
ζσ <i>M. kermadecensis</i>	p	kermadec pohutukawa	O	AK 230214
ζ <i>Mertya sinclairii</i>	p	pukanui	S	
ζ# <i>Myoporum insulare</i>	p	Tasmanian boobialla	R	
<i>M. laetum</i>	n	New Zealand boobialla	C	
<i>Myrsine australis</i>		mapou	Ab	
ζ# <i>Nerium oleander</i>	p	oleander	O	
* <i>Olea europaea</i> subsp. <i>europaea</i>	p	olive	Ab	AK 232831
ζ <i>Olearia furfuracea</i>		akepiro	O	AK 24484
ζσ <i>O. paniculata</i>	p	akiraho	R	
ζ* <i>Opuntia vulgaris</i>	p	prickly pear	C	AK 218821
ζ <i>Ozothamnus leptophyllus</i> sens. lat.		tauhinu	O	AK 24488
* <i>Phytolacca octandra</i>		inkweed	C	
ζ <i>Pimelea arenaria</i> sens. str. (Kirk 1879)		aute-taranga	Ex	
<i>Pittosporum crassifolium</i>	p	karo	Ab	
ζσ <i>P. tenuifolium</i> subsp. <i>tenuifolium</i>	p	kohukohu	R	
<i>Pouteria costata</i>		tawapou	R	AK 219005
<i>Polygala myrtifolia</i> 'Grandiflora'	p	sweet pea shrub	R	AK 232811
ζσ <i>Pomaderris apetala</i> subsp. <i>maritima</i>	p	tainui	R	
ζ# <i>Populus albus</i>	p	white poplar	S	
ζ# <i>P. nigra</i> 'Italica'	p	lombardy poplar	R	
ζ# <i>Prunus × domestica</i>	p	plum	S	
ζ# <i>P. persica</i>	p	peach	S	
<i>Pseudopanax lessonii</i>		houpara	Ab	AK 24486
ζ* <i>Pyrus communis</i>	p	pear	R	
ζ* <i>Quercus ilex</i>	p	holm oak	O	AK 230215
ζ <i>Rhabdothamnus solandri</i>		taurepo	S	
* <i>Rhamnus alaternus</i>	p	evergreen buckthorn	Ab	AK 217230
ζ# <i>Rosa multiflora</i>	p		S	
* <i>R. rubiginosa</i>		briar rose	R	
ζ* <i>R. wichuraiana</i> cv 'Dorothy perkins'	p		R	AK 232959
ζ# <i>Salix matsudana</i> 'Tortuosa'	p	tortured willow	S	
ζ# <i>Salvia rutilans</i>	p		S	
ζ# <i>Schinus molle</i>	p	pepper tree	S	
<i>Solanum aviculare</i>		poroporo	R	
* <i>S. linnaeanum</i>		apple of sodom	C	
* <i>S. mauritianum</i>		tree tobacco	Ab	
<i>Sophora chathamica</i>		kowhai	O	
ζ# <i>Teucrium fruitcans</i>	p	germander	S	
ζ# <i>Tamarix chinensis</i>	p	tamarisk	R	
ζ# <i>Lophostemon confertus</i>	p		R	AK 218991
* <i>Ulex europaeus</i>		gorse	C	
ζ# <i>Virburnum</i> sp.	p		S	
<i>Vitex lucens</i>	n	puriri	Ab	AK 232830

Dicotyledonous Lianes and Scrambling Plants (18) (A:4 I:10)

* <i>Araujia hortorum</i>		moth plant	Ab	
<i>Calystegia sepium</i> agg.		pink bindweed	C	
<i>C. soldanella</i>		sand bindweed	R	
ζ# <i>Clematis montana</i> 'Rubens'	p	clematis	S	
ζ <i>Einadia triandra</i>		pigweed	S	
ζ <i>E. trigonos</i> subsp. <i>trigonos</i>		pigweed	S	
<i>Muehlenbeckia australis</i>		pohue	R	
<i>M. complexa</i>		tororaro	Ab	
ζ <i>M. australis</i> × <i>M. complexa</i>		hybrid pohue	O	
<i>Parsonsia heterophylla</i>		native jasmine	O	
ζ* <i>Passiflora mixta</i>		banana passionfruit	O	AK 220536

ζ# <i>Plectranthus saccatus</i> 'Variegata'	p		S	
<i>Rubus cissoides</i> sens. str.		bush lawyer	R	
ζ# <i>R. idaeus</i>	p	raspberry	S	
ζ* <i>R. ulmifolius</i>		blackberry	R	
ζ* <i>R. sp. fruticosus</i> agg.	e	blackberry	S	
ζ <i>Sicyos</i> aff. <i>australis</i> (Kirk 1879)		mawhai	Ex	AK 11701
ζ# <i>Vitis vinifera</i> ?cv. 'Brandt'	p	ornamental grape	S	AK 219007

Grasses (58) (A:47 I:11)

ζ* <i>Agrostis capillaris</i>		browntop	Ab	
* <i>A. stolonifera</i>		creeping bent	O	
* <i>Ammophila arenaria</i>		marram	O	
* <i>Anthoxanthum odoratum</i>		sweet vernal grass	C	
* <i>Arrhenatherum elatius</i> subsp. <i>elatius</i>		tall oat grass	O	
ζ* <i>Avena barbata</i>		oat grass	O	
* <i>Botriochloa macra</i>		red-kneed grass	C	
* <i>Brizia minor</i>		small quaking grass	O	
* <i>Bromus arenarius</i>		sand brome	O	
* <i>B. diandrus</i>		rip-gut brome	Ab	
* <i>B. lithobius</i>			Ab	
* <i>B. hordeaceus</i>			Ab	
* <i>B. willdenowii</i>		prairie grass	Ab	
ζ <i>Cortaderia fulvida</i>		toetoe	S	AK 216969
ζ* <i>C. jubata</i>		purple pampas	Ab	
* <i>C. selloana</i>		pampas	C	
<i>C. aff. splendens</i>		coastal toetoe	O	AK 232825
* <i>Cynodon dactylon</i>		indian doab	Ab	
* <i>Cynosurus cristatus</i>		crested dogs-tail	O	
* <i>Dactylis glomerata</i>		cocksfoot	Ab	
<i>Dichelachne crinita</i>		plume grass	C	
ζ* <i>Digitaria sanguinalis</i>		summer grass	R	
ζ* <i>Echinochloa crus-galli</i>		barnyard grass	S	
ζ* <i>Eleusine indica</i>		crowsfoot	O	
* <i>Elymus rectisetus</i>		wheat grass	C	
ζ* <i>Gastridium ventricosum</i>		nit grass	S	AK 232828
ζ* <i>Glyceria declinata</i>		floating sweet grass	O	
* <i>Hordeum murinum</i>		barley grass	Ab	
* <i>Holcus lanatus</i>		Yorkshire fog	C	
ζ <i>Lachnagrostis billardierei</i>			C	
<i>L. filiformis</i>		N.Z. wind grass	C	
* <i>Lagurus ovatus</i>		haretail	Ab	AK 99023
* <i>Lolium perenne</i>		ryegrass	Ab	
ζ* <i>L. rigidum</i>		ryegrass	C	
<i>Microlaena stippioides</i>		rice grass	Ab	
<i>Oplismenus imbecillus</i>		N.Z. oat grass	Ab	
ζ* <i>Panicum dichotomiflorum</i>			R	
* <i>Paspalum dilatatum</i>		paspalum	Ab	
* <i>P. distichum</i>		mercer grass	Ab	
ζ* <i>P. urvilliei</i>		vasey grass	R	
* <i>P. vaginatum</i>		saltwater paspalum	C	
* <i>Parapholis incurva</i>		sickle grass	Ab	
* <i>Pennisetum clandestinum</i>		kikuyu	Ab	
<i>Poa anceps</i> subsp. <i>anceps</i>			Ab	
* <i>P. annua</i>		annual poa	O	
ζ* <i>P. pratensis</i>		Kentucky bluegrass	O	
ζ* <i>Polypogon fugax</i>			R	
* <i>P. monspeliensis</i>		beard grass	Ab	
* <i>P. viridis</i>		water bent	Ab	
* <i>Rytidosperma penicillata</i>		bristle grass	O	
* <i>R. racemosa</i>		bristle grass	Ab	AK 216994
ζ <i>R. unarede</i>		bristle grass	O	
ζ* <i>Schedonorus phoenix</i>		tall fescue	R	
<i>Spinifex sericeus</i>		spinifex	C	
* <i>Sporobolus africanus</i>		rats-tail	Ab	
* <i>Stenotaphrum secundatum</i>		buffalo grass	C	
<i>Stipa stipoides</i>		coastal immortality grass	O	
* <i>Vulpia bromoides</i>		vulpia hair grass	Ab	

Orchids (2) (A:0 I:2)

ζ *Drymoanthus adversus* O
Earina mucronata (Esler 1980) bamboo orchid

Rushes (11) (A:4 I:7)

ζ* *Juncus articulatus* articulated rush R
J. australis rush O
 ζ* *J. bufonius* var. *bufonius* toad rush R
 ζ *J. distegus* rush S
 ζ *J. gregiflorus* rush C
 * *J. effusus* var. *effusus* soft rush O
 ζ *J. planifolius* R
J. pallidus (Esler 1980) rush
 ζ *J. tenuis* var. *tenuis* rush C
J. usitatus rush Ab AK 232826
 ζ *Luzula picta* s.s wood rush R

Sedges (25) (A:5 I:20)

Bolboschoenus medianus purua grass C AK 216721
 ζ *Carex breviculmis* R
 ζ* *C. divisa* R
 * *C. divulsa* Ab
C. flagellifera trip-me-up Ab
C. inversa O
C. lambertiana C
C. ochrosaccus O
C. pumila C
 ζ *C. solandri* C
 ζ *C. testacea* O
C. virgata kuawa Ab
 * *Cyperus brevifolius* S
 * *C. eragrostis* C
C. ustulatus f. *ustulatus* coastal cutty grass Ab AK 216656
 ζ *Eleocharis acuta* spikerush C
Gahnia lacera Ab
G. xanthocarpa kauri sedge O
Isolepis cernus C
I. nodosus knobby club rush O
 * *I. sepulcralis* O
 ζ *I. reticularis* R
 ζ *Schoenoplectus tabernaemontani* R
 ζ *Schoenus maschalinus* S
 ζ *Uncinia uncinata* bastard grass R

Monocotyledonous Herbs (other than Grasses, Orchids, Rushes and Sedges) (19) (A:10 I:6)

ζ* *Agave americana* p century plant O AK 226997
 * *Allium vineale* wild onion O
 ζ* *Amaryllis belladonna* p naked ladies O
 ζ *Arthropodium cirrhatum* rengarenga lily O
 * *Arum italicum* Italian arum R
 ζ# *Asparagus densiflorus* p R
Astelia banksii coastal astelia Ab
 * *Crocsmia* × *crocsmifolia* p monte bretia O
 ζ *Dianella nigra* blueberry R
 ζ* *Iris foetidissima* p stinking iris O
 ζ# *I. germanica* p bearded iris R
 ζ# *Kniphofia* sp. p hotpoker S
 ζ *Lemna minor* duckweed R
 ζ* *Leucojum aestivum* snowflake R
 ζ* *Narcissus poeticus* winterbells Ab
 ζ* *N. tazetta* Ab AK 220524

<i>Phormium tenax</i>	n	harakeke	Ab
<i>Triglochin striata</i>		marsh arrow grass	O
* <i>Zantedeschia aethiopica</i>		arum lily	O

Composite Herbs (51) (A:34 I:6)

ζ* <i>Anthemis cotula</i>		stinking mayweed	R
ζ* <i>Arctotheca calendula</i>		cape daisy	S
ζ# <i>Arctotis × hybrida</i> cv.		arctotis daisy	R
ζ# <i>Aster amellus</i>		Italian aster	S
ζ# <i>A. novi-belgii</i> hybrids		michaelmas daisy	S
* <i>A. subulatus</i>		sea aster	O
ζ# <i>A. sp.</i> garden cultivar	p	?Easter daisy	S
* <i>Bellis perennis</i>		lawn daisy	C
* <i>Carduus pycnocephalus</i>		winged thistle	Ab
* <i>C. tenuiflorus</i>		winged thistle	C
ζ* <i>Chrysanthemum segetum</i>	p	corn marigold	R
* <i>Cirsium arvense</i>		Californian thistle	C
ζ* <i>C. palustre</i>		marsh thistle	S
* <i>C. vulgare</i>		Scotch thistle	Ab
* <i>Conyza albida</i>		fleabane	O
ζ <i>Cotula australis</i>			R
ζ <i>C. coronopifolia</i>		bachelors buttons	R
* <i>Crepis capillaris</i>		hawkbeard	Ab
ζ* <i>Dahlia coccinea</i> × <i>D. pinnata</i>	p	dahlia	R
ζ# <i>Dendranthemum</i>	p	Chinese chrysanthemum	S
ζ# <i>Felicia bergeriana</i>	p	felicia	S
ζ# <i>Gazania linearis</i>	p	gazania	R
ζ* <i>Gnaphalium coarctatum</i>		purple cudweed	S
* <i>G. simplicicaule</i>			O
* <i>Helminthotheca echioides</i>		oxtongue	Ab
ζ* <i>Hypochoeris glabra</i>		smooth catsear	R
* <i>H. radicata</i>		catsear	Ab
ζ* <i>Lactuca virosa</i>		acrid lettuce	S
ζ* <i>Lapsana communis</i>		nipplewort	Ab
* <i>Leontodon taraxacoides</i>		hawkbit	Ab
ζ* <i>Matricaria dioscoidea</i>		rayless chamomile	R
ζ* <i>Mycelis muralis</i>		wall lettuce	R
ζ# <i>Osteospermum fruticosum</i>	p	dimorphotheca	O
ζ# <i>O. jucundum</i>	p		R
ζ <i>Pseudognaphalium</i> "Lowland"			O
* <i>Senecio bipinnatisectus</i>		Australian fireweed	R
ζ* <i>S. eslerii</i>			S
<i>S. hispidulus</i>		fireweed	C
ζ* <i>S. jacobaea</i>		ragwort	S
<i>S. lautus</i> var. <i>lautus</i>		shore groundsel	O
ζ <i>S. scaberulus</i>			R
ζ* <i>S. skirrhodon</i>		gravel groundsel	O
* <i>S. vulgaris</i>		groundsel	C
* <i>Silybum marianum</i>		variegated thistle	Ab
* <i>Solvia sessilis</i>		onehunga weed	O
* <i>Sonchus asper</i>		prickly sow thistle	O
* <i>S. oleraceus</i>		sow thistle	Ab
ζ# <i>Tagetes patula</i>	p	French marigold	S
ζ# <i>Tanacetum parthenicum</i>	p	feverfew	R
* <i>Taraxacum officinale</i>		dandelion	O
* <i>Xanthium spinosum</i>		Bathurst bur	Ab

Dicotyledonous Herbs (Other than Composites) (137) (A:95 I:24)

ζ <i>Acaena anserinifolia</i>			S	AK 44793
* <i>A. novae-zelandiae</i>		piripiri	C	AK 229264
* <i>Amaranthus deflexus</i>			C	
* <i>A. lividus</i>			C	
* <i>A. powellii</i>			O	
* <i>Anagallis arvensis</i> subsp. <i>arvensis</i> var. <i>arvensis</i>		scarlet pimpernel	Ab	

ζ# <i>Angelica pachycarpa</i>	p	garden angelica	S	
ζ <i>Apium prostratum</i>		New Zealand celery	O	AK 44771
* <i>Atriplex prostrata</i>		orache	Ab	AK 24487
ζ# <i>Bergenia cordifolia</i>	p		S	
ζ* <i>Beta vulgaris</i> subsp. <i>vulgaris</i>	p	silverbeet	R	
ζ# <i>Brassica oleracea</i>	p	broccoli	R	
ζ* <i>Cakile edentula</i>		sea rocket	Ab	
ζ* <i>C. maritima</i>		sea rocket	C	
<i>Callitriche muelleri</i>		starwort	Ab	
ζ* <i>C. stagnalis</i>		starwort	O	
ζ* <i>Capsella bursa-pastoris</i>		shepherds purse	R	
* <i>Centaureum erythraea</i>		century	O	
ζ* <i>Cerastium glomeratum</i>		annual mouse-ear chickweed	O	
ζ# <i>C. tomentosum</i>	p	snow in the summer	S	
* <i>Chenopodium album</i>		fat-hen	O	
* <i>C. murale</i>		nettle-leaved fat-hen	Ab	
ζ* <i>C. pumilio</i>		clammy goosefoot	R	
* <i>Coronopus didymus</i>		twin cress	Ab	
ζ* <i>C. squamatus</i>		wart cress	R	
ζ* <i>Crassula multicava</i>		fairy crassula	C	AK 232815
ζ <i>C. sieberiana</i> (incl. <i>C. tetramera</i>)			R	
ζ# <i>Cynoglossum amabile</i>	p	Chinese forget-me-not	R	
<i>Dichondra repens</i> agg.		Mercury Bay	Ab	
<i>Disphyma australe</i> subsp. <i>australe</i>		horokaka	O	AK 24489
ζ* <i>Duchesnea indica</i>		Indian strawberry	O	
ζ# <i>Echeveria ×imbricata</i>	p		S	
ζ <i>Epilobium nummularifolium</i>			R	
ζ <i>E. pubens</i>			R	
ζ* <i>Erodium cicutarium</i>		storksbill	O	
ζ* <i>E. moschatum</i>		musky storksbill	O	
ζ* <i>Euphorbia depauperata</i> var. <i>pubescens</i>	p		O	AK 219669
* <i>E. peplus</i>		milkweed	Ab	
* <i>Galium aparine</i>		cleavers	C	
ζ* <i>G. divaricatum</i>		slender bedstraw	C	
ζ <i>G. propinquum</i>			R	
* <i>Geranium dissectum</i>		cut-leaved cranesbill	O	AK 216624
* <i>G. homeanum</i>			O	
* <i>G. molle</i>		dove's foot cranesbill	O	
ζ <i>G. retrorsum</i>			S	
* <i>G. solanderi</i> "coarse hairs"			Ab	AK 165637
ζ <i>G. solanderi</i> "large petals"			R	AK 230207
ζ# <i>Gomphocarpus fruticosus</i>	p	swan plant	R	
ζ# <i>Greenovia aurea</i>	p		S	
ζ <i>Haloragis erecta</i> subsp. <i>erecta</i>			O	
ζ# <i>Hoteophyllum spectabile</i> 'Brilliant'	p	orpine	S	
ζ# <i>Impatiens sodenii</i>	e	shrub balsam	R	
ζ* <i>I. walleriana</i>	p	busy lizzie	O	AK 214241
ζ* <i>Lepidium desvauxii</i>		bushy peppergrass	O	AK
ζ* <i>Linaria purpurea</i>		purple toadflax	O	
ζ* <i>L. vulgaris</i>	p	toadflax	O	
* <i>Linum trigynum</i>		yellow flax	O	
<i>Lobelia anceps</i>			C	AK 44885
ζ# <i>Lobularia maritima</i>	p	alyssum	R	
ζ* <i>Lycopersicon esculentum</i>		tomato	S	AK 232807
ζ* <i>Lythrum hyssopifolium</i>		hyssop loosestrife	O	
ζ* <i>L. junceum</i>		rose loosestrife	O	
* <i>Lotus angustissimus</i>		slender birdsfoot trefoil	C	
* <i>L. pedunculatus</i>		lotus	Ab	
* <i>L. suaveolens</i>		hairy birdsfoot trefoil	Ab	
ζ* <i>L. tenuis</i>			R	
* <i>Malva nicaeensis</i>		French mallow	Ab	
* <i>Medicago arabica</i>		spotted bur medick	Ab	

* <i>M. lupulina</i>		black medick	R	
* <i>M. nigra</i>		bur medick	C	
* <i>Melilotus indica</i>		King Island melilot	Ab	
* <i>Mentha pulegium</i>		pennyroyal	Ab	
ζ# <i>Mentha spicata</i> subsp. <i>spicata</i>		spearmint	O	
* <i>Modiola caroliniana</i>		creeping mallow	Ab	
ζ* <i>Myosotis discolor</i>		grassland forget-me-not	R	
ζ# <i>M. sylvatica</i>		garden forget-me-not	R	
* <i>Orobanche minor</i>		broomrape	O	
ζ* <i>Oxalis corniculata</i>		horned oxalis	O	
ζ <i>O. exilis</i>		creeping oxalis	Ab	
* <i>O. pes-caprae</i>		Bermuda buttercup	O	
ζ <i>O. rubens</i>			O	
ζ# <i>Pelargonium crispum</i>	p	lemon-scented pelargonium	S	
ζ <i>P. inodorum</i>		kopata	R	
ζ# <i>P. peltatum</i>	p	ivy-leaved pelargonium	O	
ζ# <i>Pelargonium tomentosum</i>	p	peppermint-scented pelargonium	S	
ζ# <i>P. × domesticum</i>	p	regal pelargonium	O	
ζ* <i>P. × hortorum</i>	p	zonal pelargonium	O	
<i>Peperomia urvilleana</i>		peperomia	R	
ζ# <i>Petroselinum crispum</i>	p	parsley	R	
* <i>Physalis peruviana</i>		cape gooseberry	O	
* <i>Plantago lanceolata</i>		narrow-leaved plantain	Ab	
* <i>P. major</i>		broad-leaved plantain	O	
* <i>Polycarpon tetraphyllum</i>		allseed	Ab	
ζ* <i>Polygonum aviculare</i>		wireweed	Ab	
* <i>Portulaca oleracea</i>		purslane	Ab	
* <i>Prunella vulgaris</i>		selfheal	C	
ζ* <i>Ranunculus parviflorus</i>		small-flowered buttercup	O	
ζ* <i>R. repens</i>		creeping buttercup	Ab	
* <i>R. sardous</i>		hairy buttercup	C	
ζ* <i>R. sceleratus</i>		celery-leaved buttercup	S	
* <i>Rorippa nasturtium-aquaticum</i>		watercress	Ab	
ζ* <i>Rumex acetosella</i>		sheep's sorrel	Ab	
* <i>R. brownii</i>		hooked dock	R	
* <i>R. conglomeratus</i>		clustered dock	Ab	
* <i>R. crispus</i>		curled dock	O	
* <i>R. obtusifolius</i>		broad-leaved dock	O	
* <i>R. pulcher</i>		fiddle dock	C	
* <i>Salsola kali</i>		saltwort	Ab	
<i>Samolus repens</i> var. <i>repens</i>		marsh primrose	C	
<i>Sarcocornia quinqueflora</i> subsp. <i>quinqueflora</i>		salicornia	C	
* <i>Sherardia arvensis</i>		field madder	O	
* <i>Silene gallica</i>		catchfly	C	
* <i>Sisymbrium orientale</i>		hedge mustard	O	
<i>Solanum americanum</i>			O	
* <i>S. nigrum</i>		black nightshade	C	
* <i>S. pseudocapsicum</i>		Jerusalem cherry	O	
ζ <i>Spergularia media</i>		sand spurrey	R	AK 230205
ζ* <i>S. rubra</i>			Ab	
* <i>Stellaria media</i>		chickweed	C	
ζ <i>S. parviflora</i>			R	
ζ* <i>Torilis arvensis</i>		spreading hedge-parsley	Ab	
* <i>Trifolium dubium</i>		suckling clover	C	
* <i>T. fragiferum</i>		strawberry clover	O	AK 219460
* <i>T. repens</i>		white clover	Ab	
* <i>T. subterraneum</i>		subterranean clover	O	
ζ* <i>Tropeolum majus</i>		nasturtium	R	
ζ* <i>Urtica urens</i>		nettle	C	
ζ* <i>Verbascum creticum</i>		Cretan mullein	R	
ζ* <i>V. thapsus</i>		woolly mullein	S	
* <i>Veronica arvensis</i>		field speedwell	C	
ζ* <i>V. persica</i>		scrambling speedwell	R	
* <i>V. seryphyllifolia</i>		turf speedwell	R	
* <i>Vicia tetrasperma</i>		smooth tare	O	
* <i>V. sativa</i>		vetch	O	

ζ* <i>Verbena officinalis</i>	vervain	R	
ζ <i>W. littoricola</i> subsp. <i>vernicaosa</i>	harebell	R	AK 232806
ζ <i>Wahlenbergia violacea</i>	harebell	S	

Total Taxa: 492 spp. and hybrids

Clarks Beach and Waiau Pa Indigenous Vascular Plants – 1 November 1999

Steve Benham

Clarks Beach lies on the southern shores of the Manukau Harbour surrounded by water on the north, south and west. I have included for the purpose of these notes the coastal margins from Camp Morley on the north facing shore, east of the Clarks Beach township to the Waiau Pa Wharf settlement on the south side. The southern side is influenced by the Taihiki River estuary. The area of coastline surveyed is approximately 5 km in length and 0.5 km at the widest point.

Several taxa are very sparsely represented and indicate a biota in rapid decline. This decline is evidence of an extremely modified habitat brought about by a land area with a long history of Maori and European settlement. There appears to be no vestige of native vegetation surviving inland from the coast. This area is either being farmed, used for leisure activities or has been urbanised. Fortunately the western tip of the peninsular is occupied by a golf course and motor camp, alleviating somewhat the human pressures brought about by the otherwise high density housing.

Within this relatively small area there are several habitats varying from pohutukawa fringed cliffs, dune trapped seepages, tidal mangrove 'forests', saltmarsh communities, esplanade reserves and exotic pine plantations.

Observations for this survey start at Camp Morley, which is a relatively rural area bordered by farmland. A windbreak of radiata pine (*Pinus radiata*) slopes gently down before reaching a damp seepage enclave with rafts of oioi - *Apodasmia similis*. As well, *Baumea articulata*, together with *Plagianthus divaricatus*, *Muehlenbeckia complexa*, *Typha orientalis*, *Cyperus ustulatus*, several ti kouka - *Cordyline australis*, with perhaps the most significant being the two sole remaining manuka (*Leptospermum scoparium*) plants in Clarks Beach/Waiau Pa. Within the high water zone an area of the noxious halophytic *Spartina alternifolia* has established. In the publication 'Memoirs of Clarks Beach' 1925-1992 by Phil Fausett, it is mentioned that in 1925 there were paddocks of 'tea tree' between the present Stevenson and Torkar

Roads. Within the dryness of the pine plantation there was one colony of *Doodia australis*, several regenerating *Coprosma robusta*, *Corynocarpus laevigatus* and *Myrsine australis* together with larger specimens of *Leucopogon fasciculatus*, *Macropiper excelsum*, *Pittosporum crassifolium* and a single specimen of *Asplenium flaccidum* within the crotch of a triple leader pine. Moving out from this plantation and walking west, we see the first subdivisions that occur on Crispe Road, with a deep watercourse between two properties where naturally occurring *Cyathea dealbata*, *Dicksonia squarrosa* and *Meliclytus ramiflorus* remain. These subdivisions continue along Torkar Road almost down to the Clarks Beach boat ramp at the tip of the peninsular. The varied landforms in this stretch allow properties to garden to the high water mark or where there are cliffs to the edge, with environmental weeds spreading down the cliff faces, and nearer to the boat ramp there is an area of esplanade reserve. Low 'white' cliffs of rhyolitic sediment, consisting of rhyolitic ash and alluvium brought down by the Waikato River appear at the beginning of Torkar Road. In several areas these 10-12m. high cliffs are suffering from severe erosion exposing carbonised timber engulfed by the sediments. The cliff tops are fringed with pohutukawas - *Metrosideros excelsa*.

A single specimen of *Lobelia anceps* was found to be clinging tenaciously to a wet seepage on the cliff with *Coprosma repens* enjoying the dryness under the pohutukawa canopy. Thickets of the fabaceous adventive *Paraserianthes lophantha* are to be found on these cliffs.

Near to Halls Walkway the land falls back to sea level and the most abundant taxa are *Metrosideros excelsa* and *Pittosporum crassifolium* together with an area of harakeke - *Phormium tenax* which is competing with the noxious *Ipomoea indica* vine. Past Wilsons Walkway there are some large karaka - *Corynocarpus laevigatus* surviving with *Muehlenbeckia complexa* on low cliffs behind some of the original baches and newer properties and amongst the pohutukawas. The cliffs continue, but nearer the sea, where *Astelia banksii*, *Microsorium*