

The Kowhai Kereru Coast

a guide for planting and restoration



A Guide for Planting & Restoring the Nature of WAITAKERE CITY



Lucas Associates

Di Lucas, Jeremy Head, & Terry Crippen,

in association with Stephen King



produced for Waitakere City Council with funding from the Sustainable Management Fund, Ministry for the Environment. 1996



A Guide for Planting & Restoring the Nature of WAITAKERE CITY

To plant & restore, IDENTIFY

CONTENTS









from puriri to Vitex lucens

MESSAGE FROM THE MAYOR OF WAITAKERE CITY

Waitakere City is blessed with a unique natural heritage. The city's landscape is dominated by native forest and sea. The magnificent Waitakere Ranges are a valued resource to the entire region and the coastline varies from the rugged and wild beaches and cliffs of the West Coast to the sheltered reaches of the Upper Waitemata Harbour.

However, parts of that heritage have been degraded during the process of timber milling, farming and growth of the urban area.

Waitakere has adapted a Green Network programme which aims to halt the degradation and turn it around. The programme is designed to protect the quality natural heritage which we still have and to restore areas where humans have harmed the environment. It is also designed to increase people's enjoyment and involvement with the natural environment.

The Green Network programme is thus a central platform of Waitakere's Ecocity commitment to sustainable development.

People are a crucial part of the equation in working towards the Green Network vision. The community - Council partnership programmes already underway such as Trees for Babies demonstrates the enormous enthusiasm which people have towards the natural environment and the value which they place upon it.

Now Council wishes to present these revegatation guides as a next step in providing people with the tools to care for and restore their environment. Good planting!

Waitakere City Council is grateful to the Ministry for the Environment for the assistance provided for some of our Green Network projects, under the sustainable Management Fund. By awarding this assistance, the Ministry for the Environment has clearly recognised that Waitakere's Green Network programme is of national significance and will provide a model for other parts of the country to work towards sustainable resource management.

Dollar

Bob Harvey Mayor of Waitakere City

WAITAKERE'S GREEN NETWORK

In 1993, Waitakere City became the first New Zealand city to adopt Agenda 21 and set a direction of becoming an eco-city. The 1993 Strategic Plan "City Futures: Strategic Directions" set the framework for achieving the eco-city vision. This framework has been further developed through the Greenprint which is more explicit in terms of the actions Council will take over the next 20 years in implementing Agenda 21.

The Green Network is one of Waitakere City's major Greenprint platforms. It involves the creation of a continuous network of green extending from the West Coast, across the Waitakere Ranges to the urban area, linking bush, open space and streams.

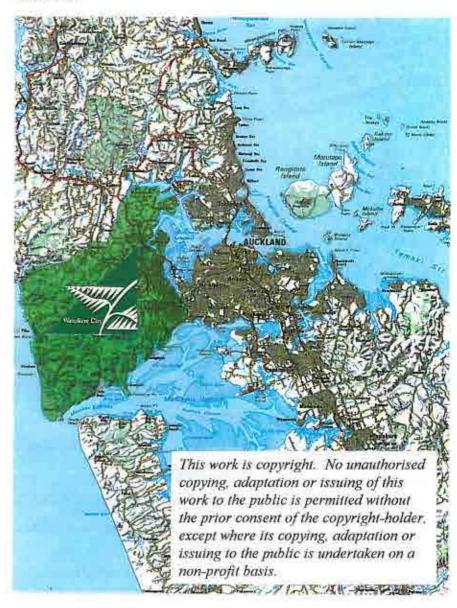
Ultimately, Waitakere City Council views the Green Network as all that is not covered by bitumen or buildings, and the intention is that Council, community and individual actions will increase the quality of, and accessibility to, this Network. The Green Network has two core objectives, to:

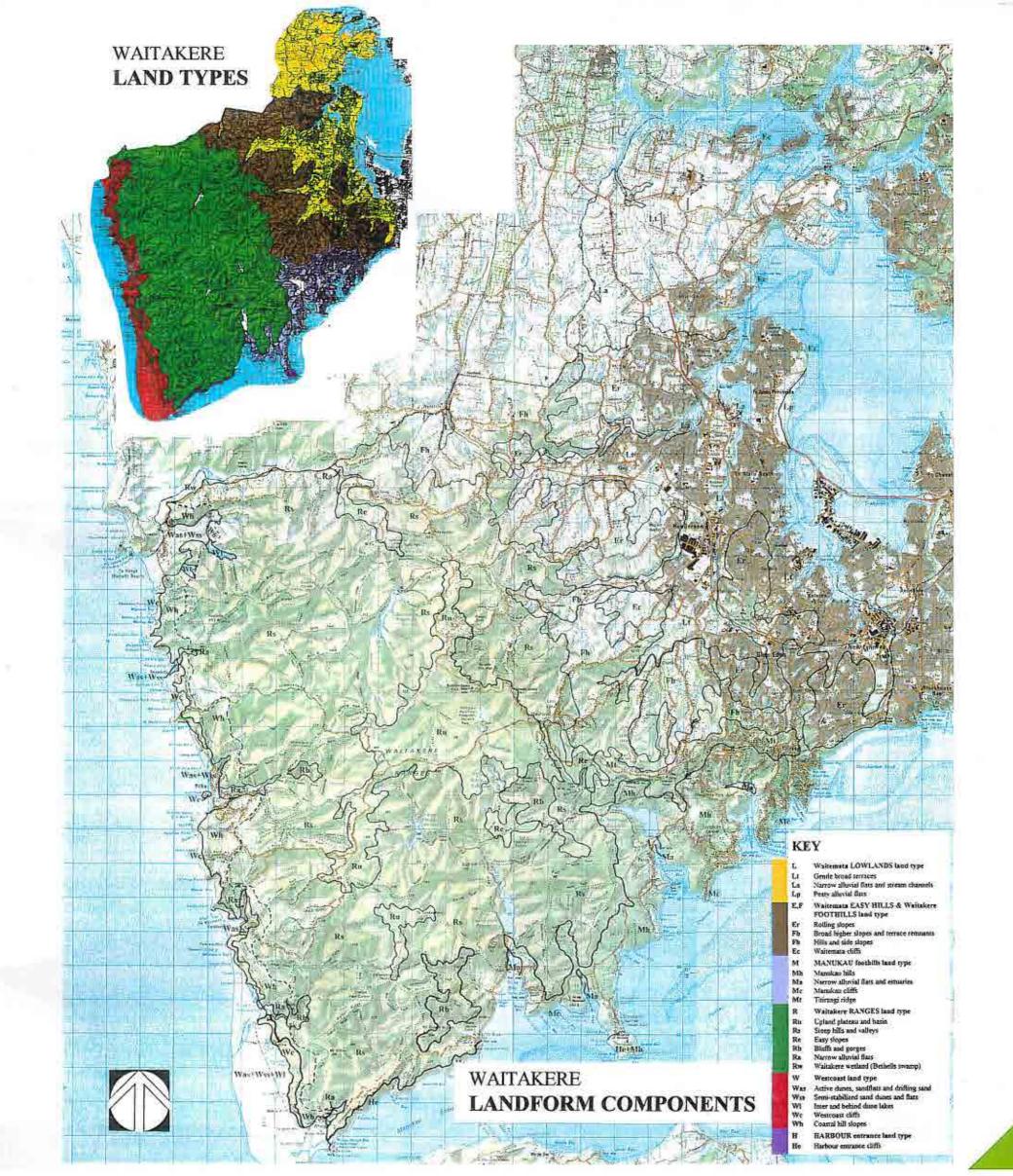
- · Protect, restore and enhance the natural environment
- Increase human enjoyment and appreciation of the natural environment

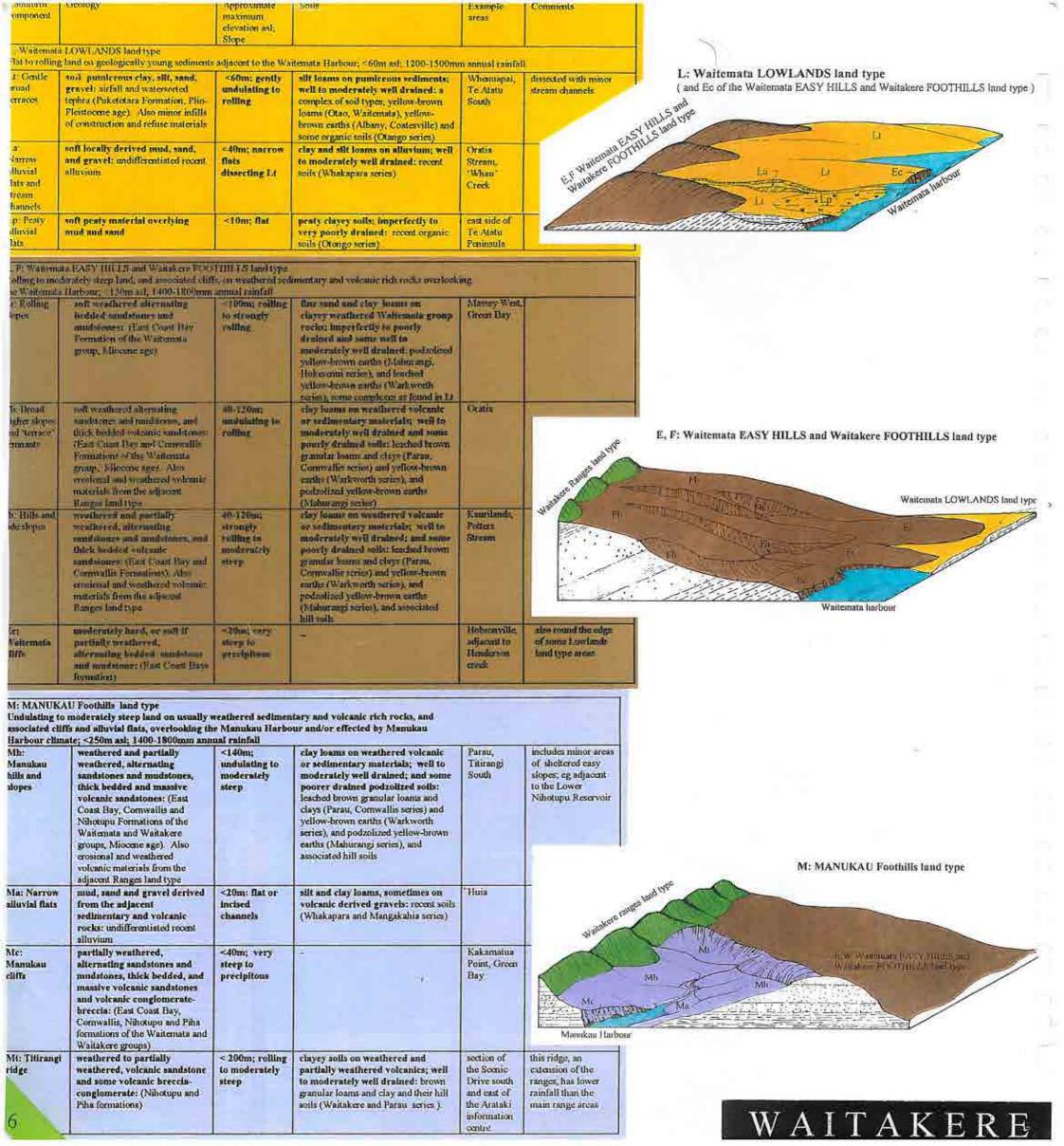
In this way, the community will "green the City", removing the artificial separation between urban and natural which accompanies the alienation of people from the environment. Indeed the Green Network and Waitakere City Council's Urban Strategy are two sides of the same coin. Together they provide the physical expression of sustainability, in which a range of urban environments are contained within and interlaced with quality natural areas.

In this vision the Green Network is marked out by diverse quality vegetation. The mature native bush which expands across the ranges is echoed in matipo, cabbage tees and tree ferns edging the streams, all the way to the Manukau and Waitemata coastlines. Raupo and flax indicate valley wetlands. Key sites of importance to Iwi are marked by clumps of karaka and other plants which provide edible berries and stock for medicines. The fruit trees of Oratia's orchards spill into nearby parks. Our urban streets are lined with titoki, jacarandas and gingkos, providing variety and seasonal change. Even the rail line is buffered with hedges and shrubs.

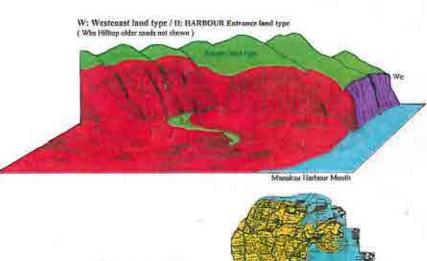
These tree-lined corridors are filled with the flight and sound of the kereru, fantails and tui; in some parts of the ranges, seasonal kaka might also be seen. Fish flicker in the depths of pristine streams. Leafy streets and parks provide pleasant routes for joggers and children making their way to school. Even in the most 'urban' parts of the City homes overlook a beautiful natural setting provided by the Green Network.

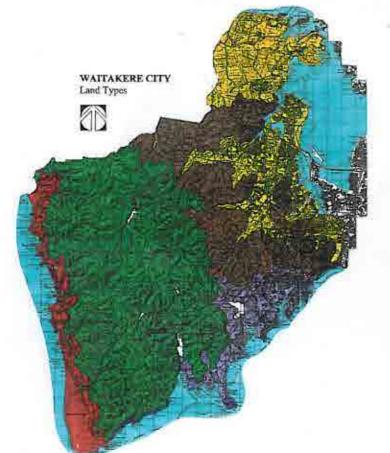












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KEY WAITAKERE Pohutukawa, Oi, **ECOSYSTEMS Exposed Coastal Ecosystem** Note: A more subdued coastal ecosystem also Kowhai, Kotare, occurs as a narrow fringe along the Harbour Coastal Ecosystem Waitemata coastline Manuka, Kahu, Stormy Coastal Hills Ecosystem Puriri, Kereru, Warm Lowlands Ecosystem Kiekie, Miromiro, High Rainfall Hills Ecosystem Rimu, Ruru, Uplands Ecosystem

WAITAKERE PLANTS

Tall Trees

Agathis australis	kauri
Dacrycarpus dacrydioides	kahikatea
Dacrydium cupressinum	rimu
Metrosideros robusta *	northern rata
Phyllocladus trichomanoides	tanekaha
Podocarpus hallii	hall's totara
Podocarpus totara	lowland totara
Prumnopitys ferruginea	miro
Prumnopitys taxifolia	matai

Medium Trees

Medium Trees	
Alectryon excelsa	titoki
Avicennia marina ssp. australasica	mangrove
Beilschmiedia tarairi	taraire
Beilschmiedia tawa	tawa
Corynocarpus laevigatus(t)	karaka
Dysoxylum spectabile	kohekohe
Elaeocarpus dentatus	hinau
Elaeocarpus hookerianus	pokaka
Halocarpus kirkii	monoao
Ixerba brexioides	tawari
Knightia excelsa	rewarewa
Kunzea ericoides	kanuka
Laurelia novae-zelandiae	pukatea
Libocedrus plumosa	kawaka
Litsea calicaris	mangeao
Metrosideros excelsa *	pohutukawa
Myrsine salicina	- toro
Nestegis cunninghamii ®	black maire
Nestegis lanceolata	white maire
Nestegis montana	oro oro
Pittosporum eugenioides tara	ta, lemonwood
Pittosporum tenuifolium	kohuhu
Pouteria costata	tawapou
Quintinia serrata	tawheowheo
Sophora microphylla (t) North var. microphylla	nland kowhai
The state of the s	e,swamp maire
Vitex lucens	puriri
Weinmannia silvicola	towai
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Tolerances

Punn, Kereru, Warni Lowlands

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Distribution: - = none; \checkmark = present; \checkmark \checkmark = common,

Small Trees/Large Shrubs

Aristotelia serrata makomako, wineberry Brachyglottis repanda (t) rangiora Carmichaelia aligera a NZ broom Carpodetus serratus putaputaweta Coprosma arborea mamangi Coprosma areolata threepenny bit tree Coprosma grandifolia kanono Coprosma lucida shining karamu Coprosma macrocarpa karamu Coprosma propinqua mingimingi Coprosma robusta karamu Coriaria arborea tutu, tupakihi Cordyline australis ti kouka, cabbage tree ti ngahere, forest cabb. tree Cordyline banksii Cyathea cunninghamii punui Cyathea dealbata ponga, silver tree fern mamaku, black tree fern Cyathea medullaris Cyathea smithii katote, soft tree fern wheki-ponga Dicksonia fibrosa G Dicksonia squarrosa wheki Dodonaea viscosa akeake Dracophyllum latifolium neinei Entelea arborescens whau Fuchsia excorticata kotukutuku Geniostoma rupestre hangehange Griselinia lucida puka Hedycarya arborea pigeonwood, porokaiwhiri Hoheria populnea houhere, lacebark Leptospermum scoparium manuka Leucopogon fasciculatus mingimingi Macropiper excelsum kawakawa Melicope ternata wharangi Melicytus lanceolatus mahoe wao Melicytus macrophyllus large-leaved mahoe Melicytus micranthus manakura Melicytus ramiflorus mahoe Mida salicifolia maire taiki Myoporum laetum ngaio Myrsine australis mapou, red matipo Olearia albida a tree daisy Olearia furfuracea akepiro, tanguru Olearia rani heketara Pennantia corymbosa kaikomako Pittosporum crassifolium karo Pittosporum ellipticum

Tolerances

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Distribution: - = none; ✓ = present; ✓ ✓ = common;

✓ ✓ ✓ = abundant; ® = rare, G = geographically restricted.

Tolerances: ■ = fully tolerant; □ = not tolerant; ½ = tolerates some, e = shade tolerant to establish; E = needs shade to establish.

(t) = toxic to toddlers; * = hybrids occur.

Small Trees/Large Shrubs cont.

Pseudopanax arboreus whauwhaupaku,5-finger Pseudopanax crassifolius* horoeka, lancewood Pseudopanax edgerleyi raukawa Pseudopanax lessonii houpara Pseudowintera axillaris horopito Rhopalostylis sapida nikau Schefflera digitata pate poroporo Solanum aviculare Sophora "fulvida" (t) west coast kowhai Streblus heterophyllus turepo, milk tree Toronia toru toru

Shrubs & Flax-like Plants

Alseuosmia macrophylla karapapa Brachyglottis kirkii kohurangi Cassinia leptophylla tauhinu Coprosma crassifolia a mingimingi Coprosma repens taupata Coprosma rhamnoides a mingimingi Coprosma spathulata Coprosma tenuicaulis swamp coprosma Corokia buddleioides korokio taranga bluff korokio Corokia cotoneaster Cyathodes juniperina prickly mingimingi Dracophyllum sinclairii spiderwood Freycinetia banksii kiekie Gaultheria antipoda snowberry koromiko Hebe macrocarpa koromiko Hebe stricta ramarama Lophomyrtus bullata Laphamyrtus obcordata rohutu poataniwha Melicope simplex Myrsine divaricata weeping mapou ora ora Nestegis montana coastal shrub daisy Olearia solandri Phebalium nudum mairehau wharariki, mountain flax Phormium cookianum Phormium tenax harakeke, flax Pimelea longifolia taranga, a daphne Pimelea tomentosa hairy daphne Pittosporum cornifolium tawhirikaro Pittosporum kirkii leather-leaf pittosporum Plagianthus divaricatus saltmarsh ribbonwood kumerahou Pomaderris kumeraho Pomaderris ericifolia tauhinu Pseudopanax anomalus shrub pseudopanax Rhabdothamnus solandri taurepo Typha orientalis raupo

Tolerances

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Low Ground Plants	Form	Height	Location & Use. Grows in:
Apium prostratum sea celery	h	20cm	
Arthropodium cirratum rengarenga, rock lily	W	40cm	rockland crevices, hot & sunny to shady waterfalls. Hardy garden plant. Attractive flower.
Astelia banksii coastal astelia	W	1.2m	rock ledges & crevices, bluff tops & coastal banks.
Astelia fragrans fragrant astelia	W	1.5m	frosty, boggy Nihotapu Basin. Possiblt was on Te Atatu peaty alluvium. Bold, handsome.
Astelia grandis ® giant swamp astelia	W	lm	cool, damp forest interior.
Astelia solandri kowharawhara, perching lily	w	80cm	epiphyte, or shady rocks & logs. Hardy.
Astelia trinervia kauri "grass"	W	2m	on ridges & drained slopes under kauri trees.
Calystegia soldanella nihinihi, shore binder	M	10cm	sand dune plant. Attractive and not invasive.
Centella uniflora	M	7cm	on clay banks & open forest margins. Excellent hardy groundcover for garden or lawn.
Coprosma acerosa sand coprosma	M	10cm	sand dune plant. Good groundcover. Interesting form. Attractive flowers.
Collospermum hastatum kahakaha	W	60cm	epiphyte, occasionally on shaded rocks. Bold, handsome landscape plant
Celmisia gracilenta pekepeke, daisy	* W	10cm	uncommon in exposed coastal hills. Open habitat
Celmisia major var. major Waitakere rock daisy	w	10cm	rock crevices. Waitakere heritage plant. Rock garden or clay pot too.
Cordyline pumilio ti rauriki, dwarf cabbage tree	w	30cm	sunny ridges in kauri country
Cotula coronopifolia bachelor's button	M	10cm	salty wet ground in spring tide zone. Attractive garden plant.
Dianella nigra turutu, NZ blueberry	W	40cm	clay banks & open sunny blufftops, kauri forest & scrub. Attractive berries.
Dichondra repens mercury bay weed	M	5cm	sandy sites in open, sunny coastal areas. Makes an excellent groundcover or lawn.
Disphyma australe horokaka, ice plant	M	10cm	salt splash zone cliffs. Attractive garden subject.
Drosera binata forked sundew	* h	10cm	sunny peaty swamps, seepage sites in gumlands. Fascinating insect catching pot plant.
Elatostema rugosum parataniwha	0	Im	Steeplands & damp gullies. Good groundcover in shade, also for fernery & as pot plant.
Epacris pauciflora tamingi	* O	50cm	damp or wet gumlands. Needs habitat management. Beautiful plant for enthusiasts.
Hebe "bishopiana" ® Huia hebe	O	40cm	bluff tops NB Limited natural distribution.
Hebe obtusata west coast cliff hebe	M	20cm	exposed coastal cliff faces.
Leptinella rotundata ®	M	3cm	salt splash or salt spray zone herbfield sites. Locally extinct. Attractive groundcover.
Leucopogon fraseri patotara	h	10cm	cliff tops. Difficult & slow to establish.
Libertia grandiflora large-flowered iris	W	40cm	light forest near bluffs & sharp ridges. Attractive garden plant.
Libertia ixioides mikoikoi, NZ iris	W	30cm	light forest near bluffs & sharp ridges. Attractive garden plant
Libertia peregrinans creeping sand iris	w	30cm	coastal sand. Rare in the wild. Attractive garden plant.
Libertia pulchella forest iris	W	10cm	peaty humus in cool forest. A dainty pot plant.
Lycopodium cernaum creeping clubmoss	1	30cm	seepage sites on sunny clay banks or on peat. A smart-looking pot plant.
Lycopodium deuterodensum tree club-moss	300	50cm	ridges & slopes in regenerating kauri country. Difficult to grow.
Muehlenbeckia complexa pohuehue	0	1m	plant on consolidating dunes. Excellent springy garden plant.
Myosotis "pansa" ® Waitakere forget-me-not	h	10cm	sunny rock crevices & bluff bases. A Waitakere heritage pot plant or rock garden plant.
Nertera depressa common nertera	M	2cm	damp open clay banks. An attractive garden plant.
Nertera dichondrifolia northern nertera	M	2cm	light forest or shrubland interior.
Peperomia urvilleana wharanui	h	20cm	shaded rocky bluff foot slopes. A shiny pot plant.
Pimelea arenaria ® autetaranga, sand daphne	h.	20cm	once grew on the dunes. Probably now extinct in Waitakere.
Pimelea prostrata prostrate daphne	M	5m	open banks. Rare in Waitakere.
Pratia angulata panakenake	M	2cm	open rocky streams. Useful as a garden plant.
Samolus repens sea primrose	M	10cm	herbfields in spring tide or salt spray zone. Of garden use.
Scandia rosifolia coastal angelica	h	30cm	coastal cliffs. Sadly possum ravaged. Good for herb garden and as pot plant.
Selliera radicans remuremu	M	5cm	herbfields in spring tide or salt spray zone. Of garden use.
Tetragonia trigyna NZ spinach	M	10cm	coastal sands. Use in the herb or vege garden.
Thelymitra longifolia white sun orchid	h	30cm	prefers clay banks & manuka gumlands. An easy orchid to cultivate.

O = shrubs
W = flax or grass forms
M = useful mat plant
h = herbaceous
* = needs active habitat management to sustain in the wild.

Tolerances harsh rockboggy DOOL wind clay lands U Ü Ö 4 0 围 4 13 a Ü П (I) ш 0 П Ш 14 10 D O 12 O П Ш 4 攤 闡 Ď O m m D 15 B 闘 pekepeke, daisy Ü Ħ U D 醋 32 12 Œ \Box 31 Ü 個 整 12 饠 12 -H EJ. D ш U 關 П D. m П 12 0 1 曹 m U 1/2 12 15 15 D П B m П H 飅 \Box D 鯔 32 榧 0 12 1 1/2 O H 12 33 П m H D O m 醋 12 13 Ü 12 12 器 П B 12 100 U 12 D \Box 12 12 0 D 1 H 12 E. 12 10 وا П П D 12 C П D 0 Œ. U 35 12 O 15 U 1 U D 12 D 贖 D U П

Low Ground Plants

sea celery

coastal astelia

kauri "grass"

sand coprosma

kahakaha

fragrant astelia

rengarenga, rock lily

giant swamp astelia

nihinihi, shore binder

Waitakere rock daisy

turutu, NZ blueberry

mercury bay weed

horokaka, ice plant

west coast cliff hebe

large-flowered iris

mikoikoi, NZ iris

creeping sand iris

creeping clubmoss

common nertera

northern nertera

prostrate daphne

® Waitakere forget-me-not

autetaranga, sand daphne

tree club-moss

forked sundew

(locally extinct)

parataniwha

tamingi

Huia hebe

patotara

forest iris

pohuehue

wharanui

panakenake

sea primrose

remuremu

NZ spinach

coastal angelica

white sun orchid

bachelor's button

ti rauriki, dwarf cabbage tree

kowharawhara, perching lily

Apium prostratum

Astelia banksii

Astelia fragrans

Astelia grandis

Astelia solandri

Astelia trinervia

Centella uniflora

Coprosma acerosa

Celmisia gracilenta

Cordyline pumilio

Dichondra repens

Disphyma australe

Elatostema rugosum

Epacris pauciflora

Hebe "bishopiana"

Leucopogon fraseri

Libertia grandiflora

Libertia peregrinans

Lycopodium cernuum

Lycopodium deuterodensum

Muehlenbeckia complexa

Nertera dichondrifolia

Peperomia urvilleana

Pimelea arenaria ®

Pimelea prostrata

Pratia angulata

Samolus repens

Scandia rosifolia

Selliera radicans

Tetragonia trigyna

Thelymitra longifolia

Libertia ixioides

Libertia pulchella

Myosotis"pansa"

Nertera depressa

Leptinella rotundata ®

Dianella nigra

Drosera binata

Hebe obtusata

Cotula coronopifolia

Calystegia soldanella

Collospermum hastatum

Celmisia major var. major.

Arthropodium cirratum

Distribution: -= none, \(\sigma = \text{present}, \(\sigma \sigma = \text{common}; \) √ √ √ = abundant; ® = rare, G = geographically restricted. Tolerances: ■ = fully tolerant, | = not tolerant, 1/2 = tolerates some, e = shade tolerant to establish: E = needs shade to establish (t) = toxic to toddlers; * = hybrids occur.

Vines & Trailers

Calystegia tuguriorum Clematis forsteri Clematis paniculata Freycinetia banksii Metrosideros carminea ® Metrosideros diffusa Metrosideros fulgens Metrosideros perforata Ripogonum scandens Parsonsia capsularis Parsonsia heterophylla Passiflora tetrandra Rubus australis Rubus cissoides Rubus squarrosus

Conditions & Uses

powhiwhi, convolvulus puataua, scented clematis puawananga, bush clematis kiekie carmine rata, akakura climbing white rata winter rata akatea, small white rata supplejack, kareao kaiwhiria, NZ jasmine kaiku, NZ jasmine kohia, NZ passion vine lawyer

Trailer, found above bluffs. Likes full light & good drainage. Entwines. A fast climber for moist sites, especially in disturbed sites. Full light. Damp forest habitat. Enjoys heavy shade to full light. Climbing up tree fern trunks & rock faces on warm slopes A large-leaved form Of damp forest environments. Establish in shade & grow up in sunshine. Of damp forests & margins, growing up on tree ferns. Excellent garden shrub. Of damp forest, margins & rocklands. Useful as a tidy, smart little shrub. Favours damp forest, especially steep, wet slopes. Attractive berries. Prefers near bluff tops and open forest. An interestuing garden subject. The stronger species. Abundant in lowlands, especially alluvial areas. Attractive climber, in warm fertile lowlands or damp deep soils. In damp forests as climber or trailer. Attractive shiny foliage. Less rampant.

bush lawyer, tataramoa spindly lawyer

estuary tussock

In damp forests or shrublands. In sun or shade. Prickly & rampant.

Trailer, not aggressively invasive. Coastal forest & wetland.

In more open sites. For the enthusiast!

Grasses

Cortaderia fulvida Cortaderia splendens Isachne globosa Microlaena avenacea Microlaena polynoda Microlaena stipoides Oplismemis imbecilis Poa anceps Spinifex sericeus Stipa stipoides

Gracious in streamside, wetland margins and near the coast. toetoe Open slopes & sand hills on exposed coastline coastal toetoe Wetland swamp millet bush rice grass Thrives in the forest interior. Prefers ridges. Enjoys interior of pohutukawa forest on sand dunes & steep sunny slopes. native bamboo meadow rice grass Thrives in the forest interior. Prefers damp sites. Forms a forest carpet in well-lit sites. slender panic grass Steep banks & cliffs. kowhangatara, sand grass On sand dunes.

Shellbanks & spring tide zone.

Sedges, Rushes Baumea articulata Carex flagellifera Carex secta Carex solandri Carex testacea Cyperus ustulatus Desmoschoenus spiralis Eleocharis sphacelata Gahnia lacera Gahnia pauciflora Gahnia setifolia Gahnia xanthocarpa Isolepis nodosa Juncus maritimus Juncus pallidus Leptocarpus similis Lepidosperma laterale Machaerina sinclairii Schoenus tendo Uncima uncinata

jointed twig rush Grows in water. boot lace sedge Forest margins & open coastal habitatas pukio, niggerhead Suited to wetland sites. A forest margin plant. a sedge Stabilised dune land & coastal shrubland. speckled sedge Adapted to wetland sites. upoko tangata, giant umbrella sedge pingao Foredunes kuta, tall spike rush In deep water 30cm to 1m deep in open sites. bamboo cutty grass Suits clay ridges, steep open sites and rocky blufftops. Upland ridges & shrubland. Open sites or light shade. cutty grass cutty grass A nurse plant for clay, shrubland country. toikiwi, giant cutty grass Suits damp or wet sites. knobby club rush Wetland Belongs on open, damp or swampy sites. wiwi, searush giant rush Wetland Estuarine & wetlands. oioi, jointed rush sword sedge Clay gumlands & regenerating kauri forest. Open sites or light shade. On wet rock faces. tuhara Damp sites under manuka in regenerating kauri forest. Light shade. wiwi, sedge hook sedge Forest gaps, edges, alongside tracks.

Tolerances moist hoggy harsh Rock-Vines & Trailers clay wind lands D 12 Calystegia tuguriorum powhiwhi, convolvulus E D П 騆 Γ Clematis forsteri puataua, scented clematis E П Clematis paniculata puawananga, bush clematis Freycinetia baueriana 醋 题 15 kiekie 田 Metrosideros carminea ® 12 U \Box carmine rata, akakura E Metrosideros diffusa U D E climbing white rata E Metrosideros fulgens 爾 D winter rata E D 12 Metrosideros perforata akatea, small white rata Ripogonum scandens E \Box D supplejack, kareao 34 15 Parsonsia capsularis П U kaiwhiria, pink jasmine E 0 U Parsonsia heterophylla kaiku, NZ jasmine C Passiflora tetrandra 12 器 D. kohia, NZ passion vine П 0 Rubus australis 32 lawyer Rubus cissoides 25 bush lawyer, tataramoa \Box Rubus squarrosus bush lawyer shade harsh boggy Grasses clay wind Cortaderia fulvida toetoe Cortaderia splendens coastal toetoe П Isachne globosa swamp millet Microlaena avenacea bush rice grass 1/2 25 Microlaena polynoda native bamboo 12 Microlaena stipoides meadow rice grass 12 35 П \Box Oplismenus imbecilis slender panic grass 12 E Poa anceps plumed tussock 35 \Box Spinifex sericeus silvery sand grass IJ \Box Stipa stipoides needle grass shade dry moist harsh boggy clay Sedges, Rushes wind Baumea articulata jointed twig rush 12 ᡂ Carex flagellifera boot lace sedge П \Box П 0 Carex secta pukio, niggerhead 34 E 34 Carex solandri 4 12 10 12 32 a sedge Carex testacea 1 speckled sedge upoko tangata,giant umbrella se Cyperus ustulatus Desmoschoenus spiralis pingao Eleocharis sphacelata kuta, tall spike rush 画 Gahnia lacera bamboo cutty grass 12 D 34 Gahnia pauciflora cutty grass 15 Gahnia setifolia cutty grass Ü Gahnia xanthocarpa toikiwi, giant cutty grass 题 Isolepis nodosa knobby club rush 15 Juneus maritimus wiwi, searush П Juncus pallidus giant rush 12 Leptocarpus similis oioi, jointed rush Ū Lepidosperma laterale sword sedge Machaerina sinclairii tuhara 1/2 D Schoenus tendo wiwi, sedge L₂ Uncinia uncinata U hook sedge Distribution: - = none; ✓ = present; ✓ ✓ = common;

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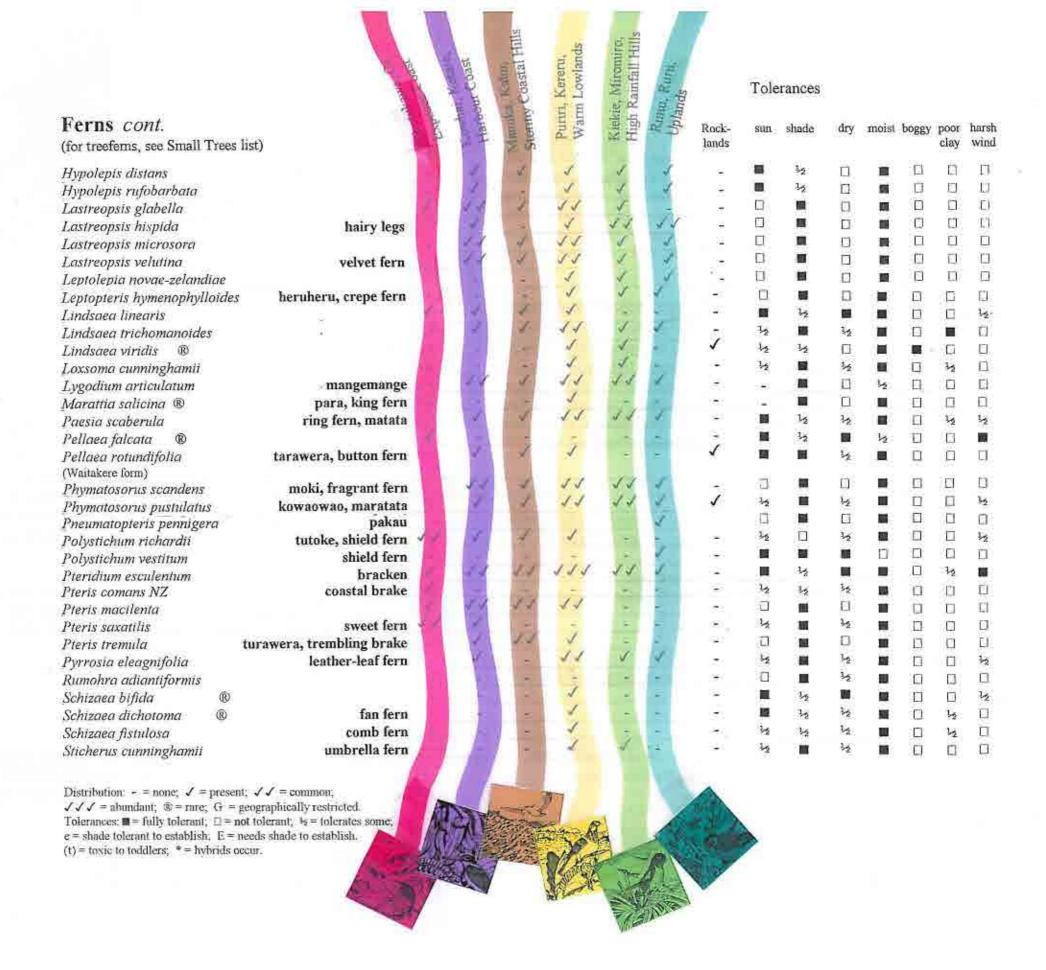
✓ ✓ ✓ = abundant, ® = rare; G = geographically restricted.
Tolerances: ■ = fully tolerant, □ = not tolerant, ½ = tolerates some;
e = shade tolerant to establish. E = needs shade to establish.

(t) = toxic to toddlers; * = hybrids occur.

Ferns			= for Garden = for pots	Preferred Sites & Conditions
Adiantum aethiopicum	makaka, round-leaf maidenhair	G	- for pots	For sandy or alluvial soil
Adiantum cunninghamii	common maidenhair	·		Suits the forest interior on alluvial country, and steep slopes.
Adiantum diaphanum	small maidenhair	G		Suits the forest interior, alluvial country, and steep slopes.
Adiantum fulvum	downy maidenhair			Suits the forest interior, alluvial country, and steep slopes.
Adiantum hispidulum	rosy maidenhair	G		Enjoys light gaps inside forests on rocky country
Adiantum viridescens	rosy materials		0	Enjoys forest interior on steep slopes.
Anarthropteris lanceolata		9.55	ATT.	An epiphyte, or on rocks in forest interior - likes nikau trunks.
Arthropteris tenella	jointed fern			Fertile soils on roots or rocks in forest interior.
Asplenium bulbiferum	manamana, hen & chicken fern	G	0	Likes a damp forest interior.
Asplenium flabellifolium	® necklace fern	G	0	Prefers open rocky sites.
Asplenium flaccidum	makawe, hanging asplenium	G	0	A forest interior epiphyte
Asplenium gracillimum	manufic transfers in premium	G		Prefers a damp forest interior.
Asplenium hookerianum		G	0	For fertile sites in lowland forest usually alluvial or rubbly steep sites.
Asplenium lamprophyllum	glossy asplenium	G		Enjoys alluvial or steep coastal forest.
Asplenium maritimum	B. cool not contain	-	-	Alluvial or rocky sites preferred.
Asplenium oblongifolium	huruhuruwhenua,shining asplenium	G		Locate in a forest interior.
Asplenium northlandicum		11.00		Rocky crevices in saltspray zone
Asplenium polyodon	sickle asplenium	G	0	An epiphyte of the forest interior.
Asplenium aff. trichomanes			3:	Rock crevices.
Azolla filiculoides	floating fern			Belongs on ponds - beware, it can be a "weed"!
Blechnum banksii	coastal blechnum			Rock crevices & gullies in saltspray zone on exposed coastline.
Blechnum "capense"	kiekio	G		Thrives on clay banks, streamsides, open gullies. Pink new fronds. Good ground
Blechmim chambersii	rereti			Commonly thrives in gullies.
Blechnum colensoi	peretao			Belongs in wet rocky habitat.
Blechnum discolor	piupiu, crown fern	G		Ridges & slopes in cool, high rainfall forest.
Blechmum filiforme	creeping carpet fern	G		Thrives on easy slopes and fertile level areas.
Blechnum fluviatile	kiwakiwa	G	0	For cool damp forest & forest interior near gullies.
Blechnum fraseri		G		Belongs on easy slopes.
Blechnum membranaceum		>53		Forest gullies preferred.
Blechnum minus	swamp kiokio	G	0	Prefers damp, semi-swampy sites
Blechnum nigrum				Relishes wet, heavily shaded streamsides
Blechnum procerum		G	0	Forest interior of cool uplands. Prefers damp sites.
Cheilanthes distans	rock fern	G281		Exposed coastal rocklands. In rock crevices.
Cheilanthes humilis	rock fern			Exposed coastal rocklands. In rock crevices.
Ctenopteris heterophylla				An epiphyte.
Deparia petersenii		G		Suits damp gullies and moist alluvial sites, especially flood zone
Dicksonia lanata				Cool, damp sites in high rainfall zone, especially kauri habitat.
Diplazium australe		G		Suits damp gullies.
Doodia media	pukupuku	G		Coastal locations.
and the state of t	® mokimoki	G		Prefers rocky sites or coastal cliffs.
Gleichenia dicarpa	tangle or swamp umbrella fern			Belongs in wetlands.
Gleichenia microphylla	waewaekaka	G		Belongs in the clay gumlands.
Grammitis billardierei	strap fern			Epiphyte
Grammitis ciliata	bank strap fern			Streambanks and on rocks.
Grammitis pseudociliata	hairy strap fern			Epiphyte
Histiopteris incisa	frost fern	G		Forest gaps & damp margins esp. cool frosty sites. Foliage frost sensitive
Hymenophyllum spp.	filmy ferns			Diverse moist forest habitats.
Hypolepis ambigua	common hypolepis			Enjoys forest gaps.
Hypolepis dicksonioides	giant hypolepis			Forest gaps & margins in exposed coastal zone. Quite rare.
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treeferns, see Small Trees list) mutum aethiopicum makaka, round-leafed maidenhair	3 8		Kerent, Lowlands	- m	10.2	Fi .	Tole						
antum aethiopicum makaka, round-leafed maidenhair		Stormy	Рипп.	Kiekle, Mitsi Aga Raunai	P. S. C.	Rock-	sun	shade	dry	moist	boggy		
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antum fulvum downy maidenhair			1	1		-	17		П	100			£
antum hispidulum rosy maidenhair	- FX	100	4	=	8	-	目	12	101	100	Ω	Ω Π	Ĩ.
antum viridescens			1	200	18	15:		3-2	Ш			П	I
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olenium polyodon sickle asplenium			14546	X (A) X	V) W	-		101	-		-13		I
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chnum discolor piupiu, crown fern		100	200	0.0	100	12.	17	111	E2:	-	П		I
chmun filiforme creeping carpet fern		17.	4.4	4.4	1000	20	1	1000			П		
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eichenia microphylla waewaekaka			55			Ī			12	100			3
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ammitis pseudociliata hairy strap fern stiopteris incisa frost fern			1	9	1	= 9		3-2				ö	20 To
menophyllum spp. filmy ferns		13	10-1	1.1	11	8	Ö	-		10	-	D	- 1
polepis amhigua common hypolepis		1	5	5	4			1-2			43		0
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✓ = abundant; ® = rare; G = geographically restricted	Tree of the	-			AS.		MA.						
rances: = fully tolerant;		The state of the s		69	500	K OF							

Ferns cont.	G = for Garden = for pots	Preferred Sites & Conditions
Hypolepis distans	G @	Enjoys forest gaps.
Hypolepis rufobarbata		Enjoys forest gaps.
Lastreopsis glabella	G	Belongs in the interior of rocky or semi-coastal/coastal or alluvial forest.
Lastreopsis hispida hairy legs	G	Belongs in damp and shady or dark interior of forests.
Lastreopsis microsora	G	Belongs in the interior of rocky or semi-coastal/coastal or alluvial forest.
Lastreopsis velutina velvet fern		Belongs in the interior of rocky semi-coastal/coastal or alluvial forest.
Leptolepia novae-zelandiae	G	Uncommon, but located in sheltered, cool damp forest interior.
Leptopteris hymenophylloides heruheru, crepe fern		Belongs in sheltered, cool damp forest interior.
Lindsaea linearis		Enjoys sunny kauri ridges and rocky sites.
Lindsaea trichomanoides		Enjoys sunny kauri ridges.
Lindsaea viridis ®		Relishes dripping wet sites.
Loxsoma cunninghamii		Belongs to streamside kauri habitat, but hard to grow.
Lygodium articulatum mangemange	G @	At home in the forest interior.
Marattia salicina ® para, king fern	G 🚳	Enjoys damp, shady sites such as streamsides or bluff bases.
Paesia scaberula matata, ring fern, scented fern		Adapted to occupy bare ground. Good ground cover plant.
Pellaea falcata fickle leaf fern		Coastal rock crevices. A great pot plant.
Pellaea rotundifolia (Wainkere form) tarawera, button fern	G @	Enjoys the forest interior, especially the fertile lowlands.
Phymatosorus scandens moki, fragrant fern	G	An epiphyte, or often abundant on the ground in rocky or fertile sites.
Phymatosorus pustulatus kowaowao, maratata	G @	An epiphyte, or on the ground in rocky or fertile lowlands.
Pneumatosorus pennigera pakau		Damp, shady forest interior, especially near streams.
Polystichum richardii tutoke, shield fern		Coastal forest interior.
Polystichum vestitum shield fern		Forest gaps in cool, wet uplands.
Pteridium esculentum bracken		An excellent first stage forest plant on sloping or easy ground.
Pteris comans NZ coastal brake		On coastal sites only.
Pteris macilenta sweet fern	G @	Suits forest interior.
Pteris saxatilis		Suits interior of coastal forests.
Pteris tremula turawera, trembling brake	G @	Enjoys gaps in the forest interior
Pyrrosia eleagnifolia leather-leaf fern		An epiphyte.
Rumohra adiantiformis		An epiphyte, mostly on tree ferns.
Schizaea bifida ®		Adapted to open, clay, peaty or rocky sites.
Schizaea dichotoma ® fan fern		Belongs in kauri forest.
Schizaea fistulosa comb fern		Enjoys peaty, open clay or rocky sites.
Sticherus cunninghamii umbrella fern		Belongs in steep kauri habitat, but hard to grow.
Athyrium australe		Good ground cover plant for shady, damp sites.



Reference for species list:

Davis, A.M.; Denyer, K. (in press) Tamaki Ecological District: Part 1 - Waitakere City Lowlands. NZ Protected Areas Programme, Waitakere City Council.

Denver, K. Cutting, M. Campbell, G. Green, C. Hillon, M. 1993. Waitaker

Denyer, K., Cutting, M., Campbell, G., Green, C.; Hilton, M. 1993. Waitakere Ecological District. Survey Report for the Protected Natural Areas Programme. Anckland Regional Council. NZ PNAP No.15.

FERNS of WAITAKERE

Waitakere has some 110 species of native fern! - the city logo provides some recognition of this amazingly rich and diverse flora. As well as a full list of these ferns, the ecosystems of which they are part, the conditions required to grow them, there are notes on their use, specialness and vulnerability. The range of tree ferns, maidenhair ferns and filmy ferns, warrant special mention. There is a surprising range of ferns belonging to the exposed west coast lands (see specific list and comments for the Pohutukawa Oi, Exposed Coastal Ecosystem).

In Waitakere, there are many groups of native ferns from the hardy kiokio and other *Blechnum* species, to delicate filmy ferns. Try your hand at growing some of them indoors or outdoors in the garden or a fernery. There are other New Zealand fern species too, almost 150 species suited to cultivation. But! - PLEASE do not grow or plant non-New Zealand ferns outdoors. Their fine spores, produced by the thousands on each frond, are capable of blowing straight up into the Waitakere Ranges where they threaten to establish and ruin the New Zealand character of our own indigenous forest.

TREE FERNS

Exotic tree ferns are among the highest pollution-risk ferns. Instead, choose one of our own six species of tree fern, plus the distinctive miniature:

- Cyathea medullaris mamaku, black tree fern
 A fast-growing, big, black-stemmed tree fern. Probably the largest and most handsome tree fern in the world.
- Cyathea dealbata ponga, silver tree fern Slower growing but longer-lived. Drought tolerant and an impressively uniform spring flush of koru.
- Cyathea cunninghamii punui
 Less known, a finer, more graceful version of mamaku. It grows fast,
 and needs lots of moisture. It grows in the high rainfall area of
 Waiatarua and Huia catchment.
- Cyathea smithii katote, soft tree fern
 A soft-textured tree fern. It grows with a tidy skirt of hanging dead fronds that protect the trunk from sun. Needs shelter and lots of moisture.
- Dicksonia fibrosa wheki ponga, kuri paka
 Hardy, needing damp ground and good soil to form a handsome crown with an impressive thick spongy trunk.
- Dicksonia squarrosa wheki
 Very hardy, it can be grown from cut logs. It eventually forms a clump from short underground suckers. Prefers damp-wet ground, tolerating poorer drainage than other tree ferns.

NOTE. Refer lists of Small Trees for data as to where each tree fern species occurs and the conditions it will tolerate.

Blechnum fraseri miniature tree fern, hard fern
 A miniature tree fern which grows to just 1 metre
 high with a trunk as thick as your thumb and
 shiny fronds. (Refer Low Ground Plants
 lists for occurrence and conditions it will tolerate)



MAIDENHAIR FERNS

Waitakere has 6 species of maidenhair to choose from - start a collection! Adiantum hispidulum, the rosy maidenhair, has pink new fronds. Adiantum aethiopicum, makaka, the round-leafed maidenhair, is dainty, rare, and although easy to cultivate is in danger of extinction due to week competition. The last plant in the Waitemata lowlands and Tamak Ecological District was rescued from smothering weeds from (Tradescantia wandering jew) in Henderson Valley this year. (It has been distributed to nurserymen so that from 1998 you can participate in the recovery of this species.) Makaka still grows at Piha.

Adiantum diaphanum, a dainty three-fingered maidenhair, both scarce and threatened in nature and found in coastal rocky areas and alluvial flood plains. Adiantum cunninghamii, coastal maidenhair, grows in forest and or steep banks and enjoys light. Adiantum fulvum and A. viridescens grow in the forest and prefer more shade.

NOTE: New Zealand possesses one of the world's largest and most impressive maidenhair fern species - Adiantum formosa. At least knee high its natural habitat is in the southern half of the North Island where it is endangered in its weed prone alluvial soil habitat.

FILMY FERNS

Filmy ferns, *Hymenophyllum* species and *Trichomanes* species, in general prefer a high rainfall, moist habitat, generally in a forest environment. The *Trichomanes* species are of specialised interest and difficult to grow. Species native to Waitakere include:



Hymenophyllum demissum Hymenophyllum dilitatum Hymenophyllum ferrugineum Hymenophyllum flabellatum Hymenophyllum flexuosum Hymenophyllum lyallii Hymenophyllum multifidum Hymenophyllum rarum Hymenophyllum revolutum Hymenophyllum sanguinolentum Hymenophyllum scabrum Trichomanes elongatum, bristle fern Trichomanes endilicherianum Trichomanes reniforme, kidney fern, raurenga Trichomanes strictum Trichomanes venosum, veined bristle-fern

Trichomanes reniforme, kidney fern, raurenga

THE NATURE OF WAITAKERE

The forests of Waitakere are unique. They sit on an ancient volcanic system and are strongly influenced by its marine coastal environment, which surrounds three sides on Waitemata and Manukau Harbours.

However, of today's bush, much was burnt or logged last century and in the new urban lowlands only a few clumps of original native trees survive. When first purchased for park and water catchment, much Waitakere land was under "scrub" or even grassland. Given a few decades, the forest is now naturally regenerating back toward its former state - a rich pattern of a diverse range of lowland forest communities. From today's fragmented Waitakere landscape a picture of the original forest pattern has been recreated to illuminate our wonderful natural heritage and provide a guide for landowners to restore it.

At least 400 plant species make up Waitakere in a diverse array of distinct forest communities, each related to its own particular habitat of terrain, geology and climate.

The Waitakere ranges were formed by an ancient massive uplift of hard volcanic basalt creating an elevated plateau with a cool climate, catching the clouds and a rainfall twice that of Auckland and Henderson. Rimu thrives on the cool plateau. Within the Ranges, softer rock has eroded away creating steep rugged hills with good drainage that suits kauri. Very steep slopes of crumbling, actively eroding rock release nutrients in this infertile landscape and provide a refuge for trees like puriri that normally abound in

its preferred fertile soils of lowland flats or young volcanic

areas.

The hard basalt is exposed in many sites to form spectacular gorges, waterfalls and bluffs. These rockland habitats

support communities of specialised plants that can tolerate droughts and little soil. In this habitat the Waitakere Ranges has its own special drought

-hardy kowhai found elsewhere only near Waipoua Forest, in a similar habitat, thus termed the west coast kowhai.

Silt has collected from slowly eroding hills in a few small valleys to form alluvial forests of kahikatea, pukatea,

puriri and ti kouka (cabbage tree).

Some abundant Northland and Auckland trees, notably taraire and towai, are strangely almost absent from the ranges of Waitakere - there are some unusual groves of taraire at Karekare which may have been introduced by coastal-dwelling Maori 800-1 000 years ago as fruit trees and to facilitate bird snaring.

Henderson, Te Atatu and Whenuapai were once covered by the great broadleaf forests of the Waitemata lowlands. A good impression of the magnificent glades that once stood can be glimpsed by taking a walk through Smith's Bush in Takapuna, Murphy's Bush in Takanini or Kirk's Bush in Papatoetoe.

On the Te Atatu Peninsula majestic 50m tall kahikatea - pukatea forest once stood high above a dense sea of nikau palms, overlooking Pollen Island, Waitemata and Auckland.

East of the Waitakere Ranges and around Titirangi and Laingholm, the soils are more sedimentary than volcanic, holding more moisture in summer and fertility. So on these "Waitemata" soils lowland totara is more common and the lush kohekohe, puriri, karaka and nikau are notably more widespread and abundant.

Climate and topography are key influences over what grows where and this is especially so in Waitakere's Wild West Coast. Storms from the Tasman dump salt spray onto the rugged landscape creating a band of salt resistant **pohutukawa** forest and a whole array of other salt hardy

plants. Native toetoe, NZ spinach and wild celery grow on the sand. Coastal ice plants, waxy taupata, clinging hebes, and even tough ferns clinging to sheer rock walls which are forever blasted with the full force of salt spray.

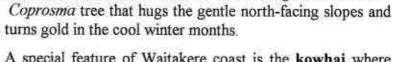


The unrelenting coastal elements have moved mountains of sand, damning valleys to create wetlands and dune impounded lakes, partially burying **pohutukawa** trees, and creating a new coastline that has grown 1.5km this century! The Te Henga wetlands are the largest in the Auckland

region and support bitterns and a wealth of other wetland birdlife. The Whatipu dunelands provide a nesting habitat for the rare banded dotterel, a haven for duneland plants and a human retreat in Auckland's best coastal wilderness.

The saltstorm forces diminish in the Manukau harbour so the **pohutukawa** belt narrows and the salt hardy plant species dwindle but still the coastal air has its influence. As the coastal air moves inland up into valleys and even over the Titirangi ridge, plants respond to its warming climatic influence.

The best indicator of this natural air conditioner is mamangi, a handsome

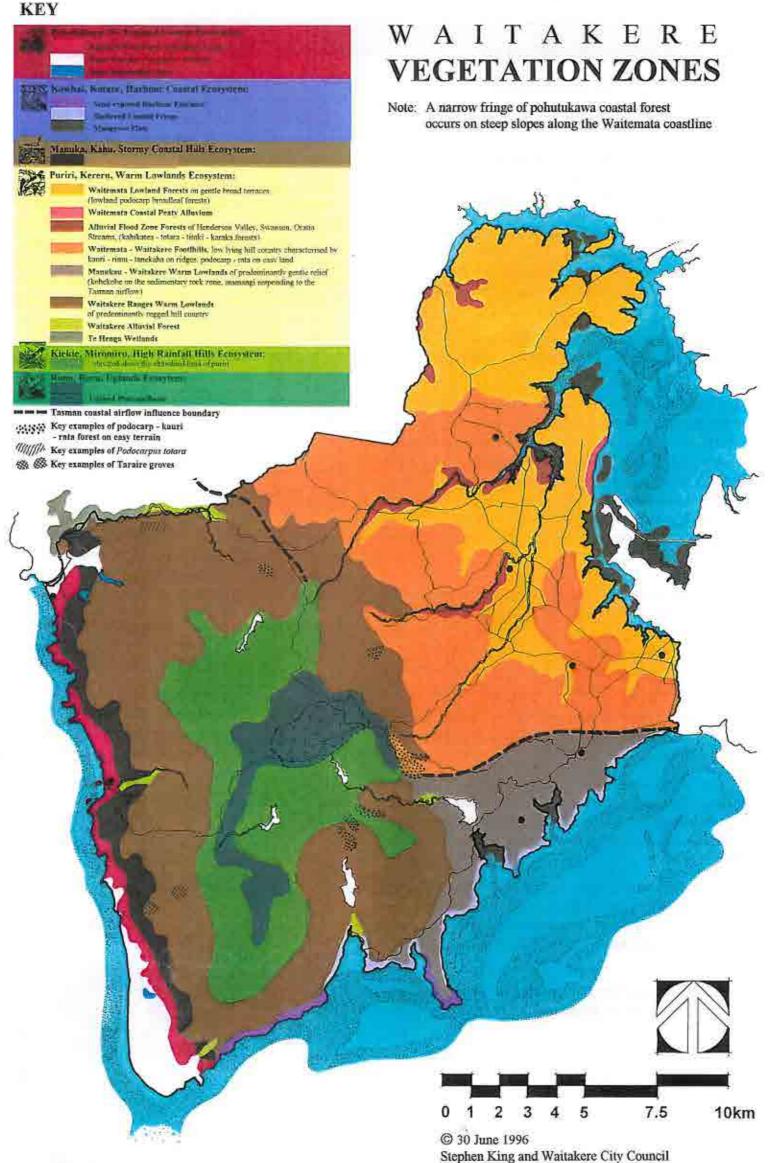


A special feature of Waitakere coast is the kowhai where rockland and coastal habitats are peppered with gold to

herald the spring and a subsequent succession of flower colour of kanuka, pohutukawa and rata that continues through to mid-summer.

From the coast to the interior a profusion of fern species abound in every niche from bare rock and dark waterfalls to treetops to provide one of the richest fern havens available supporting 110 species.





The Waitakere Ranges are a priceless asset and by far Auckland's richest natural heritage.

We can celebrate the fact that kereru (native woodpigeon) fares comparably better in Waitakere among the rich coastal food sources that abound. However, many people comment on the silence of the forest and scarcity of native birds. This is the way it has been since the arrival of europeans and their four-footed predatory hangers-on (rats, stoats, cats, possums and dogs) that devastated kiwi, kaka, kokako, tieke, kakariki and others.

The silence leaves a hollow feeling that all is not well in our forests. The stark skeleton of a 500 year old **rata** is vivid reminder of the impact of an unwanted possum.

However, the ability of nature to bounce back and heal wounds is nowhere more evident than in the profusion of **tree ferns**, that burst with energy each spring flush, and cling to every steep slope and gully.

Yet this whole energetic world of wonder hangs on a thread, for an army of

invaders is now infiltrating the forest. This time it is not the predators invading to take out the birds, but an army of alien plants set to take over the forest itself.

Originating from garden centres and spreading from gardens and roadside dumped rubbish,

wind and birds, the alien army is rapidly encroaching into the heart of the forest. Ginger, ivy asparagus, monkey apple, jasmine and a host of others threaten to overrun the entire ecosystem replacing native species and destroying the regenerative capacity of the forest.

Already at least 12 native species are threatened with extinction within Waitakere due to weed invasion. We have only a short time to turn the clock back if we are to succeed in avoiding extinction and ecosystem collapse. Succeed we must if we are to pass on this precious gifted heritage to the next generation.

While it is evident we need to embark on a coordinated weed control programme across the community, there is one vital thing we can all do:

 foster interest and pride in Waitakere's wonderful and unique natural heritage.

Join in and:

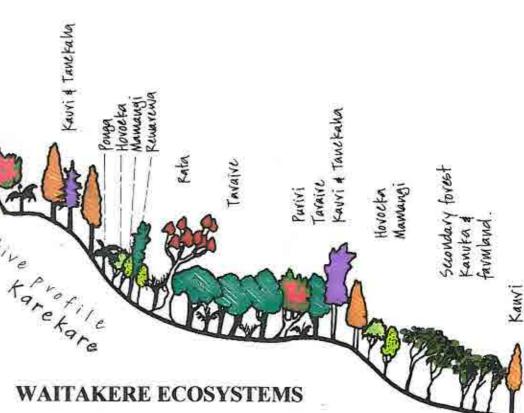
- Visit the Waitakere forests and enjoy them and learn about them.
- Take a friend and celebrate its wonders, species, seasons and landscapes.

- Give it a helping hand by getting rid of your weeds. Even better, get a community group together to tackle your weeds on a neighbourhood basis! (refer pages 54,55)
- Grow a heritage garden or forest of Waitakere plants to foster interest among your friends and family. (refer pages 50,52)

Remember:

When we get rid of weeds we restore the forest's ability to regenerate itself. We need not look as far as the Amazon to save a rainforest - our own is just as rich, just as unique and just as threatened.

> Long live te wao nui o Tiriwa



Pohutukawa, Oi, Exposed Coastal Ecosystem

As a strip along the coast facing out to Tasman Sea, the Pohutukawa, Oi Exposed Coastal Ecosystem (see on Ecosystems map) has three main components - dune systems, dune lakes, and, the areas above the dunes affected by saltspray, the exposed west coast where pohutukawa in particular thrive (see on Vegetation Zone map).

Exposed West Coast

This saltspray coastal zone is dominated by pohutukawa forest and supports its own endemic plant, the Waitakere rock daisy. Other saltspray tolerant plants include taupata, west coast cliff hebe, and horokaka, an ice-plant.

Sloping cliffs support pohutukawa forest with houpara, karo, karaka, kawakawa, nikau, Coprosma macrocarpa, ti kouka (cabbage tree) and on more sheltered sites also west coast kowhai, puriri and occasionally tawapou.

© 30 June 1996 Stephen King and Waitakers City Co. Harakeke flax, toetoe and kawakawa are the main colonising shrub species. Pohutukawa growing on or partially buried by encroaching sand often supports lush growth of nikau, karaka, kawakawa and New Zealand spinach.

Ngaio and tree daisy Olearia albida are present but scarce. Taraire is also scarce, found at just one site at Whatipu. Interesting ferns include Asplenium obtusatum, on salt spray vertical cliffs, and Blechnum banksii. The dainty Pteris saxatillis and the shield fern nestle under pohutukawa. and the giant Hypolepis dicksonioides in forest gaps.

Key establishment nurse species in the exposed coastline zone are kawakawa, flax, hangehange, houpara, pohuehue, and pohutukawa.

Dune System

Dune systems of shifting sands support pingao, and small semi-stabilised dunes have spinifex. Stabilised dunelands are clothed with pohuehue, kawakawa and ti kouka (cabbage trees). There are also extensive wetlands.

Dune Impounded Lakes

The twiggy Coprosma crassifolius is one of the many divaricating - the twiggy and tangled - plant forms that are a feature of pohutukawa forest at the dune impounded Lake Kawaupaka.

Kowhai, Kotare, Harbour Coastline Ecosystem

This ecosystem is located along the Manukau Harbour coastline (see Ecosystem map) The vegetation on the coastline from the harbour mouth to Little Huia is different to that further in, and this area can be described as the semi-exposed harbour entrance (see Vegetation Zone map)

Semi-Exposed Harbour Entrance

@ 30 lime 1996 Stenhen King and Waitaba

Pohutukawa - puriri coastline with very diverse lowland forest including

Sheltered Coastal Fringe

A narrow coastal fringe of pohutukawa joins the Northland kowhai (Sophora microphylla var. microphylla), abundant kohekohe, puriri, kauri and very diverse lowland forest including karaka and occasionally titioki, Coprosma macrocarpa, and the coastal astelia are common. The handsome wharangi is present. Ngaio and tree daisy Olearia albida are rare. Pohutukawa - rata hybrids. Numerous fern species include the abundant maidenhair, Adiantum cunninghamii, and more rarely the dainty maidenhair Adiantum diaphanum and Asplenium hookerianum - all weed endangered. A wide range of lowland plants, including kauri, reach the shoreline.

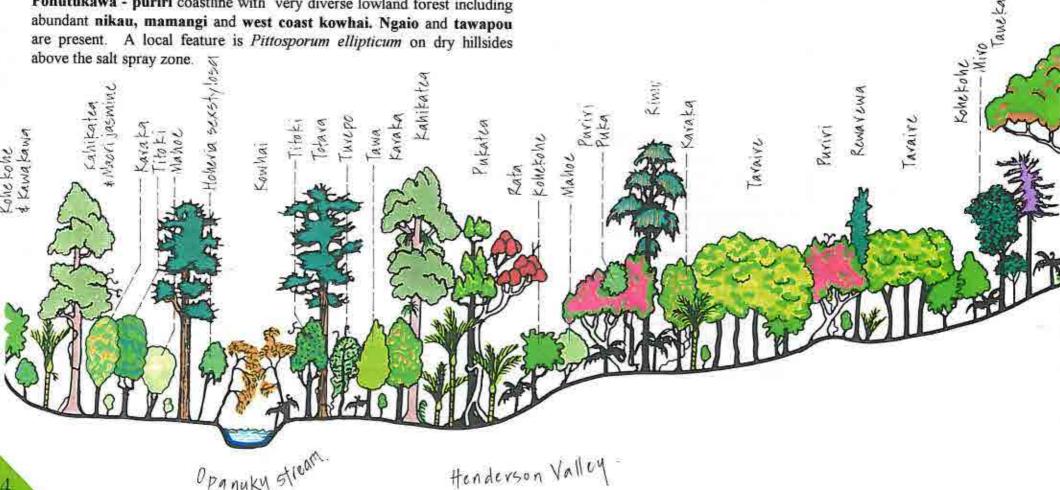
Manuka, Kahu, Stormy Coastal Hills Ecosystem

Above the exposed coastal system (see on Ecosystems map), this lowland forest is subject to occasional fierce storms that burn off the tops of puriri and other trees. Pohutukawa is present on rock outcrops, plus pohutukawa-rata hybrids. Flax is abundant in secondary vegetation.

Broadleaf Coastal Scarp (Massey)

An area characterised by karaka - tawa - kowhai with puriri, towai, abundant mahoe, kawakawa and mapou. Kahikatea, pohutukawa and pohutukawa-rata hybrid are present. This area has the best example of broadleaf forest on a coastal scarp in the Waitemata harbour. Supplejack is plentiful. Coastal plants include houpara and Coprosma macrocarpa, Kauri - tanekaha forest on ridgeline

Elsewhere Waitemata coastal cliffs support a narrow band of pohutukawa on exposed sites which meet with kowhai and kohekohe on moist sites with a southerly aspect.



Puriri, Kereru, Warm Lowlands Ecosystem



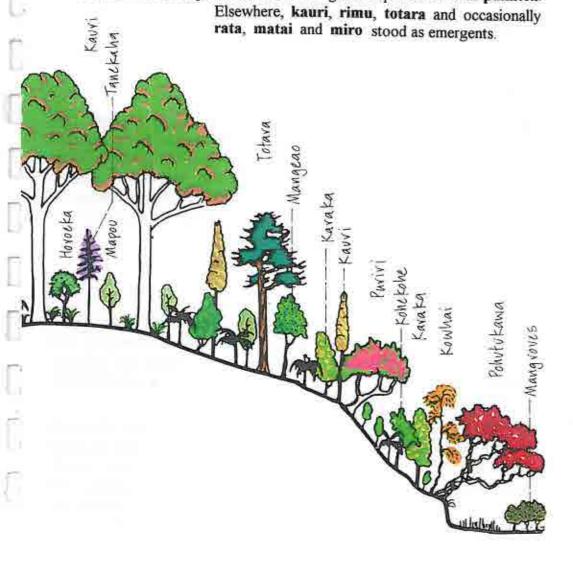
Introduction - overview

Throughout the warm lowlands ecosystem that is natural to most of Waitakere City (see on Ecosystems map), kauri, rimu, rata, kahikatea, rewarewa and the occasional miro are the main high canopy or emergent trees. Below 200m altitude, tanekaha is abundant on ridges, but in the mature forest it fringes, kauri stands on spurs or dry sharp ridges and on summer dry clay soils especially below 100 m altitude. Lowland totara is common only in the Waitemata lowlands and foothills, the Manukau-Waitakere warm foothills, frosty Te Henga valley, alluvial valley floors and a small site at Karekare.

While lowland totara prefers fertile easy slopes or flats, Hall's totara typically grows on sharp ridges, knolls, rocky streamsides and infertile sites. An unusual feature is the absence of towai and kamahi (Weinmannia spp.) and rarity of taraire.

The forests of the lowlands have a characteristically irregular and broken lower canopy due to mid-canopy trees like **taraire** being uncommon resulting in an abundance of treeferns, small trees and shrubs. This reflects the hilly nature and low nutrient status of the ancient weathered volcanic soils. In fact, excepting the **kohekohe** glades on Exhibition Drive at Waima and **taraire** groves at Karekare, nowhere do broadleaf trees form a continuous upper canopy or extensive glades.

However on the fertile Waitemata lowlands, wherever the soils are friable and deep, broadleaf trees were once abundant. Scattered between tall forest emergents, extensive glades of broadleaf trees were previously dominated by taraire, huge puriri, karaka or titoki along with abundant kohekohe, frequent tawa, with mangaeo and hinau more rarely present. In wetter sites tall kahikatea, pukatea and nikau grew in profusion with pukatea.



Swampy depressions throughout support large tall kahikatea, rata and pukatea emerging high over swamp maire and abundant nikau, kiekie, and wheki. Kohekohe prefers at least moderate fertility and summer moist slopes and is thus more abundant in the Waitemata soils and south-east sector of the Waitakere.

Puriri prefers the fertile deep soils or alluvium found in the Waitemata lowlands. Elsewhere puriri is typically found scattered on mid-slopes but is also common on harbour coastal cliffs, rocky slopes, bluff bases, and mobile gullies especially near Titirangi - Laingholm, sites where light and nutrients favour puriri establishment.

Mamangi is perhaps the most sensitive climatic indicator, and common only on warmer mid-slope sites where it is influenced by the Tasman coastal airflow.

Titoki is a good fertility indicator and uncommon except abundant in the alluvial floodzone in Henderson Valley.

Nikau palm is widespread, clearly preferring gullies, depressions, steepland footslopes, slump sites and other seepage sites where moisture is abundant. Wheki, along with putaputaweta, favours wet depressions, seepages, and moist alluvial streamsides in frosty valley bottoms. Ponga the silver tree fern is universally abundant, along with mapou, preferring gentle ridges and side slopes. Mamaku, the black tree fern, is abundant on very steep slopes and gullies (along with mahoe, pate, houhere and supplejack). Examples of these nikau palm and tree fern patterns are all visible from The Arataki Information Centre viewing platform.

Kowhai grow on sharp spurs, ridges, escarpments and along flood prone streambanks and coastal margins. White maire is widespread but never abundant and favours ridges and side slopes.

Shrubs common everywhere include mahoe, mapou, hangehange and karamu. Mahoe, pate and houhere thrive in damp gullies and wet rocky sites. A wide group of shrubs, e.g. the shiny karamu, favour drier sites and former kauri forests, akepiro, prickly mingimingi and kumerahou being especially characteristic of former kauri forest as is tanekaha. Kawakawa favours the coast, sandy, rubbly, fertile sites.

Kohuhu and tarata are features of every land on broad ridges, basins, wide valleys and the broad fertile terraces of Waitemata lowlands.

Native tree daisies are well-represented. **Heketara** is common in steeper hill country on infertile ancient volcanics, whereas **akepiro** is abundant on often infertile summer-dry, clay country of former kauri forest and on stormy coastal hills. **Rangiora** is particularly abundant on windy or rocky steep slopes. The beautiful, possum-prone **kohurangi** was once very common in the lowland **kauri** forests.

Recovery Species

Manuka, kanuka and bracken are nature's healers of burnt forests and bare land in the lowlands - hence their abundance today.

Mahoe, mapou, ponga, mamaku, hangehange, karamu, and pate are the principle broadleaf nurse plants for forest establishment in the warm lowlands.

Each lowland forest zone is defined by geological, climatic, topographic and soil features that significantly affect forest composition. The key habitat themes are outlined for each of the warm lowlands zones.

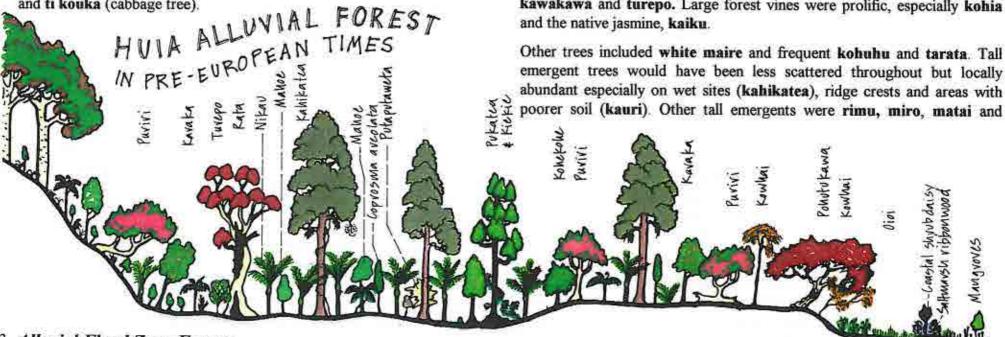
1. Waitemata Lowland Forests

Free-draining fertile soils and gentle slopes provide ideal habitat for lowland totara and abundant broadleaf trees - taraire, puriri, karaka and titoki.
 © 30 June 1996 Stephen King and Waitakere City Council

2. Waitemata Coastal Peaty Alluvium

Moist fertile peaty soil.

 Deep peaty soils favour prolific growth of pukatea, kahikatea, nikau and ti kouka (cabbage tree).



3. Alluvial Flood Zone Forests

- Free-draining, deep fertile soils on flood-prone valley floors.
- Ideal habitat for titoki and totara, and kowhai on streamsides.

4. Waitemata - Waitakere Foothills

- Gentle slopes sheltered from west coast climatic influence.
- Ridges support abundant tanekaha and kauri forests.
- Abundant kahikatea, rata, rimu, nikau, features of moist easy land.
- Waitakere foothills contain volcanic material otherwise moist Waitemata clay soils favouring kohekohe, lowland totara, nikau.

5. Manukau - Waitakere Warm Lowlands

- Mix of volcanics and sedimentary, easy terrain with some steep scarps.
- Kohekohe abundant and lowland totara significant.
- Tasman coastal airflow provides a moderating climatic influence.

6. Waitakere Ranges Warm Lowlands

- Infertile weathered ancient volcanics.
- Predominantly rugged hill country but wide local topographic diversity.
- Mostly west coast climate influenced.

7. Waitakere Alluvial Forest

with Coprosma areolata

8. Te Henga Wetlands

Waitemata Lowland Forests on gentle broad terraces.

Fuller Description of above . . .

The key and characteristic feature of these gentle lowlands with fertile deep friable soils is the abundance of large broadleaf trees.

Puriri was common and locally abundant forming groves of very large epiphyte-laden trees with abundant karaka, kohekohe and tall mahoe. Tawa and titoki were probably somewhat less abundant but still common. On dry, free-draining sites, hinau, and less commonly mangaeo, were present. Subtle folds in the land created changes in species dominance and abundance. Evidence suggests taraire was at least locally abundant forming

notably lowland totara. Large rata trees are likely to have been present in the damper sites especially in dense glades of puriri. Coprosma macrocarpa was common near the coast and it is possible mamangi inhabited some warm slopes.

extensive glades and possibly abundant throughout. Ponga, mapou and

mahoe were the most abundant low canopy or understorey trees and on

wetter sites nikau and supplejack. The understorey included abundant kawakawa and turepo. Large forest vines were prolific, especially kohia

An attractive forest floor was frequently carpeted with creeping ferns including Blechnum filiforme, Asplenium lamprophyllum, Phymatodes scandens and Arthropteris tenella. Ctenopteris lasteopteris is common.

Waitemata Lowlands were a world apart from the present urban landscape but a rich, tranquil and beautiful world.

2. Waitemata Coastal Peaty Alluvium

Free-draining peaty soils sheltered by a scarp.

Large, tall kahikatea, scattered pukatea and rata are emergent over occasional swamp maire, puriri, frequent karaka, kohekohe and abundant nikau, kawakawa and Coprosma areolata. Ti kouka (cabbage trees) grow on wetter sites. The forest formed well-defined ecotone boundary grading to flax and coastal shrub and rushland and mangrove communities on the coastal margin. The giant astelia, Astelia grandis probably grew here.

3. Alluvial Flood-Zone Forests

Frequent kahikatea, totara and occasional pukatea, matai, rimu emergent over a mid-canopy of titoki - tawa - karaka emergent over dense low canopy of mahoe. Large turepo and kaiku are common. Hoheria sextsylosa, kowhai and occasional wheki grow along riverbanks. Hoheria sextsylosa is not found elsewhere in Waitakere.

The flood-prone forest floor supports Asplenium bulbiferum (hen-and-chicken fern - manamana), Asplenium lamprophyllum, and abundant Phymatodes scandens and Ctenopteris lastropteris ferns. The rare round-leaved maidenhair, makaka, Adiantum aethiopicum is present but endangered, the dainty maidenhair, Adiantum diaphanum was probably formerly present. This is a seriously weed-endangered ecosystem.

4. Waitemata, Waitakere Foothills

Waitemata and Waitakere volcanic soils.

Low lying hill country sheltered from Tasman coastal airflow influences. Characterised by extensive ridges dominated by kauri with tanekaha and rimu; and on the valley sides puriri, rata, rimu, kahikatea with kohekohe and nikau, abundant ponga, mahoe and other broadleaf shrubs/trees. Putaputaweta, mahoe, pate, makomako, nikau in gullies. (Similar to Manukau lowland gullies).

Gentle terraces and sheltered easy terrain characteristically abundant rimukahikatea - rata, with occasional miro, kauri and Hall's totara or totara emergent over a low broadleaf canopy including ponga, kohekohe, mahoe, abundant nikau.

A few rock outcrops feature kowhai, kohekohe, nikau, puriri. Steep gully sides with abundant kohekohe, nikau, puriri and supplejack. Large kohia vines feature in moist valleys e.g. Oratia.

Rata & Kahikatea

Urban Massey, Glen Eden, and in the vicinity of Henderson, Glendene and New Lynn once supported the following forest types. Extensive areas of kauri, rimu, tanekaha forest with occasional totara and puriri on broader ridges, kahikatea, rata, kohekohe and occasional karaka on valley sides and damp sites. Nikau and ponga abundant.

Kahikatea, pukatea, rata, nikau forest wetland communities and forest ponds are a feature on old slump sites and depressions, especially around the Rangemore Track

5. Manukau - Waitakere Warm Lowlands

These Manukau Lowlands are geologically, topographically, climatically intermediate between the Waitakere Ranges Warm Lowlands and the Waitemata-Waitakere Foothills zones. With a mixture of Waitakere volcanic and Waitemata sedimentary soils on predominantly fairly gentle relief with steep scarps, the zone is strongly influenced in climate by the moderating Tasman coastal airflow.

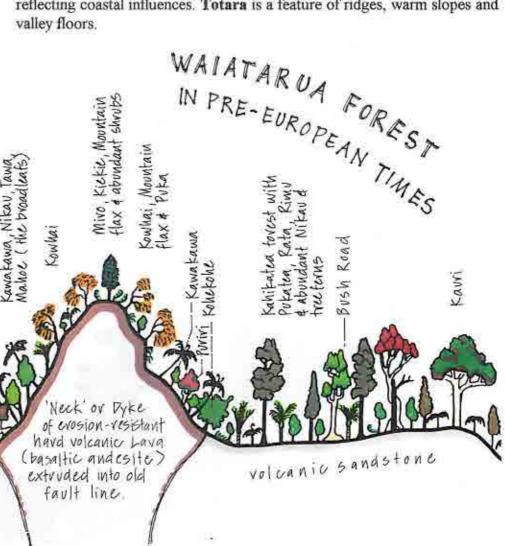
Coastal Waitakere links include mamangi - puriri forests (some of the best).

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Waitemata links include frequent totara and abundant kohekohe (the best) often growing with puriri, tawa, kowhai, karaka and nikau on south-facing slopes (Waima - Woodlands).

Abundant Northland kowhai is a special feature of steep ridges and scarps. Here kowhai grow to 10m in height and 50cm diameter trunk. Some of the best are at Laingholm. Kahikatea - rimu - rata - kauri - nikau forest, with pukatea, titoki, kohekohe and putaputaweta, is a feature of easy terrain (Waima).

Kauri - tanekaha - rimu is characteristic of low ridges with puriri and kohekohe on side slopes. Abundant kawakawa, occasional houpara and rata-pohutukawa hybrid trees are found inland on Titirangi ridge reflecting coastal influences. Totara is a feature of ridges, warm slopes and valley floors.



6. Waitakere Ranges Warm Lowlands

A diverse range of forest communities characterized by the following patterns;

- Kauri tanekaha forest on ridges, spurs, and bluff tops e.g. at Huia, near dam, and Cascades.
- Rimu kahikatea rata forest with occasional kauri on gentle terrain e.g. at Huia catchment (Christie's).
- Steepland ridges of Hall's totara, miro with rata e.g. at Fairy Falls.
- Steepland slopes of widely scattered rata, kahikatea, rimu, miro, occasional puriri and scattered tawa emergent over a low broadleaf shrub canopy characterised by mamaku, heketara, houhere, mahoe, ponga, nikau, supplejack and abundant parataniwha

e.g. at Fairy Falls.

27

- Steepland rocky sites with kowhai and often tawa and puriri e.g. at Cascades.
- · Gentle warm mid-slopes of occasional rata, and podocarps and scattered puriri. Nikau emergent over mamangi, ponga, horoeka (lancewood) and nikau.
 - e.g. Karekare, Te Henga, Piha Valley.
- Kahikatea, pukatea emergent over swamp maire and abundant nikau, kiekie, putaputaweta and often with wheki.
- Very diverse mixed semi-coastal hill forest.
 - e.g. above the descent road into Karekare.

Note: Rewarewa and nikau scattered throughout most forest types.

Two distinctive local forest variants are.-

1) Taraire forests at Karekare and Pararaha with scattered clumps in Piha, Te Henga, Huia and Whaitpu.

Dense taraire type with scattered large puriri, frequent rewarewa and occasional rimu, kauri, associated with abundant mamangi.

2)Te Henga frosty totara valley zone characterised by frequent totara on the valley floor and sunny slopes and ridges, abundant mamangi on warm north slopes and abundant kaikomako, Coprosma areolata and other divaricating shrubs especially near the valley floor.

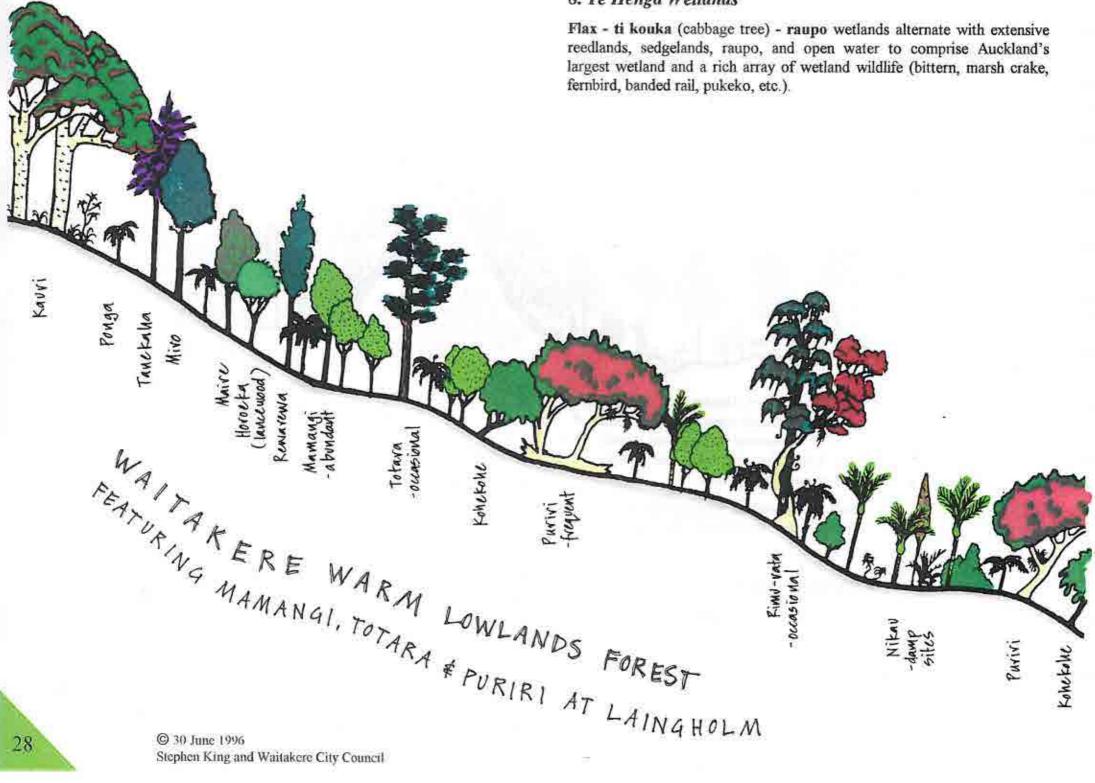
Totara is also found in the vicinity of other alluvial valleys at Piha, Karekare and Little Huia.

7. Coastal Waitakere Alluvial Valleys

Often with Coprosma areolata

Kahikatea - puriri - karaka and on wetter sites kahikatea - pukatea swamp maire with abundant nikau, ti kouka (cabbage tree), putaputaweta, and in some valleys, Coprosma areolata. Rata or pohutakawa and totara may be present. Riverine kowhai and harakeke flax too.

8. Te Henga Wetlands



Kiekie, Miromiro, High Rainfall Hills Ecosystem_

This area is situated above the climatic zone of puriri in the cool, high rainfall belt - 2 000 - 2 500mm/yr. - an annual rainfall twice that of Auckland! - and characterised by high rainfall species. It lies above the zone of tanekaha and mamangi; lowland totara is absent and Hall's totara is common. Kauri, rata, rimu, kahikatea are abundant emergent trees with frequent Hall's totara and miro - on ridges and occasional pukatea, hinau, maire, and frequent rewarewa. The Waitakere, Upper Huia and Upper Nihotupu reservoirs and their catchments are within this ecosystem (see on Ecosystems map).

> Limited areas of sheltered easy slopes and "terraces" support a dense high canopy dominated by rimu - rata kahikatea - with occasional kauri,

Limited areas of sheltered easy slopes and "terraces" support a dense high canopy dominated by rimu - rata - kahikatea - with occasional kauri, mire and Hall's totara.

An abundance of kiekie, wheki, pigeonwood, supplejack and kanono is characteristic, reflecting the high rainfall climate. Horoeka (lancewood), nikau, mahoe, houhere, winter rata and ponga are common.

Although not abundant, a special characteristic feature is high rainfall tree ferns. Katote and punui and the now rare possum-vulnerable raukawa tree.

Rimu, Ruru, Uplands Ecosystem



The top 'level' stretch of the Piha Road passes through this ecosystem from approximately Waiatarua to the Karekare-Piha fork, Rimu dominate the high rainfall upland forest areas, with distinctive cool climate species tawheo-wheo, tawari, toro growing on an elevated plateau of erosionresistant volcanic basalt.

Rimu is emergent with an occasional rata, miro, kahikatea, Hall's totara and kauri - usually with short rounded crowns and laden with epiphytes. These species emerge over a low canopy characterised by an abundance of heketara, kiekie, wheki and characteristically cool climate species such as tawheowheo, tawari and toro. Hinau, mountain maire, horoeka, ponga, wheki, pigeonwood and winter rata are common. Nikau are present. Kanuka and kohuhu are common second growth or recovery species.

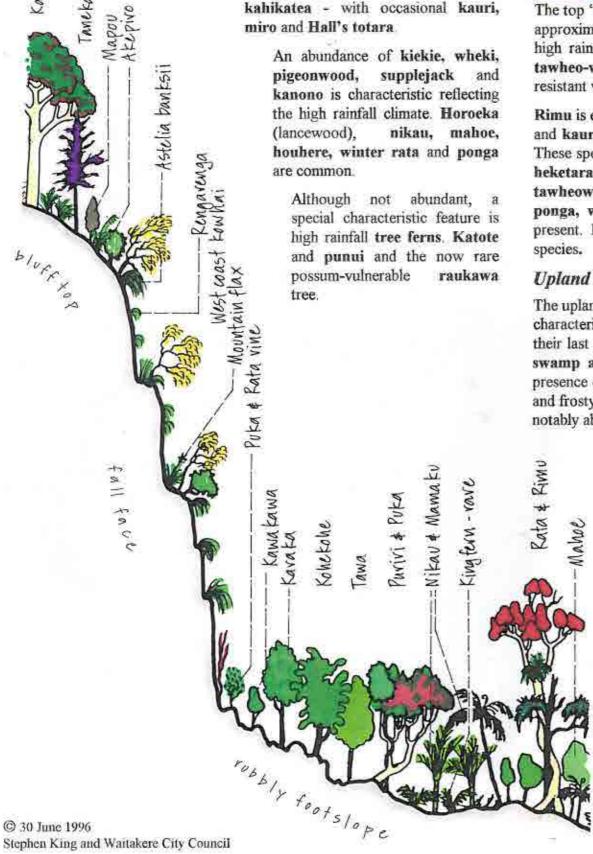
Upland Basin

The uplands embrace a plateau, a sheltered basin with a warmer climate but characteristically subject to heavy frosts. Remnant frost-hardy species find their last Waitakere refuge including wheki-ponga, mahoewao and giant swamp astelia. Tawheowheo and toro are less common. The isolated presence of lowland totara, although infrequent, reflects the gentle terrain and frosty microclimate. Kiokio ferns and the giant cutty grass, toikiwi, are notably abundant in this wet environment.

> The plateau is an ideal habitat for ancient giant kauri and once supported the biggest kauri trees in the Auckland region.

Note: On this plateau Auckland's largest kauri tree - of Tane Mahuta proportions - was purchased by a visiting English lord to ensure its protection. Unfortunately local loggers could not resist the temptation and set fire to the tree to justify their subsequent "rescue" of its timber.

WAITAKERE ROCKLANDS
Representative
Representative
Ca-CASCADES



Stephen King and Waitakere City Council

ROCKLANDS - Bluff Systems

Exposed bluffs typically of basalt, occasionally also conglomerate, support west coast kowhai, puka, coastal astelia and the rock lily, rengarenga. Wharariki flax and rata vines, including rare carmine rata, are sometimes present. Bluff tops are characteristically kauri - tanekaha communities in the lowlands, and abundant parataniwha, and kauri - hall's totara - rata - miro in the high rainfall zone.



Coastal astelia, puka or west coast kowhai are almost always present at the top.

Nutrient-rich rocky footslopes support tawa, karaka lowland forest often enriched with taurepo and wharanui, and abundant houhere, nikau, mahoe, and puriri, kawakawa and para, the king fern, in the Cascades.

KEY ROCKLAND / BLUFF SYSTEM PLANTS

Arthropodium cirratum	rengarenga, rock fily	EC, HC, I
Astelia banksit	coastal astelia	EC, HC, I
Celmisia major var.majo	Waitakere rock daisy	
Coprosma repens	taupata	EC
Disphyma australe	horokaka. NZ iceplant	EC
Griselinia lucida	puka	HC
Hehe obtusata	cliff hebe	EC
Metrosideros carminea	carmine rata	HC, L
	akatea, small white rata	
Myosotis "pansa" R * 1	Waitakere forget-me-not	EC, L
Sophora "fulvida" *	west coast kowhai	EC, HC

EC = Exposed Coastline; HC = Harbour Coastline; L = Lowlands; * = Waitakere endemic plant, ® = rare

KEY ROCKLAND INVASIVE WEEDS

	Agapanthus praecox	agapanthus
	Ageratina ripari a	mistflower
	Asparagus asparagoides	smilax
	Asparagus densiflorus	bushy asparagus
	Asparagus scandens	climbing asparagus
	Cortaderia juhata	pampas
	Cortaderia selloana	pampas
	Cotoneaster spp.	cotoneaster
	Erigeron karvinskianus	Mexican daisy
	Hedera helix	ivy
3.5	Hedychium flavescens	yellow ginger
	Hedychium gardnerianum	wild ginger
	Nephrolepsis cordifolia	tuber ladder fern
	Polygala myrtifolia	swect pea shrub
	Polygonum capitatum	pink-head knotweed
	Ulex europaeus	gorse

KEY

exposed coastal rocklands lowland rocklands

(predominantly west coast kowhai)

Northland kowhai or hybrids may occur in upper Nihotupu-Upper Huia sites KEY ROCKLAND PLANT SITES

- (1) Cascades
- ② Mercer Bay/Hikurangi saltspray cliffs
 Weed infested sites

All Waitakere endemic plants are confined to the bluff systems or coastal rocklands. These are thus nationally significant systems, the endemic plants include:

Celmisia major var. major Waitakere rock daisy (coastal)

also on Great Barrier Island

Myosotis "pansa" Waitakere forget-me-not (coastal)

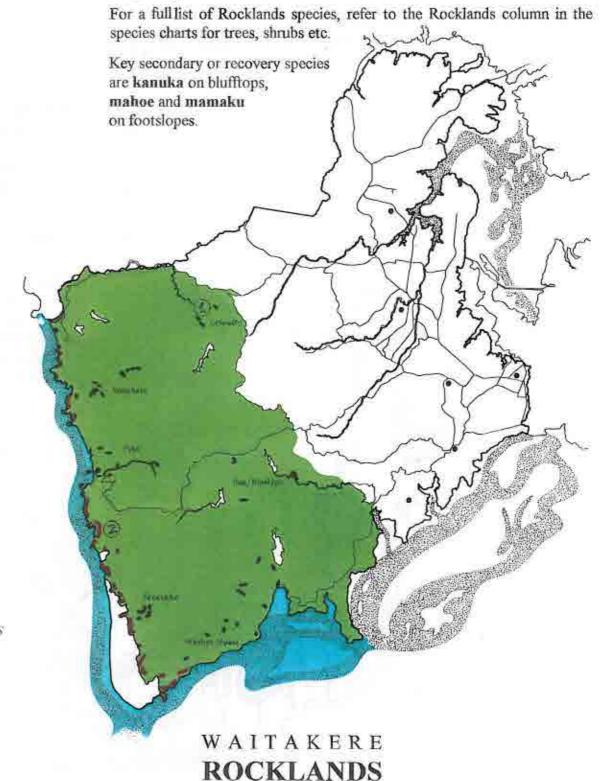
♦ Hebe bishopiana Huia hebe (semi-coastal)

 Sophora "fulvida" west coast kowhai (also at Maunganui Bluff Piwakawaka)

Associated nationally rare or restricted species include:

- Hebe obtusata west coast cliff hebe (coastal), and,
- Metrosideros carminea carmine rata, akakura (not exclusive to Northland).

Dominant fall-face species are puka, coastal astelia and the rock lily, rengarenga.



HANDS-ON GUIDE TO PLANTING & RESTORING

BIOSECURITY - the paramount principle for large sites (>1 ha)

To maintain biosecurity is the paramount restoration principle, guiding and over-riding all others because it affects not only your project but other more important - perhaps distant - natural sites/ecosystems. This is especially so if your site becomes a weed source or a source of genetic pollution of natural areas. (See pp.54-55 for lists of many local weeds.)

Invasive weeds!

- Start with a list of potentially invasive weeds that could grow in your habitat. Get the advice of a good weed ecologist if necessary.
- Survey your site AND the dispersal zone around your project, that is:
 - upstream, e.g. for, wandering willie and mistweed.
 - within 500m for blackbird dispersed seed such as ginger.
 - within 2 to 5km for kereru (pigeon) dispersed seed, like acmena.
- Any project near any natural ecosystem, and all major projects, should have an invasive weed risk assessment prepared.
- If you cannot eradicate these weed sources, DO NOT PROCEED. Cancel your restoration plans. Unless your site is small and you are in the rare position of being able to commit future generations to endless intensive weed management, it is ecologically and socially unwise to proceed. Choosing to allow a restoration vision to bow to ecological (pest invasion) or management realities is not easy, but is responsible. It is better to shift your focus to a project that is sustainable, and more beneficial and rewarding in the long term.

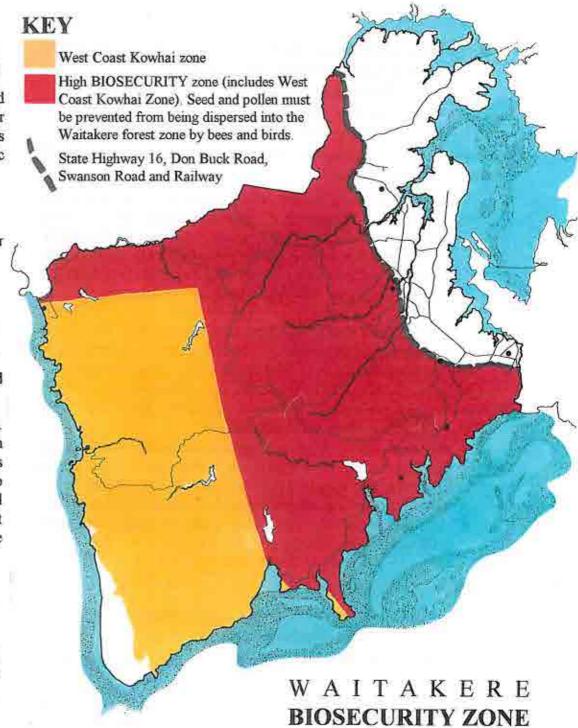
ECO-SOURCING PRINCIPLE - maintaining indigenous identity

Use local species, local seed sources to ensure the protection of natural areas against invasion by species or strains that are not part of the unique character of your local (Waitakere) landscape.

As a guide:

- Local species = those that grow or grew naturally in your site or locality.
- Local seed sources = within the ecological region, e.g. Auckland.
- For most species this can be practically applied to include sources within our (Auckland) region. For a few highly specific or naturally variable species, e.g. west coast kowhai (Sophora "fulvida") and other plants of specialized isolated habitats (e.g. the Huia hebe, Hebe bishopiana), seed sourcing and planting should take place within a much more locally defined area. A few plants that readily hybridise and express wide natural genetic variation (e.g. Coprosma macrocarpa) should be sourced very locally, e.g. West Coast, Manukau harbour, Waitemata.





ACHIEVING NATURALNESS - introducing the eco-siting principle

Rainforests are a complex array of species and plant communities. Each community is a distinctive assemblage of plants responding to their climatic zone, the substrate, the slopes, moisture and fertility. The accompanying guide is aimed to help achieve this for Waitakere.

The guiding principles are:

ECO-SITING

1. Choose the right species for :

- your climatic zone (see plant lists for each ecosystem pp.8-19)
- your substrate (rock, sand, soil, swamp) (see tolerances pp.9-19)
- your slope (ridge, sideslope, steep, etc.) (see habitats pp.36-45)

2. Choose the right quantities:

- e.g. pohutakawa may provide 50% of canopy in a pohutukawa forest, with perhaps 20 trees per hectare; or puriri may be 5-20% of a puriri forest canopy with just 5 trees per hectare.
- refer planting quantity guide, "liberal" to "sparing" (pp.36-45).

- 3. Plant each tree species in its preferred microsite/habitat (see pp.36-45):
 - · e.g. nikau in gully or moisture seepage site;
 - kowhai on steep slopes or rocky knolls;
 - kowhai or karaka on old shell middens; and,
 - take care to not overplant not too many trees.

Eco-siting ensures better survival and it ensures that the true natural character of a forest is created.

- If you get it wrong, nature will eventually sort it out after a few decades or centuries. It is both challenging and far more rewarding to learn from, and re-create, nature's natural patterns. The key here is to look at the site you have and try to draw from natural examples in your climatic zone and ecological district or region to determine what would naturally grow in that site.
- 4. Use appropriate first stage or nurse plants in an open site;
 - Identify the nurse species or colonising species appropriate to your site (climatic zone, substrate, slope) e.g. manuka, karamu.
 - Nurse species are noted for ecosystems and habitats (pp.36-45).
 - · Establish nurse crops of these hardy shrub species, plant them abundantly at about 1m to 2m spacings.
 - Use these and perhaps the hardiest and most weed resilient species for mass planting to create shelter and a natural setting for the carefully sited canopy trees (which may be planted later).
 - Seed nurse plants (e.g. manuka, karamu) directly onto weed-free sites.
 - · Occasionally the nurse role can be achieved using non-invasive exotic species, but it is not generally advisable.

BEFORE YOU START

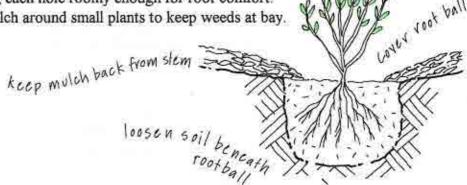
If the planting project for large sites (>1ha.) passes the acid test of invasive weed risk assessment (under Biosecurity above):

- · A weed and pest control plan which identifies the steps, risks, alternative and objectives needs to be prepared FIRST.
- Weeds may affect the scale and timing of the project or whether or not to proceed, or have a major bearing on the choice of nurse species (e.g. to rapidly achieve weed resilient cover).
- The strategy may influence the establishment method used
 - e.g. planting vs. direct seeding (manuka, karamu, etc.); or, harvesting vs. fell to waste of exotic timber nurse species.
- Plan the sequence of events of how to do it including quantities, cost, effort, etc.
- Detail the quantities of plants required.
- Consider at this stage the practical issues of non-forest invasive weeds that affect establishment (e.g. blackberry, grass, gorse).
- Give attention to the protective status of the land.
- Does the land have protective status adequate for long term restoration goals - e.g. Reserves Act covenant; Q.E.II National Trust covenant; Council by-law.
- Source plant stocks and determine costs and timetables for supply.
- · A planting project may have to be deferred, staged, or changed to meet practical constraints in supplies of suitable quantities of eco-sourced plants.
- Re-evaluate the project at this stage for its achievability and sustainability (ecologically, financially, long-term commitment) and be prepared to change before committing yourself and others.

PLANT SIZE AND PLANTING:

- Use plants big enough to cope with weed threats.
- Use cheap, small plants for nurse crops.
- Use larger plants for the main trees.
- Fertilise with blood and bone.
- Dig each hole roomy enough for root comfort.

Mulch around small plants to keep weeds at bay.



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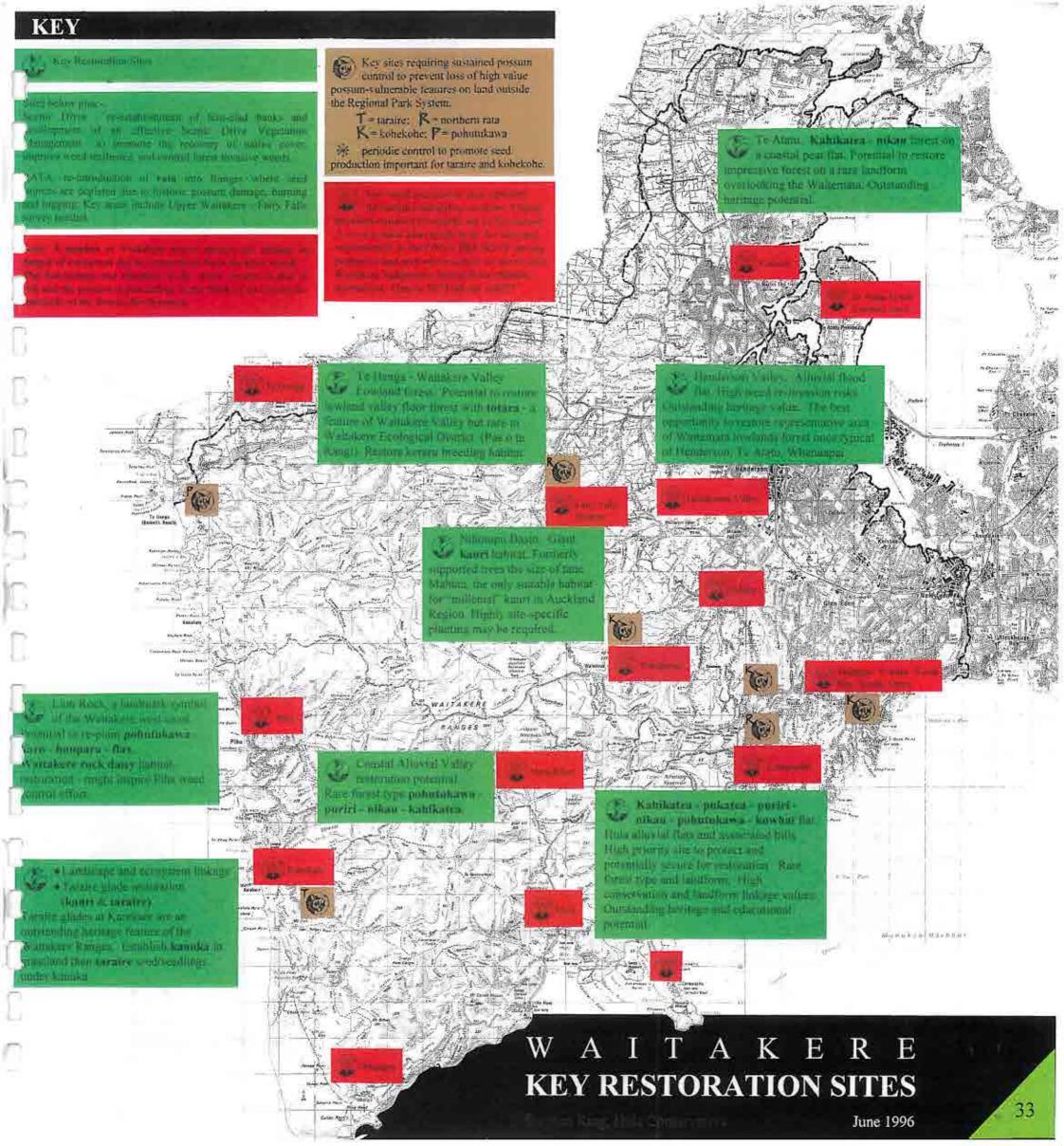
PLANTING DENSITIES

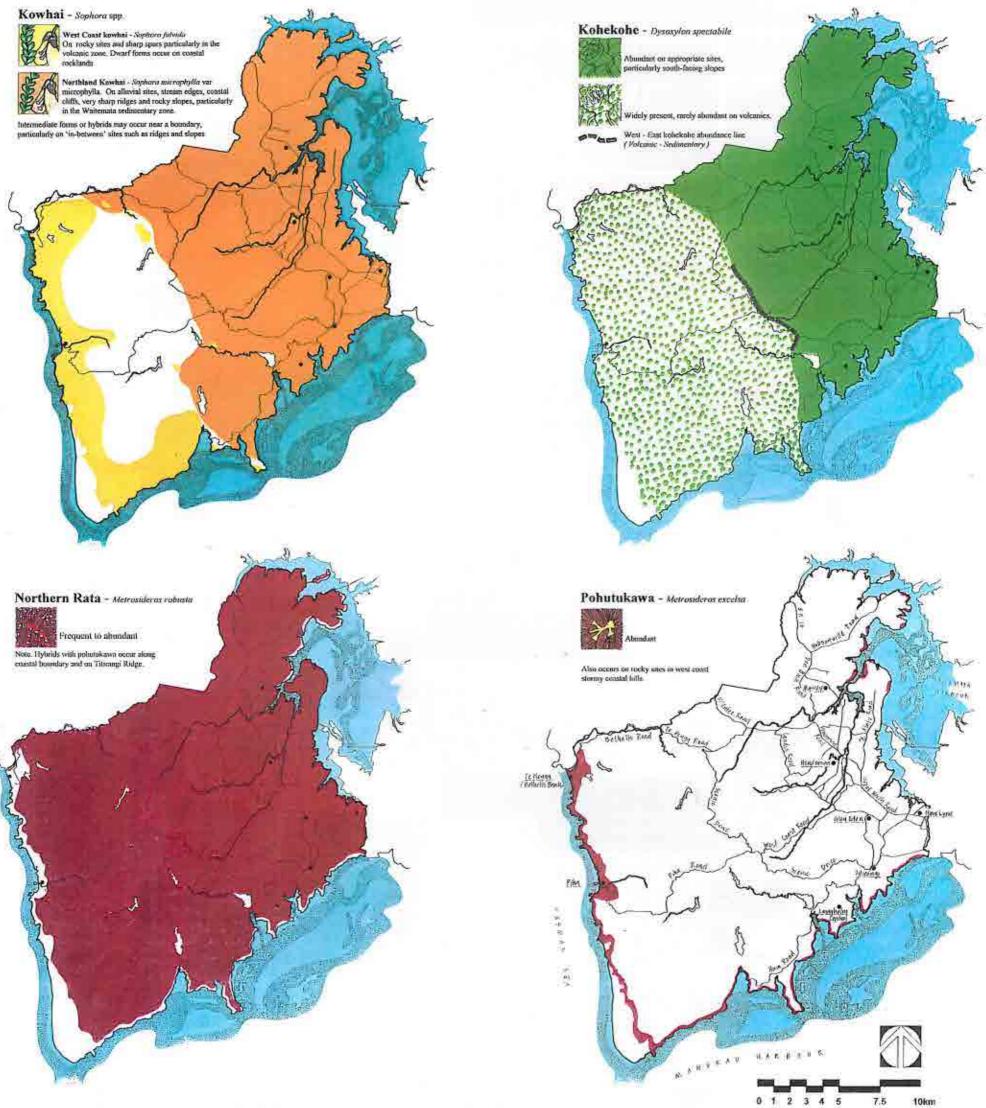
When aiming for naturalness, the planting abundance and sites chosen for nurse plant trees and shrubs is less important than siting of big canopy trees like puriri and rimu or character trees like mamangi and nikau that will form the canopy and character of the forest for many generations to come. The challenge is to make it so natural that in 20, 50 or 100 years no one will realise it was planted!

- Before planting, take a look at some natural sites on similar slopes or habitats in the same forest zone and similar altitude. Let that be your guide.
- In nature, many trees are scattered in the landscape in surprisingly low numbers often on special sites, even though they may be conspicuous due to their size and contribute significantly to the character of an area e.g. rata, kauri, puriri.
- Plant big emergent tree species (kauri, rata, rimu, etc.) carefully and sparingly, aiming to achieve a natural effect. Allow plenty of room to mature. Sometimes native trees such as kahikatea seem to grow densely and then "fight it out" over time. Well-spaced trees, however, grow much faster.
- Care needs to be taken NOT to plant too many of the main or canopy trees. Well planted, well-sited trees usually establish well so there is not normally any need to over-plant in anticipation of big losses.
- · Sometimes it is beneficial to over-plant nurse plants to achieve rapid cover and keep out weeds. Refer planting guide for nurse plants and relative quantity pp.36-45.

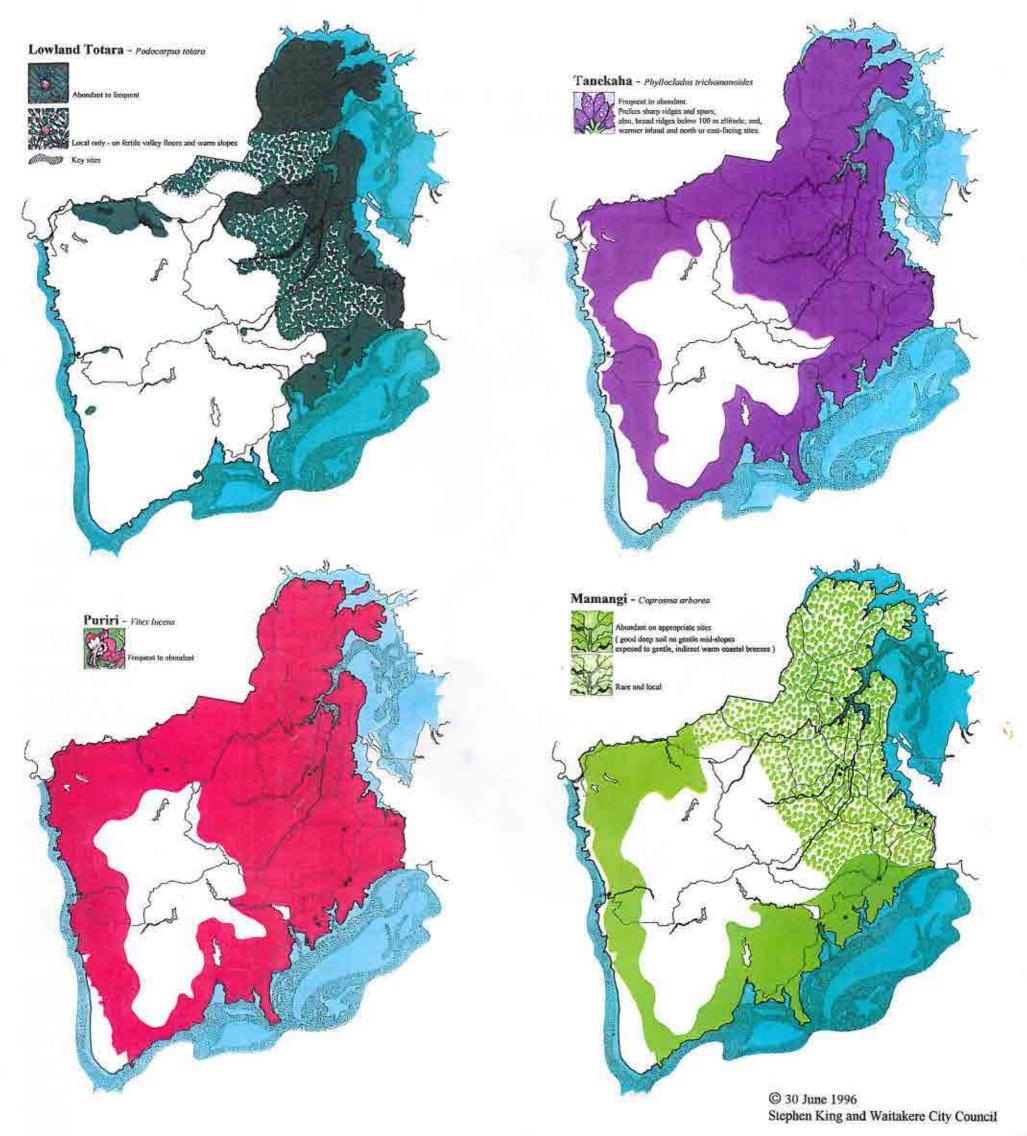
REMEMBER

- · A well-sited, well-planned planting project will often largely take care of itself especially if it is in a weed-free zone and natural regeneration can take place. Sometimes simply removing key weed sources, removing cattle and closing the gate, are enough to bring the reward.
- A poorly sited and chosen project can end up a wasted effort, a big disappointment, a burden to others, or to the environment - especially if it becomes a haven for weeds.
- · See also "How to guides" for planting and seeding methods - Q.E.II National Trust Revegetation Guides; and, Waitakere City Council's Native Revegetation Manual (Mark Bellingham Associates, 1996).





These maps show what would have been the original distribution of some of the most important plant species found in Waitakere.



WAITAKERE SPECIES DISTRIBUTIONS 35





Pohutukawa, Oi, Exposed Coastal Ecosystem

ECOSYSTEMS



Kowhai, Kotare, Harbour Coastal Ecosystem

Manuka, Kahu,

Puriri, Kereru,



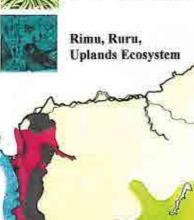
Stormy Coastal Hills Ecosystem



Kiekie, Miromiro, High Rainfall Hills Ecosystem

Warm Lowlands Ecosystem









Ferns

Adiantum aethiopicum Adiantum cunninghamii	makaka, maidenhair common maidenhair
Adiantum hispidulum	rosy maidenhair
Asplenium flabellifolium	® necklace fern
Asplenium northlandicum Asplenium maritimum	leather-leaf asplenium
Azolla filiculoides	floating fern
Blechnum banksii	coastal blechnum
Blechnum "capense"	kiokio
Blechnum membranaceum	
Cheilanthes distans	rockfern
Cheilanthes humilis	rock fern
Doodia media	pukupuku
Hypolepis dicksonioides	giant hypolepis
Lindsaea linearis -	
Pellaea falcata ®	
Polystichum richardii	tutoke, shield fern
Pterideum esculentum	bracken
Pteris macilenta	CHILLESS/99096
Pteris comans NZ	coastal brake

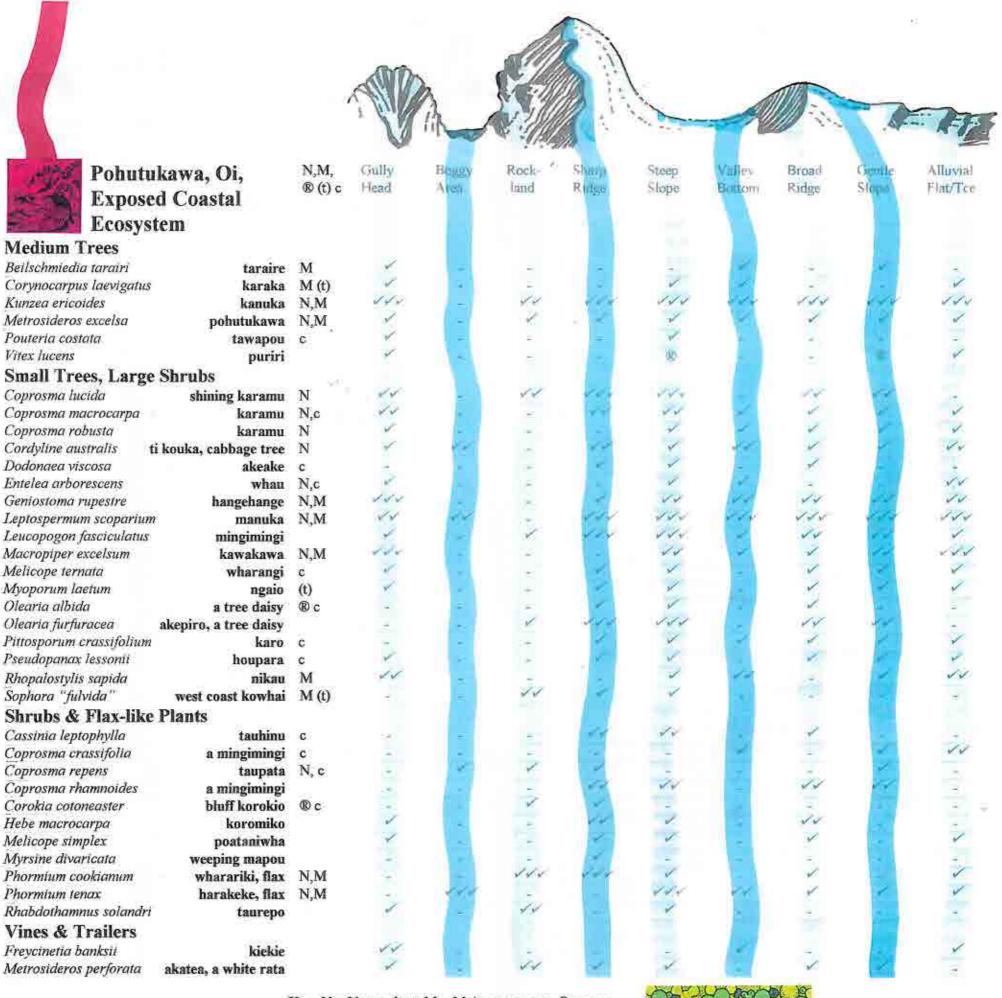
Low Ground Plants

LOW Ground Flan	113
Astelia banksii	coastal astelia
Calystegia soldanella	nihinihi, shore binder
Celmisia gracilenta	pekepeke
Celmisia major var. majo	waitakere rock daisy
Centella uniflora	
Coprosma acerosa	sand coprosma
Cordyline pumilio	ti rauriki, dwarf cabb.tree
Cotula coronopifolia	bachelor's buttons
Dianella nigra	turutu, NZ blueberry
Dichondra repens	mercury bay weed
Disphyma australe	horokaka, iceplant
Hebe bishopiana	® Huia hebe
Hebe obtusata	west coast cliff hebe
Leucopogon fraseri	patotara
Leptinella rotundata	®
Libertia peregrinans	creeping sand iris
Muehlenbeckia complex	ca pohuehue
Nertera depressa	common nertera
Peperomia urvilleana	wharanui
Pimelea arenaria 🔞	autetaranga, sand daphne
Samolus repens	sea primrose
Scandia rosifolia	coastal angelica
Selliera radicans	remuremu
Tetragonia trigyna	NZ spinach

Grasses, Sedges, Rushes

Grasses, Seup	ges, Musiles
Carex secta	pukio, niggerhead
Carex testacea	speckled sedge
Cortaderia fulvida	d toetoe
Cortaderia splena	lens coastal toetoe
Cyperus ustulatus	upoko tangata, giant umbrella sedge
Gahnia lacera	bamboo cutty grass
Juncus maritimus	wiwi, sea rush
Juncus pallidus	giant rush
Microlaena polyn	oda native bamboo
Poa anceps	

Spinifex sericeus kowhangatara, silver sand grass



Key: N = Nurse plant; M = Main component; \otimes = rare; (t) = toxic to toddlers; c = coastal sites only. For restoration, in this habitat, $\checkmark \checkmark \checkmark$ = plant liberally; $\checkmark \checkmark$ = plant generally; \checkmark = plant sparingly.





Kowhai, Kotare, Harbour Coastal Ecosystem

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Key: N = Nurse plant; M = Main component; B = rare; (t) = toxic to toddlers; c = coastal sites only. For restoration, in this habitat, $\checkmark \checkmark \checkmark$ = plant liberally; $\checkmark \checkmark$ = plant generally; \checkmark = plant sparingly.

pigeonwood

houhere, lacebark N,M

manuka N,M

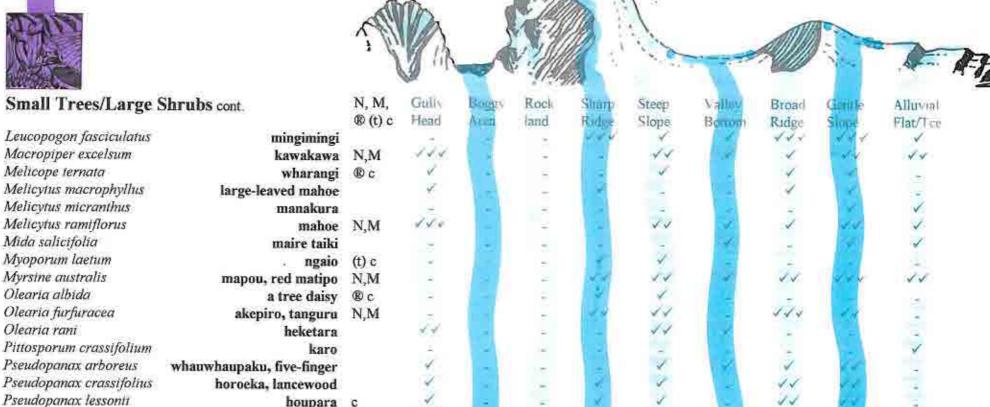


Hedycarya arborea

Hoheria populnea

Leptospermum scoparium





Shrubs & Flax-like Plants

Schefflera digitata

Sophora "fulvida"

Streblus heterophyllus

Rhopalostylis sapida

Pomaderris ericifolia

Typha orientalis

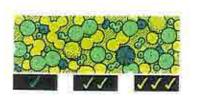
Rhabdomathus solandri

Toronia toru

Brachyglottis kirkii	kohurangi				
Coprosma rhamnoides	mingimingi				
Coprosma spathulata	- 9				
Corokia buddleioides	korokio taranga				
Corokia cotoneaster	bluff korokio				
Cyathodes juniperina	prickly mingimingi				
Dracophyllum sinclairii	spiderwood				
Freycinetia banksii	kiekie				
Gaultheria antipoda	snowberry				
Hebe macrocarpa	koromiko				
Hebe stricta	koromiko				
Melicope simplex	poataniwha				
Myrsine divaricata	weeping mapou				
Olearia solandri	coastal shrub daisy				
Phebalium nudum	mairehau				
Phormium cookianum	wharariki, mountain flax				
Phormium tenax	harakeke, flax				
Pimelea longifolia	taranga, a daphne				
Pimelea tomentosa	hairy daphne				
Pittosporum cornifolium	tawhirikaro				
Plagianthus divaricatus	5 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -				
Pomaderris kumeraho	kumerahou				

houpara c pate, patete west coast kowhai M (t) c turepo nikau M toru C N,M N,M kumerahou tauhinu taurepo raupo

wetland Key: N = Nurse plant; M = Main component; @ = rare; (t) = toxic to toddlers; c = coastal sites only. For restoration, in this habitat, $\checkmark \checkmark \checkmark =$ plant liberally, √ ✓ = plant generally; ✓ = plant sparingly.





Vines & Trailers

Calystegia tuguriorum powhiwhi, convolvulus Clematis forsteri puataua, scented clematis Clematis paniculata puawananga, bush clematis Freycinetia banksii kiekie Metrosideros carminea akakura, carmine rata Metrosideros fulgens winter rata akatea, small white rata Metrosideros perforata Ripogonum scandens kareao, supplejack Parsonsia heterophylla kaiku, NZ jasmine Passiflora tetrandra kohia, NZ passion vine Rubus australis bush lawyer Rubus cissoides tataramoa, bush lawyer

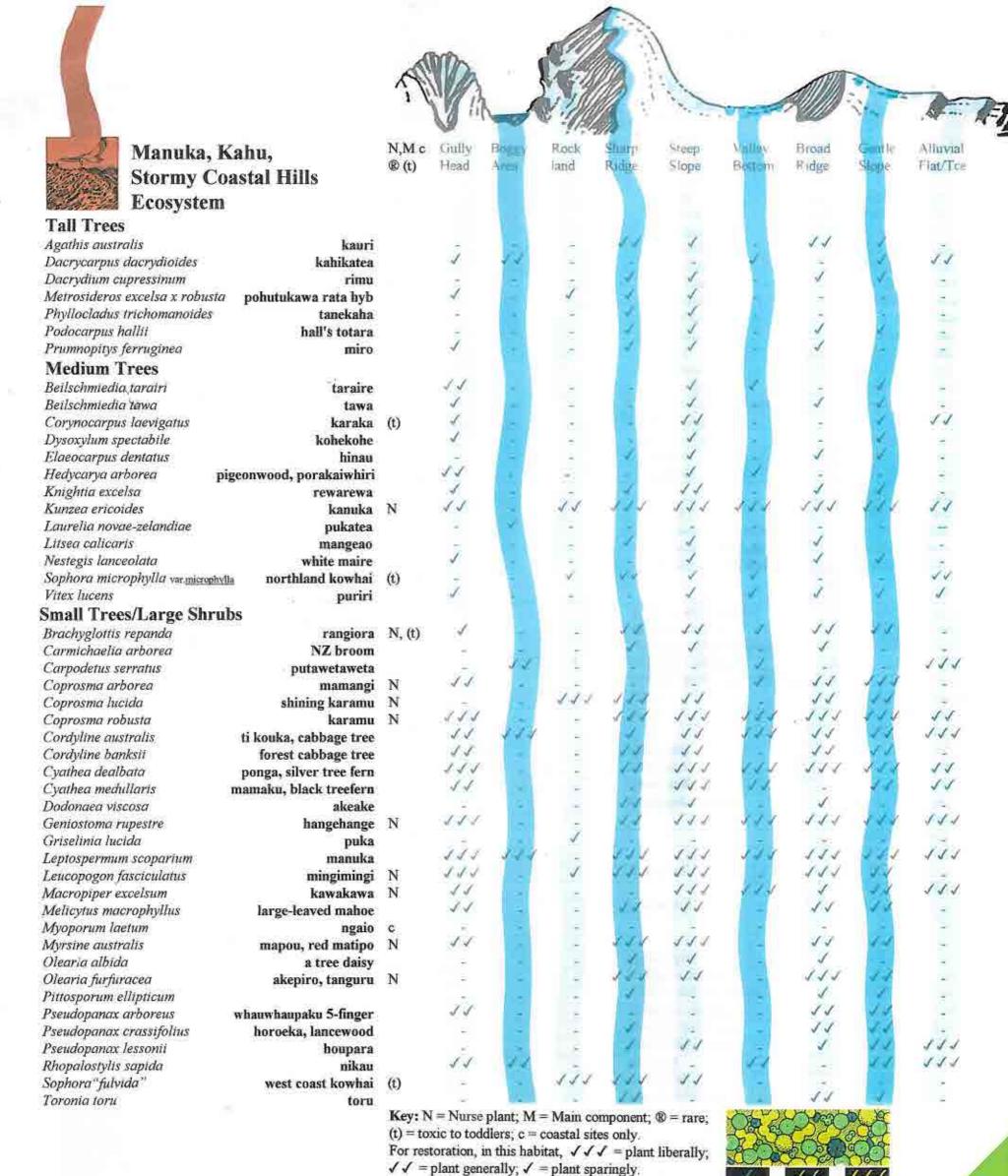
Ferns Adiantum cunninghamti common maidenhair Adiantum diaphanum small maidenhair Adiantum fulvum downy maidenhair Adiantum hispidulum rosy maidenhair Adiantum viridescens Asplenium flabellifolium necklace fern Asplenium flaccidum makawe, hanging asplenium Asplenium hookerianum Asplenium lamprophyllum glossy asplenium Asplenium oblongifolium huruhuruwhenua, shining Asplenium northlandicum leather-leaf asplenium Asplenium maritimum Azolla filiculoides floating fern Blechnum "capense" kiokio Blechnum chambersii rereti Blechnum filiforme creeping carpet fern Blechnum fraseri miniature tree fern, hard fern Blechnum membranaceum Doodia media pukupuku Doodia mollis mokimoki Gleichenia microphylla waewaekaka Grammitis pseudociliata Hymenophyllum spp. filmy ferns Hypolepis ambigua common hypolepis Hypolepis distans Hypolepis rufobarbata Lastreopsis glabella Lastreopsis hispida hairy legs Lastreopsis microsora Lastreopsis velutina velvet fern Lindsaea linearis Lindsaea trichomanoides Lygodium articulatum mangemange Paesia scaberula matata, ring fern Pellaea rotundifolia Waitakere form tarawera, button fern Phymatosorus pustulatus kowaowao, maratata Phymatosorus scandens moki, fragrant fern tutoke, shield fern Polystichum richardii Pterideum esculentum bracken Pteris macilenta sweet fern Pteris tremula turawera, trembling brake Pyrrosia eleagnifolia leather-leaf fern

Low Ground Plants

Apium prostratum sea celery Astelia banksii coastal astelia Astelia solandri kowharawhara, perching lily Astelia trinervia kauri "grass" Calystegia soldanella nihinihi, shore binder Celmisia major var. major Waitakere rock daisy Centella uniflora Collospermum hastatum kahakaha Cordyline pumilio ti raurika, dwarf cabbage tree Cotula coronopifolia bachelor's buttons Dianella nigra turuturu, NZ blueberry Dichondra repens mercury bay weed Elatostema rugosum parataniwha Hebe bishopiana Huia hebe Hebe obtusata west coast cliff hebe Leucopogon fraseri patotara Libertia grandiflora large-flowered iris Libertia ixioides mikoikoi, NZ iris Lycopodium cernuum creeping club-moss Lycopodium deuterodensum tree club-moss Muehlenbeckia complexa pohuehue Myosotis "pansa" Waitakere forget-me-not Nertera depressa common nertera Nertera dichondrifolia northern nertera Peperomia urvilleana wharanui Pimelia prostrata prostrate daphne Samolus repens sea primrose Scandia rosifolia coastal angelica Selliera radicans remuremu

Grasses, Sedges, Rushes

Carex secta pukio, niggerhead Carex solandri Cortaderia fulvida toetoe Cortaderia splendens coastal toetoe Cyperus ustulatus giant umbrella sedge Gahnia lacera bamboo cutty grass Gahnia setifolia cutty grass Gahnta xanthocarpa toikiwi, cutty grass Juncus maritimus wiwi, sea rush Juncus pallidus giant rush Microlaena avenacea bush rice grass Microlaena polynoda native bamboo Microlaena stipoides meadow rice grass Oplismenus imbecilis slender panic grass Poa anceps





Shrubs & Flax-like

Shrubs & Flax-like		
Om too & Phas-like		® (t)
Cassinia leptophylla	tauhinu	
Coprosma crassifolia	mingimingi	
Coprosma rhamnoides	mingimingi	
Corokia cotoneaster	bluff korokio	
Dracophyllum sinclairii	spiderwood	
Gaultheria antipoda	snowberry	
Hebe macrocarpa	koromiko	
Hebe stricta	koromiko	
Leucopogon fraseri	patotara	
Lohomyrtus obcordata	rohutu	
Melicope simplex	poataniwha	
Myrsine divaricata	weeping mapou	
Phormium cooktanum	wharariki, mountain flax	N
Phormium tenax	harakeke, flax	N
Pomaderris kumeraho	kumerahou	
Pomaderris ericifolia	tauhinu	
Rhabdomathus solandri	taurepo	
Vines & Trailers	ANCARLAR	

N,M

kiekie

akakura, carmine rata ®

akatea, small white rata

kaiwhiria, NZ jasmine

Guffy

Head

Rock

and

Ferns

Freycinetia baueriana

Metrosideros carminea

Metrosideros perforata

Parsonsia capsularis

I CI IIS
Adiantum cunninghamit
Adiantum hispidulum
Asplenium flaccidum
Asplenium lamprophyllum
Asplenium oblongifolium
Blechnum "capense"
Blechnum chambersii
Blechnum membranaceum
Doodia media
Doodia mollis
Hymenophyllum spp.
Hypolepis ambigua
Hypolepis distans
Hypolepis rufobarbata
Lastreopsis glabella
Lastreopsis hispida
Lastreopsis microsora
Lastropsis velutina
Lindsaea linearis
Lindsaea trichomanoides
Lygodium articulatum
Paesia scaberula
Pellaea rotundifolia
Phymatosorus pustulatus
Phymatosorus scandens
Polystichum richardii
Pterideum esculentum
Pteris macilenta
Pteris tremula

Low Ground Plants, etc.

Valloy

Вопот

Broad

Ridge

Alluvial

Flar/Tce

11

Steep

Slope

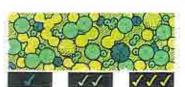
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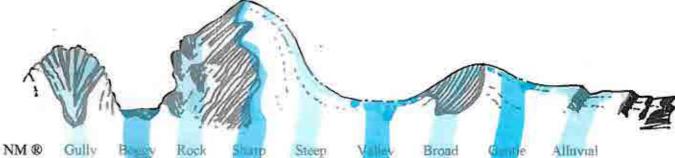
And the American	
Astelia banksii	coastal astelia
Astelia solandri	kowharawhara, perching lily
Astelia trinervia	kauri "grass"
Centella uniflora	97
Cordyline pumilio	ti rauriki, dwarf cabbage tree
Collospermum hastatum	kahakaha
Dianella nigra	turutu, NZ blueberry
Hebe bishopiana	Huia hebe
Libertia grandiflora	large-flowered iris
Libertia ixioides	mikoikoi, NZ iris
Lycopodium deuterodensum	tree club-moss
Nertera dichondrifolia	northern nertera
Peperomia urvilleana	wharanui
Pimelea prostrata	prostrate daphne
Carrer Calas Dad	

Grasses, Sedges, Rushes

Carex secta	pukio, niggerhead
Cyperus ustulatus	upoko tangata, giant umbrella sedge
Gahnia lacera	bamboo cutty grass
Gahnia setifolia	cutty grass
Gahnia xanthocarpa	toikiwi, cutty grass
Juncus pallidus	giant rush
Microlaena avenacea	
Microlaena stipoides	meadow rice grass

Key: N = Nurse plant; M = Main component; \mathbb{R} = rare; (t) = toxic to toddlers; c = coastal sites only. For restoration, in this habitat, $\checkmark \checkmark =$ plant liberally; $\checkmark \checkmark =$ plant generally; $\checkmark =$ plant sparingly.





Flat/Tce



Puriri, Kereru,

Committee of	warm Lowianus
的影响	Ecosystem Ecosystem
Tall Trees	

Agathis australis	kauri	M
Dacrycarpus dacrydioides	kahikatea	NA
Dacrydium cupressirum	rimu	M
Metrosideros robusta	northern rata	M
Phyllocladus trichomanoides	tanekaha	NN

Podocarpus hallii hall's totara Podocarpus totara lowland totara Prumnopitys ferruginea miro Prumnopitys taxifolia matai

Medium Trees

Alectryon excelsa	titoki	
Betlschmiedia tarairi	taraire	G
Beilschmiedia tawa	tawa	
Corynocarpus laevigatus	karaka	M (
Dysoxylum spectabile	kohekohe	M
Elaeocarpus dentatus	hinau	
Halocarpus kirkii	manoao	® (
Ixerba brexioides	tawari	
Knightia excelsa	rewarewa	NN
The state of the s		1000

Kunzea ericoides kanuka Laurelia novae-zelandiae pukatea Libocedrus plumosa kawaka Litsea calicaris mangeao Nestegis lanceolata white maire Pittosporum eugenioides tarata, lemonwood Pittosporum tenuifolium

Sophora microphylla var. northland kowhai Syzygium maire maire tawake Vitex lucens puriri

Small Trees/ Large Shrubs

Aristotelia serrata	makomako, wineberry
Brachyglottis repanda	rangiora
Carmichaelia aligera	NZ broom
Carpodetus serratus	putaputaweta
Coprosma arborea	mamangi
Coprosma areolata	threepenny bit tree
Coprosma grandifolia	kanono
Coprosma lucida	shining karamu
Coprosma propinqua	mingimingi
Coprosma robusta	karamu
Coriaria arborea	tutu, tupakihi
Cordyline australis	ti kouka, cabbage tree
Cordyline banksii ti n	gahere, forest cabbage tree
Cyathea dealbata	ponga, silver tree fern
Cyathea medullaris	mamaku , black tree fern

NM 00	Gully	He may	ROCK	SIESIP.	Steep	-V	Broad	
(t) c	Head	Acen	land	Rulge	Slope	Herthin	Ridge	

M	12	1	6	11	1
NM	1	1.1			
	-	100	:6	100	1
M M	· Ale		1.0	2	1
NM	9		14	1.1	1
M	-		100	1	1
NMc	8		150	1000	
	-1				100

M	: Me	100	1	
M NM	4		4.1	1
M NMc	-	100	1	1
NMc	8	150		
	1	(4)	100	1
	=	150		

	1				1
G	1	150	-	100	2
	1			1.23	11
M (t) M	1		1.40		1
M	11			1 = 1	11
				July State	100

NM NM kohuhu M (t)

M

NM(t) N M N

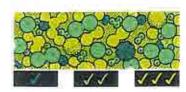
NM

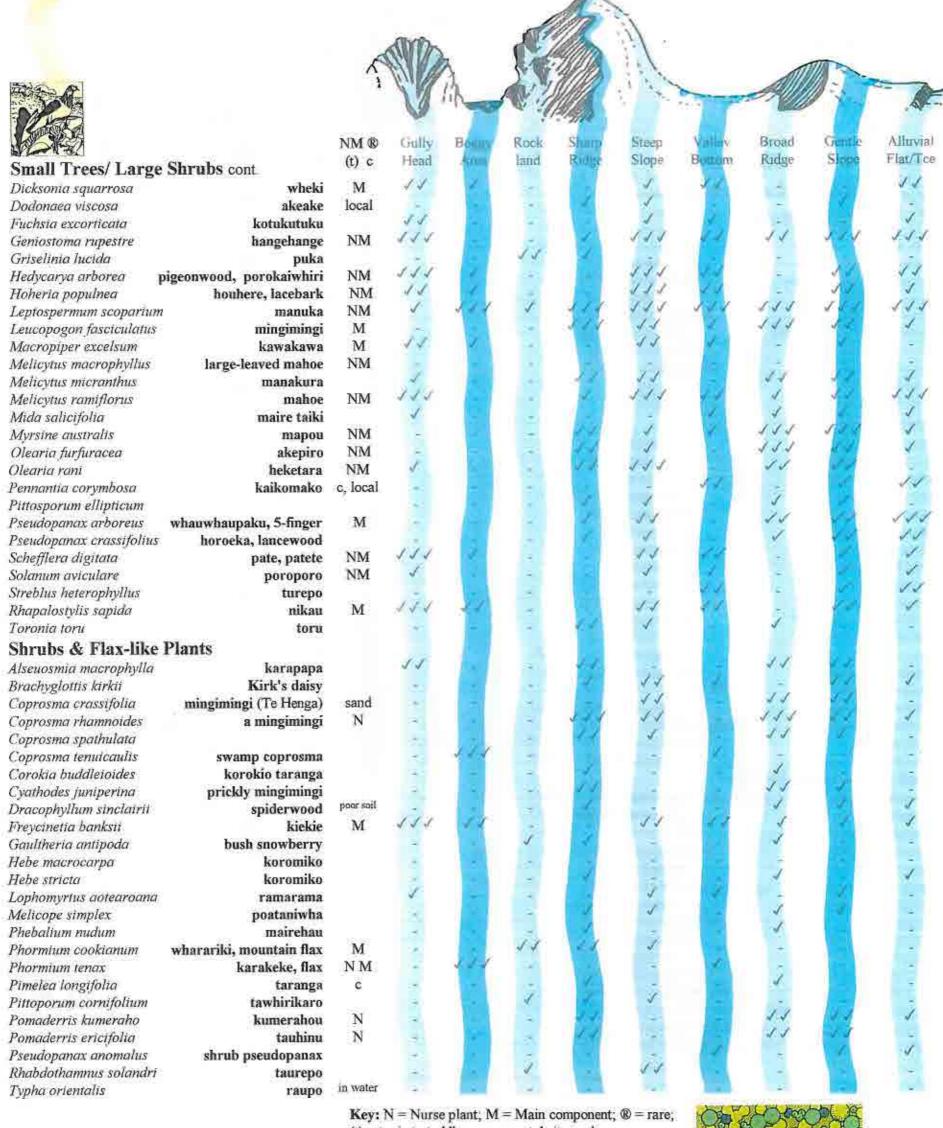
NM NM NM N(t)

NM NM

Key: N = Nurse plant; M = Main component; ® = rare; (t) = toxic to toddlers; c = coastal sites only. For restoration, in this habitat, $\sqrt{\sqrt{\sqrt{}}}$ = plant liberally;

√ ✓ = plant generally, ✓ = plant sparingly. G = Geographically restricted (refer pages 22 & 25)





Key: N = Nurse plant; M = Main component; \mathfrak{B} = rare; (t) = toxic to toddlers; c = coastal sites only. For restoration, in this habitat, $\checkmark \checkmark \checkmark$ = plant liberally; $\checkmark \checkmark$ = plant generally; \checkmark = plant sparingly.





Vines & Trailers

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Low Ground Plants

Arthropodium cirratum rengarenga, rock lily Astelia banksii coastal astelia Astelia solandri kowharahara perching lily Astelia trinervia kauri "grass" Collospermum hastatum kahakaha Cordyline pumilio ti rauriki, dwarf cabbage tree Dianella nigra turutu, NZ blueberry Drosera binata forked sundew Elatostema rugosum parataniwha Epacris pauciflora tamingi Libertia grandiflora large-flowered iris Libertia ixioides mikoikoi, NZ iris Libertia pulchella forest iris Lycopodium cernuum creeping clubmoss Lycopodium deuterodensum tree club-moss Myosotis "pansa" Waitakere forget-me-not Nertera depressa common nertera Nertera dichondrifolia northern nertera Peperomia urvilleana wharanui Pratia angulata panakenake

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Ferns

Adiantum cunninghamii common maidenhair
Adiantum fislvum downy maidenhair
Adiantum hispidulum rosy maidenhair
Adiantum viridescens
Anarthropteris lanceolata
Asplenium bulbiferum manamana, hen & chicken fern

Asplenium flabellifolium necklace fern Asplenium flaccidum makawe, hanging asplenium Asplenium hookerianum Asplenium lamprophyllum glossy asplenium Asplenium oblongifolium huruhuruwhenua, shining asplenium Asplentum polyodon sickle asplenium Azolla filiculoides floating fern Blechnum "capense" kiokio Blechnum chambersii rereti Blechnum colensoi peretao Blechnum filiforme creeping carpet fern Blechnum fraseri miniature tree fern, hard fern Blechnum membranaceum Blechnum minus swamp kiokio Blechnum nigrum Ctenopteris heterophylla Deparia petersenii Diplazium australe Doodia media pukupuku Doodia mollis mokimoki Gleichenia dicarpa swamp umbrella fern Gleichenia microphylla waewaekaka Hypolepis ambigua common hypolepis Hypolepis distans Hypolepis rufobarbata Lastreopsis glabella Lastreopsis hispida hairy legs Lastreopsis microsora Lastreopsis velutina velvet fern Leptolepia novae-zelandiae Leptopteris hymenophylloides heruheru, crepe fern Lindsaea linearis Lindsaea trichomanoides Lindsaea viridis Loxsoma cunninghamii Lygodium articulatum mangemange Marattia salicina ® king fern, para Paesia scaberula ring fern, matata Pellaea rotundifolia (Waitakere form) tarawera, button fern Phymatosorus pustulatus kowaowao, maratata Phymatosorus scandens moki, fragrant fern Pteridium esculentum bracken Pteris comans NZ coastal brake Pteris macilenta sweet fern Pteris saxatilis sweet fern Pteris tremula turawera, trembling brake Pyrrosia eleagnifolia leather-leaf fern Schizaea bifida Schizaea dichotoma fan fern Schizaea fistulosa comb fern Sticherus cunninghamii umbrella fern Trichomanes elongatum bristle fern Trichomanes endilicherianum Trichomanes reniforme kidney fern, raurenga

WEEDS IN WAITAKERE

Many weeds need plenty of light to get established. Try preventing weeds by having a good dense canopy of tree and shrub cover.

In any weed-prone area, once weed control has been undertaken, densely plant vigorous species to develop rapid shading. In the vigorous weed-paradise of the Waitakere area, you cannot drive weeds out through dense plantings, but you can make it much harder for them to get established.

RAPID SHADE CREATORS

Good species to plant after effective weed control in the coastal and lowland zones include:

♦ Kanuka
 ♦ kanuka
 ♦ kawakawa
 ♦ mahoe
 ♦ manuka
 Coprosma macrocarpa
 Kunzea ericoides
 Macropiper excelsum
 Melicytus ramiflorus
 Leptospermum scoparium

♦ ngaio Myoporum laetum (very effective)
 ♦ parataniwha Elatostema rugosum (groundcover)

♦ pate Schefflera digitata

also, but less effective:

♦ karamu Coprosma robusta
 ♦ houhere Hoheria populnea
 ♦ kanono Coprosma grandifolia

UNWANTED NATIVES

The Waitakere Ranges forest is nationally important with its own unique collection of species and its own distinctive ecology. Its appearance and ecology are entirely different from other kauri forests especially Waipoua and Coromandel. To help preserve the unique Waitakere identity, keep out plants that could be a threat.

FAKE NATIVES

Pacific cousins of New Zealand species are sometimes unwittingly sold as natives. They threaten our heritage by naturalizing in our forests or crossbreeding with them to change their identity.

Hawaii's forests are threatened by New Zealand karaka which has become a weed on its unique volcanoes. Our own forests and species, even pohutukawa, are under threat from plants from the Pacific. In time it may become illegal to grow these plants here, but in the meantime:

<u>Please</u> help protect our heritage by <u>not</u> planting the following **high risk plants:**

- Pacific Island Metrosideros species (including Kermadec Island pohutukawa and Tahitian rata)
- introduced tree ferns
- introduced ferns (very high risk)
- exotic palm trees that produce berries (spread by birds)
- offshore island and Pacific Macropiper varieties (kawakawa)

NON LOCAL NEW ZEALAND NATIVE SPECIES

Although only local species from local sources should be grown in restoration projects, many native plants from other parts of New Zealand are safe to grow in suburban areas of Waitakere. The following list are the plants that should not be grown if they present a high risk of hybridising with Waitakere species and a risk of dramatic change to the local identity and ecology of Waitakere forests.

In general:

- offshore Island Macropiper (kawakawa) varieties.
- ♦ kamahi (Weinmannia racemosa)
- ♦ non-Waitakere Coprosma macrocarpa

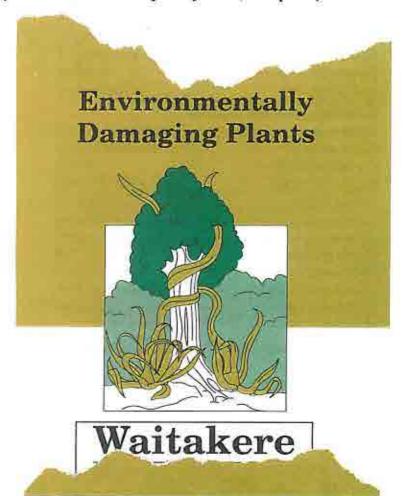
To assist in this protection of the local flora, it is proposed to develop a list of high risk plants for which sale and cultivation controls would help the survival and integrity of the special natural forests of Waitakere.

In the High Biosecurity Zone of the ranges and hinterlands (i.e. from the Great North Road west to the coast) non - Waitakere:

- kowhai (Sophora)
- Hoheria (lacebark)
- ♦ Pseudopanax (lancewood/horoeka, houpara, etc.)
- kapuka (Griselinia littoralis) (particularly in Scenic Drive, Piha, Mountain Road areas)
- makamaka (Caldcluvia (Ackama) rosaefolia)

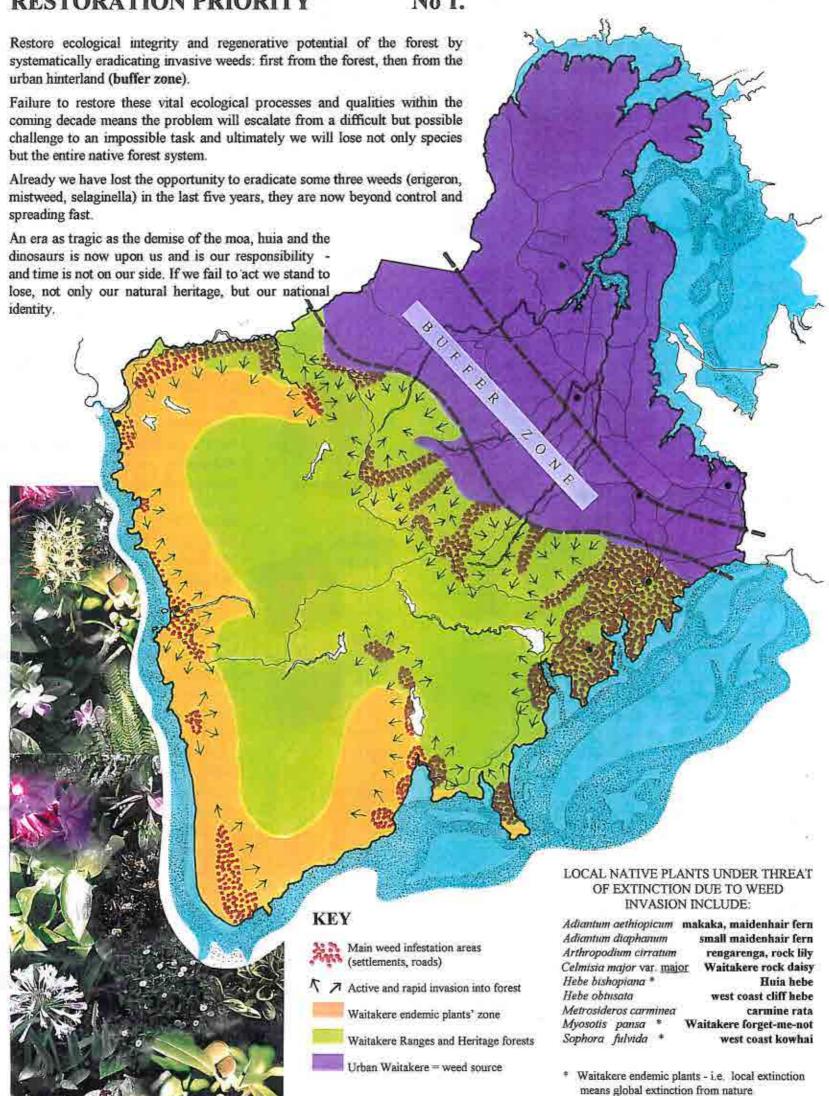
In the West Coast Kowhai Zone (Huia to Te Henga), avoid:

- non-Waitakere Hebe of any species capable of flowering in Auckland (alpine varieties acceptable).
- any kowhai other than Sophora fulvida, the special, local form.



WAITAKERE RESTORATION PRIORITY

No 1.



QUICK GUIDE TO USEFUL PLANTS & SPECIAL PLACES

To help people in choosing local native plants for different uses, particularly for garden plantings, plant guides include:

- TREES FOR STREETS & GARDENS
- Showing flowering times of ♦ FLORAL & FOOD CALENDAR

showy local native plants (outer ring), and the fruiting times of plants important as native bird

food (inner ring).

- HEDGES & SCREENS
- VISUAL EFFECTS
- BIRD FODDER
- ♦ HERITAGE GARDENS

SKITE SITES

Species list and Pseudopanax species map. Particularly for sites in the centre

> of "unnatural" urban areas, a quick guide for developing a special heritage garden using distinctive

local plants.

Directs you to an important patch of bush, habitat, group of plants or ecosystem for each community

in the city.

- HERITAGE GARDENS cont.
- SHOWY FLOWERS
- SITES FOR SEASONAL COLOUR Sites to visit to see natural

seasonal colour.

PERFUMED PLANTS

Those to plant & those to avoid.

POISONOUS PLANTS

TREES FOR STREETS & GARDENS

houhere

(Hoheria sextylosa "Henderson Creek"). A local identity street tree, fast, found only on stream sides of Waitakere lowland floodzones.

kanuka

Hardy and fast growing. All soils suitable except boggy. Soft foliage and white flowers like a dusting of snow. An excellent landscape tree, visually softening and providing a link with the Ranges.

karaka

Striking with bold, shiny foliage. Naturally confined to coastal fringe.

kohekohe

A striking tree with bold foliage, needing excellent

kohuhu

Use the distinctive small-foliage of the Waitakere

northland kowhai



A northern coastal form belonging to Auckland and Northland. Buds and nectar bring birds to town - kereru and tui. Only plant in free-draining soils, with plenty of light for seedlings. Juvenile form is upright, not divaricating. To protect the vulnerable trunk from damage from mowers, etc. plant with flax and shrubs at the base.



west coast kowhai

manatu

mangaeo

manuka

miro

nikau



pohutukawa

ponga

puriri

o rata



taraire tarata

ti kouka titoki

o toru

o totara, tanekaha, rimu, kahikatea kauri



A small tree appropriate to use only in central urban areas isolated from Waitakere Ranges. Juvenile has divaricating form.

Lowland ribbonwood. Probably not originally in Waitakere, but does occur a little further north. If used, appropriate only on sites with very fertile deep soils. Fast, deciduous, and with a striking divaricating juvenile form.

Fertile free draining soil. Handsome.

Fast. Needs moist soil to grow well

Needs good soil to grow well. Slower growing, quality tree.

In groves, avenues, etc. Interplant with other species during establishment. A long-term investment, as very slow to establish a trunk (20+ years). Needs moisture. (NOTE. Faster growing exotic and offshore island species/varieties are NOT appropriate in Waitakere as risk invasion and genetic pollution.)

Natural range limited to narrow coastal fringe habitat. Use to reinforce natural patterns. A hardy street tree.

Silver fern. Drought tolerant, slower growing. The fruits bring birds to town - tui and kereru. Bold, shiny foliage, puriri tolerates poorer topsoil than titoki, taraire, kowhai and kahikatea, but must have a good depth of topsoil.

Northern rata tree. Inland cousin of pohutukawa. Hardy, attractive tidy tree with summer red flower display, a little less regal than of pohutukawa. Extensive range in Waitakere. A neglected opportunity.

Stately, with bold, shiny foliage.

Lemonwood. Hardy tree. Use the Waitakere variety, has wider foliage.

Cabbage tree

splendid tree for use in good soil in the Waitakere lowlands.

Neat and tidy tree with light green foliage. Clay tolerant.

Tall stately trees for avenue, statement, effect, or inter- mixed among smaller-growing trees.







HEDGES & SCREENS

Fine foliage screen planting:

•	mapou	3-6m
•	kohuhu	3-6m
	koro	3 6m

♦ hangehange 1-2m

Rapid, temporary screen:

•	karamu	2-3m
	mahoe	

manuka 2-5m
 ngaio 2-5m

♦ pate 3m

♦ Coprosma macrocarpa

Formal hedge:

♦ mapou

taupata

hangehangemamangi

Coprosma areolata

Formal low hedge (like box):

pohuehue

VISUAL EFFECTS

Bold statement:

harakeke flax
 2-3m

♦ wharariki flax 1-1.5m

• ti kouka, cabbage tree

Shiny foliage:

puka shrub, slow

taupata shrub

karaka tree

kohekohe

♦ Asplenium lamprophyllum, fern

♦ Asplenium oblongifolium, fern

Phymatodes pustulatus, fern

king fern

♦ kohia, passion vine

BIRD FODDER

♦ flax

• horoeka, lancewood

♦ houpara

karaka

kotukutuku

kowhai

mahoe

nikaupigeonwood

• pohutukawa

• puriri

♦ ramarama

• rata (all spp.)

raukawa

♦ rewarewa

♦ tawa

• titoki

whauwhaupaku, 5-finger



HERITAGE GARDENS

Special gardens to celebrate Waitakere.

* = Waitakere own endemic species - plants of here only.

Grow our own endangered species in a heritage garden of Waitakere plants - for your children, to show your friends, and, for your own pleasure.

For example:

Waitakere Rockland

west coast kowhai* spring flowers
 puka shiny foliage

coastal bush"flax" handsome foliage
 Huia hebe* spring-summer flowers

carmine rata spring flowers

white rata summer flowers
 korokio fine, silver foliage

taurepo orange flowers, summer

♦ Waitakere forget-me-not*

Pseudopanax - bird fodder



In addition, a profusion of horoeka and houparn hybrids naturally occur at boundary areas, particularly on the west coast (best site is on Mercer Bay Track off Log Race Road, Piha). Prendipparear fruits are important bird fadder, particularly for kereru breeding.

Salt-meadow Herbfield

In pine bark, scoria mulch, plus a few rocks or shells.

• oioi jointed rush. Wonderful piupiu type foliage.

wiwi dark green rush

wind grass in rocks

♦ saltmarsh ribbonwood

plus native and flowering herbs, such as:

• remuremu mix with others

mix with others; or use alone as a courtyard lawn grown in fine, weed-free bark, not soil.

shore pimpernel

♦ NZ spinach edible

o native celery

In a setting of coastal fringe plants either:

♦ Coprosma macrocarpa

♦ kawakawa

♦ kowhai *

wharangi



HERITAGE GARDENS cont.

or, coastal alluvial flat plants:

- ♦ flax
- ♦ toetoe
- o nikau
- kahikatea
- putaputaweta

Cool Gully

- parataniwha plant a glade, having lots of moisture, mulch and good soil. Visit the Ranges to see what a wonderful effect you can create!
- o nikau
- hen & chicken fern
- king fern rare due to wild pigs, was a traditional carbohydrate source for maori. Needs fertile soil, good drainage, lot of summer moisture. Beautiful fronds 2-3m long.
- Lastreopsis hispidaa beautiful fern with hanging stems.

Provide shade with fast-growing

- ♦ mamaku
- pate
- ♦ houhere

Blufftop Shrubland

With rocks interspersed, a shrub garden with:

- korokio
- wharariki flax
- puka
- west coast kowhai *
- akepiro
- rata vines carmine, small white and winter rata species.
- Kiekie
- ♦ coastal bush"flax"
- hebe
- prickly mingimingi
- Gahnia lacera cutty grass
- Clematis forsteri scented clematis. Hard to obtain but a real delight.
- ferns (refer charts)
- mikoikoi

NZ iris

large-flowered iris

Perhaps also associated trees, such as:

• tanekaha, kauri, miro or hall's totara.

Inner Harbour Shrub Border,

Including:

- kawakawa
- ♦ wharangi
- ♦ Coprosma macrocarpa



Kauri Community

As in the leaf litter under each kauri tree:

- kauri "grass" a smart tussock
- karapapa fragrant, winter flowers (also lovely pot plant)
- mairehau fragrant foliage often tinged red
- spiderwood
- neinei
- akepiro
- ♦ mingimingi Leucopogon fasciculatum
 ♦ mingimingi Cyathodes juniperimum
- kahakaha Collospermum hastatum
- ♦ kiekie
- turutu beautiful blue berries

Piha Coastal Cliff Community

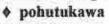
Small trees & shrubs such as:

- houpara (& local hybrids)
- kawakawa
- ♦ karo
- west coast kowhai *
- ♦ taupata
- ♦ Coprosma macrocarpa plus, over rocks:
- o coastal bush "flax"
- Waitakere rock daisy * on a sand pile:
- pohuehue
- native spinach
- ♦ spinifex
- native dichondra
- makaka

Groundcover Ferns:

- ♦ Asplenium oblongifolium
- o shield fern
- ♦ Pteris saxatillis
- giant hypolepis
- rosy maidenhair

Associated large trees



- karaka
- o puriri
- v parmi
- kohekohe

Possibly also a saltmarsh herbfield planted in sand. Plant in sand or fine bark mulch.

Further advice:

Your local native plant specialist or landscape architect can advise you (refer NZILA list in Yellow Pages).

PLANT FEATURES

Refer Floral & Food Calendar and charts for further information.

SHOWY FLOWERS:

From early spring to mid-summer there is a cascade of colour as a succession of trees burst into flower.

RED

- Carmine rata Vine, can grow as a shrub. Has large leaves. The Waitakere strain is distinct from standard horticultural stock.
- Winter rata Vine, can grow as a shrub.
 (Please do not grow introduced Metrosideros e.g. Tahitian. Pollinated by bees and birds, the introduced forms threaten to pollinate and interbreed with native rata and ruin our NZ heritage.
- Taurepo Grow in pots or garden.
- · Karapapa Grow in pot or garden. Scented.

YELLOW

 West coast Kowhai. Scented. Pot or garden. Can be trimmed. Dwarf strains occur. Pollinated by birds. Non-Waitakere Kowhai should not be grown in the Waitakere Ranges.

WHITE

Mamangi

- Puawananga Bush clematis vine. The most showy of the Clematis. For results, plant with roots in the shade, and foliage in the sun. Plant with humus, peat and blood & bone.
- Tree daisy Olearia albida, hardy, clay tolerant. A mass of white flowers in summer. Hedge or screen use. Akepiro too.
- Manuka Fast-growing, hardy, colourful. A softy pink variety grows in the Waitakere Gumlands at Cornwallis. Fast and inexpensive. Suitable for mass planting toward the back of a garden and interplant with special natives. Use local Waitakere manuka.
- Kanuka Softly cascading foliage when in flower. A snowfall effect. Excellent landscape tree in urban areas to provide quick character and a softening effect. Use local Waitakere kanuka. This kanuka is the most vigorous and best in NZ - let's not water it down by introducing other strains to cross with ours!
- Ti kouka Cabbage Tree. Large flower panicles.

SITES FOR SEASONAL COLOUR:

Heketara Scenic Drive (north of TV mast).

Kanuka Laingholm Drive, best view from Steiner School

(November-December)

Scenic Drive - Piha Road (mid-January).

Northland kowhai Laingholm: Tane Road, view from Victory Road.

Cock's Comb, Oratia from Scenic Drive.

Huia Road near Mill Bay

Huia Cascades

West coast kowhai best from Whatipu Road, &

Karekare.

best from Whatipu Road on windy road between
Little Huia and Donald McLean turnoff

for golden winter foliage.



Piha Whatipu

South Titirangi

Northern Rata

Scenic Drive near Rangemore Track

Huia water catchment

PERFUMED PLANTS

TREES

Karaka When in fruit. Ripe fruit smell has nostalgic associations.

SHRUBS

Pleasant forest flower scent:

Hangehange

Mahoe (both species)

Pigeonwood Putaputaweta

питаритамста

Floral perfume:

Heketara

Rangiora

Karo A perfume close up. October.

Karapapa Waitakere has beautiful pink and red forms with particularly good size blooms. Avoid other species or non-Waitakere stock. August.

Clematis Clematis forsteri. Sept-Oct. Beautiful scent, like feijoa fruit scent. Best in a rockery or a tub. Grows above Waitakere bluffs.

NZ jasmine vine (NOT invasive!)

Ti kouka cabbage tree

Scented foliage:

Aniseed Highly scented, Difficult to obtain. Now rare due to possums.

Wharangi

Mairehau Difficult to obtain.

Kanuka The foliage makes an acceptable tea drink.

Kawakawa Use for a drink a close relative of Fijian kava.

EXOTIC SCENTED PLANTS TO AVOID

Ginger

Queen of Night

Jasmine

REMOVE THESE WEEDS!!

PERFUMED, NON-INVASIVE EXOTICS

Boronia Gardenia Paeony Rose Carnation

POISONOUS PLANTS

Waitakere Plants Toxic to Toddlers:

Tutu (Coriaria arborea) Ngaio (Myoporum laetum) Kowhai (Sophora spp.) Extremely toxic.

Cause vomiting, pain, etc. Seeds in particular are toxic. Cause sickness, taste nasty.

Poroporo (Solanum spp.) Cause sickness, taste nasty Karaka (Corynocarpus laevigatus) Soft kernels slightly toxic.

(Reference: Poisonous Plants and Fungi in New Zealand. 1995. C.Jack Craw. Northland Regional Council, Whangarei)



ENVIRONMENTALLY DAMAGING PLANTS

Common Botanical Name Reasons for inclusion & current conservation status

African feather	Pennisetum	Noxious plant (Noxious Plant Act). Naturalised in Sth
grass	macrourum	Titirangi at 51 sites
African love	Eragrostis curvula	Noxious plant (Noxious Plant Act)
grass		
agapanthus	Agapanthus praecox	Naturalised extensively around residential areas and on coastal cliffs at Piha. Becoming common as a roadside weed. Commonly cultivated, Forms very dense clump and could become a major weed in coastal cliff situations. Very difficult to control once established.
Alligator weed	Alternanthera philoxeroides	Noxious plant (Noxious Plant Act). A number of sites a present in Piha area.
asparagus	Asparagus	Not known to be naturalised but probably commonly
fern	densiflorus	cultivated as a house plant. Has proven to be a serious weed in parts of Australia. NZ already has two major asparagus weeds.
asparagus,	Asparagus	Not known to be naturalised but probably commonly
ferny	setaceus	cultivated as a house plant. Has proven to be a serious weed in parts of Australia & Norfolk I. NZ already has two major asparagus weeds.
Australian	Carex	Noxious plant (Noxious Plant Act). Naturalised in
sedge	longebrachiata	Karekare, Oratia and Bethells/Swanson area, 53 sites.
balsam	Impatiens sodenii	Naturalised in several places. Common in gardens and probably cultivated. Can invade into forest from margin
baccharis	Baccharis halimifolia	Noxious plant (Noxious Plant Act).
bamboo	Arundinaria japonica	Not known to be naturalised in Waitakere Ranges but known to invade into adjacent natural areas in other
bamboo, black	Phyllostachys nigra	places. Cultivated. Not known to be naturalised in Waitakere Ranges but known to invade into adjacent natural areas in other places. Cultivated.
bamboo,	Phyllostachys	Known to be growing into forest in places, and invading
fishpole	aurea	into Big Muddy Creek bush. Cultivated.
banana passionfruit	Passiflora mollissima	Occurs as rampant vine in several places, smothering trees on which it grows. Popular garden plant.
banana	Passiflora mixta	Occurs as rampant vine in several places, smothering
passionfruit		trees on which it grows. Popular garden plant.
barberry	Berberis	Noxious Plant (Noxious Plant Act)
bartlettina	glaucocarpa Bartiettina sordida	Common as weed of forest edge and gardens around Titirangi and other areas. Forms dense clumps that inhibit the establishment of native plants. Cultivated.
bathurst bur	Xanthium spinosum	Noxious Plant (Noxious Plant Act). Two known sites.
blackberry	Rubus fruticosus	Common roadside and margin weed. On dunes at
Notice the Constant	agg.	Whatipu. Can persist in naturally open areas. Several large infestations occur on forest edges and
blue morning glory	Ipomoea indica	gardens. Kills trees & shrubs by smothering. Attractive plant that is tolerated if not cultivated.
blue passion flower	Passiflora caerulea	Is known from Cornwallis, though targetted there by AR Smothers trees. Cultivated as a root stock for other
llower		passionfruit plants.
bogbean	Menyanthes trifoliata	Noxious plant (Noxious Plant Act).
ooneseed	Chrysanthemoides monilifera	Large population at Cornwallis in parkland and gardens. Also known from Piha. Invades sand dunes and other coastal habitats.
boxthorn	Lycium ferocissimum	Known from sandflats at Piha, Karekare and Whatipu.
proomsedge	Andropogon virginicus	Noxious plant (Noxious Plant Act).
orush cherry	Syzygium australe	Occasionally naturalised. Has potential to replace sub- canopy trees and become a weed of streamsides. Cultivated as hedge plant.
orush wattle	Paraserianthes lophantha	Very common on forest edges and disturbed sites. Can shade out and displace native plants. Nitrogen fixing capabilities can be a problem in places.
ouddleia	Buddleja davidii	Naturalising in several places. Displaces successional species especially at streamsides. Cultivated.
our daisy	Calotis lappulacea	Noxious plant (Noxious Plant Act).
Cape honey lower	Melianthus major	Establishing on roadsides. Displaces native plants on sand dunes and forest margins. Abundantly naturalised in Northland.
Cape ivy	Senecio angulatus	Naturalised in several places. Serious problem at Piha. Smothers sub-canopy plants at forest margins.
		Cultivated.

Common	Latin Name	Reasons for inclusion and current conservation
Name		status

castor oil plant	Ricinus communis	Naturalised in several places e.g. Whatipu. Displaces native plants along waterways, roads and coastal cliffs.
cathedral bells	Cobaea scandens	Two known garden sites in Ranges. Both currently being eliminated by WCC noxious plant officers. Smothers native trees & shrubs over large areas. Cultivated.
Cattley's	Psidium	Not known to be naturalised. Major weed overseas in
guava	cattleianum	areas with similar climates e.g. Norfolk Island & coastal
*******	Henrich and Hill	New South Wales. Cultivated.
Chilean needle grass	Stipa neesiana	Noxious plant (Noxious Plant Act). One site known at Waitakere Dam.
Chinese	Pennisetum	Noxious plant (Noxious Plant Act). No known sites in
pennisetum	alopecuroides	ranges.
Chinese privet	Ligustrum sinense	Established in gardens around ranges, especially Parau. Forms long lived dense stands along streams and open margins.
climbing	Asparagus	Widespread and well established in several places.
asparagus climbing dock	scandens Rumex segittatus	Invades forest floor and kills sub-canopy plants. Naturalised on forest edges. Weed of forest edge & sand
climbing dock	rumex segments	dunes.
coitsfoot	Tussilago farfara	Noxious plant (Noxious Plant Act).
cotoneaster	Cotoneaster glaucophyllus	Common on forest edges and disturbed sites. Invades bush margins, banks and coastal cliffs. Cultivated.
cotoneaster	Cotoneaster	Naturalised in places, particularly around Cornwallis.
COCOTICASICI	franchettii	Invades bush margins, banks and coastal cliffs. Cultivated.
crocosmia	Crocosmia	Very common on forest margins. Displaces native plants
nal areas	Xcrocosmiiflora	and forest margins and other habitats. Noxious plant (Noxious Plant Act).
eel grass	Vallisneria, Lake Pupuke and Meola Creek varieties	Noxious plant (Noxious Plant Act).
elaeagnus	Elaeagnus Xreflexa	Several sites around Ranges. Persistent hedges can
		completely exclude other plants. A serious problem where it has become rampant. Still occasionally cultivated.
fountain grass	Pennisetum	Not known to be naturalised. Can suppress regrowth in
iountain graos	setaceum	forests. Serious pest in bare scoria forest in Hawai'i. Cultivated.
fringed water	Nymphoides	Noxious plant (Noxious Plant Act).
lily	peltata	
German ivy	Senecio mikanioides	Naturalised in ranges. Occurs in gardens throughout most of ranges. Smothers sub-canopy plants at forest margins. Cultivated.
giant reed	Aruηdo donax	Naturalised in several places in ranges on forest and stream edges. Proven weed of forest edges. Establishes readily in wet environments and could become a serious problem in Waitakere wetland. Cultivated.
ginger, kahili	Hedychium gardnerianum	Widespread throughout ranges. Forms dense clumps in forests.
ginger, yellow	Hedychium	In several places around ranges. Forms dense clumps in
emesal escale	flavescens	forests.
gorse	Ulex europaeus	Very common throughout ranges. Threat in naturally open areas.
green cestrum	Cestrum parqui	Noxious plant (Noxious Plant Act). No known sites in
hakea, downy	Hakea gibbosa	Waitakere City Established in several places including Kaitarakihi
nakea, prickly	Hakea sericea	gumland. Forms dense stands after fire. Fairly common around Ranges. Forms dense stands
lakea, prickly	ranoa sarioaa	after fire.
nakea, willow eaved	Hakea salicifolia	Naturalised in several places around Ranges. Considered to be a serious weed, Forms dense stands after fire.
nawthorn	Crataegus monogyna	Known to be in several places including Laingholm and Hula.
remlock	Conium maculatum	Noxious plant (Noxious Plant Act). Known sites in
- PARTIES AND	- common or was an arranged to	Ranges.
limalayan	Leycesteria	Common in parts of the Ranges on forest edges and
Honeysuckle	formosa	stream side. Forms inpenetrable stands.
nornwort	Ceratophyllum demersum	Noxious plant (Noxious Plant Act).
orse nettle .	Solanum carolinense	Noxious plant (Noxious Plant Act). No known sites in ranges
norsetail	Equisetum arvense	Noxious plant (Noxious Plant Act).
nydrangea fertile form)	Hydrangea macrophylla "lacecap"	Naturalised in several places. Cultivated.
	Hydrilla verticillata	Noxious plant (Noxious Plant Act).

Common Name	Latin Name	Reasons for inclusion and current conservation status
Italian buckthorn	Rhamnus alaternus	Not known to be naturalised. Major suppresser of native seedlings and small plants in forest and open situations. Cultivated.
ivy	Hedera helix helix	Naturalised in several places. Smothers and kills native trees and epiphytes. Cultivated.
Japanese honeysuckle	Lonicera japonica	Widespread on forest edges. Major smothering effect of trees and shrubs. Cultivated.
Japanese spindle tree	Euonymus japonicus	Not commonly naturalised but occurs in gardens. Displaces native plants in shrublands and forest margins
jasmine	Jasminum polyanthum	forming dense colonies. Cultivated. Major infestations around Huia, Waiatarua and Mountain Rd. Smothers trees and shrubs up to mid-canopy level,
Johnson grass	Sorghum	and can prevent the establishment of seedlings in more open situations. Very commonly cultivated in gardens Noxious plant (Noxious Plant Act). No known sites
Johnson grass	Halapense	Provious plant (1904) and (1904) The Kilotti Sites
lantana	Lantana camara (yellow-pink and yellow-red varieties)	Known to be naturalised in a few places. Major weed of Pacific. Cultivated.
loquat	Eriobotrya japonica	Self sown plants known from several places. Can establish in closed forest and displace native species, Cultivated.
Madeira vine	Anredera cordifolia	Known from Karekare and Whatipu, Kills shrubs and small trees within 2 years of establishing. Can become a weed of tall forest. Difficult to control.
Manchurian wild rice	Zizania latifolia	Noxious plant (Noxious Plant Act).
marshwort	Nymphoides germinate	Noxious plant (Noxious Plant Act).
Mexican daisy	Erigeron karvinskianus	Very common, with major infestations in several places. Commonly cultivated in gardens. Major smothering effer on ground covering plants and plants of cliffs, stream banks and natural open areas. Replaces rare native ground cover species.
Mexican devil	Ageratina adenophora	Naturalised in several places. Invades into forests.
mile-a-minute	Dipogen lignosus	Known to be around Karekare, Laingholm and Comwallis Vigorous smotherer of scrub, regenerating bush and coastal margins.
mistflower	Ageratina riparia	Very common throughout with major infestations in several places. Major weed of streamsides.
monkey apple	Acmena smithii	Naturalised plants in several places in forest. Large tree capable of becoming a permanent part of the canopy. Commonly cultivated as hedge.
Montspellier	Teline	Forms dense stands on margins.
broom	monspessullana	
Moreton Bay fig	Ficus macrophylla	Not known to be naturalised or common as garden plant Capable of self-seeding and could establish in forests as an emergent species (ie above canopy). Very large but occasionally cultivated.
moth plant	Araujia sericifera	Naturalised in several places. Smothers bush canopy.
nardoo Nasella	Marsilea mutica Stipa trichotoma	Noxious plant (Noxious Plant Act). Noxious plant (Noxious Plant Act). No known sites.
tussock		
needle tussock nodding thistle	Stipa rudis Carduus nutans	Noxious plant (Noxious Plant Act). Cultivated. Noxious plant (Noxious Plant Act). 15 sites listed -
Noogoora bur	Xanthium occidentale	Karekare and Swanson. Noxious plant (Noxious Plant Act).
nutgrass	Cyperus rotundus	Noxious plant (Noxious Plant Act).
old mans	Clematis vitalba	Known from 3 or 4 sites in the past, and likely to re-occur
beard	ESTIMATE DE THE	Completely smothers forest canopy.
oxygen weed oxygen weed	Egeria dense Lagarosiphon	Several sites known - big problem in Lake Wainamu Known from several garden ponds and one creek,
oxylobium	major Oxylobium	Invades forest margins.
nalm grace	lannceolatum Setaria palmifolia	Invades margins and under canopy.
palm grass pampas,	Cortaderia jubata	Extremely widespread in coastal and other natural open
purple	Contacióna Judeta	areas, and gardens. Replaces native plants in natural open areas.
pampas, white	C. selloana	Known to be naturalised in several locations. Replaces native plants in natural open areas.
parrots feather	Myriophyllum aquaticum	Common in waterways in city. Causes siltation of natura waterways.
periwinkle	Vinca major	Established in several places in ranges and city. Forms dense mats on forest floor and natural gaps preventing regeneration.

Common Name	Latin Name	Reasons for inclusion and current conservation status
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plectranthus	Plectranthus. ciliatus	Well established, particularly around Titirangi (aka Titirangi weed) as weed of forest edge, roadsides and gardens. Forms dense smothering mat. Cultivated.
plectranthus, blue spur flower	Plectranthus ecklonii	Already established as weed, and increasing. Cultivated
plectranthus	Plectranthus grandis	Establishing in Ranges. Cultivated.
Port Jackson fig	Ficus rubiginosa	Not known to be naturalised or common as garden plant. Capable of self-seeding and could establish in forests as an emergent species (ie above canopy). Very large but occasionally cultivated.
ragwort	Senecio jacobaea	Widespread in rural areas. Several biocontrol sites established.
red cestrum	Cestrum elegans	Naturalised on forest edges in several places. Displaces native plants in low/disturbed forest and at margins.
sagittaria	Segitteria graminea ssp. platyphilla	Noxious plant (Noxious Plant Act). No known sites
Salvinia	Salvinia molesta	Noxious plant (Noxious Plant Act). One known active site. Two sites inactive
selaginella	Selaginella kraussiana	Naturalised extensively in gardens and natural areas. Invading into forest in several places. Has disastrous impact on small native plants. Prevents native regeneration. Cultivated (varieties) and common weed of garden centre plants.
Senegal tea	Gymnocoronis spilanthoides	Noxious plant (Noxious Plant Act). Two or three sites, all garden ponds
sheeps bur	Acaena agnipila	Noxious plant (Noxious Plant Act).
skeleton weed	Chondrilla juncea	Noxious plant (Noxious Plant Act). Known from city in past.
smilax	Asparagus asparagoides	Been known from Ranges in past. Known from sites nea Ranges in City. Major smothering of natives in bush and coastal situations. Heavy potential for infestation from present sites.
spartina	Spartina spp.	No known sites.
spiny broom	Calicotome spinosa	Noxious plant (Noxious Plant Act).
sweet pea shrub	Polygala myrtifolia (wild variety)	Serious infestation at Cave Rock, Karekare and in other coastal places. Able to invade undisturbed coastal sites.
Taiwan cherry	Prunus campanulata	Can invade regenerating bush.
tree privet	Ligustrum lucidum	Common in City. Established in Ranges, especially around Titirangi. Forms dense stands.
Tuber sword fern	Nephrolepis cordifolia	Naturalised in gardens and forest edges, particularly around Titirangi, Cornwallis and Laingholm. Forms dense clumps that threaten natives, especially in rocky places. Cultivated.
tutsan	Hypericum androsaemum	Common around Waiatarua, Arataki and Hula on roadsides and gardens. Invades open banks.
variegated thistle	Silybum marianum	Noxious plant (Noxious Plant Act), 8 known sites in Bethells/Swanson area
velvet groundsel	Senecio petasitis	Common at Huia, Titirangi, Piha and Karekare in gardens and/or forest edges. Displaces native plants at forest margins. Possibly cultivated.
wandering jew	Tradescantia fluminensis	Extremely common throughout. Invades forest floor forming dense mats 50cm+ high, displacing natives.
water hyacinth	Eichomia crassipes	Noxious plant (Noxious Plant Act), Three sites. One large site at Whatipu.
water lettuce	Pistia stratiotes	Noxious plant (Noxious Plant Act). No known sites
water poppy	Hydrocleys nymphoides	Noxious plant (Noxious Plant Act), Known from 5 garden ponds.
white-edged nightshade	Solanum marginatum	Noxious plant (Noxious Plant Act). No known sites
wild broom	Cytisus scoparius	Noxious plant (Noxious Plant Act). 1 listed site at Titirangi.
willow, crack	Salix fragilis	Naturalised in several wet places, most importantly in Te Henga wetland. Invades wetlands and completely changes habitats. Cultivated
willow, grey	Salix cinerea	Naturalised in several wet places, most importantly in Te Henga wetland. Invades wetlands and completely changes habitats. Cultivated
woolly	Solanum	Common throughout City Displaces native plants.
-wwiij	September 1997	

The list of plants prohibited from cultivation in the Green Network (see Green Network Pamphlet), roadsides and Council owned land in the proposed District Plan is presented here. These are environmentally damaging plants that Waitakere City Council hopes to reduce in cultivation in the City, in order to reduce or prevent their presence in natural areas.

See Environmentally Damaging Plants - Destroying our Natural Heritage a Waitakere City Council pamphlet which discusses environmentally damaging plants in Waitakere City 55

COMMON NAME INDEX

Tall Trees		mingimingi	Coprosma propinqua	kiekie	Freycinetia banksii
		mingimingi	Leucopogon fasciculatus	kohia, NZ passion vine	Passiflora tetrandra
hall's totara	Podocarpus hallii	neinei	Dracophyllum latifolium	lawyer	Rubus australis
kahikatea	Dacrycarpus dacrydioides	ngalo	Myoporum laetum	powhiwhi, convolvulus	Calystegia tuguriorum
kauri	Agathis australis	nikau	Rhopalostylis sapida	puntaua, scented clematis	Clematis forsteri
lowland totara	Podocarpus totara	pate	Schefflera digitata	puawananga, bush clematis	Clematis paniculata
matai	Prumnopitys taxifolia	pigeonwood, porokaiwhiri	Hedycarya arborea	spindly lawyer	Rubus squarrosus
miro	Prunnopitys ferruginea	ponga, silver tree fern	Cyathea dealbata	supplejack, kareao	Ripogonum scandens
northern rata	Metrosideros robusta	poroporo	Solanum aviculare	winter rata	Metrosideros fulgens
rimu	Dactydium cupressimum	puka	Griselinia lucida		
tanekaha	Phyllocladus trichomanoides	punui	Cyathea cunninghamii	Grasses	
25 0 =		putaputaweta	Carpodetus serratus		
Medium Trees		rangiora	Brachyglottis repanda	bush rice grass	Microlaena avenacea
	#40 E 2 A 3E	raukawa	Pseudopanax edgerleyi	coastal toetoe	Cortaderia splendens
black maire	- The control of the second of	shining karamu	Coprosma lucida	meadow rice grass	Microlaena stipoides
hinau	Elaeocarpus dentatus	threepenny bit tree	Coprosma areolata	native bamboo	Microlaena polynoda
kanuka	Kunzea ericoides	ti kouka, cabbage tree	Cordyline australis	needle grass	Stipa stipoides
karaka	Corynocarpus laevigatus	ti ngahere, forest cabbage tree	Cordyline banksii	kowhangatara	Spinifex sericeus
kawaka kohekohe	Libocedrus plumosa	toru	Toronia toru	slender panic grass	Oplismenus imbecilis
kohuhu	Dysoxylum spectabile Pittosporum tenuifolium	turepo, milk tree	Streblus heterophyllus	swamp millet	Isachne globosa
maire tawake,swamp maire	Syzygium maire	tutu, tupakihi	Coriaria arborea	toetoe	Cortaderia fulvida
	Litsea calicaris	west coast kowhai	Sophora "fulvida"		
mangrove, manawa	Avicennia marina ssp. australasica	wharangi whau	Melicope ternata Entelea arborescens	Sedges, Rushes	
mangrove, manawa	Halocarpus kirkii	whauwhaupaku, 5-finger	Pseudopanax arboreus		
Northland kowhai	Sophora microphylla var. microphylla	wnauwnaupaku, 5-meger wheki	Pseudopanax arnoreus Dicksonia squarrosa	bootlace sedge	Carex flagellifera
oro oro	Neslegis montana	wheki-ponga	Dicksonia fibrosa	cutty grass	Gahnia pauciflora
pohutukawa	Metrosideros excelsa	witeki-poliga	Dicksoma jiorosa	cutty grass	Gahnia setifolia
pokaka	Elaeocarpus hookerianus	CITAL EL D. TON III INV A.		giant rush	Juncus pallidus
pukatea	Laurelia novae-zelandiae	Shrubs & Flax-like Plants		giant cutty grass	Gahnia lacera
puriri	Vitex lucens	bluff korokio	Corokia cotoneaster	hook sedge	Uncinia uncinata
rewarewa	Knightia excelsa	coastal shrub daisy	Olearia solandri	jointed twig rush	Baumea articulata
taraire	Beilschmiedia tarairi	hairy daphne	Pimelea tomentosa	knobby club rush	Isolepis nodosa
tarata, lemonwood	Pittosporum eugenioides	harakeke, flax	Phormium tenax	kuta, tall spike rush	Eleocharis sphacelata
tawa	Beilschmiedia tawa	karapapa	Alseuosmia macrophylla	oioi, jointed rush	Leptocarpus similis
tawapou	Pouteria costata	kiekie	Freycinetia banksii	pingao	Desmoschoenus spiralis
tawari	Ixerba brexioides	kohurangi	Brachyglottis kirkii	pukio, niggerhead	Carex secta
tawheowheo	Quintinia serrata	korokio taranga	Corokia buddleioides	speckled sedge	Carex testacea
titoki	Alectryon excelsa	koromiko	Hebe macrocarpa	sword sedge	Lepidosperma laterale
toro	Myrsine salicina	koromiko		toikiwi, giant cutty grass	Gahnia xanthocarpa Machaerina sinclairii
towai	Weinmannia silvicola	kumerahou	Pomaderis kumeraho	tuhara upokotangata giant umbrella sedge	Cyperus ustulatus
white maire	Nestegis lanceolata	leather-leaf pittosporum	Pittosporum kirkii	wiwi, a rush	Juncus maritimus
		mairehau	Phebalium mudum	wiwi, sea rush	Schoenus tendo
Small Trees/Large Shrubs		mingimingi	Coprosma crassifolia	William Sca I ash	Denoema semo
ATTENDED CARPORTER WATER	Name (No.) the death of the second of the Property	mingimingi	Coprosma rhamnoides	Tan Circuit District	
a NZ broom	Carmichaelia aligera	mingimingi	Leucopogon fasciculatus	Low Ground Plants	
a tree daisy	Olearia albida	oro oro	Nestegis montana	COLUMN MONTHUR CONTRACTOR IN MATERIAL DES	TWO 040 (CONTOCKED)
akeake	Dodonaea viscosa	poataniwha	Melicope simplex	autetaranga, sand daphne	Pimelea arenaria
akepiro, tanguru	Olearia furfuracea	prickly mingimingi	Cyathodes juniperina	bachelor's button	Cotula coronopifolia
hangehange beketara	Geniostoma rupestre	ramarama	Lophomyrtus bullata	coastal astelia	Astelia banksii
horoeka, lancewood	Olearia rani Pseudopanax crassifolius	raupo	Typha orientalis	coastal angelica common nertera	Scandia rosifolia Nertera depressa
horopito	Pseudowintera axillaris	rohutu	Lophomyrtus obcordata	creeping clubmoss	Lycopodium cernuum
houhere, lacebark	Hoheria populnea	saltmarsh ribbonwood	Plagianthus divaricatus	creeping sand iris	Libertia peregrinans
houpara	Pseudopanax lessonii	shrub pseudopanax	Pseudopanax anomalus	forest iris	Libertia pulchella
kaikomako	Pennantia corymbosa	snowberry spiderwood	Gaultheria antipoda	forked sundew	Drosera binata
kanono	Coprosma grandifolia	swamp coprosma	Dracophyllum sinclairii Coprosma tenuicaulis	fragrant astelia	Astelia fragrans
karamu	Coprosma macrocarpa	taranga, a daphne	Pimelea longifolia	giant swamp astelia	Astelia grandis
karamu	Coprosma robusta	taranga, a dapine	Cassinia leptophylla	horokaka, ice plant	Disphyma australe
karo	Pittosporum crassifolium	tauhinu	Pomaderris ericifolia	Huia hebe	Hebe bishopiana
katote, soft tree fern	Cyathea smithii	taupata	Coprosma repens	kahakaha	Collospermum hastatum
kawakawa	Macropiper excelsum	taurepo	Rhabdothamnus solandri	kauri "grass"	Astelia trinervia
kotukutuku	Fuchsia excorticata	tawhirikaro	Pittosporum cornifolium	kowharawhara, perching lily	Astelia solandri
large-leaved mahoe	Melicytus macrophyllus	weeping mapou	Myrsine divaricata	large-flowered iris	Libertia grandiflora
mahoe	Melicytus ramiflorus	wharariki, mountain flax	Phormium cookianum	mercury bay weed	Dichondra repens
mahoe wao	Melicytus lanceolatus			mikoikoi, NZ iris	Libertia ixioides
The state of the s	Mida salicifolia	Vines & Trailers		nihinihi, shore binder	Calystegia soldanella
maire taiki	THE THE PARTY OF T	TANDO NY ALEMANY		northern nertera	Nertera dichondrifolia
makomako, wineberry	Aristotelia serrata				THE CONTRACT OF STREET, STREET
makomako, wineberry mamaku, black treefern	Cyathea medullaris	akatea, small white rata	Metrosideros perforata	NZ spinach	Tetragonia trigyna
makomako, wineberry mamaku, black treefern mamangi	Cyathea medullaris Coprosma arborea	akatea, small white rata bush lawyer, tataramoa	Rubus cissoides	panakenake	Pratia angulata
makomako, wineberry mamaku, black treefern mamangi manakura	Cyathea medullaris Coprosma arborea Melicytus micranthus	bush lawyer, tataramoa carmine rata, akakura	Rubus cissoides Metrosideros carminea	panakenake parataniwha	Pratia angulata Elatostema rugosum
makomako, wineberry mamaku, black treefern mamangi manakura manuka	Cyathea medullaris Coprosma arborea Melicytus micranthus Leptospermum scoparium	bush lawyer, tataramoa carmine rata, akakura climbing white rata	Rubus cissoides Metrosideros carminea Metrosideros diffusa	panakenake	Pratia angulata
makomako, wineberry mamaku, black treefern mamangi manakura	Cyathea medullaris Coprosma arborea Melicytus micranthus	bush lawyer, tataramoa carmine rata, akakura	Rubus cissoides Metrosideros carminea	panakenake parataniwha	Pratia angulata Elatostema rugosum

pekepeke, daisy Celmisia gracilenta pohuehue Muehlenbeckia complexa prostrate daphne Pimelea prostrata Selliera radicans remuremu rengarenga, rock lily Arthropodium cirratum sand coprosma Coprosma acerosa Apium prostratum sea celery sea primrose Samolus repens tamingi Epacris pauciflora ti rauriki, dwarf cabbage tree Cordyline pumilio tree club-moss Lycopodium deuterodensum turutu, NZ blueberry Dianella nigra Waitakere forget-me-not Myosotis "pansa" west coast cliff hebe Hebe obtusata west coast rock daisy Celmisia major var. major wharanui Peperomia urvilleana white sun orchid Thelymitra longifolia

(for treeferns, see Small Trees list)

bank strap fern Grammitis ciliata bracken Pteridium esculentum

button fern, tarawera Pellaea rotundifolia (Waitakere form)

coastal blechnum Blechnum banksii

coastal brake Pteris comans NZ

comb fern Schizaea fistulosa

common hypolepsis Hypolepis ambigua

common maidenhair Adiantum cunninghamii

creeping carpet fern Blechnum filiforme

downy maidenhair Adiantum fulvum

fan fern Schizaea dichotoma

filmy ferns Hymenophyllum spp.

floating fern Azolla filiculoides

frost fern Histiopteris incisa

giant hypolepsis Hypolepis dicksonioides

glossy asplenium Asplenium lamprophyllum

hairy legs Lastreopsis hispida

hairy strap fern Grammitis pseudociliata

hen & chicken fern, manamana Asplenium bulbiferum

heruheru, crepe fern Leptopteris hymenophylloides

haruhuruwhenua, shining spleenwort Asplenium oblongifolium

jointed fern Arthropteris tenella

kiokio Blechmum "capense"

kiwakiwa Blechnum fluviatile

kowaowao, maratata Phymatosorus pustulatus

leather leaf asplenium Asplenium northlandicum

leather-leaf fern Pyrrosia eleagnifolia

makaka, round-leafed maidenhair Adiantum aethiopicum

makawe, hanging asplenium Asplenium flaccidum

manamana, necklace fern Asplenium flabellifolium

mangemange Lygodium articulatum

miniature tree fern Blechnum fraseri

moki, fragrant fern Phymatosorus scandens

mokimoki Doodia mollis

pakau Pneumatopteris pennigera

para, king fern Marattia salicina

peretao Blechnum colensoi

piupiu, crown fern Blechnum discolor

pukupuku Doodia media

rereti Blechnum chambersii

ring fern, matata Paesia scaberula

rock fern Cheilanthes distans

rock fern Cheilanthes humilis

rosy maidenhair Adiantum hispidulum

shield fern Polystichum vestitum

sickle asplenium Asplenium polyodon

small maidenhair Adiantum diaphanum

strap fern Grammitis billardierei

swamp kiokio Blechnum minus

tangle, swamp umbrella fern Gleichenia dicarpa

turawera, trembling brake Pteris tremula

tutoke, shield fern Polystichum richardii

umbrella fern Sticherus cunninghamii

velvet fern Lastreopsis velutina

waewaekaka Gleichenia microphylla

ECOSYSTEM SIGNATURE BIOTA

PLANTS

kiekie - Freycinetia banksii, lush vine or shrub, with fruits, & leaves for weavers.

kowhai - Sophora "fulvida", the elegant little west coast kowhai tree.

manuka - Leptospermum scoparium, wind-shorn tea tree pohutukawa - Metrosideros excelsa, the New Zealand Christmas tree!

puriri - Vitex lucens, the handsome canopy tree.

rimu - Dacrydium cupressiunum, grand podocarp tree.

BIRDS

kahu - harrier hawk

kereru - New Zealand pigeon

kotare - kingfisher

miromiro - tomtit, yellow-breasted tit.

oi - grey faced petrel

ruru - morepork

GLOSSARY

biosecurity - the seeking of protection against the influx of unwanted organisms. divaricating - shrubs mostly, wide-angled, tangled branches, generally small-leafed.

Ecological District - a distinctive area as determined by the geology, topography, climate and botany, as mapped nationally (W.M. McEwen. 1987. Dept. of Cons). eco-site - locating plants according to the habitats and microclimates to which they

occur naturally. eco-source - plants propagated from vegetation occuring naturally in the area to be planted.

endemic - native only to the particular region or country specified.

epiphyte - a plant growing upon another but not organically connected with it. gymnosperm - plant in which the ovule is not enclosed in the ovary, such as conifers (e.g. cone-bearing kauri and kawaka) and podocarps (e.g. rimu, totara, tanekaha, miro, manoao and kahikatea).

habitat - place in which a plant naturally grows.

hybrid - a plant whose parents are of different species, subspecies or varieties.

indigenous - native to an area or country.

indigenous ecosystem - indigenous living (biotic) elements and non-living (abiotic) materials (the physical environment) belonging in a spatially defined area, and the interactions among and between them.

interplant - planting in amongst existing vegetation, either formally or informally. local - not widespread but occurring only in a few places.

naturalised - introduced to, and established wild in, an area; not native there.

nurse crop - the preliminary planted, sown or existing vegetation which creates appropriate conditions for establishment of the next main species.

pioneer - colonising species, plants which naturally establish on an open site, able to withstand climatic extremes.

podocarp - a tree or shrub belonging to the gymnosperm family Podocarpaceae. Usually having fleshy fruits.

subsp. - subspecies - a markedly distinct geographical variant of a species resulting from some barrier to successful breeding with other populations of the species.

sp. (sing.) spp. (plural) species - the basic unit of plant classification, a group of similar individuals or populations sharing characteristics that are passed on to their seedlings and these characteristics distinguishing them from other species.

var. variety - a distinct geographical variant of a species, usually less markedly distinct than a subspecies.

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