

Botany of some of the islands in the eastern Bay of Islands, Northern New Zealand: an update

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In February 1973, Alan Esler (then botanist with the Botany Division, DSIR) visited the islands of Urupukapuka, Moturua and Okahu in the eastern Bay of Islands, and in January 1980 members of the Offshore Islands Research Group visited Urupukapuka, Okahu, Motuarohia, Waewaetorea and Motukiekie Islands. An account of these visits was published by Beever et al. (1984). In recent times Barbara Parris, with some input from the local community, has added records for Urupukapuka and Moturua to the species list published in *Tane*. For two weeks in March 2009 I joined a team of Department of Conservation (DoC) workers, consisting of Cinzia Vestena, Fiona Cameron and Andrew Townsend, and we set up several vegetation monitoring plots prior to the planned eradication of rats from the islands. This account gives an update on the state of the vegetation of Urupukapuka, Moturua and Okahu Islands, adds newly-found species to the list, and comments on some of the records. Brief visits were also paid to the small islands of Poroporo and Motungarara, and these are also commented on.

The Islands

Urupukapuka Island (208 ha)

Urupukapuka is the largest of the islands. It is a Recreational Reserve, and with a daily ferry service, is much visited. A 1959 aerial photograph was published by Beever et al. (1985), and this shows that the island, apart from a fringe of pohutukawa (*Metrosideros excelsa*), was then largely in pasture. In the intervening 50 years, c. half the area of the island has naturally regenerated – mostly with a cover of tall kanuka (*Kunzea ericoides*), but with a more diverse vegetation spreading upwards from the coast and the wetter gullies. Young pohutukawa are common wherever a light gap has allowed them to establish. It is intended that some of the island will remain in pasture, both for the convenience of visitors and for protection of archaeological sites.

DoC is coming under pressure from the local community and from tourism operators, to “hurry up” the natural regeneration by planting on the island, to make it more quickly available as a place to liberate native fauna. When one sees what has happened in 50 years without any interference, and presuming that the regeneration will speed up in the next 50 years, it would be a very great pity if that happens. One of our monitoring sites at Indico (sometimes called Entico) Bay, was under a large pohutukawa

tree, with a sub-canopy of tall *Coprosma macrocarpa*, a ground cover of five species of *Carex* and flax (*Phormium tenax*), and a few metres away, a good population of *Ranunculus urvilleanus* – a situation that could never be emulated by planting, especially in view of the thick covering of kikuyu grass (*Pennisetum clandestinum*) growing on the grassed areas.

As planting on neighbouring Waewaetorea Island is showing, there is a danger that canopy species will be included in the revegetation, thus influencing the resulting forest type. Included on Waewaetorea are species not native to the eastern Bay of Islands, not native to Waewaetorea, or if native to the island then probably not sourced from the island (Barbara Parris pers. comm.). If the go-ahead is given for planting on Urupukapuka, then DoC must keep very close control to make sure that best practice restoration takes place.

Moturua Island (150 ha)

In the 1959 photograph, Moturua Island Scenic Reserve was also largely in pasture, though with some gullies and coastal slopes under natural vegetation. This has given the island a head start in the regeneration stakes, and it now has a complete covering, apart from grassy areas around the sheltered bays. Again the main cover is of kanuka, with much less manuka (*Leptospermum scoparium*), and abundant cutty grass (*Gahnia lacera*) as ground cover. However, coastal forest is established along stream edges and in gullies, and seedlings, saplings and trees of kohekohe (*Dysoxylum spectabile*) and karaka (*Corynocarpus laevigatus*) are a hopeful sign for the future. Near the track from Otupoho Bay to Waipao Bay is an interesting area where the understorey over quite a large area is composed of plentiful Kirk's daisy (*Brachyglottis kirkii* var. *angustior*). We came across slopes covered extensively with the lycophytes, *Lycopodium deuterodensum* and *L. volubile*. A couple of shrubs of *Dracophyllum lessonianum* grew there; the newly described *Dianella latissima* was present in numbers, and also one seedling of tanekaha (*Phyllocladus trichomanoides*). Gymnosperms are rare on these islands, so this latter, and also a small rimu (*Dacrydium cupressinum*), were welcome sights. However, the many saplings of kauri (*Agathis australis*) that have been planted near this track should be removed. Wattles and pines are well established, with black wattle (*Acacia mearnsii*), brush

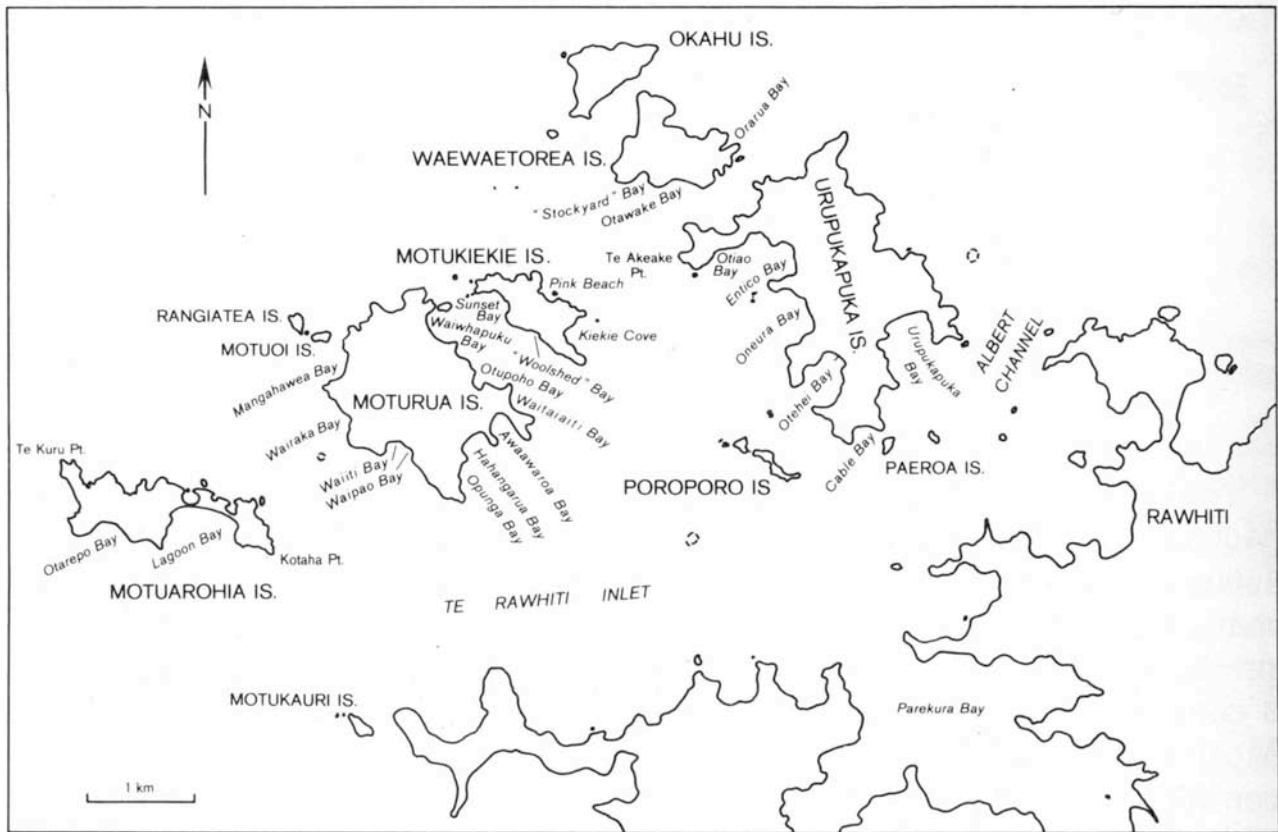


Fig. 1. Map of eastern Bay of Islands, copied with permission from Beaver et al. (1984).

wattle (*Paraserianthes lapantha*), maritime pine (*Pinus pinaster*) and radiata pine (*P. radiata*) present.

Okahu Island (21 ha)

A Recreation Reserve, this small island is bordered by high cliffs, with a central gully that leads down to a beach on the south-eastern side. The gully is thickly clothed in kikuyu grass, apart from a flax/raupo (*Typha orientalis*) swamp in the lower reaches. The rest of the island has a cover of pohutukawa around the cliff edges, blending into a mixture of shrub and small tree species. One seedling of tanekaha was also seen on this island. The natural vegetation is gradually spreading into the kikuyu - most aggressively flax, but kanuka and pohutukawa are also making inroads. Apart from scattered pampas (*Cortaderia selloana*), and of course kikuyu, there are few aggressive weeds - for instance there is no wattle. An unexpected find was a fresh-water pool in the rocks above the cliffs, where bachelor's buttons (*Cotula coronopifolia*) and *Limosella lineata* are well established.

Poroporo Island (8 ha)

To the south-west of Urupukapuka is Poroporo Island Scenic Reserve. Poroporo is a small, narrow, cliff-bound island, with an old bach-site (some concrete steps are the only physical remains of this), on the southern end. Largely due to garden escapes from the bach, and to the presence of sweet pea shrub (*Polygala myrtifolia*) which is well established on the

cliffs of all the islands, this is a very weedy island. However, despite the weeds, the presence of trees of totara (*Podocarpus totara*) and tanekaha are hopeful signs for seed dispersal, and although we didn't see any kowhai, there are records of *Sophora chathamica* growing there.

Motungarara Island (1.3 ha)

This tiny island to the south-west of Okahu could be described as a double rock stack joined by a rock platform. Although only 32 plants were recorded, with the exception of four minor weeds the flora is entirely native, and is composed of those plants that are adapted to exposed coastal conditions. Particularly attractive are the swathes of coastal tussock (*Chionochloa bromoides*) cascading down the rocky cliffs.

Threatened plants

The following plants are listed on the 2008 revision of the Threatened and uncommon plants of New Zealand list (de Lange et al. 2009)

Threatened - nationally critical

Daucus glochidiatus, the native carrot, was found on Urupukapuka in 1980 but was not seen by us. We did not visit the area where it was found, but as it is a "weedy" species that usually grows where there has been disturbance, there is a possibility that it is no longer present.

At risk – relict

Colensoa physaloides. In 1980 the only population (as *Pratia physaloides*) known from these islands was that recorded on Motukiekie Island in 1959 by A Goodwin (Beever et al. 1984). It was therefore exciting to find a single plant on Urupukapuka. Considering the number of times the vegetation on the island has been burnt, it seems most likely that the seed from this soft herb was taken there by birds. Later, on Moturua Island, it was found at two sites - at one of them flowering and fruiting nicely.

Lagenifera lanata, a little hairy-leaved daisy, grows quite commonly along the track edges on Moturua, and less commonly under kanuka on Urupukapuka.

At risk – naturally uncommon

Calystegia marginata, a dainty convolvulus, grows here and there along the track edges on Moturua.

Fuchsia procumbens was found growing on Urupukapuka in 1999.

Senecio repangae, the voucher specimens for the earlier records of *Senecio scaberula* and *S. lautus* have both been renamed as *S. repangae*.

Tetragonia tetragonoides, New Zealand spinach, is present on Urupukapuka, Okahu and Poroporo Islands, growing just above the strand line where the seeds have washed up.

Discussion

There have been many name changes and new species added to the flora since 1984, and this has caused some confusion with the species list. Where specimens were lodged in the Auckland Museum Herbarium (AK) it is a relatively simple matter to check the correct identity, but without a voucher specimen a certain amount of guesswork is required. No specimen was collected of *Ranunculus sardous* that was listed as growing at Indico Bay, Urupukapuka, but I suspect that this was in error for *R. urvilleanus*, which is well established there and was not recorded in 1980. *Lagenifera stipitata* was said to be on Urupukapuka but the vouchered specimen was actually *Bellis perennis*. The situation with *Senecio repangae* has been mentioned, and this leaves some doubt as to whether *S. lautus* is actually present on any of the islands. With the finding of the newly-named *Dianella latissima* on Moturua, there is a need

for this genus to be checked on all the islands. *Hebe stricta* recorded from Poroporo turned out to be *H. ligustrifolia*. We have added the tag "Whangarei" (*H. ligustrifolia* "Whangarei"), as this form was previously known as "Whangarei", and seems to be a distinct entity within *H. ligustrifolia sensu lato*. It is common on Urupukapuka, Moturua, Poroporo and Okahu. This raises the question of whether there is actually any *H. stricta* on the islands, but it has been seen on Urupukapuka at Indico Bay at the mouth of the southern stream, and on the ridge behind the cottages at Otehei Bay (Barbara Parris pers. comm.). A hybrid coprosma with bi-coloured leaves has been found on Urupukapuka, Poroporo and Moturua Islands. The consensus of opinion seems to be that it is *Coprosma repens* × *C. rhamnoides*. In 1980 two plants of *Brachyglottis kirkii* var. *kirkii* were seen at Akeake Point, Urupukapuka, but *B. kirkii* var. *angustior* is the variety found in abundance on Moturua. The identification of sea rocket, *Cakile maritima*, was in error for *C. edentula*. As this was the species we saw on Moturua, Okahu and Urupukapuka, I have removed the former. *Psilotum nudum*, found growing on the east cliffs of Urupukapuka is an interesting new record for the eastern Bay of Islands. Kumarahou (*Pomaderris kumeraho*) is considered to be naturalised on Urupukapuka, as the suspicion is that the plants are seedlings from those planted on Motukiekie in the 1950s and 60s (Albany provenance).

The species list contains all those species that have been recorded as growing on these five islands in the 1984 account, along with the additional species seen in the last two years. With the many changes that have taken place in the vegetation since the 1970s and 80s it is inevitable that, along with new species appearing, there will be plants that will have disappeared. Chief among these will be the pasture grasses and herbs that will have been engulfed by the rampant kikuyu grass. Beever et al. (1984) makes it clear that kikuyu was not nearly as widespread in the past as it is today. Weed work is an ongoing project with DoC workers and volunteers, and this effort has led to some species being kept under control or destroyed, so some of the weeds listed on the species list may have been eliminated. Hence the list does not necessarily accurately record the state of the flora as it is today.

Table 1. Statistics of the vascular floras of 5 islands of the eastern Bay of Islands by island. (U = Urupukapuka, M = Moturua, O = Okahu, P = Poroporo, Mn = Motungarara). Some species that are being actively cultivated have been listed (pl). 1984 figures are given in parentheses.

Group	U	M	O	P	Mn	Overall Total
Native lycophytes & ferns	29 (20)	30 (21)	18 (17)	10	4	37
Adventive lycophytes & ferns	2					2
Native gymnosperms	1 (0)	3+1pl (1)	1 (0)	2	0	3+1pl
Adventive gymnosperms	3 (1)	3 (0)	1 (0)	0	0	4+2pl
Native dicotyledons	98+8pl (83)	66 (38)	45 (35)	31	19	118+5pl
Adventive dicotyledons	104+24pl (88)	56 (42)	61 (53)	24	3	125+26
Native monocotyledons	59+1 (56)	48 (38)	35 (34)	15	5	71+1
Adventive monocotyledons	54+15 (45)	33 (29)	32 (29)	12	1	63+15
Total natives	196 (159)	148 (98)	99 (86)	58	28	236
Total adventives	202 (134)	92 (71)	94 (82)	36	4	237
Grand total	398 (293)	240 (169)	193 (168)	94	32	473

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References

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Appendix 1. Vascular plant flora of 5 islands in the eastern Bay of Islands

* = naturalised species

pl = planted

? = identity unable to be ascertained with certainty

AK = Auckland Museum herbarium voucher numbers

AH = collected by A. Hinkle et al., 2005 (AK 293872)

B = from Beever et al. 1984

F = collections by Lisa Forester, 2003 (AK 291196-99)

KR = Katie Reynolds in litt. to Ross Beever (1985)

P = sight records, 2007-2009, by Barbara Parris

TH = collected by Terry Hatch, 1999 (AK 300836)

Y = sight records, March 2009, by ME Young et al.

U = Urupukapuka, **M** = Moturua, **O** = Okahu, **P** = Poroporo, **Mn** = Motungarara

	U	M	O	P	Mn	Voucher No.
Lycophytes						
<i>Huperzia varia</i>	Y	B				AK 151349
<i>Lycopodiella cernua</i>	PY					
<i>Lycopodium deuterodensum</i>		Y				
<i>Lycopodium volubile</i>		Y				
<i>Selaginella kraussiana</i> *	P					
Ferns						
<i>Adiantum aethiopicum</i>	Y					AK 304749
<i>Adiantum cunninghamii</i>	BPY	B	B	Y		
<i>Adiantum hispidulum</i>	BPY	B	BY	Y		
<i>Asplenium flaccidum</i>	BPY	B				AK 214977
<i>Asplenium haurakiense</i>	BY		B		Y	
<i>Asplenium oblongifolium</i>	BPY	B	B	BY	Y	AK 214863
<i>Asplenium polyodon</i>	B	B				
<i>Blechnum filiforme</i>		Y		Y		
<i>Blechnum membranaceum</i>		B				AK 219909
<i>Blechnum novae-zelandiae</i>	BPY	BY	B	Y		
<i>Cheilanthes distans</i>		B	Y			
<i>Cyathea dealbata</i>	BPY	BY	BY	Y		
<i>Cyathea medullaris</i>	BPY	BY	BY	Y		
<i>Deparia petersenii</i>	BPY	B				AK 151324, 214925
<i>Dicksonia squarrosa</i>	BPY	Y	BY			
<i>Diplazium australe</i>	PY	Y				
<i>Doodia australis</i>	BPY	BY	BY	Y		AK 151354, 223046
<i>Histiopteris incisa</i>	PY	B				
<i>Hypolepis ambigua</i>	PY	B				
<i>Lindsaea linearis</i>	Y	Y				
<i>Lygodium articulatum</i>		Y				
<i>Microsorium pustulatum</i>	BPY	B	BY		Y	

<i>Nephrolepis cordifolia</i> *	pIPY					
<i>Paesia scaberula</i>	BPY	B	B			
<i>Pneumatopteris pennigera</i>	BP	B	B			AK 156888
<i>Polystichum neozelandicum</i>	?Y		?BY			
<i>Polystichum wawranum</i>	B		?B			AK 223141, 151117
<i>Psilotum nudum</i>	Y					
<i>Pteridium esculentum</i>	BPY	B	BY	Y		
<i>Pteris comans</i>		Y	B			
<i>Pteris macilenta</i>	B					
<i>Pteris tremula</i>	BPY	B	BY			
<i>Pyrrosia eleagnifolia</i>	BPY	B	BY	Y	Y	
<i>Tmesipteris lanceolata</i>		Y				

Gymnosperms

<i>Agathis australis</i>		pLY				
<i>Araucaria heterophylla</i> *	pIPY	Y				
<i>Cupressus</i> sp. *	pIP					
<i>Dacrydium cupressinum</i>		Y				
<i>Phyllocladus trichomanoides</i>		Y	Y	Y		
<i>Pinus pinaster</i> *	B	BY				
<i>Pinus radiata</i> *		Y	Y			
<i>Podocarpus totara</i>	PY	B		Y		

Dicotyledons

<i>Acacia longifolia</i> *	Y					
<i>Acacia mearnsii</i> *	B					
<i>Acaena novae-zelandiae</i>	B					
<i>Acca sellowiana</i> *	pIP					
<i>Achillea millefolium</i> *	B					
<i>Ageratina adenophora</i> *	BY	B				
<i>Ageratina riparia</i> *	BPY	B	Y			
<i>Ajuga reptans</i> *	pIP					
<i>Allamanda cathartica</i> *	pIP					
<i>Alternanthera sessilis</i>	BPY					AK 151336
<i>Anagallis arvensis</i> *	BPY	B	B	Y	Y	AK 151133
<i>Apium prostratum</i>	BP		BY			AK 151139
<i>Apium</i> "white denticles"	B					AK 151306
<i>Araujia sericifera</i> *	Y	Y				
<i>Aster subulatus</i> *	B	Y	B			
<i>Atriplex prostrata</i> *	BPY	B	BY	Y		AK 156958
<i>Avicennia marina</i>	BPY					
<i>Banksia integrifolia</i> *				Y		
<i>Bellis perennis</i> *	BPY					AK151322
<i>Bidens frondosa</i> *	B					
<i>Blackstonia perfoliata</i> *	BP		B	BY		AK 156963, 151144
<i>Bougainvillea</i> sp. *	pIP					
<i>Brachyglottiskirkii</i> var. <i>angustior</i>		FY				AK 291196
<i>Brachyglottis kirkii</i> var. <i>kirkii</i>	B					AK156991
<i>Brachyglottis repanda</i>	BY	Y				
<i>Cakile edentula</i> *	B	Y	BY			AK 156511
<i>Callitriche muelleri</i>	BPY	Y				AK 151308
<i>Callitriche stagnalis</i> *	B					
<i>Calystegia marginata</i>		BY				
<i>Calystegia sepium</i> *	BPY	B				
<i>Calystegia soldanella</i>	B	B	BY			
<i>Camellia sasanqua</i> *				Y		
<i>Campsis</i> × <i>tagliabuana</i> *	pIP					
<i>Cardamine debilis</i>	B					
<i>Carduus pycnocephalus</i> *	B					
<i>Carmichaelia australis</i>	B					
<i>Centaurium erythraea</i> *	BPY	B	B	Y		AK 156962
<i>Centella uniflora</i>	BPY	B	BY			
<i>Cerastium glomeratum</i> *	P					
<i>Chenopodium ambrosioides</i> *	B	B	B			
<i>Ciclospermum leptophyllum</i> *		B				
<i>Cirsium arvense</i> *		B				
<i>Cirsium vulgare</i> *	BPY	Y	B			AK 156966
<i>Clematis cunninghamii</i>	BPY	Y				
<i>Clematis paniculata</i>	PY	Y				
<i>Colensoa physaloides</i>	Y	Y				AK 304747
<i>Conyza sumatrensis</i> *	BPY	B	BY	Y	Y	
<i>Conyza parva</i> *	BY					
<i>Coprosma arborea</i>	BY	BY				AK 156986
<i>Coprosma areolata</i>	B					
<i>Coprosma grandifolia</i>	Y					
<i>Coprosma macrocarpa</i>	BPY	BY	B	BY		AK 156663, 151412

<i>Coprosma propinqua</i> × <i>C. robusta</i>	PY					
<i>Coprosma repens</i>	BPY	B	BY		Y	AK 151127
<i>Coprosma repens</i> × <i>C. rhamnoides</i>	PY	Y		B		AK 151345
<i>Coprosma rhamnoides</i>	BPY	BY	Y	Y		
<i>Coprosma rigida</i>	P					
<i>Coprosma robusta</i>	BPY	Y				
<i>Coriaria arborea</i>	BP	B		Y		AK 156960
<i>Corokia cotoneaster</i>	plP					
<i>Coronopus didymus</i> *	B					
<i>Corynocarpus laevigatus</i>	BP	Y	B			
<i>Cotula coronopifolia</i>	PY		Y			
<i>Crassula multicava</i> *	plPY			Y		
<i>Crassula sieberiana</i>					Y	
<i>Crepis capillaris</i> *	BP	B	B			
<i>Daucus glochidiatus</i>	B					AK 156993, 151409
<i>Dichondra repens</i>	BPY	BY	BY		Y	
<i>Disphyma australe</i>	BPY		BY		Y	
<i>Dittrichia graveolens</i> *	B					
<i>Dodonaea viscosa</i>	plPB					AK 151136
<i>Dracophyllum lessonianum</i>	Y					
<i>Dysoxylum spectabile</i>	PY					
<i>Einadia trigonos</i>				B		AK 151418
<i>Entelea arborescens</i>	B	BY				
<i>Epilobium ciliatum</i> *	B					AK 151333
<i>Epilobium nummulariifolium</i>	B					AK 151284
<i>Epilobium pallidiflorum</i>	B					
<i>Erechtites valerianifolia</i> *	BPY	B	Y			
<i>Erica lusitanica</i> *	B	Y				
<i>Erigeron karvinskianus</i> *	PY					
<i>Eriobotrya japonica</i> *			B			
<i>Erythrina crista-gallii</i> *	plP					
<i>Erythrina</i> × <i>sykesii</i> *	plP					
<i>Euchiton audax</i>	B					
<i>Euchiton collinus</i>	B	B	B			
<i>Euchiton sphaericus</i>			B			
<i>Euphorbia peplus</i> *	BP		BY	B		AK 151347, 151347
<i>Ficus benjamina</i> *	plP					
<i>Ficus carica</i> *	P		BY			
<i>Foeniculum vulgare</i> *	B	Y				AK 157059
<i>Fuchsia procumbens</i>	TH					AK 300836
<i>Fumaria muralis</i> *				B		AK 151285
<i>Galeobdolon luteum</i> *	plP					
<i>Galium aparine</i> *	B					
<i>Galium divaricatum</i> *	BP		B			
<i>Galium palustre</i> *		B				
<i>Gamochaeta calviceps</i> *	B					AK 217315
<i>Gamochaeta coarctata</i> *	B		B			
<i>Gamochaeta simplicicaulis</i> *	BP	B	B			
<i>Geniostoma ligustrifolium</i>	B	BY	BY	Y		
<i>Geranium gardneri</i> *	B	B	BY			
<i>Geranium homeanum</i>	B	B	Y			
<i>Geranium molle</i> *	P				BY	
<i>Gomphocarpus fruticosus</i> *			Y			
<i>Gonocarpus incana</i>	BY	Y				
<i>Hakea salicina</i> *		Y				
<i>Hakea sericea</i> *	B	Y	B	Y		
<i>Haloragis erecta</i>	BPY	Y	BY			
<i>Hebe ligustrifolia</i> "Whangarei"	PY	FY	Y	BY		AK 151413, 291197
<i>Hebe stricta</i>	BP	B	BY			
<i>Hedera helix</i> *	plP			Y		
<i>Hedycarya arborea</i>		Y				
<i>Hibiscus rosa-sinensis</i> *	plP					
<i>Hibiscus syriacus</i> *	plP					
<i>Hydrangea macrophylla</i> *	plP					
<i>Hydrocotyle moschata</i>	BP					AK 151309
<i>Hymenosporum flavum</i> *	plP					
<i>Hypericum pusillum</i>	BPY	Y				AK 151305
<i>Hypochaeris radicata</i> *	BPY	B	BY			
<i>Ipomea cairica</i>	B					AK 151163
<i>Jasminum polyanthum</i> *	plP			Y		
<i>Kickxia elatine</i> *	B					AK 151339, 290240
<i>Kunzea ericoides</i>	BPY	BY	BY	Y	Y	AK215749, 219379
<i>Lactuca saligna</i> *	B		B			
<i>Lagenifera lanata</i>	Y	Y				AK 304746
<i>Lagenifera pumila</i>	B			B		AK 151110, 151138
<i>Leonotis leonurus</i> *	plP					
<i>Leontodon taraxacoides</i> *	BY	B		Y		

<i>Lepidium pseudotasmanicum*</i>	Y					AK 304750
<i>Leptecophylla juniperina</i>	BY			Y		AK 156988
<i>Leptospermum scoparium</i>	BPY	BY	B	Y		
<i>Leucopogon fasciculatus</i>	BPY	BY	BY	Y	Y	
<i>Leucopogon fraseri</i>	BPY		Y			
<i>Lilaeopsis novae-zelandiae</i>	BP					AK 151165
<i>Limosella lineata</i>			Y			
<i>Linum bienne*</i>				B		AK 151421
<i>Linum trigynum*</i>	BY	B	BY			AK 157138
<i>Lobelia anceps</i>	BPY	B	BY		Y	AK 151143
<i>Lotus angustissimus*</i>	BY	B	B			AK156812, 219558
<i>Lotus pedunculatus*</i>	BP		B			
<i>Lotus suaveolens*</i>	BPY	B	B			AK 157061
<i>Ludwigia palustris*</i>	PY					
<i>Macropiper excelsum</i>	BPY	B	BY			AK 156995
<i>Medicago arabica*</i>	B		B			
<i>Medicago lupulina*</i>	B	B	B	B		AK 151423, 157060
<i>Medicago nigra*</i>	B	B	B			AK 157064
<i>Melicytus ramiflorus</i>	BPY	BY			Y	
<i>Melilotus indicus*</i>	B	B	BY			AK 156813
<i>Mentha pulegium*</i>	B					AK151112, 156961
<i>Mentha suaveolens*</i>	B					
<i>Meryta sinclairii</i>	plP					
<i>Metrosideros carminea</i>	B		KR			AK 151135
<i>Metrosideros excelsa</i>	BPY	BY	BY	Y	Y	AK 158554
<i>Metrosideros perforata</i>	Y					
<i>Modiola caroliniana*</i>	B	B	BY			
<i>Muehlenbeckia australis</i>	BP					
<i>Muehlenbeckia complexa</i>	BPY	B	B	Y	Y	AK 156965
<i>Myoporum laetum</i>	B					
<i>Myrsine australis</i>	BPY	Y		Y		
<i>Nerium oleander*</i>	plP			Y		
<i>Nertera dichondrifolia</i>	Y	Y				
<i>Oenanthe pimpinelloides*</i>			B			
<i>Olearia furfuracea</i>	BPY	Y	BY	Y		
<i>Olearia solandri</i>	plP					
<i>Orobanche minor*</i>	B		B			
<i>Osteospermum jucundum*</i>	plP					
<i>Oxalis corniculata*</i>	BP	B	B			AK 44820
<i>Oxalis exilis</i>	P			Y	Y	
<i>Oxalis pescaprae*</i>	P					
<i>Oxalis rubens*</i>		Y				
<i>Paraserianthes lophantha*</i>	BPY	B		Y		
<i>Parentucellia viscosa*</i>	BP		BY			
<i>Parietaria debilis</i>	B					AK 151310
<i>Pelargonium inodorum</i>	B					
<i>Peperomia urvilleana</i>	BPY	B	Y	Y	Y	
<i>Pericallis x hybrida*</i>	plP					
<i>Persea americana*</i>	plP					
<i>Persicaria decipiens</i>	BP		Y			AK 151335
<i>Persicaria hydropiper*</i>	B	B				
<i>Persicaria maculosa*</i>	P					
<i>Physalis peruviana*</i>	BPY	Y	Y	Y		
<i>Phytolacca octandra*</i>	BP	B	BY			
<i>Pimelea prostrata</i>	BPY	B	BY		Y	
<i>Pittosporum crassifolium</i>	BPY		Y	BY		Y
<i>Pittosporum eugenioides</i>	plP					
<i>Pittosporum pimeleoides</i>	KR					
<i>Pittosporum umbellatum</i>	B	Y	BY			AK 151115
<i>Plagianthus divaricatus</i>	BP					
<i>Planchonella costata</i>		KR				
<i>Plantago lanceolata*</i>	BPY	B	B	Y		AK 156959
<i>Plantago major*</i>	BPY					
<i>Polycarpon tetraphyllum*</i>	B		B			
<i>Polygala myrtifolia*</i>	BPY	Y	Y	Y		
<i>Pomaderris amoena</i>	BY		BY	B		AK 151415
<i>Pomaderris kumeraho*</i>	PY					
<i>Primula vulgaris*</i>	plP					
<i>Prunella vulgaris*</i>	BP					
<i>Prunus persica*</i>	plBP					
<i>Pseudognaphalium luteoalbum</i>	B	Y	BY		Y	
<i>Pseudopanax arboreus</i>	plP					
<i>Pseudopanax crassifolius</i>	B					
<i>P. crassifolius x P. lessonii</i>	PY		Y	B		AK 151122, 151123
<i>Pseudopanax lessonii</i>	BPY	Y	BY	BY	Y	AK 151124
<i>Ranunculus acaulis</i>	B	B				AK 162663
<i>Ranunculus amphitrichus</i>	B					AK 151304

<i>Ranunculus reflexus</i>	BY			B		AK 151419, 156990
<i>Ranunculus repens</i> *	BPY					
<i>Ranunculus sardous</i> *	B					
<i>Ranunculus urvilleanus</i>	PY	B				AK 304748
<i>Raphanus raphanistrum</i> *	BPY	B	BY			
<i>Rhabdothamnus solandri</i>	BPY					
<i>Rorippa nasturtium-aquaticum</i> *	B					
<i>Rubus ulmifolius</i> *		B				AK 151149
<i>Rumex acetosella</i> *	B					
<i>Rumex brownii</i> *	B	B				AK 151325
<i>Rumex conglomeratus</i> *	B	B	B			
<i>Rumex crispus</i> *	BP	B	B			
<i>Rumex pulcher</i> *			B			
<i>Rumex sagittatus</i> *		Y				
<i>Salix babylonica</i> *	pIP					
<i>Salsola kali</i> *	B	B	B			
<i>Samolus repens</i>	BY	Y	BY	Y	Y	
<i>Sarcocornia quinqueflora</i>	BPY	B	B	Y	Y	
<i>Schefflera actinophylla</i> *	pIP					
<i>Schefflera digitata</i>		BY				AK 151148
<i>Scleranthus biflorus</i>				B		AK 151417
<i>Selliera radicans</i>	BP	B	B			
<i>Senecio bipinnatisectus</i> *	BPY	Y	BY			
<i>Senecio diaschides</i> *	BP					AK 156528
<i>Senecio glomeratus</i>	BP					
<i>Senecio hispidulus</i>	B	Y		Y		AK 157099
<i>Senecio jacobaea</i> *	BY					
<i>Senecio lautus</i>	BY		BY		Y	
<i>Senecio mikanioides</i> *	PY					
<i>Senecio minimus</i>	BY	B				AK 156989
<i>Senecio quadridentatus</i>				Y		
<i>Senecio repangae</i>	B					AK 157100, 151130
<i>Silene gallica</i> *	B		B			
<i>Silybum marianum</i> *	BP		B			AK 157108
<i>Sison amomum</i> *	PY					
<i>Solanum americanum</i>	B	B	BY	Y		
<i>Solanum linnaeanum</i> *	BPY	B	B			AK 156985
<i>Solanum mauritianum</i> *	PY	B				
<i>Solanum nigrum</i> *	BPY	B	B			
<i>Sonchus asper</i> *	B					
<i>Sonchus oleraceus</i> *	BPY	B	BY	Y		
<i>Sophora chathamica</i>	pIP	B		B		AK 151125
<i>Symphytum ×uplandicum</i> *	B					
<i>Taraxacum officinale</i> *	BPY					
<i>Tetragonia tetragonioides</i>	PY		Y	Y		
<i>Tragopogon porrifolius</i> *			B			
<i>Trifolium dubium</i> *	BP		B			
<i>Trifolium glomeratum</i> *	B		B			AK 157063
<i>Trifolium pratense</i> *	B					
<i>Trifolium repens</i> *	BPY		B		Y	
<i>Trifolium subterraneum</i> *	B		B			AK 151153
<i>Tropaeolum majus</i> *	pIP					
<i>Ulex europaeus</i> *	BPY	BY	BY	Y		
<i>Verbascum blattaria</i> *	B		B			
<i>Verbascum creticum</i> *			Y			
<i>Verbena bonariensis</i> *	BPY	B				AK 151294
<i>Verbena brasiliensis</i> *	B					AK 151293, 252197
<i>Verbena litoralis</i> *	BY			B		AK 151111, 151303
<i>Veronica arvensis</i> *	B					
<i>Veronica plebeia</i>	BPY	B	Y			
<i>Vinca major</i> *	pIP	B				
<i>Vitex lucens</i>	pIP	B				
<i>Vitis vinifera</i> *	pIP			Y		
<i>Wahlenbergia littoricola</i>	Y	B		Y		
<i>Wahlenbergia violacea</i>	BY	Y	B			
<i>Weinmannia silvicola</i>	BPY	Y				AK 262621, 156987

Monocotyledons

<i>Acianthus sinclairii</i>	Y					
<i>Agapanthus praecox</i>	PY			Y		
<i>Agave americana</i> *	pIPY			Y		
<i>Agrostis capillaris</i> *	BPY	B	BY			AK 151129
<i>Agrostis? gigantea</i> *	B					
<i>Agrostis stolonifera</i> *	BP					AK 151334
<i>Aira caryophyllacea</i> *	B	B	B			AK 151132
<i>Aira multiculmis</i> *	B					

<i>Allium vineale*</i>	BP	B	B				AK 156806, 156416
<i>Aloe arborescens*</i>	pIP						
<i>Aloe ciliaris*</i>	pIP						
<i>Alpina zerumbet*</i>				pB			AK 151121
<i>Amaryllis belladonna*</i>	pIP						
<i>Anthoxanthum odoratum*</i>	BPY	B	BY				
<i>Apodasmia similis</i>	BPY						
<i>Arthropodium cirratum</i>	BPY	B	BY	Y			
<i>Arum italicum*</i>	pIP						
<i>Arundo donax*</i>	P	BY		Y			
<i>Astelia banksii</i>	BPY	BY	BY	Y	Y		
<i>Austrostipa stipoides</i>	BY			BY			AK 151164, 151416
<i>Avena barbata*</i>	B	B	B				AK 156793, 216348
<i>Axonopus fissifolius*</i>	B	Y					
<i>Baumea articulata</i>	BPY	B					
<i>Baumea juncea</i>	B		BY				
<i>Baumea rubiginosa</i>	BY	B					
<i>Baumea teretifolia</i>		Y					
<i>Beschornia yuccoides*</i>	pIP						
<i>Bolboschoenus fluviatilis</i>		B					
<i>Bothriochloa macra*</i>	BY	BF	B				AK 156799, 291199
<i>Briza maxima*</i>			B				
<i>Briza minor*</i>	BY		B				AK 156796
<i>Bromus diandrus*</i>	B	B	B				
<i>Bromus mollis*</i>	B		B				
<i>Bromus unioloides*</i>	B	B	B				
<i>Canna cv. 'Wyoming'*</i>	pIP						
<i>Carex breviculmis</i>	BP		BY	Y			
<i>Carex dissita</i>	B						
<i>Carex divisa*</i>	P	B					
<i>Carex divulsa*</i>	BPY		B				AK 151332, 157049
<i>Carex flacca*</i>	Y						
<i>Carex flagellifera</i>	BPY	B	BY	Y			
<i>Carex inversa</i>	BY	B	BY				
<i>Carex lambertiana</i>	BP	B					
<i>Carex longibrachiata*</i>	BPY						AK 249587
<i>Carex ochrosaccus</i>	BY	Y					
<i>Carex pumila</i>	BPY	B	BY				
<i>Carex virgata</i>	BPY	Y	B				AK 151328
<i>Chionochloa bromoides</i>	BPY	B	BY	Y	Y		AK 151134, 151128
<i>Chlorophytum comosum*</i>	pIP			Y			
<i>Collospermum hastatum</i>		B		Y			
<i>Colocasia esculenta*</i>	pIB	B					
<i>Cordyline australis</i>	BPY	B	BY	Y	Y		
<i>Cordyline banksii</i>		B					
<i>Cordyline fruticosa*</i>	pIAH						
<i>Cortaderia selloana*</i>	BPY	B	Y	Y			
<i>Crococsmia x crocosmiiflora*</i>				Y			
<i>Cynodon dactylon*</i>	BP	B	B				
<i>Cynosurus cristatus*</i>	B						AK 151337
<i>Cyperusbrevifolius*</i>	BY		BY				AK 157044, 151331
<i>Cyperus ustulatus</i>	BPY	B	BY				
<i>Dactylis glomerata*</i>	BPY	B	BY				
<i>Desmoschoenus spiralis</i>		B					
<i>Dianella latissima</i>		Y					
<i>Dianella nigra</i>	BPY		BY	Y			
<i>Dichelachne crinita</i>	B	B	B				
<i>Dichelachne micrantha</i>	B						AK 156525
<i>Echinochloa crus-galli*</i>	B						
<i>Echinopogon ovatus</i>	B		B				AK 156992
<i>Eleocharis acuta</i>		BPY	B	BY			
<i>Elymus multiflorus</i>	B		B	B			AK 151420, 151126
<i>Elymus rectisetus*</i>	B		B				AK 151161
<i>Elymus solandri</i>	pIP						
<i>Eragrostis brownii*</i>	B						
<i>Ficinia nodosa</i>	BPY	B	B	Y	Y		
<i>Gahnia lacera</i>	BPY	BY	BY	BY			AK 151131, 265190
<i>Gahnia setifolia</i>	Y						
<i>Gastroidium ventricosum*</i>	B		B				AK 156794, 151141
<i>Hedychium gardnerianum*</i>	PY						
<i>Holcus lanatus*</i>	BY	B	Y				
<i>Hordeum leporinum*</i>	B	B	B				
<i>Isachne globosa</i>	BPY	B					AK 151338
<i>Isolepis cernua</i>	BP	B	BY				
<i>Isolepis inundata</i>	?Y	B					
<i>Isolepis prolifera</i>	B						
<i>Isolepis sepulcralis*</i>	BY						AK 156872

<i>Juncus acuminatus*</i>	Y							
<i>Juncus articulatus*</i>	BP							
<i>Juncus australis</i>	B	B	Y					
<i>Juncus bufonius</i> var. <i>congestus*</i>	B							
<i>Juncus edgariae</i>	BPY	B	B					
<i>Juncus effusus*</i>	BPY	B						
<i>Juncus krausii</i>	B							
<i>Juncus microcephalus*</i>		B						AK 217070
<i>Juncus planifolius</i>	B							
<i>Juncus sarophorus</i>	BPY		Y					
<i>Juncus usitatus</i>	BPY		B					
<i>Kniphofia uvaria*</i>				Y				
<i>Lachnagrostis billardierei</i>	BP	B	BY					AK 151140
<i>Lachnagrostis filliformis</i>	B		B					
<i>Lachnagrostis littoralis</i>	B							AK 151137
<i>Lagurus ovatus*</i>	BP	B	BY					
<i>Lepidosperma australe</i>	Y	Y						
<i>Lepidosperma laterale</i>		Y						
<i>Lolium perenne*</i>	B	B	B					
<i>Microlaena stipoides</i>	BPY	B	BY					
<i>Monstera deliciosa*</i>	pIP							
<i>Morelotia affinis</i>	BY	B		Y				
<i>Oplismenus hirtellus</i>	BPY	B						
<i>Parapholis incurva*</i>	B		B					
<i>Paspalum dilatatum*</i>	BPY	B	BY	Y	Y			AK 157062
<i>Paspalum distichum*</i>	B	B	Y					
<i>Paspalum orbiculare</i>	B	B	B					
<i>Paspalum vaginatum*</i>	BP							AK 216855
<i>Pennisetum clandestinum*</i>	BPY	BY	BY	Y				
<i>Phoenix canariensis*</i>	pIP							
<i>Phoenix rupicola*</i>		?PY						
<i>Phormium tenax</i>	BPY	B	BY	Y	Y			
<i>Phyllostachys aurea*</i>	pIP							
<i>Phyllostachys nigra*</i>	pIP							
<i>Poa anceps</i>	BY	B	B					AK 151142
<i>Poa annua*</i>	B							
<i>Poa trivialis*</i>	B	B						
<i>Polygomon monspeliensis*</i>	B		B					
<i>Potamogeton cheesemanii</i>	PY							
<i>Ripogonum scandens</i>		Y						
<i>Rytidosperma biannulare</i>	B							
<i>Rytidosperma penicillatum*</i>	B	B	B					
<i>Rytidosperma racemosum*</i>	B	B	B					AK 156656
<i>Rytidosperma unarede</i>	B		B					AK 151289
<i>Schedonorus arundinaceus*</i>		Y						
<i>Schoenoplectus tabernaemontani</i>	BPY	B	B					AK 151384, 151329
<i>Schoenus apogon</i>	BY	Y						
<i>Schoenus maschalinus</i>	PY	Y						
<i>Schoenus tendo</i>		Y						
<i>Spinifex sericeus</i>	BP	B	BY					
<i>Sporobolus africanus*</i>	BPY	B	BY	Y				AK 156964
<i>Stenotaphrum secundatum*</i>	BPY	B	B					
<i>Strelitzia reginae*</i>	pIP							
<i>Thelymitra longifolia</i>	B		B					
<i>Thelymitra pauciflora</i> agg.	Y							
<i>Tradescantia fluminensis*</i>	P							
<i>Triglochin striata</i>	BPY	B						
<i>Typha orientalis</i>	B	B	BY					
<i>Uncinia uncinata</i>	BPY	B	B	Y				AK 157047
<i>Vulpia bromoides*</i>	B	B	B					AK 156795
<i>Watsonia bulbifera*</i>	P							
<i>Yucca</i> sp. *	pIP			Y				
<i>Zantedeschia aethiopica*</i>		Y						
<i>Zostera muelleri</i>	BPY							AK 151406