

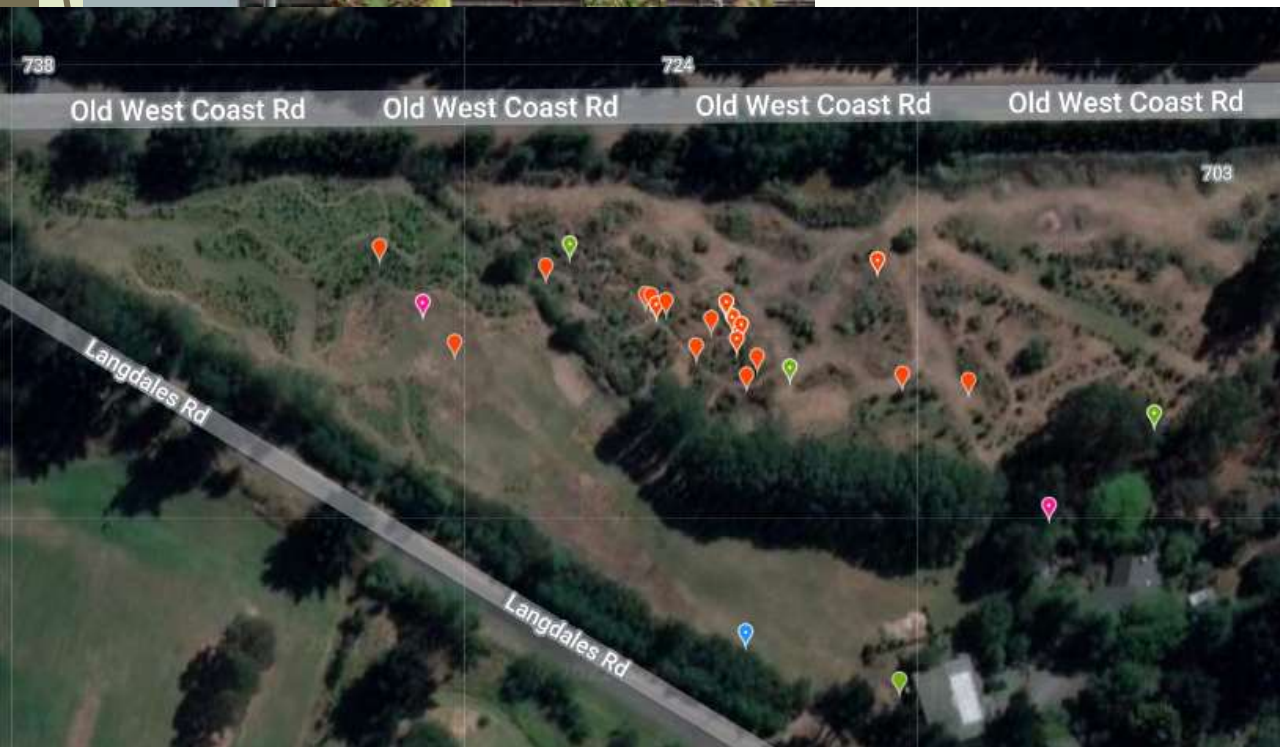


[https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/553/landcare\\_ignatieva.pdf;sequence=1](https://researcharchive.lincoln.ac.nz/bitstream/handle/10182/553/landcare_ignatieva.pdf;sequence=1)



# Nut Point Ecological Restoration

in palettes, patterns, place-making & prospects



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12<sup>th</sup> November 2022

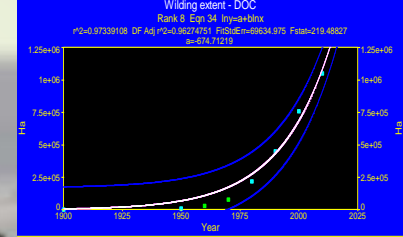
*Kia ora - Tena koe*

# Palettes, Patterns & Places

- **Species for Eco-Restoration:** about 1000 in NZ that can be used in different niches and at different stages – each hosts birds, lizards, insects, fungi
  - >30 000 exotic plants & thousands are **weeds** !! Eco-sourcing !!
- **Structural/growth forms:** Trees, shrubs, tussocks, forbs, vines, perching plants
- Know their **Place (zone) in landscape** -: spatial pattern
- & **Place thru time:** biogeography & succession temporal pattern
- & **Nature/Human intervention:** stress/disturbance
- All part of **Legibility** - foundational theme in **Design**
- **Revelatory for both ecosystems & people**

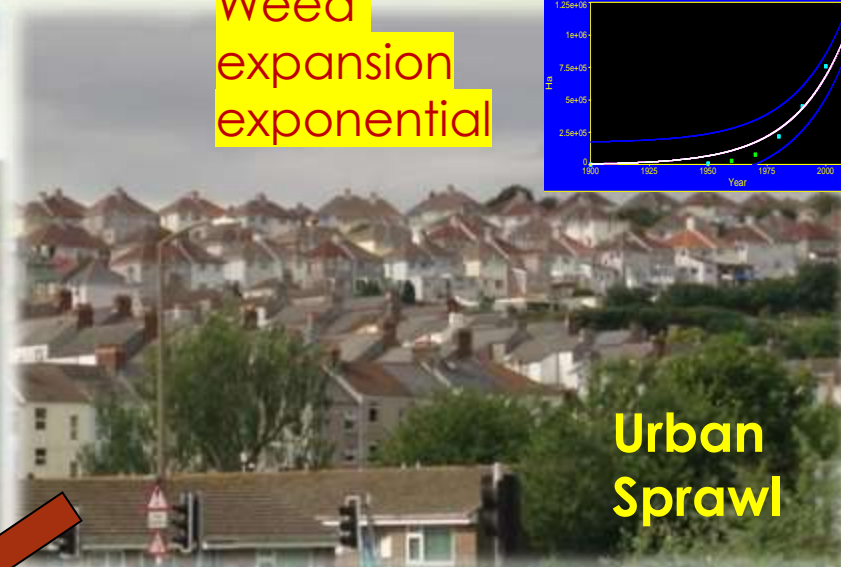
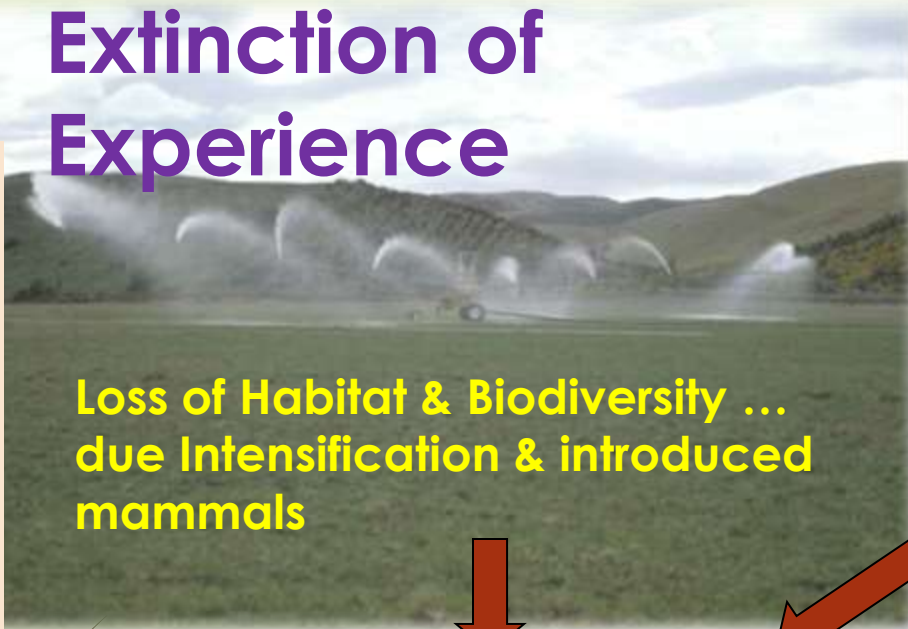
# Extinction of Experience

Weed expansion exponential



ECOLOGICAL COLLAPSE IN NZ CONTEXT BIOLOGICALLY, SOCIALLY & CULTURALLY

Mind over Matter !



Lowland Herbaceous Biodiversity & seedlings ...



- Degraded
- Fragmented
- Disconnected
- Disintegrated
- Invaded

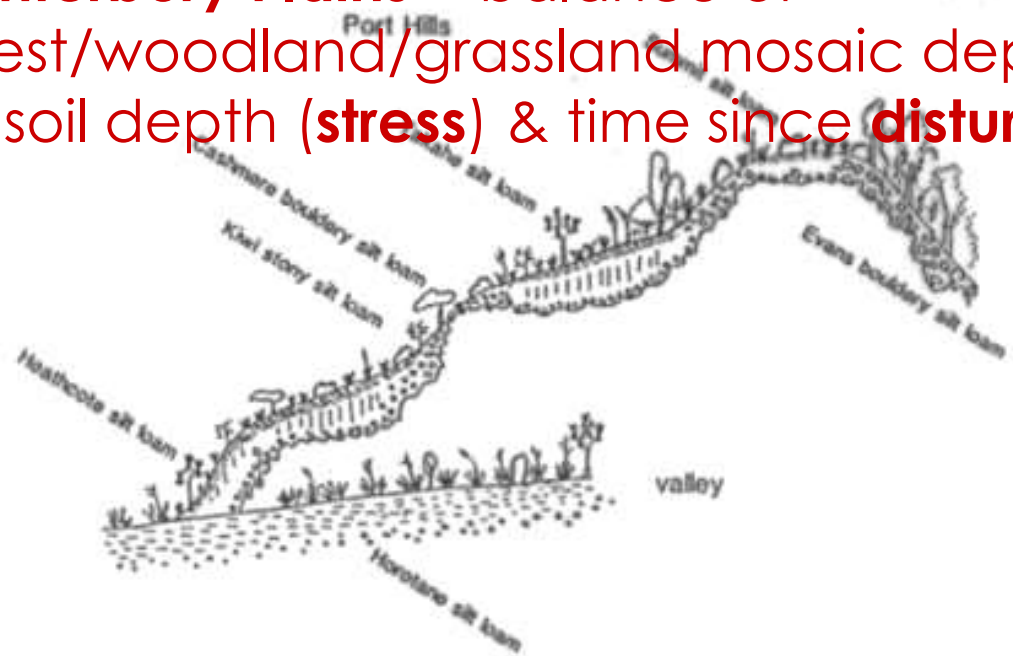


... squeezed out between intensification & rank tall grass/shrub competition

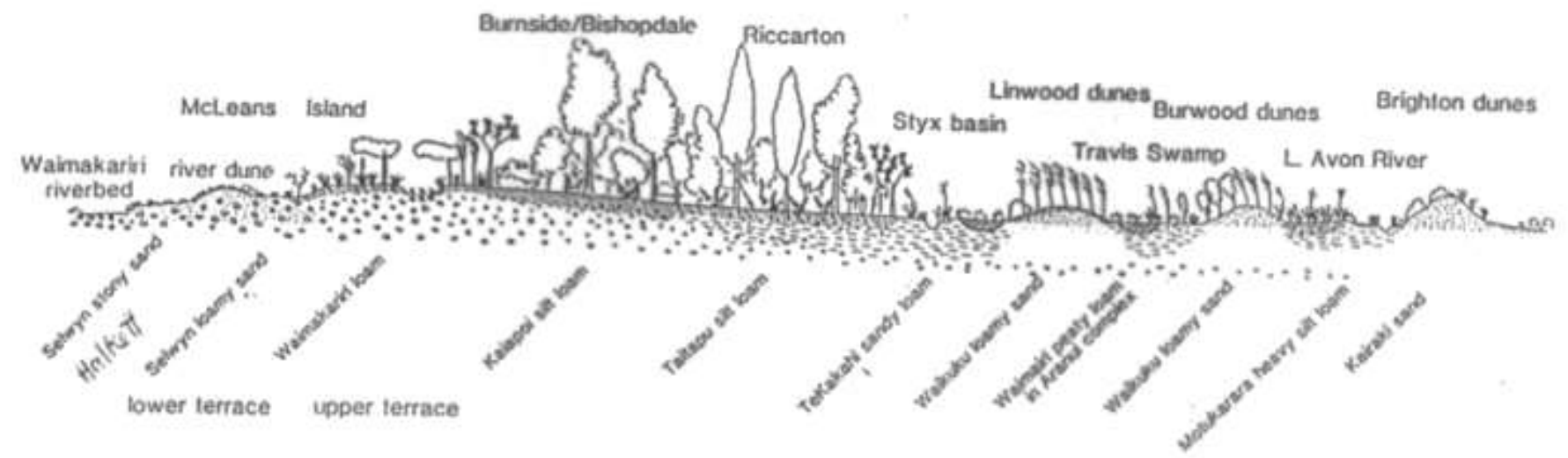


**Idealised cross-section of CHCH – landforms, soils, potential vegetation ...**

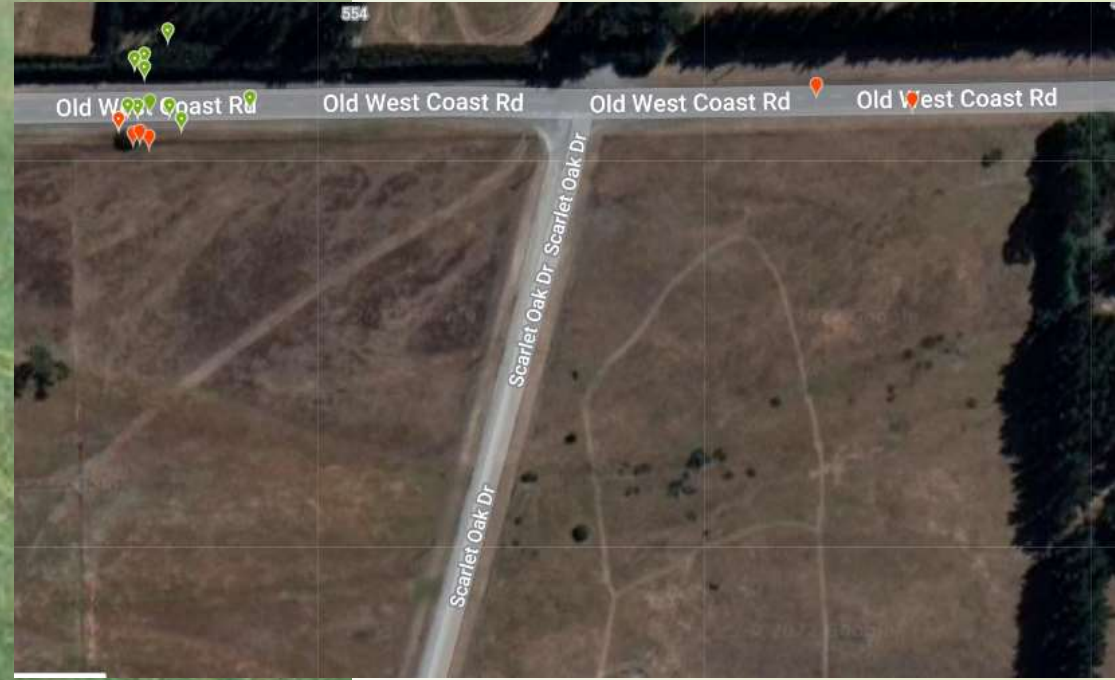
**Canterbury Plains = balance of forest/woodland/grassland mosaic depending on soil depth (**stress**) & time since **disturbance****



**What it was !**



# Dry grasslands/savannah & shrublands

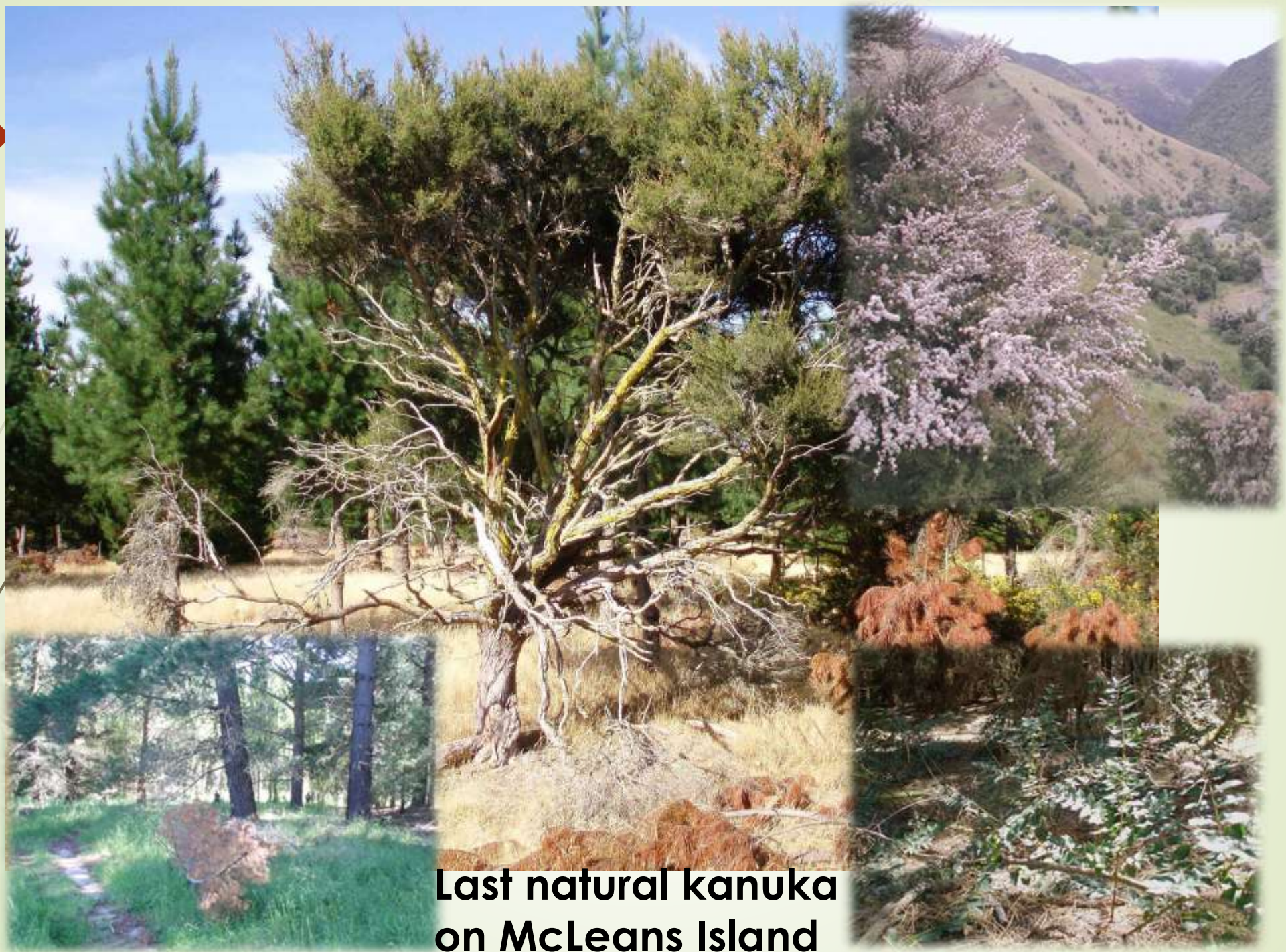


Hi Stress  
Drought



The ancient  
kowhai





**Last natural kanuka  
on McLeans Island**

# Templeton Golf Course & Rakai Island savannah



rbaced



Dry Kanuka (myrtle) Woodland on Rakaia Island & Totara-Matai (podocarp) Forest in South Canterbury



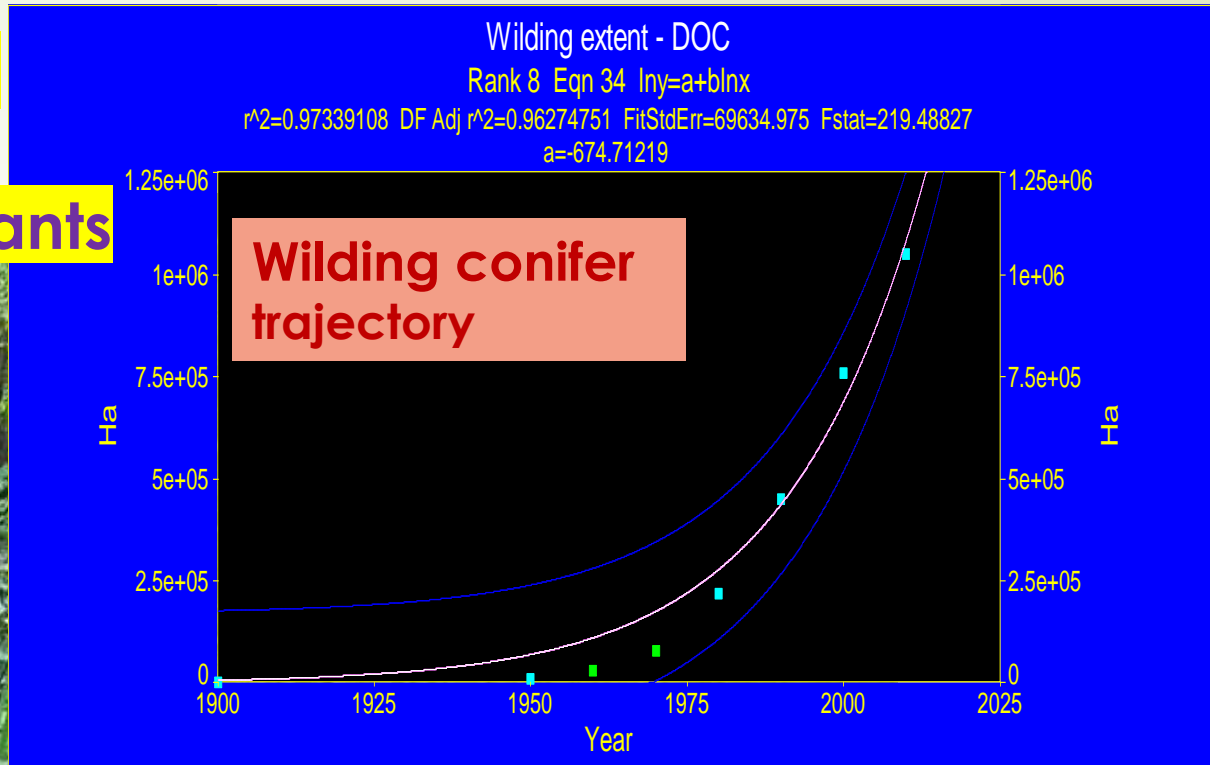
**Still Threatened Dryland Ecosystems**  
- *Death by a Thousand Cuts*



**Weed Problem all pervasive ...  
Still Work to Do –  
Controlling Visually Invasive Plants**



**European Ivy  
smothering native  
ground cover &  
regeneration**



Why we need native plants



Pines/Dry Seed



Rodents & insectivores

for

or



75% Berries & Nectar



Frugivores & Honey Eaters

for

# The Landscape Restoration Journey

- ▶ **Twinkle in Eye**
- ▶ **Concept** – the Case for this site (ecologically, spatially, sociologically, culturally) – for protection, managed regeneration, full scale restoration, combo.
- ▶ **Do No Harm – Survey what's there – environmentally, ecologically & culturally**
- ▶ **Right plant – right place – right time (watch this space)**
- ▶ **Know your plants, your envt, and your context**
- ▶ **Plant availability/eco-sourced**
- ▶ **Site preparation – weed management/pest control**
- ▶ **Planting – a professional job – needs expertise and/or careful supervision**
- ▶ **Layout, planting technique, protection**
- ▶ **Maintenance, maintenance, maintenance**
- ▶ **Self-Actualisation/Transcendence – taken from Maslow**
  - ▶ **Predator removal**
  - ▶ **Landscape connectivity**
  - ▶ **Human connectivity**

# The Priorities

- Protect first (even the pohuehue on the roadside fence – food for birds, lizards, butterflies)
- Facilitate Regeneration 2<sup>nd</sup>
- Pest management and regen
- Restoration ... Right Plant - eco-sourced,
- Right place
- Good planting technique
- Watch Spray drift/ring-barking
- Maintenance/budgeted
- All leads to Human well-being

Scrambling Pohuehue (*Muehlenbeckia complexa*)

Research Grade



meurkc

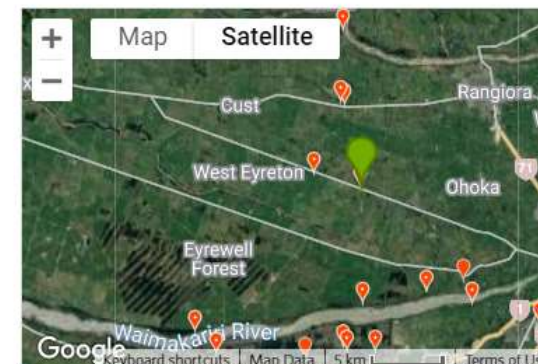
23,632 observations

Observed:

Nov 11, 2022 - 3:53 PM NZDT

Submitted:

Nov 11, 2022 - 3:54 PM NZDT



Rangiora 7475, New Zealand

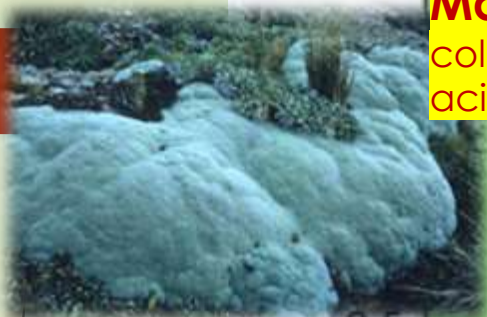
# Swamp Forests of Exotic Willow

a nursery for natural/facilitated regeneration

go with the flow – work with nature (matai dispersed 2.5km by kereru feeding on spring shoots of willow)



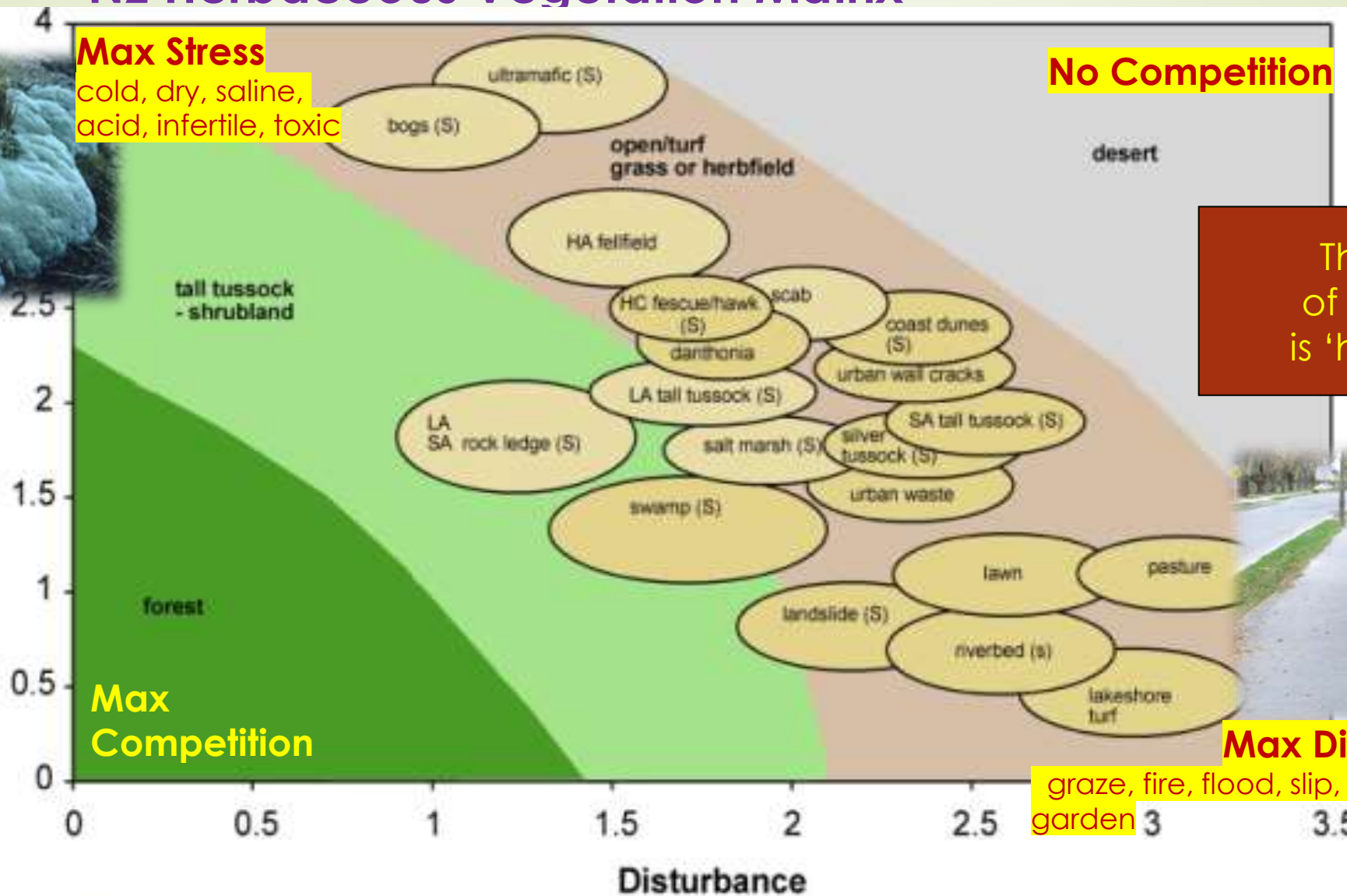
# NZ Herbaceous Vegetation Matrix



**Max Stress**  
cold, dry, saline,  
acid, infertile, toxic

**No Competition**

**Stress**



The majority of the NZ flora is 'herbaceous'

**Heading to Restoration when all else failed**

**Max Disturbance**

graze, fire, flood, slip, mow, garden



Philip Grime's **Stress-Disturbance Plant Strategy concept** with **Competitors, Stress tolerators & Ruderals (CSR Theory)**

**Silver tussock overtaken by exotic grass – a maintenance nightmare  
Not following Grime !**



**Silver tussock needs grazing/weeding or stress in forest environment or it wants to succeed to forest**



Grazing/disturbance keeps the exotic grass/woodland competition at bay – allowing native grassland species some light



*Muehlenbeckia axillaris*



*Geranium retrorsum*



*Carmichaelia corrugata*



**Constructing Nature's Gardens on these ecological principles  
Then letting nature take over – a dry gravelly section on edge of motorway for grassland spp**



# Motorway biodiversity – anywhere is ok & necessary!



Hi Stress, Periodic  
disturbance – weeding  
Watch spray drift



2011



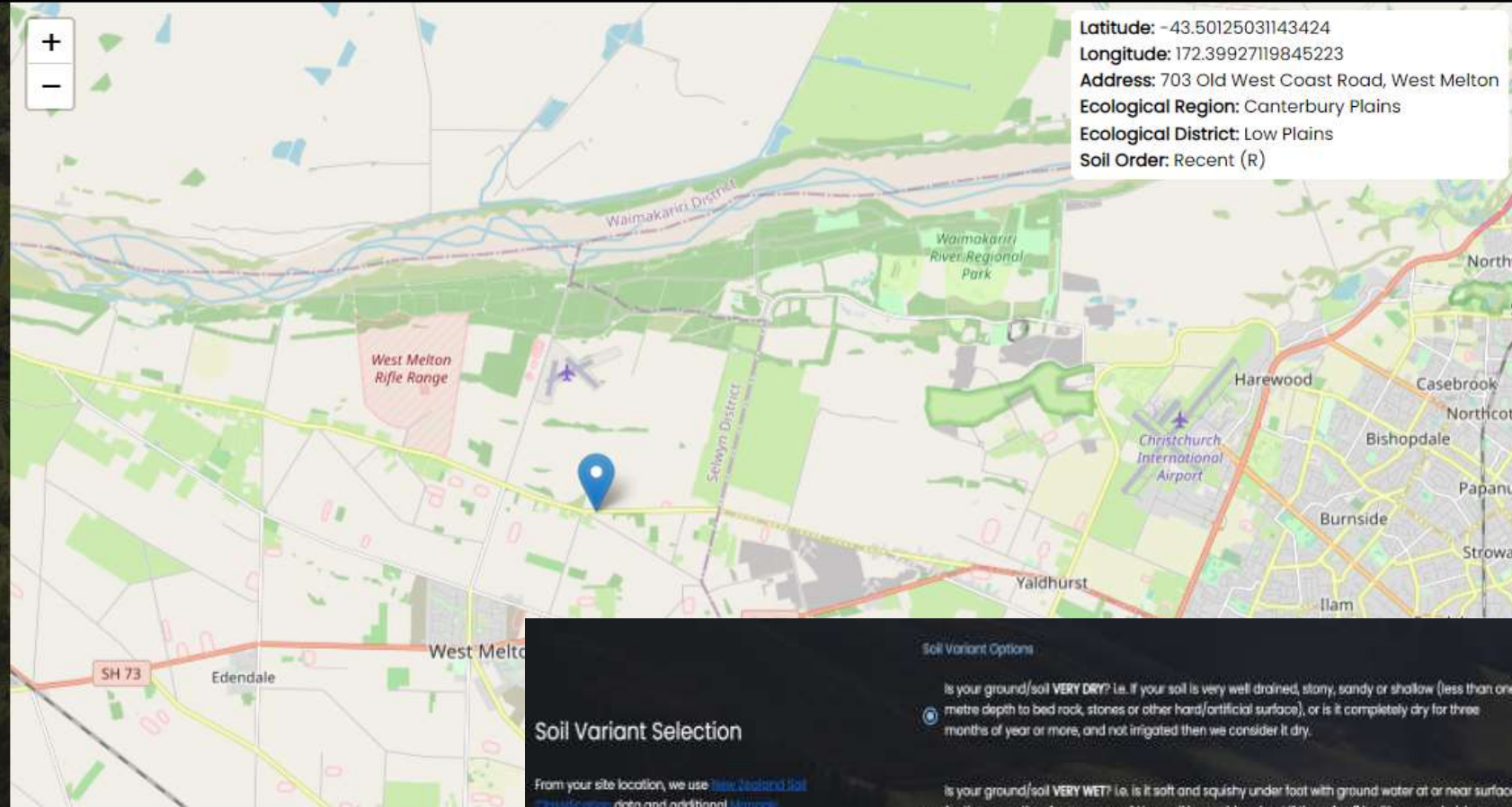
2014



**Rock Gardens** –  
Islands for Meta-  
populations of host-  
specific invertebrates

# Right Plant Right Place Right Time Plant Selector Tool for New Zealand.

Your native plant selection starts here! Use the map to select a planting site location within New Zealand. On the following pages you will provide more details on your project until the system has enough information to create your plant species list and planting plan. To start, click on the map and pan and zoom to the site location. Once the location is selected, click on the "next step" button to complete the process. Repeat this process for sites at different locations.



**Latitude:** -43.50125031143424  
**Longitude:** 172.39927119845223  
**Address:** 703 Old West Coast Road, West Melton  
**Ecological Region:** Canterbury Plains  
**Ecological District:** Low Plains  
**Soil Order:** Recent (R)

**Soil Variant Selection**

From your site location, we use [New Zealand Soil Classification](#) data and additional [Marron](#), [Wharfedale](#) and [Research](#) data to determine overall soil type. However we also need to know as much as possible about the moisture content of the soil at your planting site location.

Please select an option from the choices listed to the right:

**Soil Variant Options**

Is your ground/soil **VERY DRY?** i.e. if your soil is very well drained, stony, sandy or shallow (less than one metre depth to bed rock, stones or other hard/artificial surface), or is it completely dry for three months of year or more, and not irrigated then we consider it dry.

Is your ground/soil **VERY WET?** i.e. is it soft and squishy under foot with ground water at or near surface for three months of year or more? Your soil is considered wet if the **subsoil** is either very dark brown and **peat**-like, or grey rather than a red, brown, or yellow rusty colour?

If your ground/soil does not meet either of the two previous definitions, we'd likely classify it as **MOIST**, or somewhere in between very wet and very dry. Your ground is considered moist if it has compacted soil that is fine or has a soft/crumblly texture. The sand, silt and clay mixture known as loam is considered moist in this context. Moist soils are more than one metre above an impervious layer, and are never water-logged nor are they completely dry for more than three months. If you are unsure, or if you plan to irrigate your site, then select this option.

BACK

## The Plant Selector tool for listing native plants for restoration & landscaping

## Habitat Selection

We now need to specify the type of environment that characterizes your site. Please select one of the options to the right.

### Habitat Options

- URBAN
- RIPARIAN
- STORMWATER TREATMENT TRAIN
- OPEN WETLAND/LAKE
- BUSH RESTORATION WITH HILL ELEMENTS
- DUNE SYSTEM
- SALT MARSH/TIDAL LAGOONS & COASTAL BANKS
- MATAURANGA MAORI
- TRANSPORT CORRIDORS
- RURAL

### Image Variations

#### Hill Slopes



#### Hill Slopes Features



### Hill Slopes

## Zone Selection

Please click on the subregion within the images that most accurately defines your planting project.



# Plant List Results

[DOWNLOAD PDF](#)
[DOWNLOAD CSV](#)

Please review the plant species list – it can be saved as a CSV file or appended to a planting plan guidebook. Additional information on each species can be obtained by entering the plant species name into the search box at [inaturalist.nz](http://inaturalist.nz) or in the "search flora" box at [www.nzpcn.org.nz](http://www.nzpcn.org.nz). Click the "Download PDF" button to create a planting plan guidebook specific to your project site..

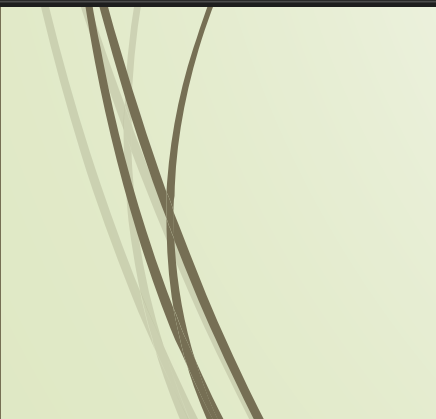
Names	Growth Form / Max Height (m) / Spacing (m) / Forest Position	Moisture Preferences	Tolerances (Water / Drought / Frost / Salinity)	Ecosystem Services	Carbon Sequestration Rate	Planting Stage
<i>Carmichaelia australis</i> / common broom; New Zealand broom / <i>Carmichaelia aligera</i> , <i>C. cunninghamii</i> , <i>C. egmontiana</i> , <i>C. flagelliformis</i> , <i>C. rivulata</i> , <i>C. violacea</i> , <i>C. robusta</i>	Shrub / 3 / 1.5 / B	Dry	L / H / H / M	Erosion control, Nectar (Insect)		1
<i>Cheilanthes distans</i> / woolly cloak fern	Fern / 0.15 / 0.3 / S	Dry	L / H / H / L	None		1
<i>Cheilanthes humilis</i> / rock fern / <i>Cheilanthes sieberi</i> , <i>C. tenuifolia</i>	Fern / 0.25 / 0.5	Dry	L / H / H / L	None		1
<i>Coprosma crassifolia</i> / thick-leaved coprosma, mikimiki	Tall Shrub / 4 / 1.5 / B, S	Mesic, Dry	M / H / H / M	Erosion control, Shelter, Fruit (Bird), Fruit (Lizard)		1
<i>Coprosma intertexta</i> / tangled coprosma	Shrub / 2 / 1.5 / B	Dry	L / H / H / L	Erosion control, Shelter, Fruit (Bird), Fruit (Lizard)		1
<i>Coprosma propinqua</i> / mikimiki	Tall Shrub / 6 / 1.5 / B, S	Wet, Mesic, Dry	H / H / H / H	Erosion control, Shelter, Coastal Shelter, Fruit (Bird), Fruit (Lizard)		1
<i>Coprosma robusta</i> / karamu	Small Tree / 6 / 1.5 / B	Mesic	H / M / M / M	Erosion control, Shelter, Fruit (Bird), Fruit (Lizard)		1
<i>Coprosma virescens</i> / green coprosma	Tall Shrub / 7 / 1.5 / B, S	Mesic, Dry	L / H / H / L	Erosion control, Shelter, Fruit (Bird), Fruit (Lizard)		1
<i>Cordyline australis</i> / cabbage tree; ti kouka; ti	Medium Tree / 15 / 3.0 / B	Wet, Mesic, Dry	H / H / H / M	Erosion control, Filtration, Fibre, Food, Shelter, Shade, Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird), Fruit (Lizard), Cultural		1
<i>Coriaria sarmentosa</i> / tutu	Shrub / 1 / 1.0 / S	Mesic, Dry	L / H / H / L	Erosion control, Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird), Fruit (Lizard)		1

**NOTE – tool in final stages of development & not all species appropriate for this terrace site**

Discaria toumatou / matagouri; wild irishman; tumatakuru	Tall Shrub / 5 / 1.5 / B	Dry	L / H / H / M	Erosion control, Shelter, Coastal Shelter, Nectar/Pollen (Lizard), Nectar (Insect)	1
Dodonaea viscosa / akeake	Small Tree / 6 / 1.5 / B, C	Dry	L / H / M / H	Erosion control, Shelter, Coastal Shelter, Nectar/Pollen (Lizard), Nectar (Insect)	1
Epilobium spp	Forb / 0.1 / 0.3 / B	Wet, Mesic, Dry	M / M / M / M	Nectar (Insect)	1
Fuchsia x colensoi	Shrub / 3 / 1.5 / B	Mesic	L / M / M / M	Erosion control, Filtration, Food, Shelter, Nectar (Bird), Fruit (Bird), Cultural	1
Hebe salicifolia / koromiko / Veronica salicifolia	Tall Shrub / 3 / 1.5 / B, S	Mesic	L / M / M / L	Erosion control, Shelter, Nectar (Insect), Cultural	1
Hoheria angustifolia / narrow-leaved lacebark	Medium Tree / 10 / 3.0 / B, C	Mesic	M / H / H / L	Erosion control, Filtration, Fibre, Shelter, Shade, Nectar (Insect), Cultural	1
Hydrocotyle spp / pennywort	Mat Forb / 0.03 / 0.3 / B	Mesic	M / H / H / M	Erosion control, Nectar (Insect)	1
Kunzea ericoides / kanuka; white tea tree / Leptospermum ericoides	Noble Tree / 20 / 1.5 / B, C	Mesic, Dry	L / H / H / L	Erosion control, Filtration, Timber, Fibre, Food, Shelter, Coastal Shelter, Shade, Nectar (Bird), Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird)	1
Muehlenbeckia astonii / bush pohuehue	Tall Shrub / 5 / 1.5 / B, S	Dry	L / H / H / M	Erosion control, Fibre, Shelter, Coastal Shelter, Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird), Fruit (Lizard)	1
Muehlenbeckia complexa / scrambling pohuehue; wire vine	Scrambler / 2 / 1.5 / S	Mesic, Dry	M / H / H / H	Erosion control, Fibre, Shelter, Coastal Shelter, Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird), Fruit (Lizard)	1
Myoporum laetum / ngaio	Small Tree / 8 / 3.0 / B, C	Mesic, Dry	L / H / L / H	Erosion control, Coastal Shelter, Shade, Nectar (Insect), Fruit (Bird), Cultural	1
Myrsine divaricata / weeping mapou; weeping matipo	Tall Shrub / 5 / 1.5 / B, S	Wet, Mesic, Dry	H / M / H / L	Erosion control, Shelter, Nectar (Insect), Fruit (Bird), Fruit (Lizard), Cultural	1
Olearia adenocarpa / Canterbury daisy shrub	Tall Shrub / 3 / 1.5 / B	Dry	L / H / H / L	Erosion control, Shelter, Nectar (Insect)	1
Olearia bullata / wrinkle-leaved olearia	Tall Shrub / 3 / 1.5 / B	Mesic, Dry	M / H / H / L	Erosion control, Shelter, Nectar (Insect)	1
Olearia fimbriata	Small Tree / 8 / 1.5 / B	Mesic, Dry	L / H / H / L	Erosion control, Shelter, Nectar (Insect)	1
Olearia lineata	Small Tree / 7 / 1.5 / B	Mesic, Dry	L / H / H / L	Erosion control, Shelter, Nectar (Insect)	1
Olearia odorata / scented shrub daisy	Tall Shrub / 4 / 1.5 / B	Mesic, Dry	L / H / H / L	Erosion control, Shelter, Nectar (Insect)	1
Olearia paniculata / akiraho; golden akeake	Small Tree / 7 / 1.5 / B, C	Mesic, Dry	L / H / H / M	Erosion control, Shelter, Nectar (Insect)	1
Olearia virgata / twiggy shrub daisy	Tall Shrub / 3 / 1.5 / B	Mesic	L / H / H / L	Erosion control, Shelter, Nectar (Insect)	1
Ozothamnus leptophyllus / tauhinu; cottonwood / Cassinia leptophylla, Cassinia retorta, C. fulvida, C. vauvilliersii	Shrub / 2 / 1.5 / B, S	Mesic, Dry	M / H / H / M	Erosion control, Shelter, Nectar (Insect)	1

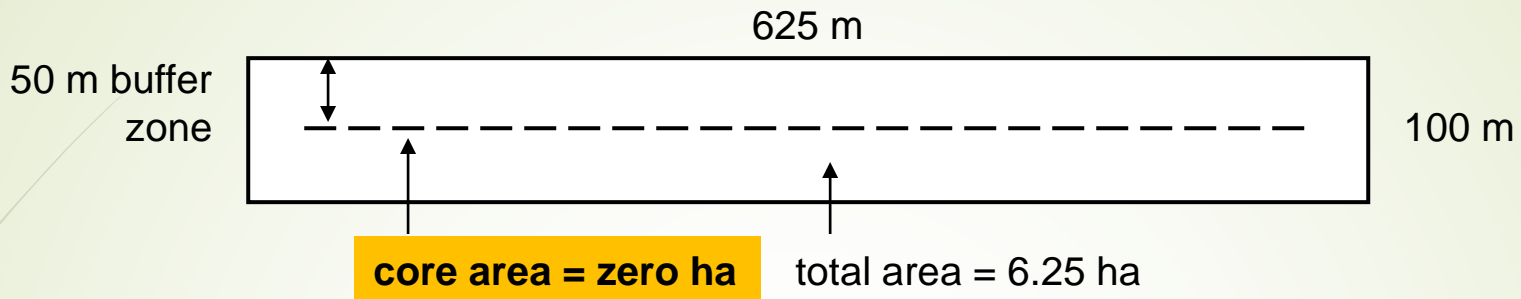


Pittosporum eugenioides / lemonwood; tarata	Medium Tree / 12 / 3.0 / B, C	Mesic	M / M / M / M	Erosion control, Shelter, Nectar (Insect), Fruit (Bird), Fruit (Lizard)	1	
Plagianthus regius / lowland ribbonwood; manatu; ribbonwood / Plagianthus betulinus	Medium Tree / 15 / 3.0 / B, C	Mesic	M / M / H / M	Erosion control, Fibre, Shelter, Shade, Nectar (Insect), Cultural	1	
Pteridium esculentum / bracken; bracken fern; rarauhe	Fern / 2.5 / 1.5 / S	Mesic, Dry	M / H / H / M	Erosion control, Food, Shelter, Cultural	1	
Sophora microphylla / kowhai; weeping kowhai	Noble Tree / 25 / 5.0 / B, C	Mesic, Dry	L / H / H / M	Erosion control, Shelter, Shade, Nectar (Bird), Cultural	1	
Sophora prostrata / prostrate kowhai	Shrub / 2 / 1.5 / B	Dry	L / H / H / M	Erosion control, Shelter, Shade, Nectar (Bird), Cultural	1	
Alectryon excelsus / titoki; New Zealand oak	Noble Tree / 17 / 5.0 / C	Mesic	M / L / L / L	Erosion control, Timber, Fibre, Food, Shelter, Shade, Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird), Cultural	2	
Anemanthele lessoniana / bamboo grass; wind grass; hunangamoho / Oryzopsis lessoniana, Oryzopsis rigida, Stipa arundinacea	Short Tussock / 0.9 / 1.0 / B	Mesic	M / M / M / L	Erosion control	2	
Astelia fragrans / bush lily; bush flax	Griselinia littoralis / broadleaf; papauma; kapuka	Medium Tree / 15 / 5.0 / B, C	Mesic	M / H / H / H	Erosion control, Filtration, Shelter, Coastal Shelter, Shade, Nectar (Insect), Fruit (Bird), Fruit (Lizard), Cultural	2
	Melicytus alpinus / porcupine shrub / Hymenanthera alpina	Shrub / 1.5 / 0.75 / S	Dry	L / H / H / M	Erosion control, Shelter, Nectar (Insect), Fruit (Lizard)	2
	Melicytus crassifolius / porcupine shrub / Hymenanthera crassifolia	Shrub / 2 / 1.0 / S	Dry	L / H / H / H	Erosion control, Shelter, Coastal Shelter, Nectar (Insect), Fruit (Lizard)	2
	Myrsine australis / mapou; red matipo	Small Tree / 7 / 1.5 / B, C	Mesic	M / M / L / M	Erosion control, Shelter, Coastal Shelter, Shade, Nectar (Insect), Fruit (Bird), Fruit (Lizard)	2
	Nothofagus solandri / mountain beech (var. cliffortioides); black beech (var. solandri); tawhai rauriki	Noble Tree / 25 / 5.0 / C	Mesic	H / H / H / M	Erosion control, Timber, Shelter, Shade, Honey-dew (Bird/Insect), Cultural	2
	Paesia scaberula	Fern / 0.5 / 0.5 / B	Mesic	M / M / M / L	Erosion control	2
	Pennantia corymbosa / kaikomako	Medium Tree / 12 / 3.0 / B, C	Mesic	H / M / M / L	Erosion control, Timber, Shelter, Shade, Nectar (Insect), Fruit (Bird), Cultural	2
	Poa imbecilla	Turf / 0.25 / 0.5 / B	Mesic, Dry	L / H / H / M	Erosion control, Filtration, Seed (bird)	2
	Poa pusilla	Turf / 0.2 / 0.5 / B	Mesic	L / M / M / L	Erosion control, Filtration, Seed (bird)	2
	Podocarpus totara / totara; lowland totara	Noble Tree / 30 / 5.0 / C	Mesic, Dry	M / H / H / L	Erosion control, Timber, Food, Shelter, Shade, Fruit (Bird), Fruit (Lizard), Cultural	2
	Pomaderris phyllicifolia / tauhinu / Pomaderris ericifolia	Shrub / 1.5 / 1.5 / B, S	Mesic, Dry	L / H / H / M	Erosion control, Shelter, Nectar (Insect)	2

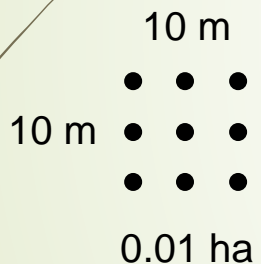
Prumnopitys taxifolia / matai; black pine / Podocarpus spicatus	Noble Tree / 30 / 5.0 / C	Mesic	M / H / H / L	Erosion control, Timber, Food, Shelter, Shade, Fruit (Bird), Cultural	2	
Pseudopanax arboreus / five-finger; whauwhaupaku / Neopanax arboreus	Small Tree / 8 / 1.5 / B	Mesic	L / M / L / M	Erosion control, Shelter, Shade, Nectar (Bird), Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird)	2	
Pseudopanax crassifolius / lancewood; horoeka / Neopanax crassifolius	Medium Tree / 12 / 3.0 / B, C	Mesic	M / M / M / M	Erosion control, Shelter, Nectar (Bird), Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird)	2	
Rubus squarrosus / leafless lawyer	Scrambler / 5 / 1.5 / B	Mesic, Dry	M / H / H / M	Erosion control, Fibre, Nectar (Insect), Fruit (Bird), Cultural	2	
Solanum aviculare / poroporo; bullbul; bullibulli	Tall Shrub / 3 / 1.5 / B	Mesic	L / H / L / M	Erosion control, Food, Shelter, Shade, Nectar (Insect), Fruit (Bird), Cultural	2	
Solanum laciniatum / poroporo; bullbul; bullibulli	Tall Shrub / 3 / 1.5 / B	Mesic, Dry	L / H / L / M	Erosion control, Food, Shelter, Shade, Nectar (Insect), Fruit (Bird), Cultural	2	
Acaena anserinifolia / pipiriri	Mat Forb/Subshrub / 0.05 / 0.5 / B, S	Mesic	M / M / H / L	Erosion control, Filtration, Nectar/Pollen (Lizard), Nectar (Insect), Grain (Bird)	3	
Acaena pusilla / pipiriri	Mat Forb/Subshrub / 0.05 / 0.5 / B, C, S	Mesic	M / M / H / L	Erosion control, Nectar/Pollen (Lizard), Nectar (Insect), Grain (Bird)	3	
Asplenium flabellifolium / necklace fern	Fern / 0.05 / 0.3 / C	Mesic, Dry	L / H / L / L	None	3	
Asplenium gracillimum / graceful spleenwort	Clematis foetida / yellow clematis	Vine / vine / 1.5 / B	Mesic	M / M / M / L	Fibre, Nectar (Insect)	3
	Clematis paniculata / puawhananga	Vine / vine / 3.0 / B	Mesic	M / L / L / L	Fibre, Nectar (Insect)	3
Asplenium hookerianum / spleenwort	Clematis petriei / clematis	Vine / vine / 1.5 / B	Mesic	M / M / M / L	Fibre, Nectar (Insect)	3
Blechnum penna-marina / dwarf kiokio	Helichrysum lanceolatum / niniao / Helichrysum aggregatum, H. glomeratum	Shrub / 3 / 1.5 / B, C	Mesic, Dry	L / H / H / L	Erosion control, Nectar (Insect)	3
Calystegia tuguriorum / convolvulus	Histiopteris incisa / water fern, mata	Fern / 1 / 1.0 / B, C	Mesic	M / L / L / M	Erosion control	3
	Hypolepis ambigua / pigfern	Fern / 1.8 / 1.5	Mesic	H / M / M / L	Erosion control	3
	Hypolepis rufobarbata / red pigfern	Fern / 1 / 1.0 / B	Mesic	M / L / L / L	Erosion control	3
	Lagenifera spp / daisy	Rosette Forb / 0.02 / 0.3 / B, C	Mesic	M / M / M / L	Erosion control, Filtration, Timber, Fibre, Food, Shelter, Coastal Shelter, Shade, Nectar (Bird), Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird), Fruit (Lizard), Cultural	3
	Microsorium pustulatus / hounds tongue fern / Phymatosorus diversifolius	Fern, Epiphyte / 0.8 / 0.75 / B, C	Mesic	L / M / L / M	Erosion control, Cultural	3
	Parsonsia capsularis / small flowered jasmine; New Zealand jasmine	Vine / vine / 1.5 / B, C	Mesic, Dry	M / H / H / M	Erosion control, Fibre, Nectar (Insect)	3
	Parsonsia heterophylla / New Zealand jasmine	Vine / vine / 1.5 / B, C	Mesic, Dry	M / H / H / M	Erosion control, Fibre, Nectar (Insect)	3

Pellaea rotundifolia / button fern	Fern / 0.6 / 0.75 / B, C	Dry	L / H / M / L	Erosion control, Cultural	3
Poa breviglumis	Turf / 0.3 / 0.5 / B	Mesic	M / M / M / M	Erosion control, Filtration, Seed (bird)	3
Poa matthewsii	Turf / 0.2 / 0.5 / B	Mesic	L / M / M / L	Erosion control, Filtration, Seed (bird)	3
Polystichum richardii / black shield fern; common shield fern; pikopiko / Polystichum oculatum, Polystichum neozelandica	Fern / 0.8 / 0.75 / B, C	Mesic	L / M / M / L	Erosion control, Filtration, Shelter	3
Polystichum vestitum / prickly shield fern; puniu	Fern / 1.3 / 1.5 / B, C	Mesic	H / L / M / L	Erosion control, Filtration, Shelter	3
Ranunculus reflexus / buttercup / Ranunculus hirtus	Rosette Forb / 0.3 / 0.5 / B, C	Mesic	M / M / L / L	Nectar (Insect)	3
Rubus schmidelioides / white-leaved lawyer; tataramoa; bush lawyer	Vine / vine / 1.5 / C	Mesic, Dry	L / H / H / L	Erosion control, Fibre, Nectar (Insect), Fruit (Bird), Cultural	3
Uncinia ferruginea / hook-sedge	Short Tussock / 0.5 / 0.75 / C	Mesic	M / M / M / L	Erosion control, Seed (Bird)	3
Uncinia rubra / hook-sedge	Turf / 0.3 / 0.5 / B	Wet, Mesic	H / L / M / L	Erosion control, Seed (Bird)	3
Urtica ferox / tree nettle; ongaonga	Shrub / 2.5 / 1.5 / C	Mesic	L / M / L / M	Erosion control, Shelter, Shade, Nectar (Insect), Cultural	3
Urtica incisa / scrub nettle	Forb / 0.3 / 0.75 / C	Mesic	M / M / L / L	Erosion control, Shelter, Nectar (Insect), Cultural	3
Illeostylus micranthus / pirita: mistletoe / Loranthus micranthus	Mistletoe / hemiparasite / 1.5	Mesic	M / M / M / M	Erosion control, Filtration, Timber, Fibre, Food, Shelter, Coastal Shelter, Shade, Nectar (Bird), Nectar/Pollen (Lizard), Nectar (Insect), Fruit (Bird), Fruit (Lizard), Cultural	4
Pyrrhosia eleagnifolia / leather-leaf fern / Pyrrhosia serpens	Fern, Epiphyte / epiphyte / 1.5 / B, S	Mesic	M / M / M / M	Cultural	4
Tupeia antarctica	Mistletoe / mistletoe / 1.5 / B, S	Mesic	M / M / M / M	Nectar (Insect), Fruit (Lizard), Cultural	4

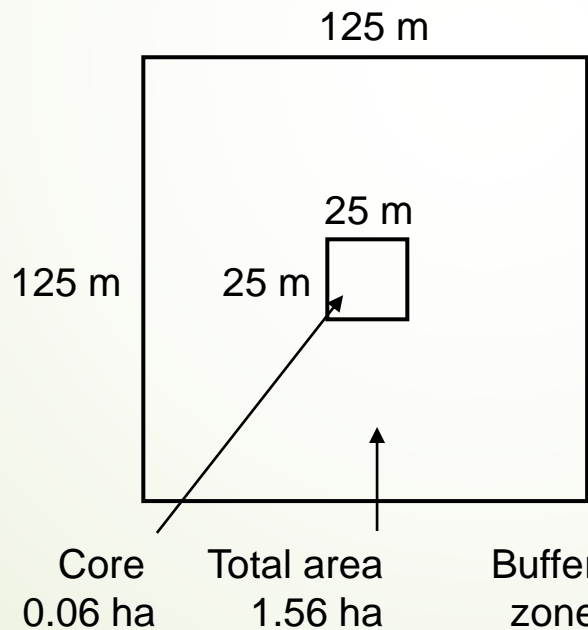
# Optimising Patch Shape – Linear forest patch



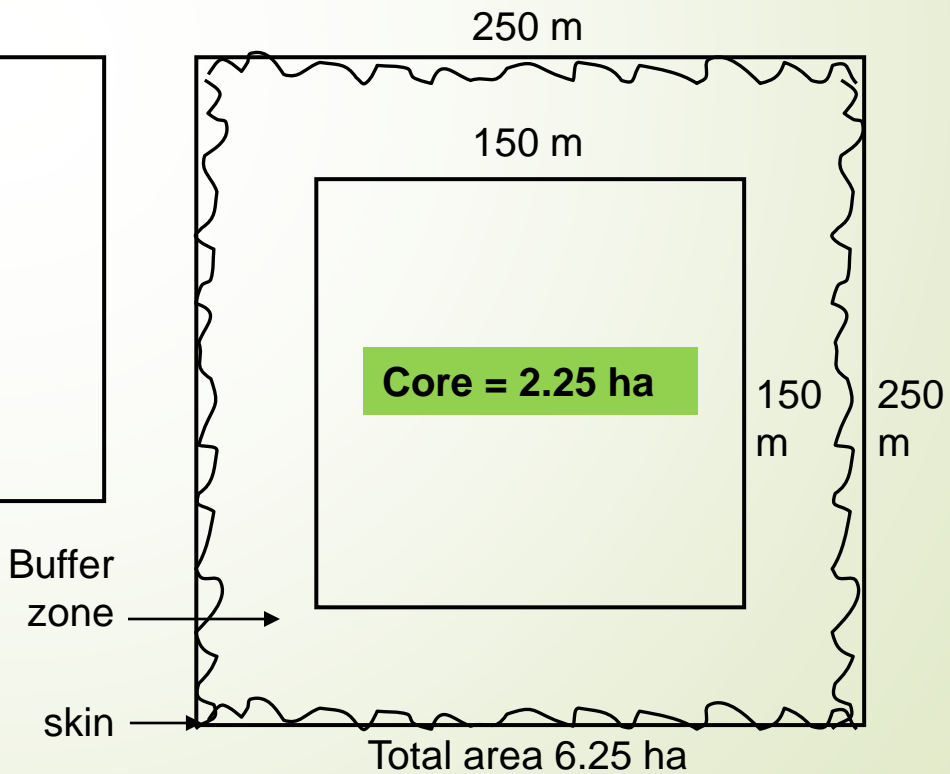
Street/playground  
Noble Tree Grove



Neighbourhood  
Habitat Patch



District/Suburb  
Core Sanctuary



# Stepping up - from Habitat Elements to Landscape

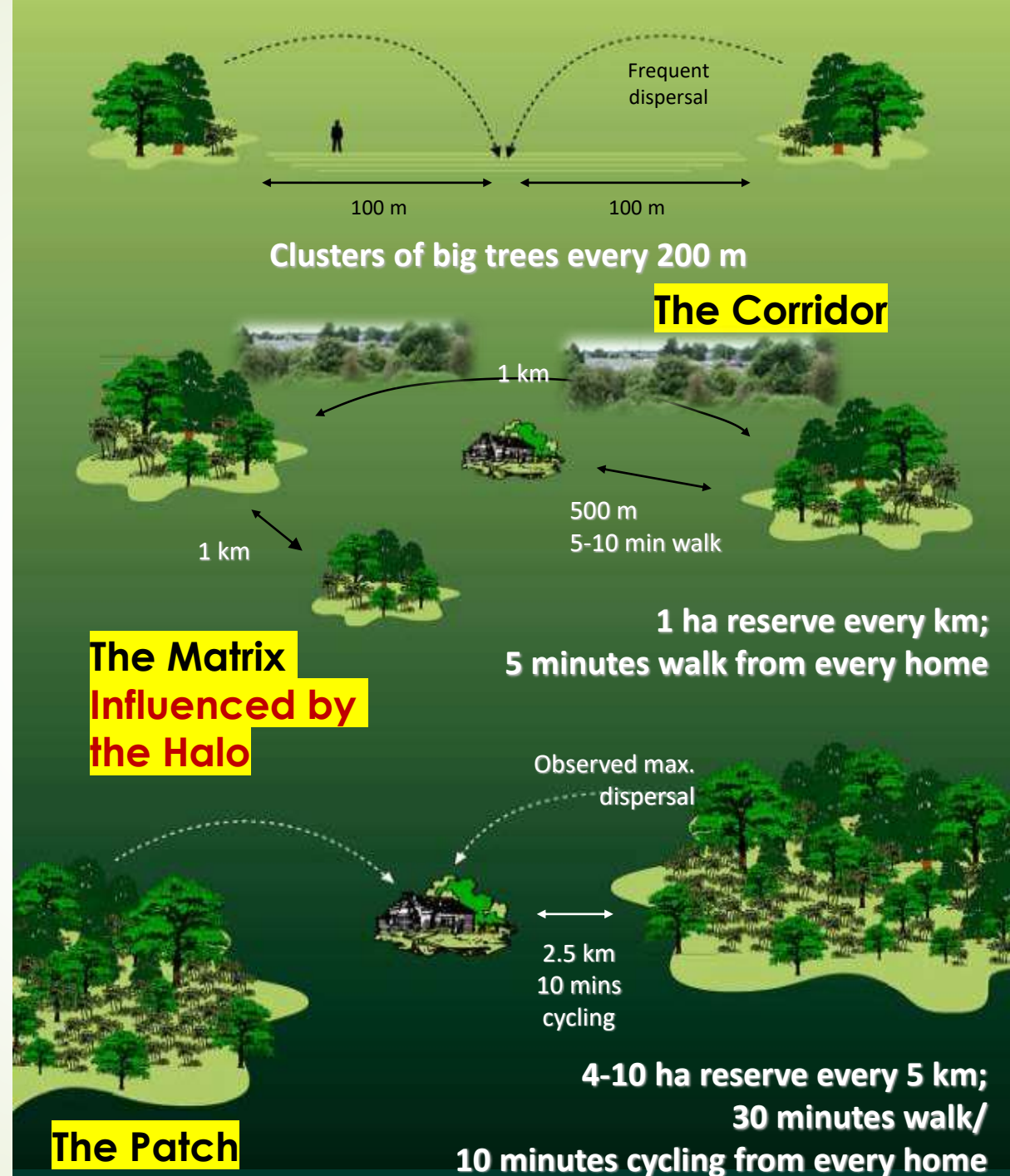
- 
- **Catchment/watershed** – a natural unit/system of large scale
  - **Patches** – blocks of prominent habitat (forest/scrub/tall tussock) – range of size/edge
  - **Sanctuaries** – patches protected from introduced pest species (in NZ habitat alone – not enough)
  - **Corridors** – linear patches with edge effect
  - **Matrix** – lower-growing vegetation/built ground **between** patches & corridors
  - Forman et al. provide many metrics around landscape patterns

# The Patch

## Configurations & Networks

## Integrating People Nature & Landscape

Meurk & Hall (2006): **spatial optimum** for forest habitat function & human experience equated with:  
**groves a few minutes walk** from each residence; **habitats within 10 minutes walk** (max distance = 0.5 km); & **sanctuaries within 45 minutes walk** (max distance = 0.5 km; or 10 mins bike ride)  
**Authentic** – sense of place, legible landscape



# Te Ara Kakariki – the patch/green dots



**Exemplar of *Nut Point Gallery* site**

# Dry Woodland Restoration Stepping Stones for *Te Ara Kakariki*



Med Stress  
Drought

# *Te Ara Kakariki* – linear patches/corridors

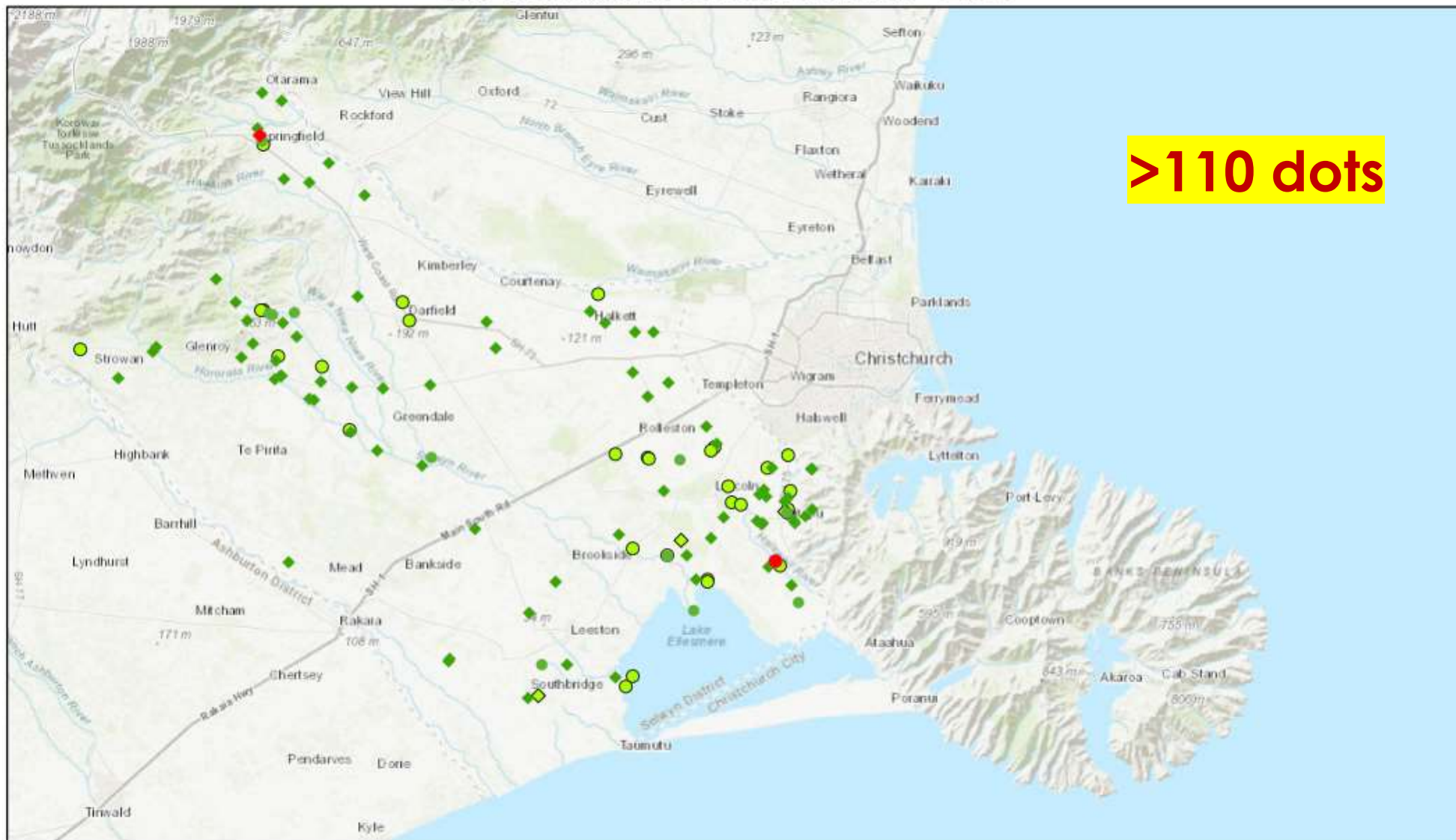




**49 Dots  
to Date  
2015?**

Google

# Te Ara Kākāriki Greendots 2009 - 2021

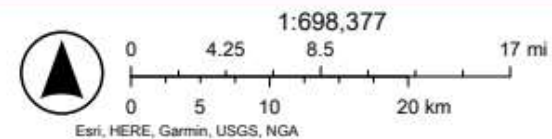


>110 dots

7/25/2022

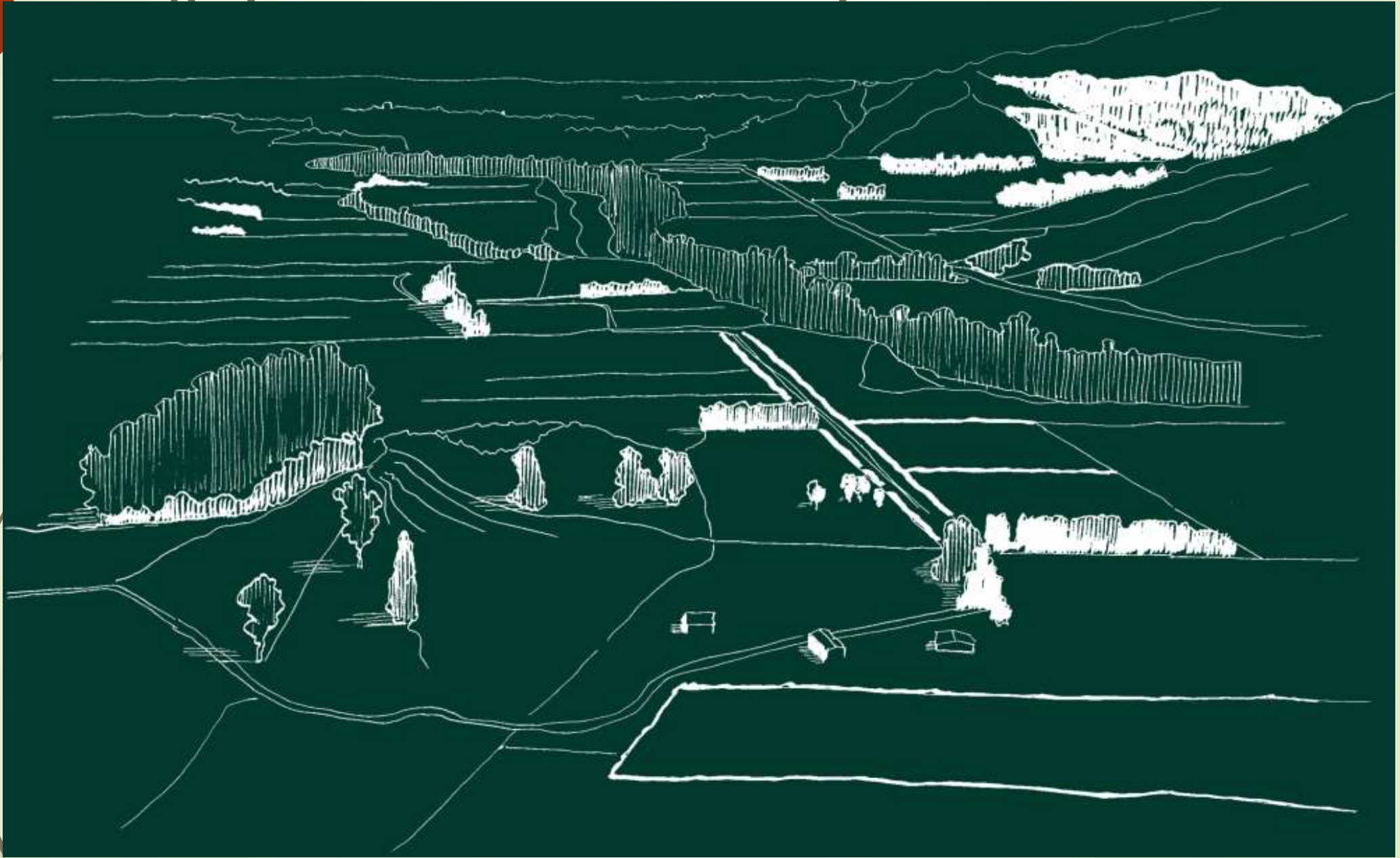
Legacy Sites Community Plantouts Kids Discovery Plantout

- |           |           |           |
|-----------|-----------|-----------|
| ◆ Private | ◆ Private | ● Public  |
| ● Public  | ● Public  | ◆ Private |

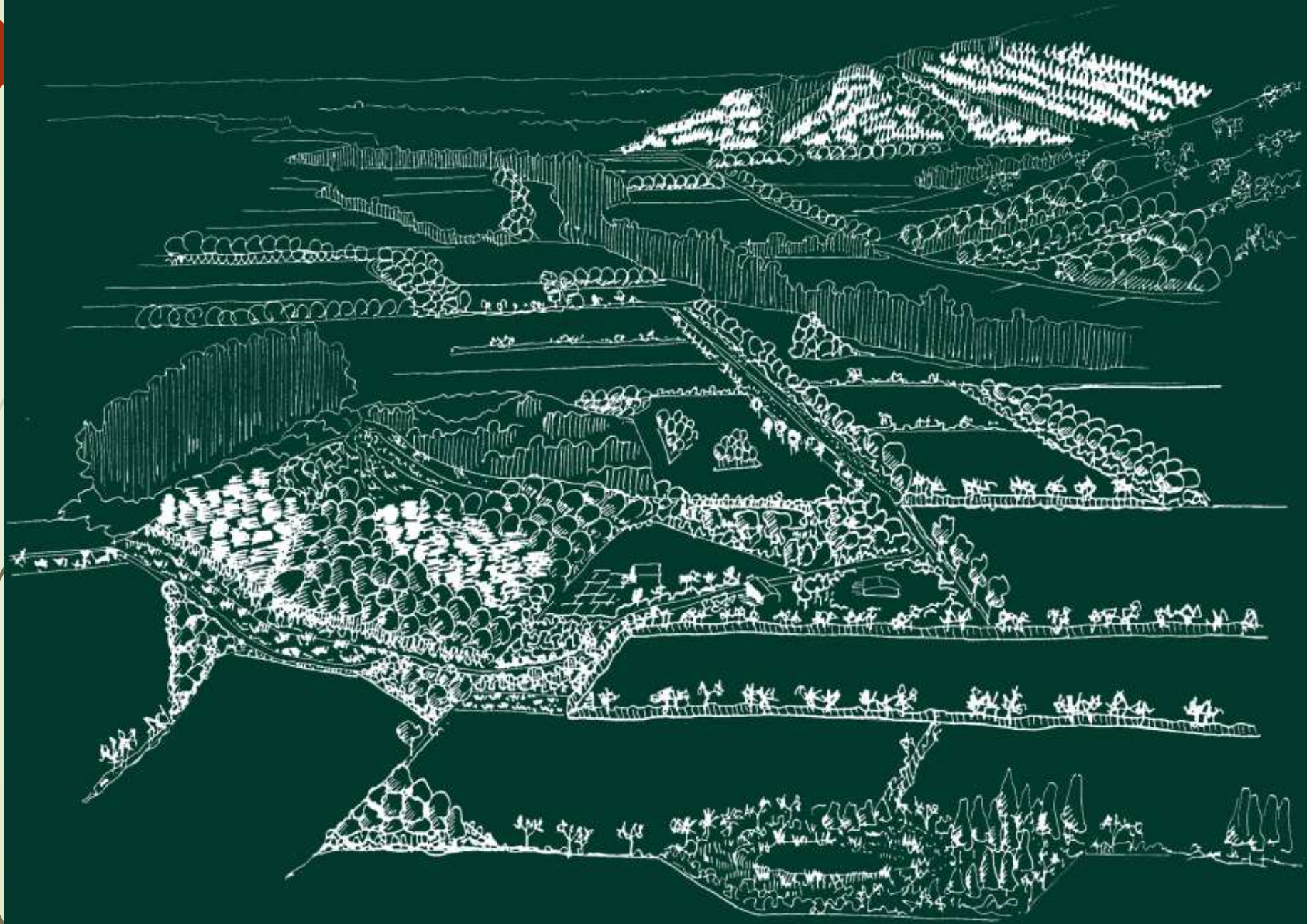


# Contemporary Dysfunctional Rural Landscape

Largely exotic trees – invasive &/or low wildlife value



# Prospective Integrated Functional Landscape



**Simon Swaffield  
drawings**

# Classic English countryside – model/exemplar for healthy cultural landscapes



Hedgerows, woodlots, natural forest patches, no tillage, mixed crops/pastures, rural & urban wild – not 'tidied' to an inch of its life

**But with The NZ noble NATIVE TREES for identity, carbon, wildlife & harvest**

totara, matai, rimu, miro, kahikatea, kauri, pokaka, hinau, kowhai, kanuka, tawa, taraire, rata, horoeka, pahautea, kawaka, tanekaha, pukatea, karaka, kohekohe, beech, houhere, manatu, rewarewa, mangeao, maire, kaikomako, tarata, tawapou, tawheowheo, raukawa, towai, turepo, swamp maire, toru, puriri, kamahi

**Species – depending on where you are**

**Muehlenbeckia complexa hedge, displaced gorse, for butterflies, lizards & bush birds**



**Simple exotic conifer hedge only good for insectivores**



**Visibility is Key to conservation culture**



**Species Richness, Simplicity & Biodiversity – in the rural corridor**



# Native NZ perennial plants under vines?



Shields et al. 2016

Left: *Acaena inermis* 'purpurea',  
Right: *Hebe chathamica*  
Photos: Jean Jack



Phacelia &  
Buckwheat  
Biocontrol hosts



Islands/Oases  
of Native  
habitat - food  
for wildlife,  
sources for halo



# Portals; Avenues; & Plains water corridors this is our NZ-Aotearoa



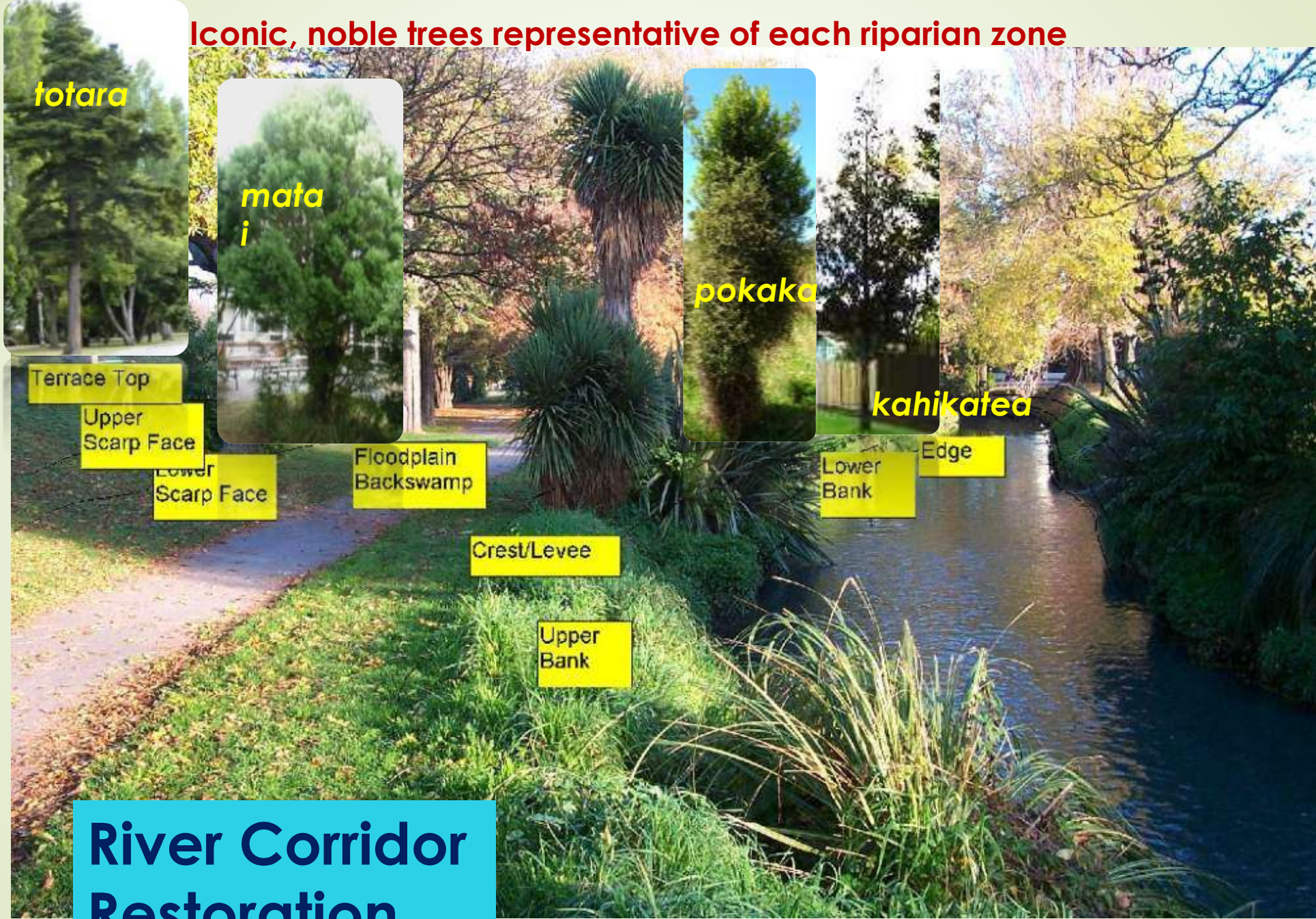
Water races – one of  
our most threatened  
& crucial habitats



Rare koura



Iconic, noble trees representative of each riparian zone



*totara*

*matai*

*pokaka*

*kahikatea*

Terrace Top

Upper Scarp Face

Lower Scarp Face

Floodplain Backswamp

Crest/Levee

Upper Bank

Lower Bank

Edge

**River Corridor Restoration**

# More texture, shapes, 'palms' & scrolls



Extreme Hedging 😊



**Landscape Design  
to celebrate iconic  
forms of  
NZ-Aotearoa-  
Canterbury-Otautahi**



# Future-proofing: Repairing the damage ... iwi action; TAK, WET; Otamahua, connecting people to nature & each other



Restoring the  
habitat,  
the landscape,  
the soul,  
the community,  
the village !



# Protection & mulching important in establishment – something poetic



# Taitapu Sculpture Garden



## Art & Ecology

Colour, form, texture  
talking to the plants



# Legibility – window to the ‘Fires of Tamatea’



# Recapturing all Heritage Legible Cultural Markers



**Pegasus –  
Kaiapoi Pa**



**Mahinga Kai Exemplar**



# A Maslow-like hierarchy of Ecosystem Restoration needs

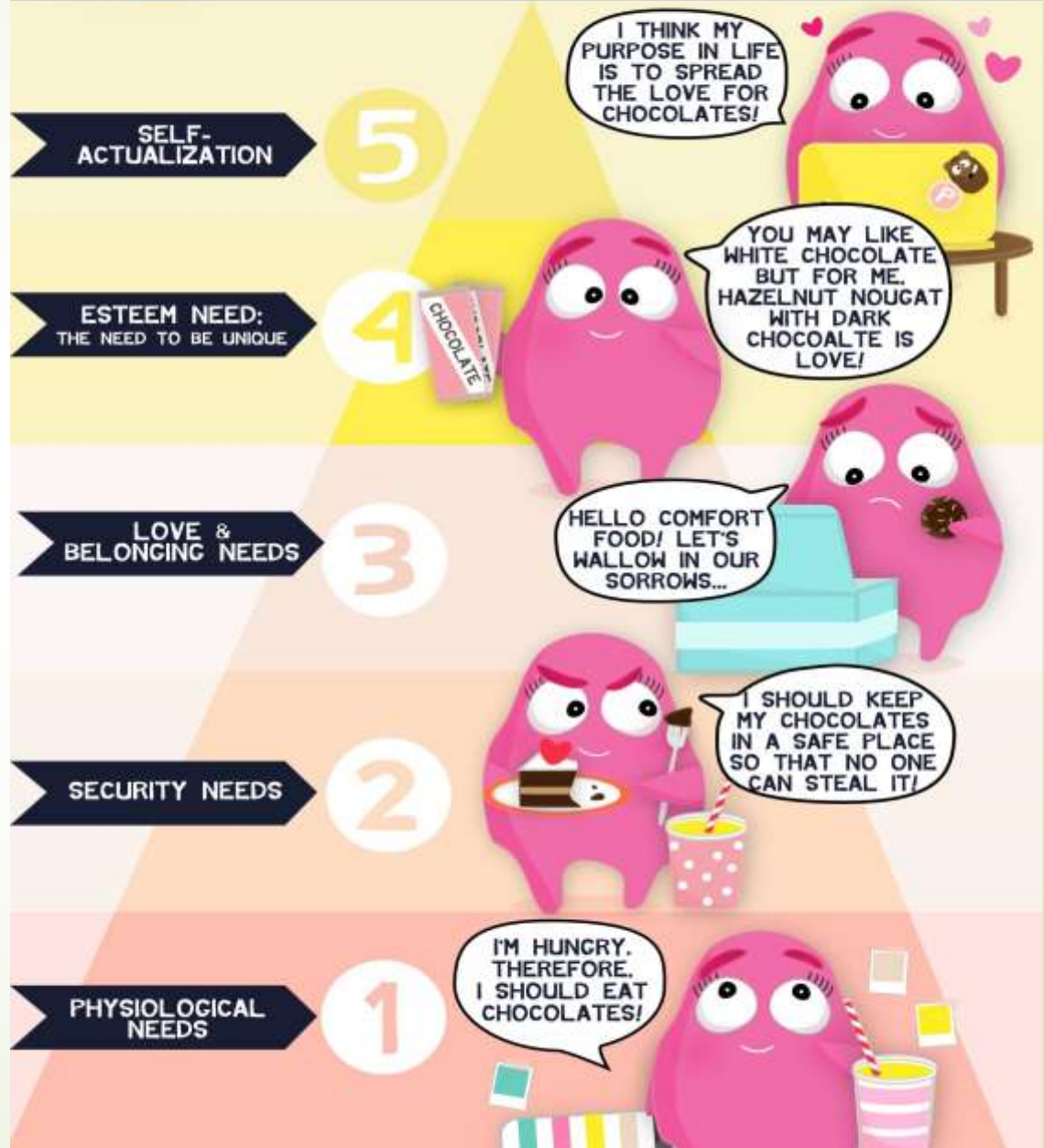
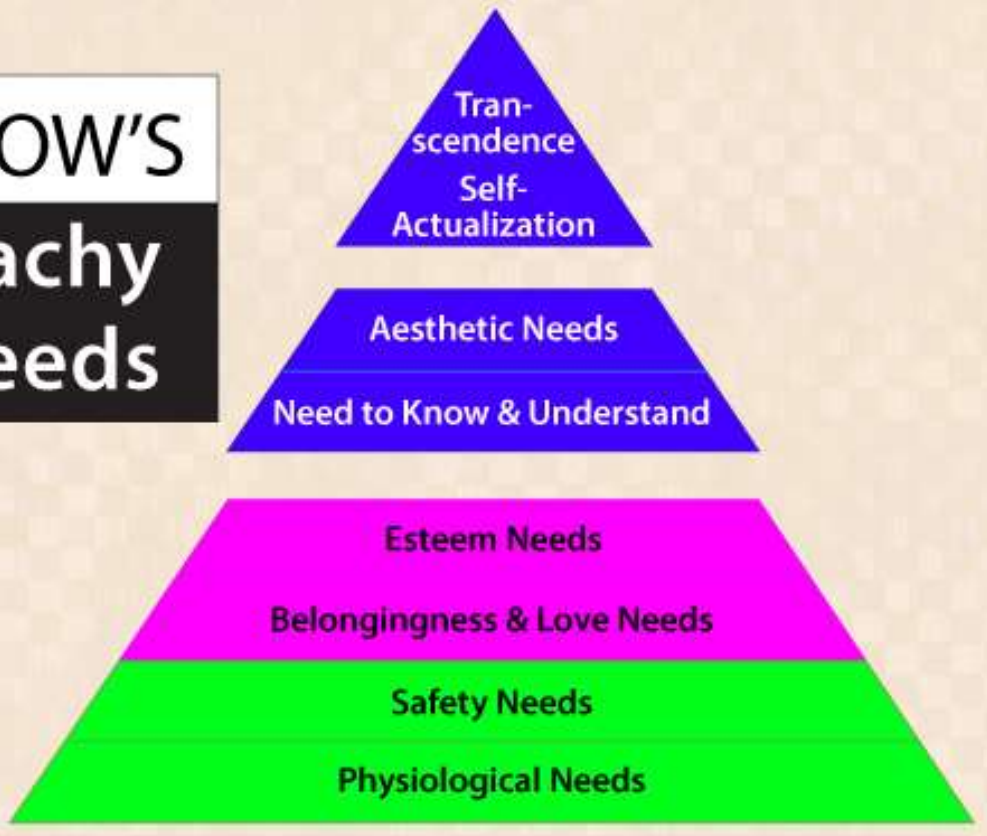
Understanding our Place in the Bio-Noosphere



# MASLOW'S HIERARCHY OF NEEDS & CHOCOLATES

© www.googlygooeys.com, 2012.

## MASLOW'S Hierarchy of Needs



The Parallel & Mutual Universes of **Tree/Forest & Human needs** - as sentient but interdependent parts of the ecosystem

**The Landscape  
Conservation Progression  
is Painted & Revealed  
& We are in the Frame !  
Interwoven Ecosystem &  
Human Needs**

Transcendence,  
Cultural/Spiritual/Art/Acting  
for Connected Biosphere & Village

**& all below rising  
to the top**

Deep Multi-  
Dimensional  
Connections

Understanding in  
a Spatial Context

Love/Bonding

Safety/Surety

Basic Needs/  
Components

Deep Understanding, Revelation, Ecological Literacy,  
Matauranga Maori, Scaling to Sanctuary & Landscape,  
Identity/Sense of Place

Caring, Maintenance, Kaitiakitanga, Pests, Enrichment,  
Physical Connection, Mutual Benefit - Forest Bathing

Protection>Regeneration>Restoration - spp Selection, Eco-  
Sourced Supply, Stage 1 Placement, Planting Technique

Basic Grimean Ingredients of Species/Niches, Env'tal Stress & Disturbance

# What can we do in mid Canterbury Low Plains?

- ▶ A vision for a sustainable future
- ▶ Integrating natural heritage and production
- ▶ Need buy-in from both farmers and wider public
- ▶ Avoid removal of remaining primary vegetation (that which has not been cultivated) unless survey shows it really has no natural value – eg areas of exotic sward grass mono-culture
- ▶ Where development is to happen, maintain 50-100 m wide visual corridors along highways of remnant or restored native tussock and shrubland – especially to fore of view lines
- ▶ Over time establish native shelter and boundary plantings
- ▶ Contain & progressively constrict wilding conifers, birch, sycamore, rowan, alder, grey willow, cotoneaster, barberry, broom, gorse, lupins, ivy,
- ▶ Gradually displace dense stands of conifers and deciduous exotic trees by interplanting totara, matai, broadleaf, kohuhu, kanuka, kowhai, tarata, narrow-leaved lacebark, etc.

# In Summary

## Many ecological solutions to biodiversity crisis in cultural landscape ... multi-dimensional/inclusive city

- Share power – **Biodiversity Partnership** (recombinant ecosystems with **ecological integrity of indigenous component**)
- **Legible Landscapes** – visibly reflecting history, environment, pattern, process, space and natural character.
- **Te Tiriti** – weaving resilience
- **Winning hearts & minds** achieving **ecological literacy** ...
- **Nassauer's tidy frames** (edges) around ecosystem messiness/functionality
- The **edginess & succession of nature** - from control to understanding to creativity
- **Mainstream** (ecologically & culturally) if it is to survive biological extinction, must **reverse extinction of experience & NDD** & achieve landscape **connectivity, integrity, legibility & kindness!**
- **A National Park City?**
- **Transcendence**



Tui on  
harakeke  
by David  
Cook