

# Planting Guide for Lower Waikato River

## Waikato River mouth to Tuakau Bridge



This planting guide is designed to assist anyone undertaking ecological restoration along the Waikato River from Port Waikato as far as the Tuakau Bridge. It is one in a series of three guides covering the stretch of river from just south of Hamilton out to the sea. There is a fourth guide for the Waipa River from Whatawhata to Ngaruawahia before it joins the Waikato River.

The species lists are not intended to be a comprehensive description of the primeval forests along the river 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.

### 1. Planting guide for Waikato River mouth to Tuakau Bridge

The section of river from Port Waikato to the Tuakau Bridge includes four distinctive zones – tidal salt-marsh; low islands and river margins; steep riverbanks and back swamp. Each zone has its own assemblage of plants and with the exception of the salt-marsh, plants are grouped into five categories – colonisers; canopy trees; understory 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 of a forest can be restored. 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. It is worth looking at similar natural areas in the locality to gain a better appreciation of the mix and densities of species.

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.

The approximate final height of a plant is given where it is over one metre.



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Conservation  
*Te Papa Atawhai*

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.

## Planting to attract wildlife

The plants value as bird food is indicated by an N for nectar and F for fruit and seeds. The table below sets out the main food requirements for some of the native birds that live in bush.

Species	Fruit/seeds	Nectar	Insects	Foliage	Other
Bellbird	*	*	*		
Fantail			*		
Grey warbler			*		
Kaka	*	*	*		tree sap
Kakariki	*	*	*		
Kereru	*			*	flowers
Kingfisher			*		fish, rodents, lizards
Kiwi	*		*		spiders, worms, koura
Shining cuckoo			*		
Morepork			*		rodents, birds, lizards
Robin			*		
Tui	*	*	*		
Wax/white/silvereye	*	*	*		
Whitehead			*		

## 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 Lower Waikato and Waipa Rivers with funding support from the Waikato District Council and Department of Conservation.



# Waikato River mouth to Tuakau Bridge

## Tidal salt-marsh

Although regularly inundated with sea/brackish water at high tide, plants in the tidal zone have the potential to spread over a large area. Restoration may only be required where disturbance has occurred. Reintroducing a few plants of the groundcover herbs may be sufficient for restoration purposes.

Characteristic species		Planting			Plant tolerances / preferences							Planting tips			
Botanical name	Common name	open ground	established cover	mature stage	flood	wet	moist	dry	sun	shade	frost		maximum height (approx) if over 1 metre	food type	
															Suggested number of plants per 100 m <sup>2</sup>
<b>Listed in order from wettest to driest habitat</b>															
<i>Schoenoplectus tabernaemontani</i>	kuawa/lake clubrush				●	●	○	○	●	○	○	tolerates flooding	1-2		
<i>Samolus repens</i>	sea primrose				●	●	○	●	●	○	○	perennial herb moist soil			
<i>Selliera radicans</i>	selliera				●	●	○	○	●	○	○	perennial herb moist soil			
<i>Juncus kraussii</i>	rush				●	●	○	○	●	○	○	upper intertidal open area			
<i>Apodasmia similis</i>	oiioi/jointed wire rush				●	●	●	●	●	○	●	upper intertidal open area	1.2		
<i>Plagianthus divaricatus</i>	saltmarsh ribbonwood				●	●	●	●	●	○	●	upper intertidal open area	3		



# Waikato River Mouth to Tuakau Bridge

## Low islands and river margins

The river level is influenced by tide in this section more than seasonal flooding which is moderated by the close proximity to the open sea. This results in a stable water table year round and includes species which have a low tolerance to flooding. Proximity to the sea also ensures the predominance of coastal tree species

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 ● preferred conditions							Plant frost sensitive species under other trees	maximum height (approx) if over 1 metre	food type	
		open ground	established cover	mature stage	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>Phormium tenax</i>	harakeke/flax				●	●	●	●	●	○	●	water's edge	3	N	
<i>Cyperus ustulatus</i>	giant umbrella sedge				●	●	●	◐	●	○	●	very wet ground	1.2		
<i>Austroderia splendens</i>	toe toe				●	●	●	●	●	○	●	waters edge, wet ground	1.5		
<i>Cordyline australis</i>	ti kōuka/cabbage tree				◐	●	●	●	●	◐	●	most areas	12	F/N	
<i>Coprosma robusta</i>	karamu				◐	●	●	●	●	◐	◐	most areas	5	F	
<b>Canopy trees</b> Listed in order from most common to least common		15	15	0	<i>Canopy trees are long-lived, tall and spreading, but slow to establish</i>										
<i>Dacrycarpus dacrydioides</i>	kahikatea				●	●	●	◐	●	○	●	most sites	60	F	
<i>Laurelia novae-zelandiae</i>	pukatea				●	●	●	◐	◐	●	○	sheltered site	35		
<i>Vitex lucens</i>	puriri				◐	●	●	●	●	●	○	occasional better soil	20	F/N	
<i>Sophora microphylla</i>	kowhai				◐	◐	●	●	●	○	●	margins, well drained, mounds	10	N	
<i>Sophora chathamica</i>	kowhai				◐	◐	●	●	●	○	●	well drained, mounds	10	N	

<b>Understory</b>															
<b>Listed in order from most common to least common</b>		25	25	15	flood	wet	moist	dry	sun	shade	frost	<b>Planting tips</b>			
<i>Melicytus ramiflorus</i>	mahoe				○	○	●	●	●	●	○	sheltered site	10	F	
<i>Myrsine australis</i>	mapou				○	○	●	●	●	●	○	anywhere	7	F	
<i>Carpodetus serratus</i>	putaputaweta				○	●	●	○	●	●	○	above flood levels	10	F	
<i>Streblus heterophyllus</i>	turepo				○	●	●	○	○	●	●	sheltered site	12		
<i>Hedycarya arborea</i>	porokaiwhiri/pigeonwood				○	○	●	○	○	●	○	sheltered site	12	F	
<i>Coprosma rigida</i>					●	●	●	●	●	○	●	anywhere	5	F	
<i>Coprosma rotundifolia</i>					●	●	●	○	●	●	○	anywhere	4	F	
<i>Coprosma areolata</i>	thin-leaved coprosma				○	○	●	●	●	●	●	drier areas	5	F	
<i>Coprosma grandifolia</i>	kawariki/kanono				○	○	●	○	○	●	○	sheltered site	6	F	
<i>Coprosma propinqua</i>	mingimingi				●	●	●	○	●	○	●	very wet area	7	F	
<i>Melicytus micranthus</i>	swamp mahoe				●	○	●	○	●	●	○	sheltered site	5	F	
<i>Dicksonia squarrosa</i>	wheki				○	●	●	●	●	●	●	damp shade	2-8		
<i>Cyathea dealbata</i>	ponga				○	○	●	●	●	●	○	damp shade	10		
<i>Cyathea medullaris</i>	mamaku				○	○	●	●	●	●	○	damp shade	20		
<b>Grasses, sedges and reeds</b>					<b><i>These plants are well adapted to situations where nothing much else grows, sometimes under taller vegetation, sometimes in boggy or very wet places</i></b>										
<b>Listed in order from wettest to driest habitat</b>		0	10	15											
<i>Typha orientalis</i>	raupo				●	●	●	○	●	○	●	shallow water	1-3		
<i>Machaerina articulata</i>	jointed baumea				●	●	●	○	●	○	●	shallow water	1.8		
<i>Carex secta</i>	purei/pukio				○	●	●	○	●	○	●	wet area	1-2		
<i>Carex virgata</i>	purei/pukio				○	●	●	○	●	○	●	wet area	1		
<i>Carex lessoniana</i>	rautahi/forest sedge				○	●	●	○	●	○	●	wet area	1		
<i>Carex dissita</i>	forest sedge				○	●	●	○	●	●	●	moist shady area			
<b>Climbers and epiphytes</b>		0	0	10	<b><i>These plants take advantage of trees to get their leaves up into the sunlight</i></b>										
<i>Metrosideros perforata</i>	akatea				○	○	○	●	●	●	○	well drained soil or base of tree		N	
<i>Metrosideros diffusa</i>	akatea				○	○	○	●	●	●	○	well drained soil or base of tree		N	
<i>Metrosideros fulgens</i>	rata				○	○	○	●	●	●	○	well drained soil		N	
<i>Freycinetia banksii</i>	kiekie				○	●	●	●	●	●	○	higher ground shady area		F/N	
<i>Astelia hastata</i>	kahakaha				○	○	●	●	●	●	○	attach to tree fork			
<i>Parsonsia heterophylla</i>	kaihua				○	●	●	○	●	●	○	damp shady place			
<i>Microsorium pustulatum</i>	kowaowao/hounds tongue				○	●	●	●	●	●	○	attach to tree		N	
<i>Astelia solandri</i>	kaiwharawhara				○	○	●	●	●	●	○	damp shady		F	

# Waikato River Mouth to Tuakau Bridge

## Steep river banks

Although much of the river margin is low lying there are some steeper banks which support a great range of species.

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							Look for wet spots where trees may do well in dry weather	maximum height (approx) if over 1 metre	food type	
		open ground	established cover	mature stage	flood	wet	moist	dry	sun	shade	frost				
<b>Colonisers</b> Listed in order of earlier establishing to longer lived		60	10	0	<i>Colonisers are typically quick growing, tolerant of a wide range of environments and effective and early dispersers</i>										
<i>Hebe stricta</i>	koromiko				○	○	●	●	●	○	●	above flood level	4		
<i>Austroderia splendens</i>	toetoe				◐	●	●	●	●	○	●	open areas	1.5		
<i>Cyperus ustulatus</i>	giant umbrella sedge				●	●	●	●	●	○	●	wet open areas	1.2		
<i>Coprosma robusta</i>	karamu				◐	●	●	●	●	◐	◐	most areas	5	F	
<i>Cordyline australis</i>	ti kōuka/cabbage tree				◐	●	●	●	●	◐	●	most areas	12	F/N	
<i>Kunzea robusta</i>	kanuka				◐	○	●	●	●	○	●	dry sloping ground	16	N	
<b>Canopy trees</b> Listed in order from most common to least common		15	15	0	<i>Canopy trees are long-lived, tall and spreading, but slow to establish</i>										
<i>Dacrycarpus dacrydioides</i>	kahikatea				●	●	●	◐	●	○	●	most sites	60	F	
<i>Laurelia novae-zelandiae</i>	pukatea				●	●	●	◐	◐	●	○	sheltered site	35		
<i>Vitex lucens</i>	puriri				○	◐	●	◐	●	●	○	occasional better soil	20	F/N	
<i>Sophora microphylla</i>	kowhai				◐	◐	●	●	●	○	●	well drained, mounds	10	N	
<i>Sophora chathamica</i>	kowhai				◐	◐	●	●	●	○	●	well drained, mounds	10	N	
<i>Alectryon excelsus</i>	titoki				◐	○	●	●	◐	●	○	sheltered area	10	F	
<i>Beilschmiedia taraira</i>	taraira				◐	○	●	●	◐	●	○	sloping ground	20	F	
<i>Entelea arborescens</i>	whau				○	○	●	●	●	◐	○	higher ground			

<b>Understory</b>														
<b>Listed in order from most common to least common</b>		25	25	15	flood	wet	moist	dry	sun	shade	frost	<b>Planting tips</b>		
<i>Meliccytus ramiflorus</i>	mahoe				○	○	●	●	●	●	○	sheltered site	10	F
<i>Coprosma grandifolia</i>	kawariki/kanono				●	●	●	○	○	●	○	sheltered damp site	7	F
<i>Schefflera digitata</i>	pate				○	○	●	○	●	●	○	damp above floods	8	F
<i>Streblus heterophyllus</i>	turepo				○	●	●	○	○	●	●	sheltered site	12	
<i>Myrsine australis</i>	mapou				○	○	●	●	●	●	○	anywhere	7	F
<i>Coprosma rigida</i>					●	●	●	●	●	●	●	anywhere	5	F
<i>Geniostoma ligustrifolium</i>	hangehange				○	○	●	●	●	●	○	sheltered site	4	N
<i>Piper excelsum (syn Macropiper)</i>	kawakawa				○	○	●	●	○	●	○	sheltered above floods	7	F
<i>Hedycarya arborea</i>	porokaiwhiri/pigeonwood				○	○	●	○	○	●	○	moist soil	12	F
<i>Coprosma areolata</i>	thin-leaved coprosma				○	●	●	●	●	●	●	upper slope	5	F
<i>Coprosma lucida</i>	shining karamu				○	○	○	●	●	●	○	steep banks	6	F
<i>Brachyglottis repanda</i>	rangiora				○	○	●	○	○	●	○	upper slope	6	
<b>Ferns</b>		<b>0</b>	<b>10</b>	<b>15</b>	<b><i>Ferns use the last of the light reaching the forest floor</i></b>									
<i>Blechnum filiforme</i>	thread fern				○	○	●	●	○	●	○	damp shade		
<i>Blechnum novae-zelandiae</i>	kiokio				●	●	●	○	●	●	●	anywhere		
<i>Asplenium oblongifolium</i>	shining spleenwort				○	○	●	●	○	●	○	damp shade		
<i>Asplenium bulbiferum</i>	pikopiko				○	●	●	○	○	●	○	damp shade		
<i>Dicksonia squarrosa</i>	wheki				○	●	●	●	●	●	●	damp shade	2-8	
<i>Cyathea dealbata</i>	ponga				○	○	●	●	●	●	○	damp shade	10	
<i>Cyathea medullaris</i>	mamaku				○	○	●	●	●	●	○	damp shade	20	
<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>Clematis paniculata</i>	puawhanga				○	○	●	○	○	●	○	moist well drained spot		
<i>Metrosideros perforata</i>	akatea				○	○	○	●	●	●	○	well drained soil or base of tree		N
<i>Metrosideros diffusa</i>	akatea				○	○	○	●	●	●	○	well drained soil or base of tree		N
<i>Metrosideros fulgens</i>	rata				○	○	○	●	●	●	○	well drained soil		N
<i>Freycinetia banksii</i>	kiekie				○	●	○	○	○	●	○	damp shady ground		F/N
<i>Astelia hastata</i>	kahakaha				○	○	●	●	●	●	○	raised soil or attach to tree fork I		
<i>Parsonsia heterophylla</i>	kaihua/NZ jasmine				●	●	●	○	●	●	○	damp shady place		
<i>Microsorium pustulatum</i>	kowaowao				○	○	○	●	●	●	○	attach to tree		N
<i>Astelia solandri</i>	kaiwharawhara				○	○	●	●	●	●	○	damp shady ground		F
<i>Asplenium polyodon</i>	sickle spleenwort				○	○	●	●	●	●	○	damp shady ground		

# Waikato River Mouth to Tuakau Bridge

## Back swamp

Often where streams flow into the river, or there are springs at the foot of banks, there is a rich swamp forest habitat.

Characteristic species		Planting			Plant tolerances / preferences							Planting tips		maximum height (approx) if over 1 metre	food type
Botanical name	Common name	open ground	established cover	mature stage	flood	wet	moist	dry	sun	shade	frost	Look for humps of higher ground to plant trees on			
<b>Colonisers</b> Listed in order from wettest to driest habitat		35	10	0	<i>Colonisers are typically quick growing, tolerant of a wide range of environments and effective and early dispersers</i>										
<i>Typha orientalis</i>	raupo				●	●	○	○	●	○	●	shallow open water		1-3	
<i>Phormium tenax</i>	harakeke/flax				●	●	●	●	●	○	●	waters edge		2	N
<i>Cyperus ustulatus</i>	giant umbrella sedge				●	●	●	○	●	○	●	wet open area		1.2	
<i>Austroderia splendens</i>	toetoe				○	●	●	●	●	○	●	waters edge		1.5	
<i>Machaerina rubiginosa</i>	baumea				○	●	●	○	●	○	●	open boggy ground			
<i>Cordyline australis</i>	ti kōuka/cabbage tree				○	●	●	●	●	○	●	most areas		12	F/N
<i>Coprosma robusta</i>	karamu				○	●	●	●	●	○	○	most areas		5	F
<b>Canopy trees</b> Listed in order from most common to least common		15	15	0	<i>Canopy trees are long-lived, tall and spreading, but slow to establish</i>										
<i>Dacrycarpus dacrydioides</i>	kahikatea				●	●	●	○	●	○	●	most sites		60	F
<i>Laurelia novae-zelandiae</i>	pukatea				●	●	●	○	○	●	○	sheltered site		35	
<i>Sophora microphylla</i>	kowhai				○	○	●	●	●	○	●	margins, well drained, mounds		10	N
<i>Rhopalostylis sapida</i>	nikau				○	○	●	○	●	●	○	sheltered damp sites		10	F
<i>Syzygium maire</i>	maire tawake				○	●	●	○	○	●	○	boggy stable water level		15	

<b>Understory</b>														
<b>Listed in order from most wettest to driest habitat</b>		25	25	15	flood	wet	moist	dry	sun	shade	frost	<b>Planting tips</b>		
<i>Coprosma tenuicaulis</i>	hukihuki/swamp coprosma				●	●	○	○	●	○	●	very boggy to damp place	3	F
<i>Coprosma propinqua</i>	mingimingi				●	●	●	○	●	○	●	very boggy to damp place	7	F
<i>Coprosma rigida</i>					●	●	●	●	●	○	●	anywhere	5	F
<i>Coprosma rotundifolia</i>					●	●	●	○	●	●	○	anywhere	4	F
<i>Carpodetus serratus</i>	putaputaweta				○	○	●	○	○	●	○	above flood levels	10	F
<i>Streblus heterophyllus</i>	turepo				○	○	●	○	○	●	●	sheltered site	12	
<i>Myrsine australis</i>	mapou				○	○	●	●	●	●	○	anywhere	7	F
<i>Melicytus ramiflorus</i>	mahoe				○	○	●	○	●	●	○	sheltered site	10	F
<i>Melicytus micranthus</i>	swamp mahoe				●	○	●	○	○	●	○	sheltered site	5	F
<i>Coprosma grandifolia</i>	kawariki/kanono				○	○	●	○	○	●	○	sheltered site	7	F
<i>Coprosma areolata</i>	thin-leaved coprosma				○	○	●	●	●	●	●	drier areas	5	F
<i>Dicksonia squarrosa</i>	wheki				○	●	●	●	●	●	●	damp shade	2-8	
<i>Cyathea dealbata</i>	ponga				○	○	●	○	●	●	○	damp shade	10	
<i>Cyathea medullaris</i>	mamaku				○	○	●	●	●	●	○	damp shade	20	
<b>Grasses, sedges and lilies,</b>					<i>These plants are well adapted to situations where nothing much else grows, sometimes under taller vegetation, sometimes in boggy or very wet places</i>									
<b>Listed in order from wettest to driest habitat</b>		25	10	15										
<i>Machaerina articulata</i>	jointed baumea				○	●	●	○	●	○	●	shallow water	1.8	
<i>Carex secta</i>	purei/pukio				○	●	●	○	●	○	●	wet area	1-2	
<i>Carex virgata</i>	purei/pukio				○	●	●	○	●	○	●	wet area	1	
<i>Carex lessoniana</i>	rautahi/forest sedge				○	●	●	○	●	○	●	wet area	1	
<i>Gahnia xanthocarpa</i>	giant sedge				●	●	○	○	●	●	●	boggy sun or shade	1.5	
<i>Elatostema rugosum</i>	parataniwha	0			○	●	○	○	○	●	○	moist shady place		
<i>Astelia grandis</i>	swamp astelia				●	●	●	○	●	●	●	boggy place	1	
<i>Blechnum minus</i>	swamp kiokio				○	●	○	○	●	●	●	boggy sometimes shady place	1	
<i>Machaerina tenax</i>	sedge				●	●	○	○	○	●	●	shady boggy place		
<i>Carex dissita</i>	forest sedge				○	○	●	○	○	●	●	damp semi-shade		
<i>Carex uncinata</i>	hook sedge				○	○	●	○	○	●	●	damp semi-shade		
<i>Carex solandri</i>	forest sedge				○	○	●	○	○	●	●	damp semi-shade		

Climbers and epiphytes		0	0	10	flood	wet	moist	dry	sun	shade	frost	Planting tips		
<i>Metrosideros perforata</i>	akatea				○	○	○	●	●	●	○	well drained soil or base of tree		N
<i>Metrosideros diffusa</i>	akatea				○	○	○	●	●	●	○	well drained soil or base of tree		N
<i>Freycinetia banksii</i>	kiekie				◐	●	●	◐	◐	●	◐	damp shady ground		F/N
<i>Astelia hastata</i>	kahakaha				○	○	●	●	●	●	○	raised soil or attach to tree fork		
<i>Parsonsia heterophylla</i>	kaihua/NZ jasmine				●	●	●	○	●	◐	◐	semi-shade		
<i>Microsorium pustulatum</i>	kowaowao				◐	○	◐	●	●	●	○	attach to tree		
<i>Ripogonum scandens</i>	kareao/supplejack				●	●	●	◐	●	●	○	damp shade		

*Take care to ensure plants are ecosourced from natural areas*