

VEGETATION OF THE GREEN CORRIDORS RANGE TO RIVER

Prepared for Palmerston North City Council by
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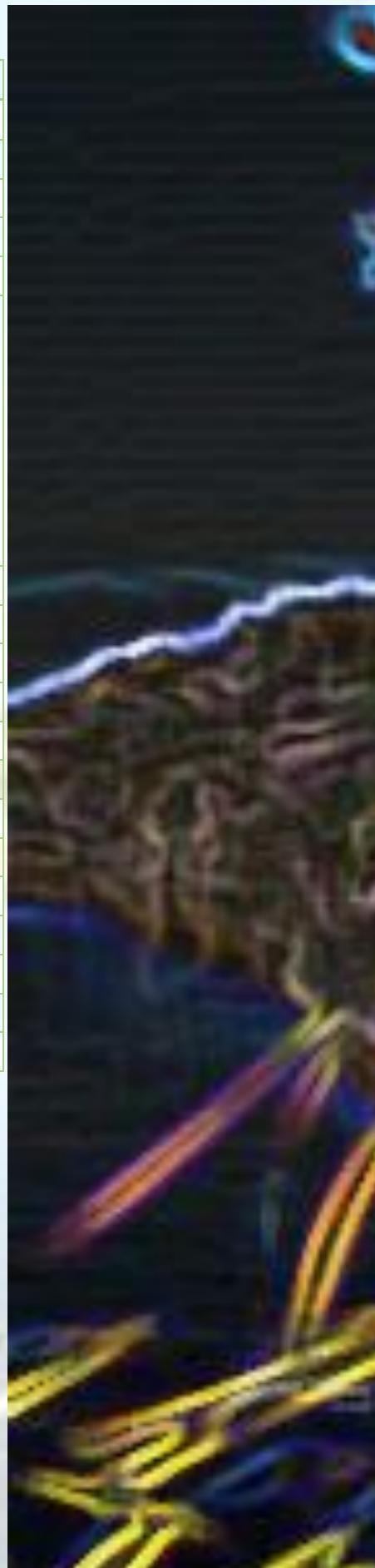
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GREEN REPORTING
REVEGETATION ASSESSMENT & ADVICE

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Words and images by Courtney Rudman.

**Front Cover and Background Image: Manga O tane
Reserve**



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City: Palmerston North

Region: Manawatu

Access:

- Turitea Walkways:** Turitea Road (5 points) and Ngahere Park Road.
- Titoki Reserve:** Cashmere Drive (2 points), Sycamore Crescent (through Peren Park) and Silkwood Place.
- Lower Titoki Reserve:** Cliff Road, Vaucluse Heights, Ruapehu Drive and Cashmere Drive.
- Upper Pari Reserve:** Aokautere Drive and Waicola Drive.
- Lower Pari Reserve:** No walking track.
- Adderstone Reserve:** Aokautere Drive and Pacific Drive.
- Manga O Tane Reserve:** No walking track.

Abstract:

Located along the Turitea Stream (below the Turitea Reserve) and the drains of six Summerhill Reserves, Palmerston North; Green Corridors Range to River as a project commenced plantings in 2001. In 2000, The Green Corridors Project was envisioned (at a picnic in a paddock) beside the Turitea Stream between likeminded individuals. Over the coming years an average of 3000 eco-sourced natives were planted until an increase in funding in 2015 allowed the numbers to increase to 8000 plants per year. Green Corridors is a community run project in which a committee oversees decision making; along with the support and funding of Palmerston North City Council and Horizons Regional Council. Through the duration of the project, Environment Network Manawatu and Royal Forest and Bird Protection Society of New Zealand have continued to provide promoting and advertising of community planting events.

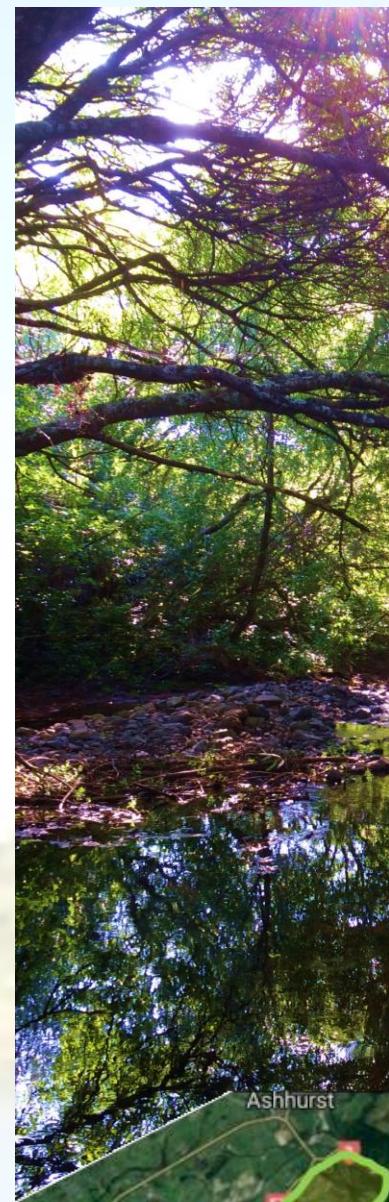
Eco-sourcing seed plays a large role in achieving the complete vision set out in 2000. The seed is germinated, grown on and selected for site specific purposes by Starter Plants Limited. Starter Plants also carries out the planting of the majority of natives grown. Community planting events contribute on average 25% of plantings however, this continues to increase yearly as organisations such as Ricoh New Zealand Limited become more invested and generate further community involvement.

Much of the inspiration for the Green Corridors came from the work being done by the Keebles Bush Trust, located near Massey University, Palmerston North. Keebles Bush is a remnant podocarp forest that covers 23 hectares; the seed was sourced from here for the first 10-12 years of the Green Corridors. In order to increase diversity among species, seed and young plants have recently been sourced from areas such as Turitea Reserve, Kahuterawa Reserve and remnant bush areas from the Gorge Scenic Reserve through to Kahuterawa Stream. 40 of the native species that make up the Vegetation of the Green Corridors Range to River are reviewed in this report.



Introduction:

- My name is Courtney Elizabeth Rudman of 32 Roots Street West, Feilding.
- I am a revegetation assessor and advisor, trading under the name Green Reporting Limited.
- I have worked closely with the Green Corridors (GC) Committee, Palmerston North City Council (PNCC) and Horizons Regional Council (HRC) since 2015, as a grower, planter and plant pest control manager. This relationship has occurred under my existing title as General Manager for the small business 'Starter Plants' whom has been contracted to PNCC since 2002 (until October 2018) for the purpose of the above roles.
- Prior to employment at Starter Plants, I completed a Bachelor of Arts (Environmental Studies) and a Diploma in Business Studies through Massey University, Palmerston North.
- My expertise is in germinating and understanding the needs of eco-sourced native plants (specifically; plants sourced from the territory spanning from the Gorge Scenic Reserve to the bush framing the Kahuterawa Stream).
- My role at Starter Plants has meant that I have worked intensively with native plant species. This has given me great insight into the understanding of eco-sourced plants and their relationship with the surrounding environment and habitats.
- The conclusions in this report have been founded on my own observations and data collected. I have at times referred to written resources and drawn from the knowledge of Eddie Welsh, who was a member of the group that initially envisioned the Green Corridors Project.



Site Description:

The Green Corridors Range to River varies in character depending on the area being discussed. The zones that follow the Turitea Stream can be described as highly treasured riparian strips, with plantings occurring on average 20 metres either side (or solely one side) of the stream. The intention is to draw the birdlife down from the above reserve towards the Manawatu River and Palmerston North City. The walkway that runs through these zones is mown and worn grass tracks with structures such as a walking bridge and Department of Conservation (DOC) standard steps making the experience more comfortable for those who wish to avoid wet feet.

The zones that have been developed in the drainage reserves in the Summerhill area are much wider, with the ability to plant a denser population. The layout of the land has allowed for several wetland areas to be planted, as well as two ferneries. The land through this area is heavily sloped and was previously hill country farmland. The plantings are over different elevations and create a feeling of seclusion or an escape from city life.

There are walkways throughout the majority of the Green Corridors. Keen mountain bikers can take advantage of the loop available through the Summerhill Reserves and horse owners frequently exercise their beloved animals along the tracks of the Turitea Valley. In total, there is approximately 6.5 km of walkways and tracks in the Green Corridors.



There are three sections of the Green Corridors where there is no access or walking track. These areas are heavily planted however, they have received little care since initial plantings. Manga O tane Reserve was completely cleared before planting commenced and this is evident in the condition of the current bush. In comparison, Lower Pari Reserve (which was not cleared) is infested with plant pests. Due to the lack of access, it is difficult to maintain an area such as this. Lower Pari Reserve has formed a gorge through the centre of the drain, due to this, a walking track through this reserve is highly unlikely. Manga O tane Reserve can only be accessed



off Aokautere Road however, it is on a dangerous bend on the busy road. Due to this, no walking track will be installed. The reserve land downstream of Ngahere Park Bridge will hopefully, in the future, have a walking track that will continue the connection through to the downstream bridge.



Geology and Soils:

Turitea Valley:

The formation of the Tararua Range occurred due to pressure from the Pacific and Australian tectonic plates colliding. The two plates are too buoyant for one to subduct down into the mantle, instead the two plates push together creating the range in which the source of the Turitea Stream can be located. The soils of the Turitea Reserve are derived from Greywacke and will be strongly leached and acidic (similar to that of the Gorge Reserve) however, the soils that make up the profiles found in the four sites along the stream are principally silt. The soil profiles show little to no horizons as the soil is made up of a silt layer before hitting river stones (metal). This is due to the changing course of the stream depositing silt as it moves across the landscape. There are several areas along the stream where establishing trees has been difficult due to the amount of metal creating excessively free draining sites with little top soil creating limited rooting depth. The soil has a weak structure and can be dry in the summer months and water abundant during and either side of the winter months. During the winter the water table is high. Due to the age of the plantings and the majority of trees and shrubs being evergreen, there is limited organic matter in the top soil. There is also little worm activity.

Summerhill:

The soils of the Summerhill Reserves vary due to land use. Much of the drainage reserve has been formed on clay from the above building sites. Due to run off from the land above, the soil of the drainage reserves often become waterlogged and are prone to erosion. Much of the land and natural drainage system has been altered due to housing erected on the hill tops. The soil alters throughout gullies due to the mixture and addition of waste material from building sites. Site surfaces become artificial in areas. Over thousands of years the loess covered hill terraces have formed distinctive soil profiles. The grey, clay rich soil is dense with mottled and veined horizons. Mottling indicates that seasonal moisture changes produce an oxidising effect. Despite these factors, many of the eco-sourced native species selected for this area establish easily and often thrive where some remnant bush is present, this is due to the high organic matter that can be found mixed into the weathered soil.

At a glance:

Profile samples were collected at random from four sites on either side of the Turitea Walking Track, as well as Titkoi Reserve.

Palmerston North average
temperature range:
22°C in February
12°C in July

Average rainfall:
960mm; raining 60%
of the year.

Average wind gust:
7.2 – 12.3 mph

Average sun hours:
70.8 per month

Turitea Valley Soil Order:
Fluvial Recent Soil – sediments deposited by flowing water.

Summerhill Soil Order:
Mixed Anthropic Soils and Gley Soils – drastic disturbance and loss of original soil character in some areas, through urbanisation.

References: 3, 5 and 8.



Profile- Turitea Valley:

Profile Site

The four sites selected at random were almost identical. The samples were so close that it was decided to illustrate just one of the four profiles so as not to repeat the information. Each hole was 50-60cm deep, with little top soil, a large silt loam (fine alluvium) horizon and a stony horizon which is difficult to break through. These soils are quick draining and retain little moisture in the heat of the summer. Nutrient levels tend to be moderate – low. Stonier sites are more difficult to establish.



Soil Horizons

A - Lacking distinct topsoil development

C – Fluvial Raw Soil, sediment deposited by flowing water

R – underlying rock

Profile- Titoki Reserve:

Profile Site

The sample illustrated was taken from Titoki Reserve, close to Cashmere Drive and Anne's Place. It represents much of the soil found through the gullies of the Summerhill area. The soil is strongly gleyed which suggests waterlogging through winter and spring, it is quite possible that in areas, the soil remains moist all year round. The rust coloured mottles are segregated iron and manganese oxide that has occurred through weathering. Soil organisms can be limited.



Soil Horizons

Ah - distinctive topsoil

Bw - Altered by weathering

Bg - Mottled and grey profile indicative of gleying

C - some weathering but minimal biological activity



Vegetation:

Eco-sourced species of the Turitea Valley and Summerhill area.

Collected by seed, in the majority of cases, the plants of the Green Corridors Range to River are eco-sourced from local remnants and are adapted to the climate and geography in which the germinated plants are re-homed. Species often adapt and evolve to the region in which they have been located for hundreds of years, meaning that a Karamu found in the Turitea Valley has different characteristics to a Karamu that is found in Taupō, Northland or even the Rangitikei. The flowering and fruiting of particular plant species also varies between regions. This is why the seed or plant is sourced from the Gorge Reserve, Turitea Reserve or Valley, remnants on the eastern side of the Manawatū River (within the Palmerston North boundary) and remnants following the Kahuterawa Stream from the Reserve to Keebles Bush. By planting species that have been eco-sourced, the survival rate of plantings increases and the local natural biodiversity is maintained.

When planting a new area, it is best to clear unwanted plant and animal pests. However, do not remove or spray the ground cover as this will encourage the germination of plant pests. The initial planting should be of nursery, pioneer, or early successional species such as Karamu, Koromiko and Manuka. These species are fast growing and provide shelter and protection for the next succession (secondary) species. The establishment of bush requires a building block approach in order for success. Secondary species such as Akeake, Mapou and Tarata develop a sub canopy and outlive the nursery species. These species continue to provide protection for the much slower growing species that become the long living canopy of the bush. Canopy species include the much admired, Kamahi, Rata, Titoki and Tawa.

Canopy species can live from 60 to over hundreds of years. The advantages of having areas zoned where these canopy species may be planted is that there is plenty of room for the large root systems to establish without interfering with drainage or plumbing. There are few overhead restrictions such as powerlines, limiting the growth and height of a future heritage tree. The species can be appreciated in a natural setting by residents and visitors. The Green Corridors Range to River is establishing areas in which future generations may enjoy and continue to experience the natural heritage of the Turitea and surrounding remnants.

The following species have been planted in the Green Corridors and warrant a mention, however their numbers are small and therefore a description has not been included in this report.

Biddibiddi	Kaikomako
Carex geminata	Kanuka
Carex lessoniana	New Zealand Blueberry
Carex virgata	Puketea
Coprosma rhamnoides	Rohutu
Cyperus ustulatus	



References: 1, 2 and 7.



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Nursery (Pioneer Species):

When revegetating farm land, pioneer species are used in the initial plantings. This is to create a nursery environment for secondary species and more precious species such as Rata, Kamahi and Tawa, which will dominate the future bush canopy. Pioneer species are fast growing, provide sun and frost protection and have a short lifespan of 15-20 years.



Coastal Tree Daisy / *Olearia solandri*

Source: Kahuterawa Road, Oxenham Bush –Private Property (seed).
Seed Collection: May.

Description: A shrub that is generally found on coastal areas from North Cape to the upper South Island. Useful as quick growing shelter in slightly drier areas of the Green Corridors, it makes a good alternative to Manuka. In the autumn, small flowers appear singularly along each branchlet. The leaves are small and dark green.

Height: 3-4m.



Areas present: *O.solandri* can be found throughout the new plantings in Valley Views and upstream between the foot bridge and the start of the Green Corridors walking track.

Karamu / *Coprosma robusta*

Source: Ngahere Park Road, Keebles Bush, Oxenham Bush –Private Property (seed).
Seed Collection: March-April.

Description: Karamu is a useful shelter plant that tolerates a large variety of conditions. Of all the nursery species used in the Green Corridors, Karamu would be the most prolific. The leaves are dark green, slightly leather like and prone to rust when young- Alternate a weekly spray programme of copper and lime sulphur. The berries are an attractive orangey red and are often seen in mass in the autumn. They provide a good food source for native birds.

Height: 2-4m.



Key:

Attracts feeding birds;
 Nectar  Fruit
 Insect
References: 1,6 and 7



Koromiko / Hebe / *Hebe stricta*

Source: Keebles Bush, Oxenham Bush (seed).

Seed Collection: April-May;

The Rock Farm (cuttings) Best practise: Dec-Jan.

Description: Unlike the Hebe found in local retail nurseries, Koromiko is open branched, unattractive and very 'twiggy' looking. The leaves are narrow and slightly glossy. As a fast growing native, it is ideal as a nursery species and can be used for gapping up (space filler). The flowers are an off-white and appear on spikes in the summer months.

Height: 2m

Areas present: Throughout the Turitea Valley and Summerhill Reserves.



Mahoe / Whiteywood / *Melicytus ramiflorus*

Source: Keebles Bush/Link, Turitea Dam, Oxenham Bush – Private Property (seed)

Seed Collection: March-April

Description: A fast growing tree, Mahoe is found throughout New Zealand and provides shelter for other plant varieties. It is ideal for planting under Gorse, as it can be frost tender when young and smoothes the Gorse once it has established. It generally takes approximately 7 years before a tree or shrub shades out grasses or unwanted plant varieties. The bark becomes a greyish white mottled with lichens and the leaves a contrasting bright green, serrated and pointed at the end. Flowers appear in spring and are followed by dark purple berries.

Height: 5+m.

Areas present: Predominately in the lower half of Titoki Reserve and the Valley Views planting sight.



Key:

Attracts feeding birds;

 Nectar  Fruit
 Insect

References: 1,6 and 7



GREEN REPORTING

Manuka / Tea Tree / *Leptospermum scoparium*

Source: Ngahere Park Road (seed).

Seed Collection: June

Description: Manuka self-seeds and is tolerate of most conditions. It has narrow dark green leaves and can be easily confused with Kanuka when young (despite coming from different families). It acts as a shelter, nursery plant or can be used for 'gapping up'. The white flower is prolific throughout spring and attracts bees.

Height: 3-7m

Areas present: Throughout the Turitea Valley and Summerhill Reserves.



Secondary Plantings:

Larger species or species that generally have a longer life span are planted after pioneer/nursery plants. These plants are slightly slower growing and rely on pioneer species to provide shelter from the elements. The majority of secondary species are used to create diversification and to help complete ecosystem services, however some are utilised solely as additional protection against full sun, wind and frost.



Akeake / *Dodonaea viscosa*

Source: Keebles Bush, Keebles Link (seed).

Seed Collection: March-April

Description: Akeake can be found in lowland scrub and forest throughout the North Island and upper South Island. This native has long, thin leaves that are light green. Flowers occur late in the year, with female and male flowers on separate trees. Seeds are present in summer through to autumn. Akeake tolerate drier conditions and provide excellent wind protection.

Height: 3-7m.

Areas present: Throughout Turitea Valley and the Summerhill Reserves.



Key:

Attracts feeding birds;

 Nectar  Fruit

 Insect

References: 1,6 and 7



GREEN REPORTING

Five Finger / *Pseudopanax arboreus*

Source: Titoki Reserve, Kahuterawa Road, Keebles Link, Turitea Dam (seed).
Seed Collection: March-May

Description: Found throughout New Zealand, this lowland forest species is easily distinguished. The leaves radiate on short stems around one central stem, producing a hand-like shape. There can be 5-7 leaflets per "hand". The small flowers are produced in clusters during the winter. Female and male flowers are produced on separate plants. A small dark purple berry is produced which attract native birds. Five Finger do not mind drier conditions or areas where there is good aeration.

Height: 3-6m.

Areas present: The majority can be found in the lower half of Titoki Reserve, however there are some plants present between the new walking bridge and upstream of the Picnic Spot.



Kanono / *Coprosma grandifolia*

Source: Turitea Dam, Turitea Road, Oxenham Bush – Private Property (seed).
Seed collection: January-April.

Description: A small tree with olive, wavy edged leaves that does well in the shade and can tolerate full sun. It is good for areas where there is existing shelter and available moisture. The berries are orange and attract native fruit feeding birds.

Height: 3-4m.

Areas present: Valley Views and Lower Titoki Reserve.



Key:

Attracts feeding birds;
 Nectar  Fruit
 Insect
References: 1,6 and 7



Kohuhu / Pittosporum tenuifolium



Source: Starter Plants – Private Property, Keebles Link (seed).
Seed collection: April-May.

Description: A quick growing tree that is great for providing shelter and gapfilling areas where pioneer species are coming to the end of their life. The leaves are greener and slightly shinier than that of *p. eugenioides*. The dark red flowers are very fragrant and attract nectar feeders.

Height: 4-6m.

Areas present: Throughout Turitea Valley and Summerhill Reserves.



Lacebark / Hoberia populnea



Source: Kereru Drive, Keebles Bush/Link, Kahuterawa Reserve (seed).
Seed Collection: April-May.

Description: As a juvenile, Lacebark looks very similar to Ribbonwood, however it quickly grows into a graceful tree with oval leaves that are serrated. Lacebark has white starry flowers in late summer and autumn. The bark has a netted appearance due to the fibrous layer beneath, giving its common name 'Lacebark'.

Height: 4-6m.

Areas present: Throughout Turitea Valley and Summerhill Reserves.



Mapou / Red Matipo / Myrsine australis



Source: Keebles Bush/Link, Turitea Dam (seed).
Seed Collection: January-April. Cold start required for germination.

Description: This tree has narrow, wavy leaves that are light green with red speckles and red margins. The young branches are also red. Mapou can grow in most conditions and is good for gap-up planting.
Height: 3m.

Areas present: Throughout Turitea Valley and Summerhill Reserves.



Key:

- Attracts feeding birds;
- Nectar Fruit
- Insect
- References: 1,6 and 7



Ngaio / *Myoporum laetum*

Source: Keebles Link (seed).
Seed Collection: March.

Description: Poisonous to livestock.
Ngaio is a quick growing tree with bright green leaves. The leaf is speckled with oil glands giving it a textured appearance. Tolerating most conditions, Ngaio makes a good shelter or gap-up plant however, it is frost tender when young.

Height: 6m.

Areas present: Throughout Adderstone, Titioki and Pari Reserve, as well as a small number upstream of Ngahere Park Bridge.



Pate / *Schefflera digitata*

Source: Turitea Road, Oxenham Bush –Private Property,
Keebles Bush (seed).

Seed Collection: April-July.

Description: Pate prefer slightly damper areas and produce large panicles of small white-green flowers that hang in the summer. The leaves compose of up to nine oval leaflets (progressively getting bigger as they splay outwards) from one single point. The white-purple berries attract native berry feeders.

Height: 3m.

Areas present: Titoki Reserve.



Key:

Attracts feeding birds;

 Nectar  Fruit

 Insect

References: 1,6 and 7



Pigeonwood / *Hedycarya arborea*



Source: Turitea Road, Turitea Dam (seed).
Seed Collection: January-April.

Description: A tree with dark green oblong leaves with fine serrated edges. The male and female flowers are present on separate trees. Bright orange-red berries are produced when both sexes are present. Pigeonwood require shelter (particularly when young) and good moisture.

Height: 5-10m.

Areas present: Titoki Reserve.



Tarata / Lemonwood / *Pittosporum eugenoides*



Source: Turitea Road, Oxenham Bush, Starter Plants-Private Property (seed).
Seed Collection: January-May.

Description: The tallest of New Zealand Pittosporums, Tarata is well foliated with leaves that are long, wavy, oval and glossy yellow-green. The leaves have a lemon scent when crushed. There are small off-white flowers produced in large clusters in spring.

Height: 5-12m.

Areas present: Throughout Turitea Valley and summer Hill Reserves.



Key:

Attracts feeding birds;
 Nectar Fruit
 Insect
References: 1,6 and 7



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Canopy Species:

The canopy is the top or outer layer of a bush line or top habitat zone. When discussing canopy species, it refers to the species that will dominate the canopy once the trees are mature. These trees will house the majority of bird life and other fauna and provide protection, from the elements, to the understory.



Kahikatea / White Pine / *Dacrycarpus dacrydioides*

Source: Turitea Road, Alice Tate's –Private Property (Kereru Drive), Keebles Link (seed).
Seed Collection: March-April.

Description: As New Zealand's tallest tree, Kahikatea can reach up to 65m tall. However, it takes approximately 120 years to do so. The juvenile tree has a long, bronze, needle like leaf which change to dark green compressed scales in adulthood. Cones are produced on male trees and the seeds (small bright red fruit) on female trees. Kahikatea are ideal for swampy areas as they don't mind wet feet.

Height: Up to 65m.



Areas present: Wet areas throughout Turitea Valley and Summer Hill Reserves.

Kamahi / *Weinmannia racemose*

Source: Oxenham's Bush –Private Property, Kahuterawa Reserve (seed).
Seed Collection: March. Requires a cool-moist stratify.



Description: This very slow growing tree can hold its juvenile shrubby form for a long time. The juvenile form has trifolioate, leathery, dark green leaves while the adult has singular. Cream flowers similar to *Hebe stricta* are present in spring and summer, these are followed by small red fruit.

Height: Up to 25m.

Areas present: Remnant trees exist opposite and downstream slightly from the Picnic Spot. To date, all germinated seed has not reached a suitable size for planting.

Key:

Attracts feeding birds;

Nectar Fruit

Insect

References: 1,6 and 7



Matai / *Prumnopitys taxifolia*

Source: Keebles Bush, Turitea Dam (seed).
Seed Collection: January-March.

Description: **Syn. *Podocarpus spicatus*.** Matai looks very similar to Miro, however the leaves are slightly shorter and the juvenile form looks much like a tangled mess. Matai can tolerate drier conditions.

Height: Up to 40m.

Areas present: Throughout the upper half of Turitea Valley.



Miro / *Prumnopitys ferruginea*

Source: Kahuterawa Bush (seed).
Seed Collection: April-June.

Description: **Syn. *Podocarpus ferrugineus*.** This slow growing species has a soft needle like leaf. The bark is dark and slightly scaly. It is a very attractive tree. The female produces small flowers which are followed by large red berries. Both female and male trees are required for fruiting to occur. Miro enjoy moist soil and a semi-shaded location.

Height: Up to 25m.

Areas present: Scattered throughout the top half of Turitea Valley and Titoki Reserve.



Northern Rata / *Metrosideros robusta*

Source: Kahuterawa Road Reserve, Kahuterawa Bush (seed); Gorge Reserve (young plants).
Seed Collection: July-August.

Description: Northern Rata generally begins as an epiphyte on a host tree, however when grown from propagation it can become an unruly looking shrub before it begins to mature. The leaves are leathery, dark green and may have a red tint. Flowering occurs after many years and are very similar to that of the New Zealand Christmas Tree (Pohutukawa).

Height: Up to 25m.

Areas present: Scattered throughout the top half of Turitea Valley and Titoki Reserve.



Key:

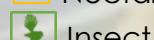
Attracts feeding birds;



Nectar



Fruit



Insect

References: 1,6 and 7



GREEN REPORTING

Rewarewa / New Zealand Honeysuckle / *Knightia excels*

Source: Alice Tate's –Private Property (Kereru Drive) (seed).
Seed Collection: April-June.

Description: Rewarewa has long, narrow, pointed leaves that are serrated. They are also leathery and dark green. The spring-summer flowers are a bottlebrush shape and a deep orange-red. The flowers are followed by unique seed pods. Rewarewa tolerate most conditions.

Height: 8-20m.

Areas present: Turitea Valley.



Rimu / Red Pine / *Dacrydium cupressinum*

Source: Keebles Link (seed).
Seed Collection: March.

Description: Rimu has a very slow growth habit however, it grows to become a distinctive canopy tree. Young Rimu foliage is covered in small bronze needles and has a cascading effect. Rimu, when young, prefers some shade and shelter and moist conditions.

Height: 40+m.

Areas present: The top half of Turitea Valley.



Tawa / Beilschmiedia tawa

Source: Cashmere Drive, Turitea Dam, Bledisloe Park (seed).
Seed Collection: January

Description: Tawa is a difficult plant to grow from seed as it does not like to have its roots disturbed; making it tricky to pot on. It is a slow tree to establish, however as one of the original dominant canopy trees in the area, it is well worth persisting with. The leaves are light green and elongated. The flowers are small and are followed by large black berries. Tawa requires moist conditions and frost protection when young.

Height: 8-10m.

Areas present: Remnant trees can be found at the top of Turitea Valley and Titoki Reserve. Green Corridors is yet to plant out any propagated Tawa.



Key:

Attracts feeding birds;

 Nectar  Fruit

 Insect

References: 1,6 and 7



GREEN REPORTING

Titoki / New Zealand Oak / *Alectryon excelsus*

Source: Cashmere Drive, Anne's Place (seed).
Seed Collection: January.

Description: Titoki is an attractive tree with pinnate, serrated leaves in a light green colour with a slight gloss. The flowers are insignificant with a rusty tone and are followed by deep red seed capsules which split to expose the seed. Young Titoki require frost protection.

Height: 8-10m.

Areas present: Scattered throughout established areas of the Green Corridors.



Totara / *Podocarpus totara*

Source: Kahuterawa Bush, Orchard Farm Road (seed).
Seed Collection: March-April.

Description: Due to its size and age, the grand Totara tree signifies strength and durability. Its needle leaves are olive-dark green and the bark of a reddish brown, with a tendency to peel. Male and female parts occur on separate trees. The female carries a bright red fruit in early autumn. Totara tolerate most conditions.

Height: Up to 30m.

Areas present: Scattered throughout established areas of the Green Corridors.



Key:

Attracts feeding birds;
 Nectar  Fruit
 Insect
References: 1,6 and 7



Erosion Control:

The eroding of stream banks and hillsides is an issue that arises with much of New Zealand's cleared landscape. Whether the area was cleared for farmland or modified for housing, the implementation of erosion control is active in each region. The Green Corridors is no different. In the Turitea valley, the land must withstand high volumes of water along the stream banks and in the Summerhill area, land that was never intended for infrastructure must adapt to modification. The following species are utilised for their intrusive and fibrous root systems, in the prospect of holding land in place.



Toetoe / *Cortaderia* spp.

Source: Turitea Road, Kahuterawa Road (seed).
Seed Collection: January-February.



Description: A tall grass that produces a feather like seed head. The majority present in the Green Corridors are *C. fulvida*, a smaller variety with bluish green leaves. The golden flower plumes often have a pink hue. Toetoe tolerate most conditions and are quick to establish.

Areas present: Throughout the Green Corridors.

Ribbonwood / *Plagianthus regius*

Source: Keebles Link (seed).
Seed Collection: February.



Description: **Syn. *P. betulinus*.** One of New Zealand's few semi-deciduous trees, the Ribbonwood has the ability to withstand strong winds and external pressures. The flowers often occur on separate trees. The juvenile form looks similar to the Lacebark with its divaricating toothed leaves. Ribbonwood tolerates most soil conditions.

Height: 5-10m.

Areas present: Throughout the Green Corridors.



Key:

- Attracts feeding birds;
- Nectar Fruit
- Insect
- References: 1,6 and 7



Sediment Control:

Excess levels of sediment are one of the greatest pollutant in New Zealand streams and waterways. Sediment can be caused by erosion or made up of decomposition of fauna and flora. There are many wetland species that act as sediment control or as a filter before sediment has the opportunity to make it to the water. Planting the following wetland species gives streams, such as the Turitea, the ability to maintain a natural and sustainable level of sediment.



Purei / Ni**erhead / Carex secta

Source: Kahuterawa Bush, Keebles Link (seed).

Seed Collection: February.

Description: Used throughout the wet areas of the Green Corridors, *C. secta* forms large clumps of weeping yellowish-green leaves with a soft appearance. This species will grow in any moist soil and in full sun or semi-shade. Over time older plants will develop a trunk.

Height: 1m.



Areas present: Throughout the Green Corridors.

New Zealand Rush / *Juncus pallidus*

Source: Turitea streamside (plant divisions, seed).

Seed Collection: March.

Description: A fast growing species with pale blue-green leaves that can grow into dense clumps. It is a useful plant for wet or swampy areas.

Height: 1-2m.



Areas present: Valley Views and in small patches through the Summerhill Reserves.



Key:

Attracts feeding birds;

 Nectar  Fruit

 Insect

References: 1,6 and 7



Speciality Species:

Speciality species refers to the plants that are iconic to New Zealand and are easily recognised by non-botanists. These species are often strategically placed so that they are able to be viewed from the path or particular outlook.



Cabbage Tree / Ti Kouka / *Cordyline australis*

Source: Massey Poultry Farm, Keebles Bush (seed).
Seed Collection: March-April.

Description: The Cabbage Tree is one of New Zealand's most distinctive species. It begins life as a grass like plant before developing a single trunk. Over time the trunk begins to branch out creating a many different sculptural forms. Creamy flowers appear in mass in late spring through to summer.

Height: 5-10m.



Areas present: Throughout the Green Corridors.

Fern species

Source: Kahuterawa Bush, Turitea Reserve (young plants).

Description: Fern varieties create further interest and add texture to the understory. **Hen and Chicken / Asplenium bulbiferum** is the most common fern to be reintroduced, however ferns are quick to establish naturally where dense shade is provided. There are many **Soft Tree Ferns / Cyathea smithii** that have naturally occurred along the cliff of the Turitea Stream, near Ngahere Park.

Height: 0.5- 8m.



Areas present: Middle and Lower Titoki, as well as The Link through to Ngahere Park Bridge.



Key:

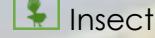
Attracts feeding birds;



Nectar



Fruit



Insect

References: 1,6 and 7



GREEN REPORTING

Kawakawa / Pepper Tree / *Macropiper excelsum*

Source: Oxenham Bush –Private Property (seed).
Seed Collection: April.

Description: Found in shady parts of the Green Corridors, Kawakawa can grow in abundance and create a dense shrub form. The leaves are easily recognised as they are heart shaped. The flowers are compact spikes that appear from the leaf. Male and female flowers are on separate spikes and generally on separate plants. These plants are frost tender and can be predated on by caterpillars.

Height: 2m.

Areas present: Throughout the Green Corridors.



Kowhai / *Sophora* spp.

Source: Keebles Bush (*S. godleyi* seed) Orchard Road,
Poultry Farm Road (*S. microphylla*) (seed).
Seed Collection: January-April.

Description: Kowhai is another distinctive species that can be found in the Green Corridors. The variety that is used in most areas is *S.microphylla* as it tolerates most conditions whereas *S. godleyi* prefers slightly drier soils. Kowhai in its juvenile form tends to be semi-deciduous in the Manawatu. It produces a fern-like foliage with leaves occurring in opposites along the leaf stem. Its bright yellow flowers are present in the spring.

Height: 3-7m.

Areas present: Throughout the Green Corridors.



Key:

Attracts feeding birds;
 Nectar  Fruit
 Insect

References: 1,6 and 7



Lancewood / Horoeki / *Pseudopanax crassifolius*

Source: Turitea Road, Oxenham Bush –Private Property, Alice Tate's –Private Property (Kereru Drive), Keebles Link (seed).
Seed Collection: March-July.

Description: This species is recognised easiest in its juvenile form. The long, narrow, serrated leaves face downwards from the stem and can be up to 60 cm long. The variety present in the Green Corridors tends to be dark green to bronze in appearance. The juvenile form can last 10-20 years before it transforms into a round headed tree.

Height: 5m.

Areas present: Throughout the Green Corridors.



Nikau / *Rhopalostylis sapida*

Source: Kahuterawa Bush, Turitea Dam (young plants).

Description: An attractive tree that is very slow growing. The fronds come from a single trunk that shows its age by the scars of fallen leaves. The flowers do not emerge until the tree is approximately 30 years old. Young Nikau require shelter and moist soil in order to establish. The mature, tropical looking plant produces pinky-purple flowers which are followed by bright red berries.

Height: 10m.

Areas present: Established areas throughout the Green Corridors.



Key:

Attracts feeding birds:

 Nectar  Fruit
 Insect

References: 1,6 and 7



Puka / Pukanui / Meryta sinclairii

Source: Oxenham Bush –Private Property (seed).
Seed Collection: May-July.

Description: It is believed that the Puka was confined to the Three Kings and Hen and Chicken Islands and did not occur naturally elsewhere. It is difficult to say when the species was introduced to Oxenham Bush. It can be debated whether the species is continued to be used in the Green Corridors as a “true” eco-sourced species, however its dark fruit provide a great food source for native birds. This plant is frost tender and prefers a sunny site with good soil.

Height: 5m.

Areas present: Upper Turitea Valley.



Putaputaweta / Marble Leaf / Carpodetus serratus

Source: Turitea Reserve (seed).
Seed Collection: October-November

Description: Putaputaweta enjoys growing in the margins -on the side of tracks, clearings and stream banks. The juvenile form is a distinctive plant with small oval foliage with slightly serrated edges. The foliage has light green marbling on dark green blade. Tiny white flowers can be found on the tree in summer.
Height: 5m.

Areas present: Throughout Turitea Valley and Summerhill Reserves.



Rangiora / Bushman's Friend / Brachyglottis repanda

Source: Turitea Road, Turitea Dam (seed).
Seed Collection: November- February.

Description: The large leaves of the Rangiora are leathery, dull green on the upper side and felted and white on the underside. The leaves can grow up to 25cm long. Rangiora is tolerant of most conditions but may be difficult to established. Small fragrant flowers are present in spring-summer followed by orange-red fruit.
Height: 3m.

Areas present: Turitea Valley. Small numbers in Summerhill.



Key:

Attracts feeding birds;



Nectar  Fruit 

Insect 

References: 1,6 and 7



GREEN REPORTING

Non-eco-sourced Species:

Due to the clearance of land (intensification), there are some species that have not naturally regenerated in the Green Corridors seed sourcing territory. In order to reintroduce plant varieties into the area, the species below have been sourced from a plug nursery. Eco-sourced seed has been utilised where possible, however results are dependent on the season and the germination numbers very low.



Swamp Flax / *Phormium tenax*

Source: Nga Ruakau Nurseries (plugs), Keeble's Bush (seed). This specie has been unable to regenerate from forest fire and clearing of the land, making it difficult to collect eco-sourced seed.



Description: A flax with upright foliage. Generally larger than mountain flax, *P. tenax* produces a flower stalk from 1.5-4m long. The flowers are a red-brown.

Height: 2-3m.

Areas present: Wet areas throughout the Green Corridors.



Mountain Flax / *Phormium cookianum*

Source: Nga Raukau Nurseries (plugs), Starter Plants – Private Property, 10 plants originally sourced from The Manawatu Gorge Reserve (seed). This specie has been unable to regenerate from forest fire and clearing of the land, making it difficult to collect eco-sourced seed.

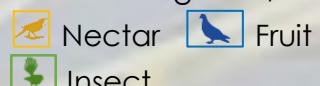
Description: Mountain Flax has a droopy leaf that is generally 1.5m long. This flax can be found in most conditions and doesn't mind getting wet feet occasionally. The flower stalk is approximately 0.6-2m long and is droopy and twisted. Unlike *P. tenax* flowers, these are yellowish-orange and are easily identified by Tui and Bellbird.

Height: 1.5m

Areas present: Throughout the Green Corridors.

Key:

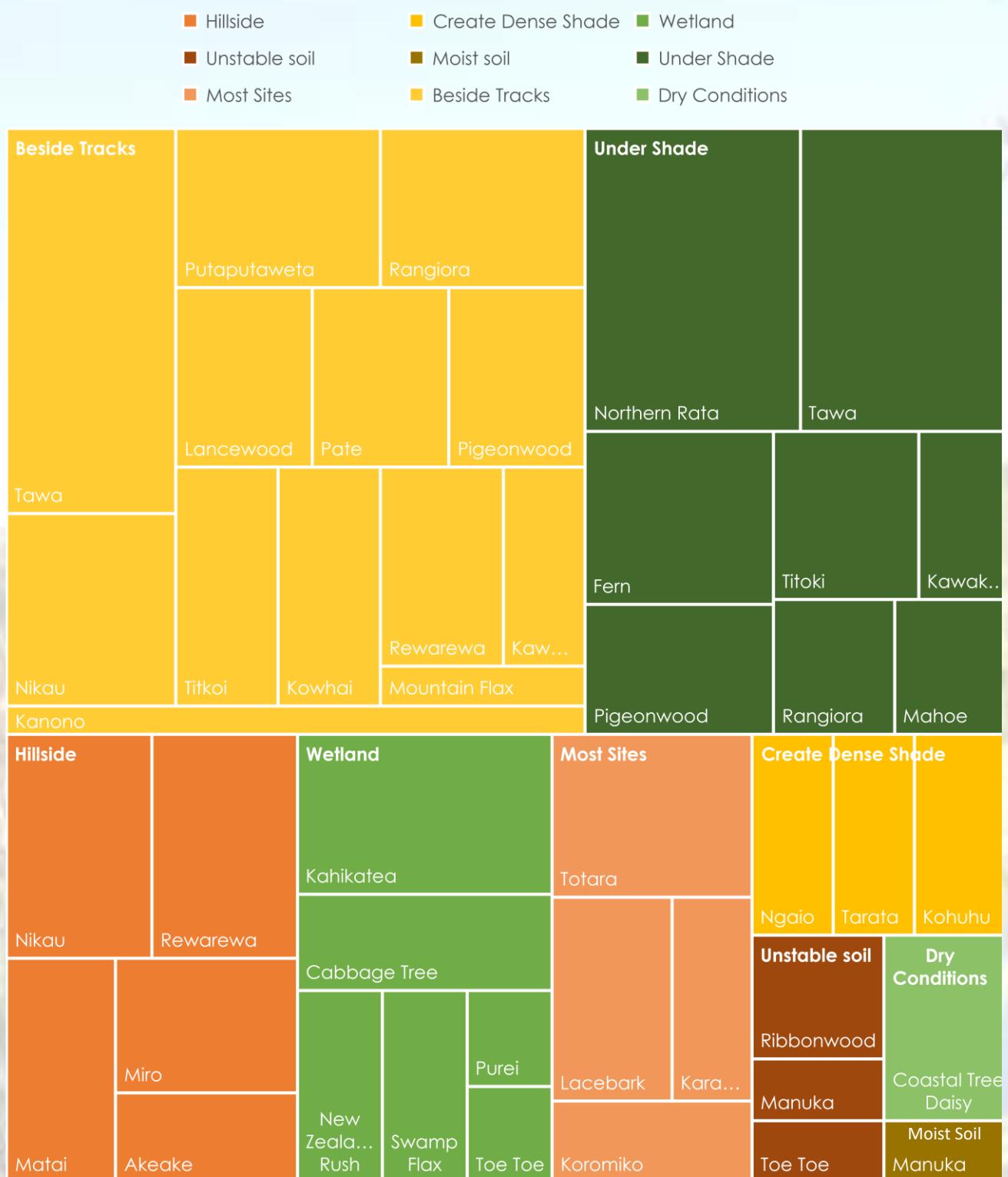
Attracts feeding birds;



References: 1,6 and 7



Site Suitability Chart



GREEN REPORTING

Successful Establishments

Upper Turitea

The initial planting of the Green Corridors commenced in 2001 in the areas nicknamed 'The Picnic Spot' and 'Peanut Slab Block'. Seed was sourced from the nearby Keebles Bush and contract planted for the first two years. The Upper Turitea section of the Green Corridors established quickly with little effort. The section is sheltered from the elements and provides an ideal environment for young bush. The pioneer species are now coming to the end of their lives and more secondary planting is required. Unfortunately, *Tradescantia* (Wandering Willy) from the above Reserve is present and despite chemical treatment, continues to wash down during winter flooding and takes hold. The presence of *Tradescantia* (smothering seedlings) means that it is difficult for the bush to generate without human assistance. The successful plantings carry through to the Ngahere Park Bridge.

Manga O Tane Reserve

This is a prime example of the successful gully restoration. The area was cleared of gorse and other pest species in 2005 before planting commenced in 2008. Although gorse is still present, the regeneration of natives is dense enough that the gorse will become smothered and pushed out of the community. Currently, the gorse works well as a nursery plant and provides protection for native seedlings. Manga O Tane Reserve has not been touched since 2010 and the plants continue to do well without additional assistance.

Titoki Reserve (Cashmere Drive to 2010 planting boundary)

Nicknamed 'Middle Titoki'- this area, like Manga O Tane Reserve, was cleared of all pest species before the start of planting in 2010. The section had existing historic Titoki trees which had been previously grazed under. In the initial plantings, wetland species were introduced to the drainage bed and slips caused by erosion, covered by fast growing species. Middle Titoki continues to establish itself and this is evident in the large number of seedlings present. In 2016, a fernery was introduced to add diversity to the area. Very little gap up planting or plant pest control is required in this area. It is possible that this area has done so well due to the existing Titoki trees and the gully providing shelter from the elements.



Common themes:

- Area previously grazed.
- Land cleared of plant pests.
- Some remnant bush is present or nearby.
- Plantings present in a gully or protected by a single hillside.



Challenges

Lower Turitea

This title refers to the areas nicknamed, 'The Rock Farm', The Dog's Leg' and 'Valley Views'. Although the plantings in Valley Views are only 1-2 years old, it is evident that the section has a similar issue to that of the 'The Dog's leg' (initial planting in 2005). The land is extremely well drained and dries out quickly- making it suitable for only a small number of eco-sourced species. It will take a lot longer to establish an area such as this, as tree or shrubs that have been established for several years can suddenly perish seemly without reason.

Pari, (Upper) Titoki and Addertone Reserves

These three sections were partially planted before the founding of the Green Corridors Project. As a result, the original native species planted here are not commonly found in the Manawatū and are a misrepresentation of the local bush. Areas throughout these reserves are too difficult to reach through council land and therefore property owners that are keen on revegetation have taken upon themselves to introduce more native species. Often these keen gardeners are not aware of eco-sourcing or the principles behind Green Corridors. At the other end of the spectrum, there are also neighbouring properties that use the Reserves to dump their green waste- introducing plant pests.

Plant Pests:

By far the greatest challenge facing Green Corridors is the control of plant pests (largely exotic species). These have been introduced through several modes including wind, water and human and animal activities. In the Turitea Valley plant pests are predominately introduced by flood waters bringing plants down from the above reserve, including Montbretia and Wandering Willy. Other pest species in the valley are; Arum Lily, Banana Passionfruit, Blackberry, Gorse, Hawthorn, Morning Glory, Thistle and Willow. The plant pests in the Summerhill Reserves have been introduced in majority by birds and approximately 20 percent by green waste or unknowing community members (this percentage excludes non-eco-sourced natives). Plant pests in the Summerhill include; Agapanthus, Blackberry, Broom, Cherry, Elderberry, Gorse, Hawthorn, Japanese Honeysuckle and Old Man's Beard.



Common themes:

- Community members plant native species that are found elsewhere in New Zealand.
- Neighbouring properties often dump green waste into reserve.
- Land was never cleared of plant pests.
- Plantings are exposed to the elements.
- Land is free draining and dries out very quickly.



Planting

Equipment Required:



Gardening Gloves

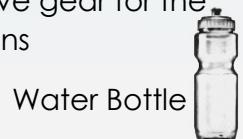
Spade – Sharp, flathead,
light weight.



Gumboots



Correct clothes and
protective gear for the
conditions



Method:



1
Select appropriate
specie for site.



2
Dig a hole which is slightly
bigger than the plants root
mass.



3
Place the plant in the hole-
make sure the root mass
sits below ground level.



4
Fill in the rest of the hole and
use your boot to press firmly
around the plant, sealing the
hole.

Important Notes:

- Assess the site in the summer and winter months to determine the dry and saturated areas. Also observe wind, light and any potential obstacles such as overhead powerlines, underground wiring or drainage.
- Plant during the winter months to ensure adequate watering during establishment.
- Allow each plant to mature without competing for space by planting native species 1.5-2 metres apart.
- To create a natural look and feel, plant randomly in mixed groups of 3 or 5 and 1-2 scattered. Avoid creating a corridor or hedge of one variety.
- When planting and once the root mass is covered, the hole needs to be sealed so that moisture is not lost through evaporation.
- To give planted natives a head start on the surrounding grasses, apply granular preemergent around the native in a 15-25cm radius. This also saves a release visit.



GREEN REPORTING

Recommended Reading and Websites

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<http://www.weedbusters.org.nz/weed-information/weed-list/>



Fauna

Mammals, birds, reptiles, invertebrates and aquatic life are key to the success of Green Corridors Range to River. Each species has their place within the ecosystem and assist in maintaining the balance however, there are also species that threaten this delicate balance. Pest species that can be found through the Green Corridors include rat, mice and cat; this is evident in the traps set by PNCC contractors and cats present in neighbouring houses. With initiatives through organisations such as Predator Free New Zealand and community involvement, it is possible to keep the populations of these pest species under control.

Birds:

An objective of the Green Corridors is to encourage birdlife to create a relationship with the newly established vegetation and restore an ecosystem. New Zealand native birds can be attracted by nectar, fruit or insects, this means considering all types of birds when selecting plant species and aiming for diversity.

Bird Sightings:

Common Name	Scientific Name	Day 1 27-01-2018		Day 2 28-01-2018	
		Tally	No.	Tally	No.
Blackbird	<i>Turdus merula</i>	I	1		
Duck-Mallard	<i>Anas platyrhynchos</i>		4	##	5
Fantail	<i>Rhipidura fuliginosa</i>		3		1
Kingfisher	<i>Todiramphus sanctus</i>		1		
Pukeko	<i>Porphyrio melanotus</i>		1	## II	7
Rosella-Eastern	<i>Platycercus eximius</i>		2		
Silveryeye	<i>Zosterops lateralis</i>				1
Song Thrush	<i>Turdus philomelos</i>		1	II	2
Tui	<i>Prosthemadera novaeseelandiae</i>			## II	7

Bird Calls:

In a space of 5 minutes from 8.05 to 8.30pm on 27-01-2018, the following bird calls were recorded.

- 1 Blackbird
- 1 Tui

The lack of bird calls during dusk suggests that the birds do not roost in the Green Corridors, however they do travel to the revegetation sites during the day to feed on the insects, fruit and nectar that are available.



Above: an Australian Eastern Rosella hiding amongst the bush canopy. The good news about the presence of Rosella is that this means that there is adequate vegetation (new leaves and buds), fruit and seeds in sections of the Green Corridors. Unfortunately, this also means that New Zealand native birds are having to compete for food with an introduced bird that is known to be competitive, particularly when nesting. The native species which were sited the most were Pukeko and Tui. Pukeko is a wetland bird however, their presence is not unexpected due to the surrounding farmland and wet areas. Pukeko are incredibly adaptive and have taken advantage of the semi isolated stream. Tui are nectar feeders however, they also eat flying insects and small native fruits. They are responsible for pollinating a large number of native plants.

Reference: 6



GREEN REPORTING

Invertebrates:

The majority of the invertebrates present in the Green Corridors are difficult to locate without a pitfall trap. Four pitfall traps were located along the Turitea Stream vegetation in order to determine what populations are present.

Trap 1:

Description	Name	Tally	Total
Fly-misc.	Unknown	I	1
Hopper	Crustacea. specie unknown	II	2
Sand Fly	Austrosimulium spp.	III	4
Worm -Common (Small)	Octolasion cyaneum	I	1
Spider	Unknown	III	3
TOTAL			11



Above: A pitfall trap is designed for trapping and releasing invertebrates. A hole is dug and a container (preferably made out of a material that is difficult for insects to climb) is placed in the hole. The edge of the container needs to be level with the ground. Place some rocks or sticks around/across the hole at site a lid across the top (this prevents any disturbance of the container or water getting in). Leave overnight and return the following day to empty.

Trap 2:

Description	Name	Tally	Total
Hopper	Crustacea. specie unknown	I	1
Spider	Unknown	I	1
TOTAL			2

Trap 3:

Description	Name	Tally	Total
Ant	<i>Nylanderia</i> spp.		9
Beetle- Water scavenger	<i>Dactylosternum abdominale</i>	30+
Hopper- Land (Small)	Crustacea. Specie unknown	50+
Hopper- Land (Large)	Crustacea. Specie unknown		2
Misc.	Unknown		2
Slater/Woodlice	<i>Porcellio scaber</i>	I	1
Spider	Unknown	II	2
TOTAL			96+

Trap 4: Dry ferns

Description	Name	Tally	Total
Centipede	<i>Cryptops</i> spp.	I	1
Spider -Garden Wolf	<i>Lycosa</i> spp.	I	1
Hopper	Crustacea. specie unknown	I	1
Misc. sml insect	Unknown	I	1
Spider	Unknown		6
Spider-Red legs	Unknown	II	1
TOTAL			11

The pitfall traps which were located at random produced varied results however, each trap contained at least two invertebrates. Trap 3 had the highest number at 96+. When examining the sites selected, there was little difference between Trap 1-3. Trap 4 was located amongst a fernery. I am unable to determine why Trap 3 would have significantly more invertebrates than the other traps.



Insect sightings:

Common Name	Scientific Name	Tally	Total
Butterfly- White	<i>Pieris rapae</i>	III	3
Butterfly-Red Admiral	<i>Vanessa gonerilla gonerilla</i>	II	2
Butterfly-Meadow argus	<i>Junonia villida</i>	I	1
Bumble Bee	<i>Bombus terrestris</i>	I	1
Damselfly (Blue)	<i>Austrolestes colensonis</i>	III	3
TOTAL			10

Aquatic Life:

Sighted:

1 Brown Trout (*Salmo trutta*)

Reptiles:

No sightings or signs of reptiles where found. However, I do suspect there are Common Skinks present throughout the Green Corridors as they are often found in overgrown gardens in the Manawatū and enjoy feeding on invertebrates such as beetles and spiders -in which there are plenty of in established sections of the Green Corridors.

Most native invertebrates are plant specific. Having a large range of insects suggests that the diversity of plants present in the Green Corridors is beneficial to the ecosystem and providing a suitable diet for native birds. It takes approximately 7-8 years of plant growth before grasses are completely shaded out and can no longer grow between trees and shrubs. Once this change begins to occur, a layer of leaf litter can be established- creating an increase in food supply for invertebrates in the Green Corridors. With an increase of invertebrates, it is expected that the number of bird and reptile sightings will also increase.



GREEN REPORTING

Management:

Green Corridors Range to River is structured in a way that does not resemble other biodiversity projects. There are three main components that help Green Corridors to perform and operate at a high standard; 1. Community-committee members, 2. Palmerston North City Council officers from Planning and Leisure Assets and 3. Horizons Regional Council's freshwater coordinator.

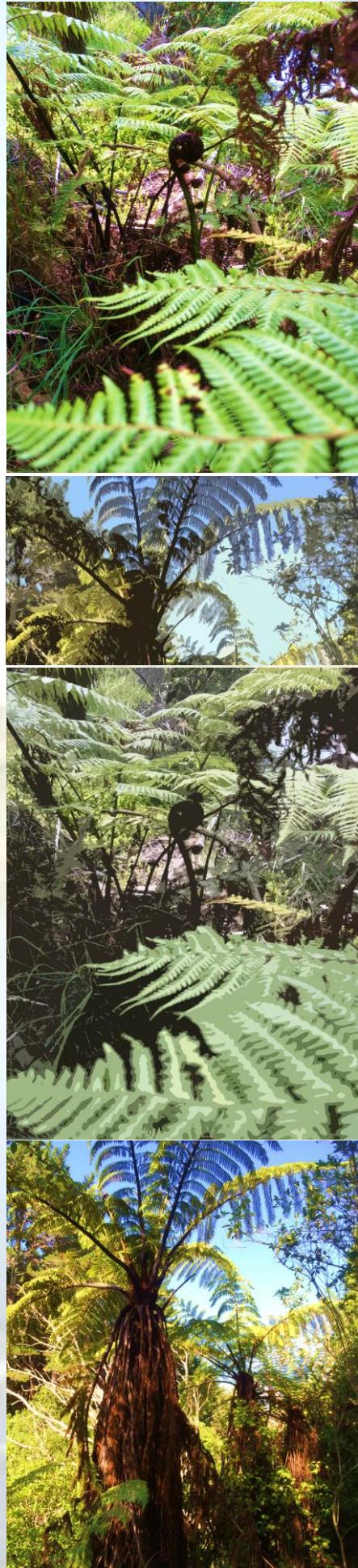
The direction of Green Corridors Range to River is determined by the community members on the committee. Community is an important ingredient as these members police funding decisions, promote Green Corridors Range to River and participate in plantings. Green Corridors is a community lead project and as such community-committee members (under the advice of PNCC and HRC) have the final say over matters concerning the biodiversity project.

Palmerston North City Council provide the majority of the funding for the implementation of Green Corridors activities. Funding goes towards carrying out eco-sourcing, germination, growing-on and planting native plant species. The funds also cover maintenance, plant pest control and a small amount of administration. These items allocated in the budget are contracted out to a third party. Over the years there have been many contractors covering different components however, the most recent and longest serving has been Starter Plants Limited- whom have carried out all tasks required to run the day to day nursery and maintenance operations of Green Corridors.

Horizons Regional Council (HRC) provides advice to the committee on freshwater maintenance, erosion control and funds for plant and animal pest control, as well as the fencing of new sections (as they become available). HRC have also assisted Green Corridors with the clearing of new sections and volunteers on planting days.

New Zealand's National Walkway: Te Araroa runs through sections of the Turitea Valley, these sections fall under the Green Corridors and as such are required to be maintained at a high standard. Any structures and alterations made to the track are to be of Department of Conservation (DoC) standards. DoC does not currently have a sitting member on the committee however, the PNCC leisure assets team are experienced in making sure these standards are met.

Rangitāne O Manawatū has ancestral ties to the land in which the Green Corridors occupies. Rangitāne does not currently have a sitting member on the committee however, the PNCC committee members ensure that cultural significance is considered during strategic planning sessions.



History:

Originally 'The Green Corridors Project', the name was shortened to Green Corridors before rebranding in 2017 to Green Corridors: Range to River.

The Project:

Taking inspiration from Keebles Bush- what is considered the optimum remnant piece of podocarp-broadleaf forest in the Manawatu, Green Corridors was dreamed up while having a picnic in a paddock that is now one of the first sections of the Green Corridors to have been planted. The dream team consisted of a PNCC environmental planner- David Forrest, a seed collector- Peter van Essen, a farmer and keen environmentalist – Kathy Love and a nurseryman- Eddie Welsh. The picnic occurred in 2000 and the first 3000 natives were planted the following year. Seed was eco-sourced from Keebles Bush by Peter van Essen and for the first few years grown by Whanganui Prison and planted out by subcontractors. It was quickly discovered that this system was not adequate for this project. In 2002, Starter Plants Limited (owned by Eddie Welsh) took over the germinating, growing and planting of eco-sourced natives for the Green Corridors. Starter Plants were also to maintain the planted areas for the five years following planting. In October 2018, due to Eddie Welsh's retirement- Starter Plants contract will finish with PNCC and a new contractor will be awarded the privilege of transforming Green Corridors.

The land:

The Turitea Valley was once dominated by Tawa trees reaching over 30 metres with species such as Mahoe and Nikau as an understory. There were areas of Northern Rata and Kamahi scattered through the valley. Other than the Tawa forest within the Turitea Reserve and a few pockets running along the Turitea Stream, the land was logged and cleared for farming.

The hills of the Summerhill subdivision were once home to Rangitāne O Manawatū, where it served as a lookout and escape route. Much of the land was cleared by the 1970s for farming and the remaining remnants were hit hard by grazing pests; including cattle and sheep. The farmland was subdivided in the late 1990's and building occurred in the early 2000's which coincided with the development of Green Corridors. In 2003, Green Corridors expanded into the Summerhill subdivision by planting in Adderstone Reserve.



Reference: 2.



GREEN REPORTING

Planting Timeline:

Year	Section/Nickname	Area	No. Plants
2001	Picnic Spot	Turitea Valley	1500
	Peanut Slab Block	Turitea Valley	1500
2002	Miss Manawatu	Turitea Valley	1500
	The Link	Turitea Valley	1500
2003	Rock Farm	Turitea Valley	1500
	Adderstone Reserve	Summerhill Reserve	1500
2004	Gap-Up Planting	Green Corridors	3000
2005	Dog's Leg	Turitea Valley	1500
	Manga o tane Reserve	Summerhill Reserve	1500
2006	Middle Pari Reserve	Summerhill Reserve	1500
	Gap-Up Planting	Green Corridors	1500
2007	Upper Pari Reserve	Summerhill Reserve	1500
	Gap-Up Planting	Green Corridors	1500
2008	Upper Titoki Reserve	Summerhill Reserve	1500
	Gap-Up Planting	Green Corridors	1500
2009	Lower Pari Reserve	Summerhill Reserve	500
	Lower Titoki Reserve	Summerhill Reserve	2500
2010	Middle Titoki Reserve	Summerhill Reserve	3000
2011-13	Gap-Up Planting	Green Corridors	9000
	Massey LATU	Turitea Valley	1000
2014	Gap-Up Planting	Green Corridors	2000
	Gap-Up Planting	Green Corridors	8000
2015	Valley Views	Turitea Valley	8000
	Gap-Up Planting	Green Corridors	8000
Total:			66,000



Recommendations

Plant Pest Control

- An efficient approach to plant pest control would be to have a separate contractor that is able to focus solely on maintenance and give it the attention it requires. With additional funding from Ministry for the Environment (MfE), it is an ideal time to get this issue under control. Plant pest control would easily utilise an additional 1000 hours per financial year, if the budget allowed.

Community Planting Days and Education

- Community planting events contribute on average 25% of plantings however, this continues to increase yearly as organisations such as Ricoh New Zealand Limited become more invested and generate further community involvement. In order to maintain successful community planting days, organisation and Health and Safety relating to these events requires priority.
- Education is the greatest tool the Green Corridors has in regards to the community. Planting days can be utilised to educate on eco-sourcing and the vision behind Green Corridors Range to River. Often residents of Summerhill take it upon themselves to plant variegated or other non-eco-sourced species in Titoki Reserve. Their help is appreciated however, they need to be aware of what the Green Corridors is striving to achieve.

Plantings

- In areas where species establishment is difficult due to free draining stony soil near the Turitea Stream, consider a different planting plan. Patches planted in Valley Views (2017) had little success due to this challenge. Now that the troubled areas have been identified; species such as Akeake, Coastal Tree Daisy, Lacebark and Mountain Flax may be introduced. These species do not mind dry conditions however, keep in mind that few additional species are able to be introduced and therefore these patches will have limited diversity. Alternatively, these areas may remain grassed and utilised as picnic spots.
- In order to reach the goal of 10,000 natives planted each year in Green Corridors, the funds allocated to plants needs to increase by at least \$5,000. The committee may consider having more corporates come on board to fund additional planting days. Consideration will also be required for additional maintenance once these plants are in the ground.
- The land the Green Corridors now occupies was once dominated by Tawa. Species associated with Tawa forests include; Mahoe, Pigeonwood, Hinau, Rewarewa and Toro. Of these species, very few Tawa, Hinau and no Toro have been eco-sourced and reintroduced to Green Corridors. I suggest discussing with Vivienne McGlynn possible seed sourcing of these three species and concentrating on establishing plants that can be planted out in 4-5 years. These species will be very valuable to the diversity of the Green Corridors.



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RICOH New Zealand

Royal Forest and Bird Protection Society of New Zealand



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