

# Planting guide for Eastern Waikato



## High to lowland habitats

This planting guide is designed to assist anyone undertaking ecological restoration on the ranges and hills, in the valleys and along river, stream and lake margins to the east of the Waikato River from Taupiri north to Mangatangi. It is one in a series of planting guides covering different ecosystems in Waikato District, including sections of the Waikato and Waipa rivers; peat lakes, kahikatea remnants, coastal forest, western ranges and limestone outcrops.

The species lists are not intended to be a comprehensive description of the primeval forests that once existed in the area but a simplified recipe for the reconstruction of natural patterns and processes based on the practical knowledge and experience of plant growers involved in ecological restoration. It is worth remembering that ecological restoration is not usually a one-off activity but may require a number of interventions in order to restore natural patterns and processes. Restoring less common species may require specialist advice.

### Planting guide for eastern ranges, valleys and river, stream and lake margins.

A series of ranges and rolling hill country dissected by broad alluvial valleys lies between the Waikato River and the eastern boundary of the Waikato district. Sandwiched in between are Lakes Waikare, Ohinewai, Kimihia and Hakanoa and their associated wetlands.

Rimu-tawa forest dominates this landscape where the land has not been developed for agriculture. Drier leached soils in this mild climate sometimes result in a forest of kauri, tanekaha and hard beech with a distinctive understory. Taraire is absent or at least very uncommon in this part of the district but puriri extends into the less frost prone areas and kamahi is replaced by its close relative towai. Lower lying land is dominated by kahikatea forest. Open wetlands occur where drainage is poor or water levels high. (Note: The peatlands of the Whangamarino Wetland Ramsar site are outside the scope of this guide).

Each zone has its own assemblage of plants grouped into five categories - colonisers; canopy trees; understorey shrubs; grasses sedges, ferns and ground covers; and climbers and epiphytes. A representative range of species for each of the five categories is included in order that something resembling the natural structure can be restored. Not all categories of plants are suitable for planting in the initial stages of restoration e.g. climbers and epiphytes, but their eventual inclusion will give resilience to a plant community and enhance the habitat for yet other species.

An indication is provided as to the total number of plants of each category (not individual species) that might be planted in a 100 square metre (10 x 10m) section in each of three situations - open ground, established cover and mature native canopy. Where a canopy already exists, the planting density will be less than open ground.



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It is worth looking at similar natural areas in the locality to gain a better appreciation of the mix and densities of species. The approximate final height of a plant is given where it is over one metre.

The guide to tolerances/preferences is intended to give guidance for the positioning of each plant. This is only a rough guide. On the table ○ means this species is unlikely to survive the condition, ◐ means it may survive but may not thrive or compete well with other vegetation and ● indicates the species is well adapted to the conditions. It is recommended that plants are located in positions indicated by ● in the tolerances/preferences section.

Some plants such as ferns and epiphytes may be best left to see if they come back naturally once conditions are right. Epiphytes are not the easiest plants to establish but if you want to assist natural processes there are several things you could do:

- place spores or seeds directly onto tree fern trunks (a good growing medium);
- surround roots of plant with a mixture of sphagnum moss and potting mix or compost, enclose with a suitable support (windbreak cloth, bird netting) and tie to a tree (do not use wire or nails);
- plant on a mound on the ground close to a tree in a shady place.

## Planting to attract wildlife

The plants value as bird food is indicated by an N for nectar and F for fruit and seeds.

Many native birds such as tui, bellbird, kaka, kakariki and silvereye will feed on both fruit and nectar whereas kereru prefer fruit and foliage. For birds like fantail, grey warbler and whitehead, plant varieties are not as important as a healthy mix of spiders, moths and beetles (which also feed on nectar/pollen) and earthworms. A good layer of leaf mulch on the forest floor should meet this need. Ruru (morepork) and kingfisher also eat insects as well as mice.

## Ecological restoration in the Waikato

Always choose ecosourced plants when undertaking ecological restoration. Ecosourced plants are those which are grown from seeds or propagules (including spores and cuttings) collected from naturally-occurring vegetation in a locality close to where they are to be replanted as part of a restoration project. With seeds, attention must be paid to possible cross-pollination from nearby garden plants.

It's worth taking care to ensure plants are ecosourced from natural areas to:

- avoid the risk of planting species which are not native to the local area and which could become invasive;
- help maintain the unique local characteristics of the native plants in your area;
- obtain plants that have a greater chance of growing successfully because they are adapted to local conditions.

Ecosourced Waikato (a group representing plant growers, the Department of Conservation and local and regional authorities) has developed the native plant lists for the Waikato District with funding support from the Waikato District Council and Department of Conservation.



# Eastern Waikato – ranges and hills

## Hillslopes / rimu – tawa forest

Rimu-tawa forest once covered most of the higher ground between the Hamilton and Meremere Basins to the west and east of the Waikato River but is now more limited in distribution. While tawa dominated the canopy with rimu a common emergent species, the forest varied considerably between stream sides and ridges. This section describes a broad view of this forest type. Species should be selected with appropriate tolerances and preferences for the conditions at specific sites. These tolerances and preferences are indicated below along with planting tips.

Characteristic species		Planting			Plant tolerances / preferences							Planting tips		maximum height (approx) if over 1 metre	bird food type
Botanical name	Common name	open ground	established cover	mature native canopy	flood	wet	moist	dry	sun	shade	frost				
		Suggested number of plants per 100 m <sup>2</sup>			○ unlikely to survive ◐ may survive but not thrive ● well adapted to conditions										
<b>Colonisers</b>					<i>Colonisers are typically quick growing, tolerant of a wide range of environments and effective and early dispersers</i>										
<b>Listed in order from stream sides to ridges</b>		60	10	0											
<i>Austroderia fulvida</i>	toe toe														
<i>Cordyline australis</i>	ti kōuka/cabbage tree				●	●	●	●	●	◐	●		open areas	12	F/N
<i>Coprosma robusta</i>	karamu				●	●	●	○	●	○	◐		good soil	5	F
<i>Plagianthus regius</i>	manatu / ribbonwood				●	●	●	●	●	◐	●		avoid long grass	10	
<i>Hoheria sextylosa</i>	lacebark				◐	○	●	◐	●	◐	●		open areas	8	N
<i>Kunzea robusta</i>	kanuka				●	○	●	●	●	○	◐		dry sloping ground	16	N
<i>Olearia furfuracea</i>	akepiro				?	○	◐	●	●	◐	○		exposed areas especially coastal	7	
<b>Canopy trees</b>					<i>Canopy trees are long-lived, tall and spreading, but slow to establish</i>										
<b>Listed in order from wettest to driest sites</b>		15	15	0											
<i>Dacrycarpus dacrydioides</i>	kahikatea				◐	◐	●	◐	●	○	●		sunny moist areas	60	F
<i>Laurelia novae-zelandiae</i>	pukatea				●	●	●	◐	◐	◐	○		wet sheltered areas	35	
<i>Syzygium maire</i>	swamp maire				?	●	◐	○	●	●	○		sheltered, stable boggy areas	16	F
<i>Alectryon excelsus</i>	titoki				○	○	●	◐	◐	●	◐		sheltered areas	10	F
<i>Coprosma arborea</i>	mamangi				○	○	◐	●	●	◐	○		well drained sloping ground	10	F
<i>Beilschmiedia tawa</i>	tawa				○	○	●	◐	◐	●	◐		sheltered areas	20	F

<i>Podocarpus totara</i>	totara				●	○	●	○	●	○	●	anywhere	30	F
<i>Vitex lucens</i>	puriri				○	○	●	○	●	●	○	Only northern frost free sites	25	F/N
<i>Dysoxylum spectabile</i>	kohekohe				○	○	●	○	○	●	○	sheltered sloping ground	17	F/N
<i>Dacrydium cupressinum</i>	rimu				?	○	●	●	●	○	●	well drained sloping ground	35	F
<i>Elaeocarpus dentatus</i>	hinau				?	○	●	●	○	●	?	well drained, shady sloping ground	20	F/N
<i>Litsea calicaris</i>	mangeao				?	○	●	●	●	○	○	well drained sloping ground	15	
<i>Prumnopitys ferruginea</i>	miro				?	○	○	●	●	●	●	well drained sloping ground	35	F
<i>Weinmannia silvicola</i>	towai				○	○	●	●	●	○	●	steep ground	26	
<b>Understorey Listed in order from wettest to driest sites</b>		<b>25</b>	<b>25</b>	<b>15</b>	<b>flood</b>	<b>wet</b>	<b>moist</b>	<b>dry</b>	<b>sun</b>	<b>shade</b>	<b>frost</b>	<b>Planting tips</b>		
<i>Streblus heterophyllus</i>	turepo				●	○	○	○	○	●	●	established sheltered site initially	12	F
<i>Melicytus ramiflorus</i>	mahoe				○	○	●	○	●	●	○	sheltered site initially	10	F
<i>Carpodetus serratus</i>	putawetaweta				○	○	●	○	●	●	●	sun or shade, avoid flooding	10	F
<i>Fuchsia excorticata</i>	kotukutuku				○	○	●	○	●	●	○	wet areas above flood level	12	F
<i>Schefflera digitata</i>	pate				○	●	●	○	●	●	○	wet areas above flood level	8	F
<i>Coprosma grandifolia</i>	kawariki/kanono				●	○	●	○	○	●	○	moist shady stream banks	7	F
<i>Aristolelia serrata</i>	makomako/wineberry				○	○	●	○	●	○	●	not too wet or too dry	8	F
<i>Coprosma areolata</i>					●	●	●	○	●	○	○	tolerant of most conditions	4	F
<i>Myrsine australis</i>	mapou				○	○	●	●	●	●	○	anywhere	7	F
<i>Rhabdothamnus solandrii</i>	taurepo				○	○	●	○	○	●	○	steep wet banks	2	N
<i>Dicksonia squarrosa</i>	wheki				?	○	○	○	●	●	●	damp sheltered areas	2-8	
<i>Cyathea dealbata</i>	ponga				?	○	○	○	●	●	●	damp sheltered areas	10	
<i>Cyathea medullaris</i>	mamaku				?	○	○	○	●	●	●	damp sheltered areas	15	
<i>Cyathea smithii</i>	kātote / soft tree fern				?	○	○	○	●	●	●	damp sheltered areas, higher up		
<i>Rhopalostylis sapida</i>	nikau				?	?	●	○	○	●	○	sheltered	10	F
<i>Leucopogon fasciculatus</i>	mingimingi				○	○	○	○	●	○	●	light shade	5	F
<i>Nestegis lanceolata</i>	white maire				?	○	●	●	●	●	●	most areas	15	F
<i>Piper excelsum</i>	kawakawa				○	○	●	●	●	●	○	sheltered	3-7	F
<i>Hedycarya arborea</i>	porokaiwhiri/pigeonwood				●	○	●	○	○	●	○	sheltered sites initially	12	F
<i>Geniostema ligustrifolium</i>	hangehange				○	○	●	○	●	●	○	wide range of tolerances	4	
<i>Cordyline banksii</i>	te ngāhere				?	○	○	●	●	○	?	well drained sloping ground	3	F

<i>Brachyglottis repanda</i>	rangiora				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	?	well drained	7	
<i>Coprosma lucida</i>	shining karamu				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	well drained sloping ground	5	F
<i>Coprosma rhamnoides</i>					<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	well drained sloping ground	2	F
<i>Coprosma spathulata</i>					<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	well drained sloping ground	2	F
<i>Olearia ranii</i>	heketara				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	?	well drained	8	
<i>Pseudopanax arboreus</i>	five finger				?	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	steep clay banks	8	F
<i>Pseudopanax crassifolius</i>	horoeka/lancewood				?	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	exposed areas, wet or dry	13	F
<b>Grasses, sedges and ferns</b>		<b>0</b>	<b>10</b>	<b>15</b>	<b><i>These plants are well adapted to shady situations under taller vegetation.</i></b>									
<i>Asplenium bulbiferum</i>	hen and chickens fern					<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	damp shady places		
<i>Blechnum filiforme</i>	thread fern					<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	?	damp to dry shady places		
<i>Blechnum fluviatile</i>	kiwakiwa					<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	?	shady gullies		
<i>Microlaena avenaceae</i>	bush rice grass				?	?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	?	vulnerable to drought		
<i>Carex uncinata</i>	hook sedge				?	?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	?	damp site		
<i>Carex dissita</i>	forest sedge				?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	damp site		
<i>Carex lambertiana</i>	forest sedge					<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	damp site		
<i>Elatostema rugosum</i>	parataniwha				<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	shady stream banks		
<b>Climbers and epiphytes</b>		<b>0</b>	<b>0</b>	<b>10</b>	<b><i>These plants take advantage of trees to get their leaves up into the sunlight</i></b>									
<i>Asplenium flaccidum</i>												attach to tree		
<i>Asplenium polyodon</i>	sickle spleenwort											attach to tree		
<i>Astelia solandri</i>	kahakaha											attach to tree		
<i>Astelia hastata</i>	kahakaha											attach to tree		
<i>Earina autumnalis</i>	Easter orchid											attach to tree		
<i>Earina mucronata</i>	peka-a-waka											attach to tree		
<i>Dendrobium cunninghamii</i>	winika											attach to tree		
<i>Microsorium pustulatum</i>	kowaowao											attach to tree		
<i>Microsorium scandens</i>	mokimoki											attach to tree		
<i>Pyrrosia eleagnifolia</i>	leather leaf fern											attach to tree		
<i>Freycinetia banksii</i>	kiekie				<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	moist sheltered areas		F/N
<i>Parsonsia heterophylla</i>	kaihua/NZ jasmine				<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	moist sheltered areas		
<i>Passiflora tetrandra</i>	kohia/NZ passionfruit				<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	open areas		F/N
<i>Rubus cissoides</i>	tataramoa				<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	?	open areas		
<i>Metrosideros diffusa</i>	akatea				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	well drained soil or base of tree		N

<i>Metrosideros fulgens</i>	rata													well drained soil		N
<i>Metrosideros perforata</i>	akatea													well drained soil or base of tree		N
<i>Clematis paniculata</i>	puawananga													sheltered areas		
<i>Ripogonum scandens</i>	kareao/supplejack													moist shady areas		F

## Eastern Waikato – ranges and hills

### Leached ridges / kauri – hard beech forest

Within a broader mosaic of forest types, forest dominated by kauri and hard beech can be found, most commonly on well drained leached ridges. Historically, kauri may have dominated some coastal flats and river terraces in the area but no remnants remain as a reference guide to the plant associations.

Characteristic species		Planting			Plant tolerances / preferences							Planting tips		maximum height (approx) if over 1 metre	food type	
Botanical name	Common name	open ground	established co	mature native canopy	flood	wet	moist	dry	sun	shade	frost	Plant frost sensitive species under other trees				
<b>Colonisers</b>		<b>35</b>	<b>10</b>	<b>0</b>	<i>Colonisers are typically quick growing, tolerant of a wide range of environments and effective and early dispersers but do not persist once other species are well established.</i>											
<i>Kunzea robusta</i>	kanuka				●	○	●	●	●	○	○	○	dry sloping ground		20	
<i>Pomaderris amoena</i>	tauhinu				?	○	○	●	●	○	?	dry exposed clay banks		2		
<i>Hebe stricta</i>	koromiko				○	○	●	●	●	○	●	short lived		2		
<b>Canopy trees listed in order from most common to least common</b>		<b>15</b>	<b>15</b>	<b>0</b>	<i>Canopy trees are long-lived, tall and spreading, but slow to establish</i>											
<i>Agathis australis</i>	kauri				?	?	●	●	●	●	○	leached ridges		50		
<i>Phyllocadus trichomanoides</i>	tanekaha				?	?	●	●	●	●	○	leached ridges		30	F	
<i>Fuscospora truncata</i>	hard beech				○	○	●	●	○	●	●	leached ridges, requires shade		30		
<i>Dacrydium cupressinum</i>	rimu				?	○	●	●	●	●	●	sloping ground		35	F	

<b>Understorey</b>														
<b>Listed in order from wettest to driest habitat</b>		<b>25</b>	<b>25</b>	<b>15</b>	<b>Many understory plants require the stable conditions created under trees</b>									
<i>Alseuosmia quercifolia</i>					?	?	●	○	●	○	○	moist well drained light shade	1.5	F
<i>Coprosma lucida</i>	shining karamu				○	○	○	●	●	●	●	well drained sloping ground	5	F
<i>Coprosma rhamnoides</i>					○	○	●	○	●	●	●	well drained sloping ground	2	F
<i>Coprosma spathulata</i>					○	○	●	●	○	●	○	well drained sloping ground	2	F
<i>Cordyline banksii</i>	te ngahere				○	○	○	●	●	○	?	well drained sloping ground	3	F
<i>Geniostoma ligustrifolium</i>	hangehange				○	○	●	○	●	●	○	wide range of tolerances	4	
<i>Leucopogon fasciculatus</i>	mingimingi				○	○	○	○	●	○	●	light shade	5	F
<i>Myrsine australis</i>	mapou				○	○	●	●	●	●	○	anywhere	7	F
<i>Nestegis lanceolata</i>	white maire				?	○	●	●	●	●	●	wide range of tolerances	13	F
<i>Brachyglottis repanda</i>	rangiora				○	○	○	●	●	●	?	well drained	7	
<i>Olearia ranii</i>	heketara				○	○	○	●	●	●	?	well drained	8	
<i>Leptecophylla juniperina</i>	prickly mingimingi				○	○	○	●	●	●	●	well drained sloping ground	5	F
<i>Pseudopanax crassifolius</i>	horoeke/lancewood				?	●	●	●	●	○	●	exposed areas	15	F
<b>Grasses, sedges, lilies and ferns</b>		<b>0</b>	<b>10</b>	<b>15</b>	<b>These plants are well adapted to shady sites under taller vegetation.</b>									
<i>Astelia trinervia</i>	kauri grass				○	○	○	●	○	●	?	steep ground		F
<i>Gahnia pauciflora</i>	cutting sedge				○	○	○	●	○	●	?	steep ground		
<i>Blechnum parrisiae</i>	rasp fern				○	○	○	●	○	●	?	light shade		
<i>Lindsea trichomanoides</i>	fern				○	○	○	●	○	●	?	light shade		
<i>Morelotia affinis</i>	sedge											exposed clay banks		
<i>Cardiomanrs reniforme</i>	raurenga/kidney fern				○	○	○	●	○	●	?	light shade		
<b>Climbers and epiphytes</b>		<b>0</b>	<b>0</b>	<b>10</b>	<b>These plants take advantage of trees to get their leaves up into the sunlight</b>									
<i>Asplenium flaccidum</i>	hanging spleenwort											attach to tree		
<i>Asplenium polyodon</i>	sickle spleenwort											attach to tree		
<i>Astelia solandri</i>	kaiwharawhara											attach to tree		F
<i>Astelia hastata</i>	kahakaha											attach to tree		F
<i>Earina autumnalis</i>	Easter orchid											attach to tree		
<i>Earina mucronata</i>	peka-a-waka											attach to tree		
<i>Dendrobium cunninghamii</i>	winika											attach to tree		
<i>Microsorium pustulatum</i>	kowaowao											attach to tree		
<i>Microsorium scandens</i>	mokimoki											attach to tree		
<i>Pyrrosia eleagnifolia</i>	leather leaf fern											attach to tree		

<i>Freycinetia banksii</i>	kiekie											moist sheltered areas		F
<i>Parsonsia heterophylla</i>	kaihua/NZ jasmine											moist sheltered areas		N
<i>Passiflora tetrandra</i>	kohia/NZ passionfruit											open areas		
<i>Rubus cissoides</i>	tataramoa											open areas		F
<i>Metrosideros diffusa</i>	akatea											sheltered base of tree		N
<i>Metrosideros fulgens</i>	rata											well drained soil		N
<i>Metrosideros perforata</i>	akatea											sheltered base of tree		N
<i>Ripogonum scandens</i>	kareao/supplejack											moist shady areas		F
<i>Clematis paniculata</i>	puawhannanga											sheltered areas		N
<i>Lygodium articulatum</i>	mangemange											well drained light shade		

## Eastern Waikato - ranges and hills

### Steep rocky streams

Flowing down from the ranges and other higher ground are occasional steep rocky fast flowing streams. The deep incisions made by these streams leave room for only occasional alluvial flats. The ground is steep, well drained and rocky.

Characteristic species		Planting			Plant tolerances / preferences							Planting tips		maximum height (approx) if over 1 metre	bird food type
Botanical name	Common name	open ground	established cover	mature stage	flood	wet	moist	dry	sun	shade	frost				
		Suggested number of plants per 100 m <sup>2</sup>			○ unlikely to survive ◐ may survive but not thrive ● well adapted to conditions										
<b>Colonisers</b>					<b>Colonisers are typically quick growing, tolerant of a wide range of environments and effective and early dispersers</b>										
<b>Listed in order from wettest to driest preferences</b>		<b>60</b>	<b>10</b>	<b>0</b>											
<i>Cordyline australis</i>	ti kōuka/cabbage tree				●	●	●	●	●	◐	●	open areas	12	F/N	
<i>Hoheria sextylosa</i>	houhere / lacebark				●	◐	●	◐	●	◐	●	open areas	6		
<i>Coriaria arborea</i>	tutu				●	◐	●	◐	●	◐	●	poisonous to livestock	6	F	
<i>Coprosma robusta</i>	karamu				●	●	●	○	●	○	◐	good soil	5	F	
<i>Kunzea robusta</i>	kanuka				●	○	●	●	●	○	◐	dry sloping ground	16	N	



<b>Canopy trees</b>		15	15	0	<b>Canopy trees are long-lived, tall and spreading, but slow to establish</b>									
<b>listed in order from wettest to driest preferences</b>														
<i>Syzygium maire</i>	maire tawaki / swamp maire				○	●	○	○	○	●	○	boggy seeps above floods	10	F
<i>Laurelia novae-zelandiae</i>	pukatea				●	●	●	○	○	○	○	sheltered areas	35	
<i>Podocarpus totara</i>	totara				●	○	●	○	●	○	●	anywhere	30	F
<i>Alectryon excelsus</i>	titoki				○	○	●	○	○	●	○	sheltered areas	10	F
<i>Beilschmiedia tawa</i>	tawa				○	○	●	○	○	●	○	sheltered areas	20	F
<i>Weinmania racemosa</i>	kamahi				○	○	●	○	●	○	●	sunny moist areas	60	F
<i>Prumnopitys ferruginea</i>	miro				●	○	●	○	●	●	●	wide range of tolerances		
<i>Elaeocarpus dentatus</i>	hinau				●	○	●	○	●	●	?	Moist sheltered well drained site		
<b>Understorey</b>		25	25											
<b>Listed in order from wettest areas</b>					<b>flood</b>	<b>wet</b>	<b>moist</b>	<b>dry</b>	<b>sun</b>	<b>shade</b>	<b>frost</b>	<b>Planting tips</b>		
<i>Coprosma rigida</i>					●	●	●	○	●	○	●	sun or shade	5	
<i>Coprosma rotundifolia</i>					●	●	●	○	●	●	●	sun or shade	4	F
<i>Pseudopanax crassifolius</i>	horoeka/lancewood				?	●	●	●	●	○	●	exposed areas	13	F
<i>Streblus heterophyllus</i>	turepo				●	○	○	○	○	●	●	moist shady stream banks	10	F
<i>Dicksonia squarrosa</i>	wheki				?	○	○	○	●	●	●	damp sheltered areas	2-8	
<i>Cyathea dealbata</i>	ponga				?	○	○	○	●	●	●	damp sheltered areas	10	
<i>Cyathea medullaris</i>	mamaku				?	○	○	○	●	●	●	damp sheltered areas	15	
<i>Carpodetus serratus</i>	putawetaweta				○	○	●	○	●	●	●	sun or shade, avoid flooding	10	F
<i>Coprosma grandifolia</i>	kawariki/kanono				●	○	●	○	○	●	○	moist shady stream banks	7	F
<i>Myrsine australis</i>	mapou				○	○	●	●	●	●	○	anywhere	7	F
<i>Geniostoma ligustrifolium</i>	hangehange				○	○	●	○	●	●	○	wide range of tolerances	4	
<i>Melicytus ramiflorus</i>	mahoe				○	○	●	○	●	●	○	sheltered site initially	10	F
<i>Aristotelia serrata</i>	makomako/wineberry				○	○	●	○	●	○	●	not too wet or too dry	8	F
<i>Schefflera digitata</i>	pate				○	○	●	○	●	●	○	wet areas above flood level	8	F
<i>Fuchsia excorticata</i>	kotukutuku				○	○	●	○	●	●	○	wet areas above flood level	12	F
<i>Hedycarya arborea</i>	porokaiwhiri/pigeonwood				●	○	●	○	○	●	○	sheltered sites initially	12	F
<i>Nestegis lanceolata</i>	white maire				○	○	●	○	●	●	?	moist sheltered site	15	F
<i>Rhabdothamnus solandrii</i>	taurepo				○	○	●	○	○	●	○	steep banks, humid microclimate	2	
<i>Rhopalostylis sapida</i>	nikau				?	?	●	○	○	●	○	sheltered	10	F



# Eastern Waikato – valleys and water margins

## Kahikatea dominated lower slopes and riparian margins

Alluvial flats and swampy ground along the margins of waterways, lakes and wetlands favours a community of plants adapted to poorly drained soil and occasional flooding

Characteristic species		Planting			Plant tolerances / preferences							Planting tips		
Botanical name	Common name	Suggested number of plants per 100 m <sup>2</sup>			○ unlikely to survive ◐ may survive but not thrive ● well adapted to conditions							maximum height (approx) if over 1 metre	bird food type	
		open ground	established cover	mature native canopy	flood	wet	moist	dry	sun	shade	frost			
<b>Colonisers</b> Listed in order from wettest to driest habitat		60	10	0	<i>Colonisers are typically quick growing, tolerant of a wide range of environments and effective and early dispersers</i>									
<i>Cordyline australis</i>	ti kōuka/cabbage tree				●	●	●	●	●	◐	●	open areas	12	F/N
<i>Plagianthus regius</i>	manatu / ribbonwood				●	●	●	◐	●	◐	●	From boggy ground to upper slopes	10	
<i>Hoheria sextylosa</i>	houhere / lacebark				●	◐	●	◐	●	◐	●	from boggy ground to lower slopes	6	
<i>Coprosma robusta</i>	karamu				●	●	●	○	●	○	◐	good soil	5	F
<i>Kunzea robusta</i>	kanuka				●	○	●	●	●	○	◐	dry sloping ground	16	N
<b>Canopy trees</b> Listed in order from wettest to driest sites		15	15	0	<i>Canopy trees are long-lived, tall and spreading, but slow to establish</i>									
<i>Dacrycarpus dacrydioides</i>	kahikatea				◐	◐	●	◐	●	○	●	sunny moist areas	60	F
<i>Laurelia novae-zelandiae</i>	pukatea				●	●	●	◐	◐	◐	○	sheltered areas	35	
<i>Prumnopitys taxifolia</i>	matai				●	◐	●	◐	●	●	●	wide range of tolerances	25	F
<i>Sophora microphylla</i>	kowhai				●	●	●	●	●	○	●	forest margins		N
<i>Podocarpus totara</i>	totara				●	◐	●	◐	●	◐	●	anywhere	30	F
<i>Elaeocarpus hookerianus</i>	pokaka				●	◐	●	◐	●	●	?	moist sheltered site	12	F
<i>Alectryon excelsus</i>	titoki				○	○	●	◐	◐	●	◐	sheltered areas	10	F
<i>Beilschmiedia tawa</i>	tawa				○	○	●	◐	◐	●	◐	sheltered areas	20	F
<i>Vitex lucens</i>	puriri				◐	◐	●	◐	●	●	○	sheltered from frost		N/F
<i>Coprosma arborea</i>	mamangi				○	○	◐	●	●	◐	○	well drained sloping ground	10	F

<b>Understorey Listed in order from wettest to driest sites</b>		25	25	15	flood	wet	moist	dry	sun	shade	frost	<b>Planting tips</b> <i>Many understorey plants require the stable conditions created under trees</i>		
<i>Coprosma propinqua</i>	mingimingi				●	●	●	○	●	○	●	wet and seasonally flooded areas	5	F
<i>Coprosma rigida</i>					●	●	●	○	●	○	●	wetter areas	5	F
<i>Coprosma rotundifolia</i>					●	●	●	○	●	○	●	wetter areas	5	F
<i>Pseudopanax crassifolius</i>	horoeaka/lancewood				?	●	●	●	●	○	●	exposed areas	13	F
<i>Streblus heterophyllus</i>	turepo				●	○	○	○	○	●	●	moist shady stream banks	6	F
<i>Carpodetus serratus</i>	putawetaweta				○	○	●	○	●	●	●	sun or shade, avoid flooding	10	F
<i>Coprosma grandifolia</i>	kawariki/kanono				●	○	●	○	○	●	○	moist shady stream banks	7	F
<i>Myrsine australis</i>	mapou				○	○	●	●	●	●	○	anywhere	7	F
<i>Geniostoma ligustrifolium</i>	hangehange				○	○	●	○	●	●	○	wide range of tolerances	4	
<i>Melicytus ramiflorus</i>	mahoe				○	○	●	○	●	●	○	sheltered site initially	10	F
<i>Aristolelia serrata</i>	makomako/wineberry				○	○	●	○	●	○	●	open areas, not too wet or too dry	8	F
<i>Fuchsia excorticata</i>	kotukutuku				○	○	●	○	●	●	○	wet areas above flood level	12	F
<i>Coprosma areolata</i>					○	○	●	○	●	●	●	wet or dry, shade or sunny	4	F
<i>Hedycarya arborea</i>	porokaiwhiri/pigeonwood				●	○	●	○	○	●	○	sheltered sites initially	12	F
<i>Leucopogon fasciculatus</i>	mingimingi				○	○	○	○	●	○	●	light shade	5	F
<i>Nestegis lanceolata</i>	white maire				?	○	●	●	●	●	●	most areas	15	F
<i>Rhopalostylis sapida</i>	nikau				?	?	●	○	○	●	○	sheltered	10	F
<i>Schefflera digitata</i>	pate				○	○	●	○	●	●	○	margins and wet areas above floods	8	F
<b>Grasses, sedges, ferns and ground covers. Listed in order from wettest sites</b>		<b>0</b>	<b>10</b>	<b>15</b>	<b><i>These plants are well adapted to situations where little else grows under taller vegetation</i></b>									
<i>Carex secta</i>	purei				●	●	●	○	●	○	●	very wet areas		
<i>Carex virgata</i>	purei				●	●	●	○	●	○	●	very wet areas		
<i>Gahnia xanthocarpa</i>	giant sedge				○	●	●	○	●	●	●	shaded, very wet areas		
<i>Lobelia angulata</i>	pratia				●	●	●	○	●	●	●	well established sites		
<i>Asplenium bulbiferum</i>	hen and chicken fern				○	○	●	○	○	●	○	damp shady sites		
<i>Pneumatopteris pennigera</i>	pakauroharoha /gully fern				○	○	●	○	○	●	○	damp shady sites		
<i>Carex dissita</i>	forest sedge				○	○	●	○	●	●	●	damp site		
<i>Carex uncinata</i>	hook sedge				○	●	●	○	○	●	?	damp site		
<i>Microlaena avenaceae</i>	bush rice grass				?	○	●	○	○	●	?	vulnerable to drought /moist micro-climate		

		0	0	10	flood	wet	moist	dry	sun	shade	frost	Planting tips		
Climbers and epiphytes		0	0	10								<i>These species can be planted if there are established trees to support them</i>		
<i>Asplenium flaccidum</i>	hanging spleenwort											attach to tree		
<i>Asplenium polyodon</i>	sickle spleenwort											attach to tree		
<i>Astelia solandri</i>	kahakaha											attach to tree		
<i>Astelia hastata</i>	kahakaha											attach to tree		F
<i>Earina autumnalis</i>	Easter orchid											attach to tree		
<i>Earina mucronata</i>	peka-a-waka											attach to tree		
<i>Dendrobium cunninghamii</i>	winika											attach to tree		
<i>Microsorium pustulatum</i>	kowaowao											attach to tree		
<i>Microsorium scandens</i>	mokimoki											attach to tree		
<i>Pyrrosia eleagnifolia</i>	leather leaf fern											attach to tree		
<i>Freycinetia banksii</i>	kiekie				○	●	●	○	○	●	○	moist sheltered areas		F/N
<i>Parsonsia heterophylla</i>	kaihua/NZ jasmine				●	●	●	○	●	●	○	moist sheltered areas		N
<i>Passiflora tetrandra</i>	kohia/NZ passionfruit				●	○	●	●	●	○	●	open areas		F/N
<i>Metrosideros diffusa</i>	akatea				○	○	○	●	●	●	●	well drained soil or base of tree		N
<i>Metrosideros fulgens</i>	rata				○	○	○	●	●	●	○	well drained soil		N
<i>Metrosideros perforata</i>	akatea				○	○	○	●	●	●	●	well drained soil or base of tree		N
<i>Ripogonum scandens</i>	kareao/supplejack				●	○	●	○	●	●	○	moist shady areas		F

Orchid plants must not be collected from natural areas

# Eastern Waikato - wetlands

## Seeps, pond margins and swampy areas

Wetlands occur wherever land is poorly drained. The waterlogged soil supports a shorter less productive plant community than better aerated soil. This provides an opportunity for species tolerant of living in permanently or seasonally wet conditions and more light demanding than other species of a similar stature.

Characteristic species		Planting			Plant tolerances/preferences							Planting tips		maximum height (approx) if over 1 metre	bird food type
Botanical name	Common name	open ground	established cover	mature stage	flood	wet	moist	dry	sun	shade	frost				
<b>Colonisers</b>					○ unlikely to survive ◐ may survive but not thrive ● well adapted to conditions										
<b>Listed in order from wettest to driest habitat</b>		<b>60</b>	<b>10</b>	<b>0</b>	<i>This group is quick to establish in a wetland but some species may eventually be outcompeted by taller vegetation in drier parts of the wetland</i>										
<i>Typha orientalis</i>	raupo				●	●	◐	○	●	○	●	shallow open water	2		
<i>Phormium tenax</i>	harakeke / flax				●	●	●	●	●	○	●	very wet sunny areas	3		
<i>Carex geminata</i>	cutty grass				●	●	●	●	●	○	●	wet sunny areas			
<i>Cyperus ustulatus</i>					●	●	●	●	●	○	●	wet sunny areas			
<i>Leptospermum scoparium</i>	manuka				◐	●	●	◐	●	○	●	wet sunny areas	8	N	
<i>Machaerina rubiginosa</i>					◐	●	●	◐	●	○	●	wet sunny areas			
<i>Machaerina teretifolia</i>					◐	●	●	◐	●	○	●	wet sunny areas			
<i>Machaerina arthrophylla</i>					◐	●	●	◐	●	○	●	wet sunny areas			
<i>Carex subdola</i>						●	●	◐	●	○	●	wet sunny areas			
<i>Cordyline australis</i>	ti kouka				●	●	●	●	●	◐	●	most sites	12	F	
<i>Coprosma robusta</i>	karamu				◐	●	●	◐	●	◐	◐	drier sites	4	F	
<b>Canopy trees</b>					<i>Stunted and sparse in a wetland. Density will vary according to ground conditions.</i>										
<b>Listed in order from high to low tolerance of wet</b>		<b>&lt;15</b>	<b>&lt;15</b>	<b>0</b>											
<i>Cordyline australis</i>	ti kouka				◐	●	●	●	●	◐	●	very boggy conditions	12	F	
<i>Dacrycarpus dacrydioides</i>	kahikatea				◐	◐	●	◐	●	○	●	drier sites in swamps	60	F	
<i>Laurelia novae-zelandiae</i>	pukatea				◐	◐	●	◐	●	●	◐	drier, sheltered sites	35		
<i>Syzygium maire</i>	swamp maire / maire tawaki					◐	●	○	●	●	○	boggy very sheltered sites	16	F	
<i>Sophora microphylla</i>	kowhai				●	●	●	●	●	○	●	margins	10	N	

Understorey Listed in order from wettest to driest ground		25	25		flood	wet	moist	dry	sun	shade	frost	Planting tips <i>Some species are more likely to be found only in drier parts of wetland</i>		
<i>Coprosma tenuicaulis</i>	hukihuki				●	●	○	○	●	○	●	very wet open areas	4	F
<i>Coprosma propinqua</i>	mingimingi				●	●	●	○	●	○	●	very wet mostly open areas	5	F
<i>Coprosma rigida</i>					●	●	●	○	●	○	●	quite wet partial shade	5	F
<i>Coprosma rotundifolia</i>					●	●	●	○	●	○	●	quite wet partial shade	5	F
<i>Carpodetus serratus</i>	putaputaweta				○	●	●	○	●	●	○	consistently damp ground	10	F
<i>Myrsine australis</i>	mapou				●	○	●	○	●	●	○	almost anywhere	7	F
<i>Melicytus ramiflorus</i>	mahoe				○	○	●	○	○	●	○	not too dry or frosty	10	F
<i>Melicytus micranthus</i>					●	○	●	○	○	●	○	shady flood prone areas	10	F
<i>Streblus heterophyllus</i>	turepo				●	○	●	○	○	●	○	shady flood prone areas	10	F
<i>Dicksonia squarrosa</i>	wheki				?	○	●	○	○	●	●	consistently damp ground	8	
<i>Cyathea dealbata</i>	ponga				?	○	●	○	○	●	○	consistently damp ground	10	
<i>Cyathea medullaris</i>	mamaku				?	○	●	○	○	●	○	consistently damp ground	15	
<i>Pseudopanax crassifolius</i>	horoeka / lancewood				?	●	●	●	●	○	●	low fertility soil	13	F
<b>Grasses, sedges ferns and ground covers Listed in order from wettest to driest habitat</b>					<i>In a wetland there may be no marked succession sequence. Many of these species may be planted on a bare site yet persist as the plant community matures.</i>									
<i>Eleocharis sphacelata</i>					?	●	○	○	●	○	●	water depth to 500 mm		
<i>Schoenoplectus tabernaemontani</i>	kapungawha/ lake clubrush				●	●	○	○	●	○	●	water depth to 500mm with fluctuations		
<i>Machaerina articulata</i>	wiwi				○	●	○	○	●	○		water depth to 500 mm		
<i>Bolboschoenus fluviatilis</i>	kukuraho/marsh clubrush				○	●	○	○	●	○	●	very wet swampy ground, deciduous		
<i>Carex secta</i>	purei				○	●	○	○	●	○	●	open, very wet swampy ground		
<i>Carex virgata</i>	purei				○	●	○	○	●	○	●	open, very wet swampy ground		
<i>Gahnia xanthocarpa</i>	giant sedge				○	●	○	○	●	●	●	shaded, very wet swampy ground		
<i>Astelia grandis</i>	swamp astelia				?	●	○	○	○	●	●	shaded, very wet swampy ground	2	
<i>Blechnum minus</i>					?	●	○	○	○	●	●	shaded, very wet swampy ground		
<i>Eleocharis acuta</i>					?	●	○	○	●	○	●	open, very wet swampy ground		
<i>Sparganium subglobosum</i>	burr reed				?	●	○	○	●	○	●	open, very wet swampy ground		
<i>Machaerina tenax</i>	baumea				●	●	○	○	○	●	●	shaded, very wet swampy ground		
<i>Elatostema rugosum</i>	parataniwha				●	●	○	○	○	●		very shaded wet areas		
<i>Dianella haemata</i>	swamp turutu					●	●	○	●	○	●	open, wet areas		F

Climbers and epiphytes		0	0	10	<i>These species can be planted if there are established trees to support them</i>									
<i>Freycinetia banksii</i>	kiekie				?	●	●	○	●	●	●	under established trees		F
<i>Rubus australis</i>	swamp lawyer				?	●	●	?	●	●	?	under established trees		F

*This guide is based on the best knowledge available at time of publication. Experience and research can change over time and the information may require refinement in the future.*