



Whakahaumanu
Ngā Awa ā Pākihi

Braided River Revival

BRR presentation to U3A; “Re-wilding Canterbury”



Nō hea au

- Personal background
- University, Freshwater Ecology, Botany, Music degree
- Ecology Field worker, Restoration Wai-Ora
- Regional Park Ranger
- Team Lead Braided River revival

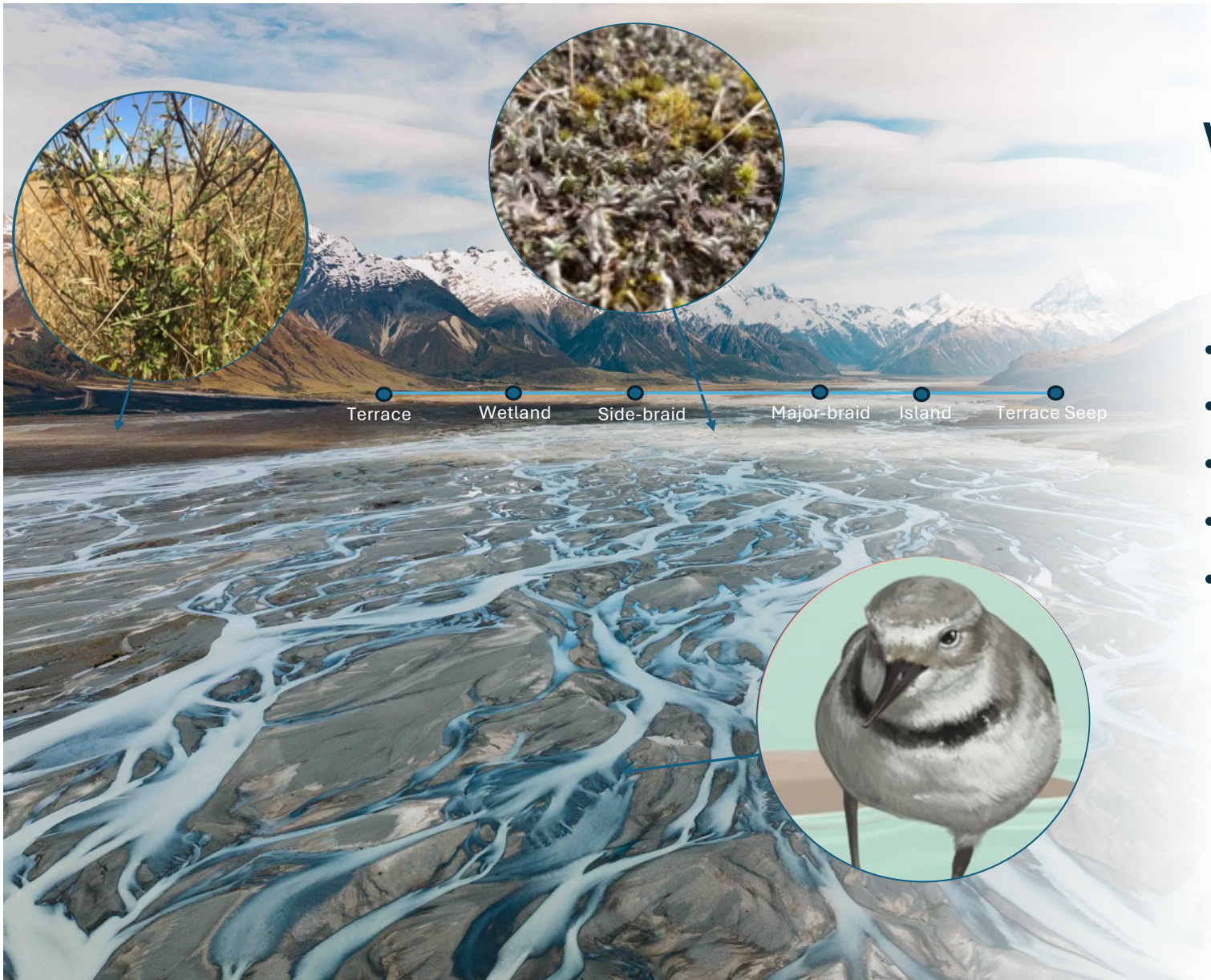
A wide, braided river system flows through a valley. The river is composed of numerous small, interconnected channels of light blue water, creating a complex, web-like pattern on a dark, sandy or silty bed. In the background, a range of rugged mountains with significant snow cover stretches across the horizon under a sky with scattered white clouds.

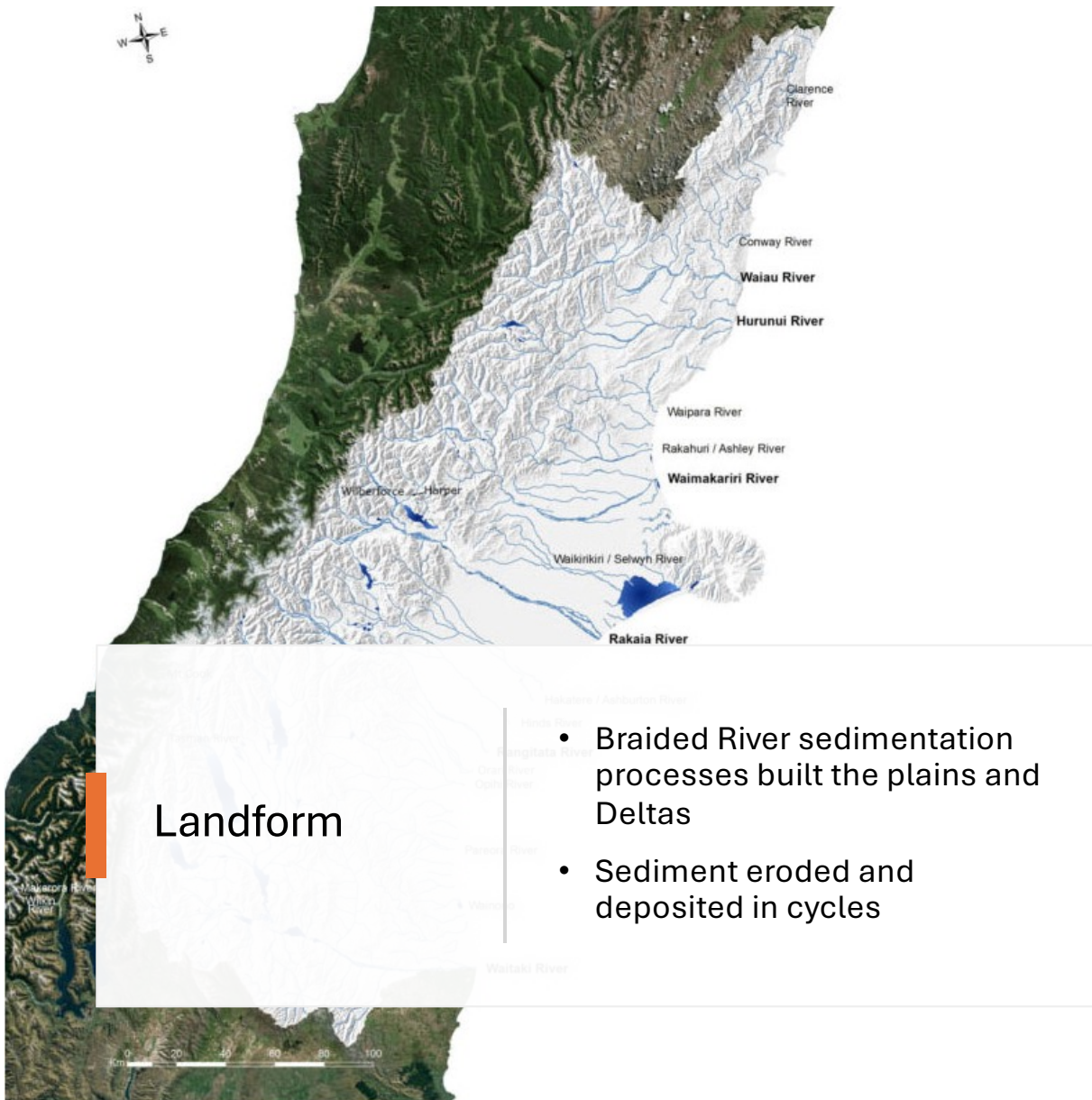
What is a braided river?

- Beautiful and unique
- Fascinating geomorphology
- Flora and fauna – high endemism
- Numerous obligate species

What is a braided river?

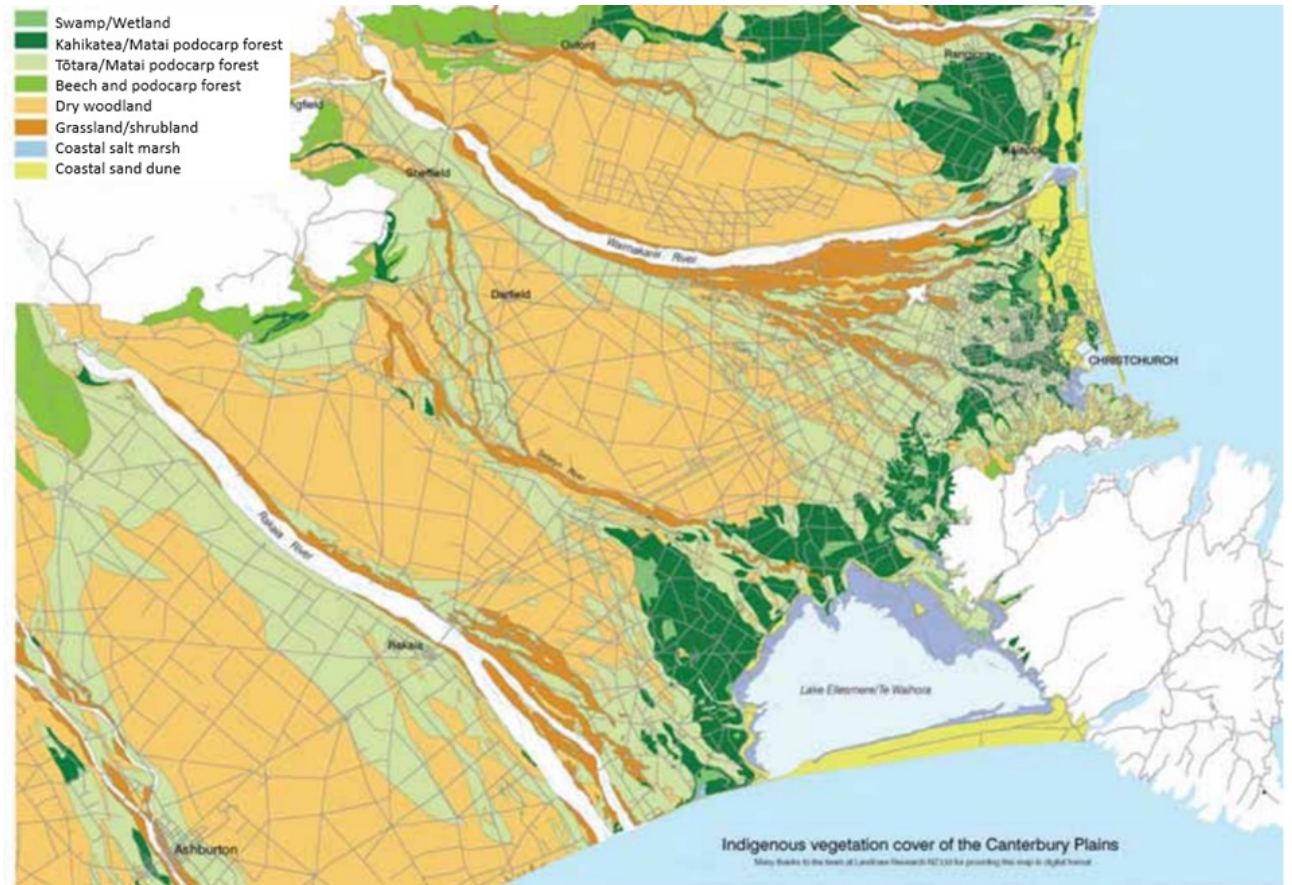
- A mosaic of habitats
- Transient across a braidplain
- More often disturbed habitats
- Less often disturbed habitats
- Connected with all freshwater bodies within their catchments including tributaries, wetlands, springs and groundwater systems.

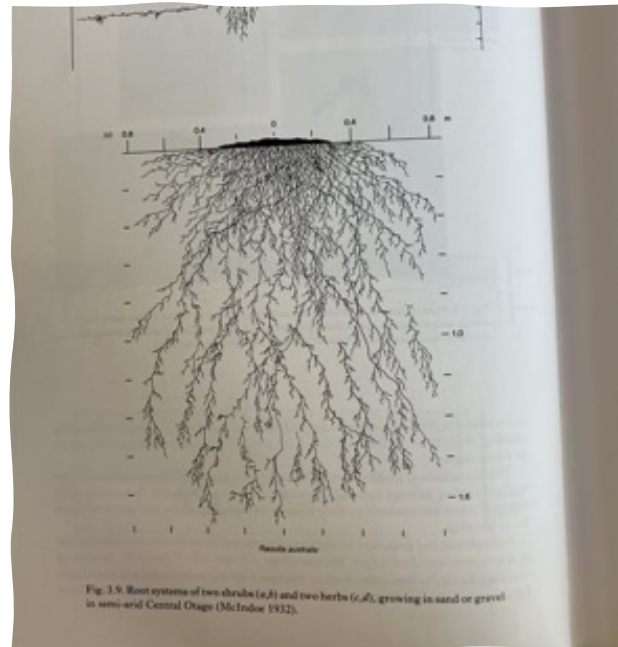




Seral stages and ecological succession

*The pre-Polynesian vegetation of the dry Canterbury Plains (average annual rainfall is about 800 mm) is thought to have consisted of lowland podocarp-broadleaf forest on deeper soils, kānuka (*Kunzea ericoides*) shrubland on stony, free-draining soils, and some grassland primarily on disturbed sites (Molloy and Ives, 1972; McGlone, 1989; Wardle, 1991)*





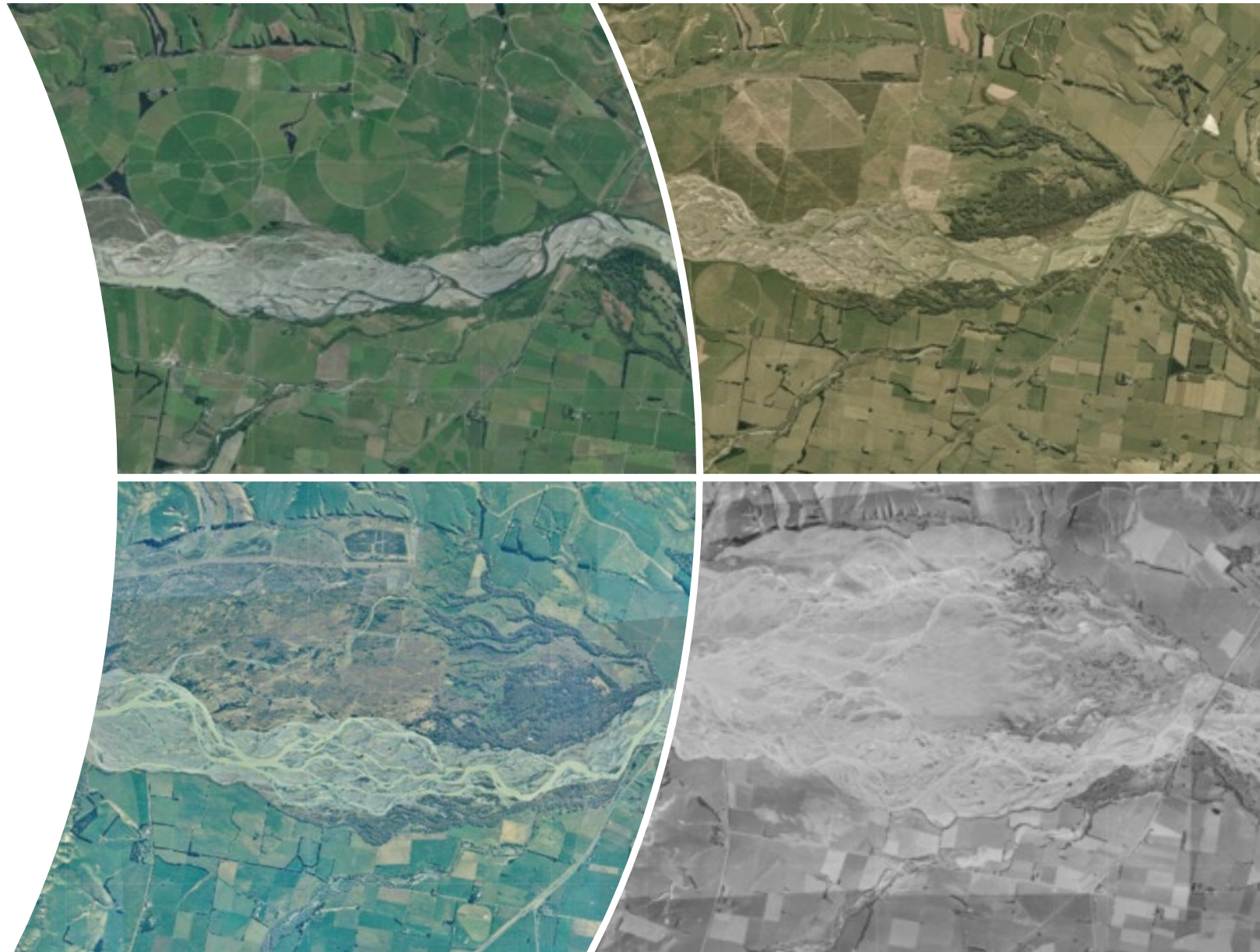
Native and non-native nutrient fixers, bacterial symbiotes and insane root-depth species

Braided river habitat adaptations



Our land-use history

- Narrowing of the braided rivers; and emphasis on production. (“*Marginal lands act 1950*”)
- Flooding and management
- Weeds and their management
- Native species and their management





**WRIGHT'S CUT WILL
BE ENOUGH TO HOLD
THE WAIMAKARIRI.
MR JAS. STEWART SAYS
LOWER CUT NOT NEEDED.**

Work above White's Bridge, and especially the proposed cut through Wright's property, is regarded as absolutely essential in connection with Waimakariri River protection by Mr James Stewart, whose views on the subject are based on a life-long knowledge of the stream and its vagaries. But Mr Stewart is opposed to work below the railway bridge, and he is, in his opinion, unnecessarily, in his opinion, for several reasons, the principal one being that from Stewart's Gully to the river there has not been a flood for many years that has done any damage whatever.





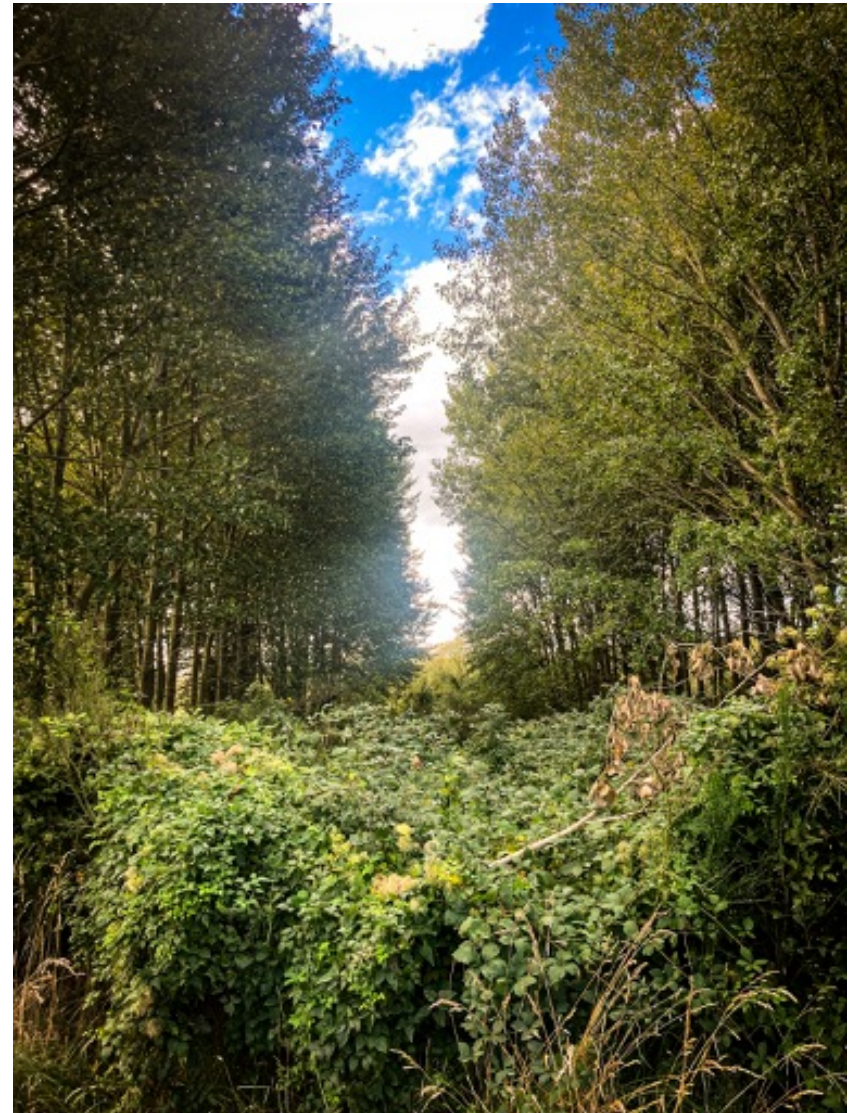
Flood protection Infrastructure



Tree lines – Land mgmt. for flood protection

- Expendable frontline
- Defensive reinforcing
- Productive landuse
- (the lower reaches)

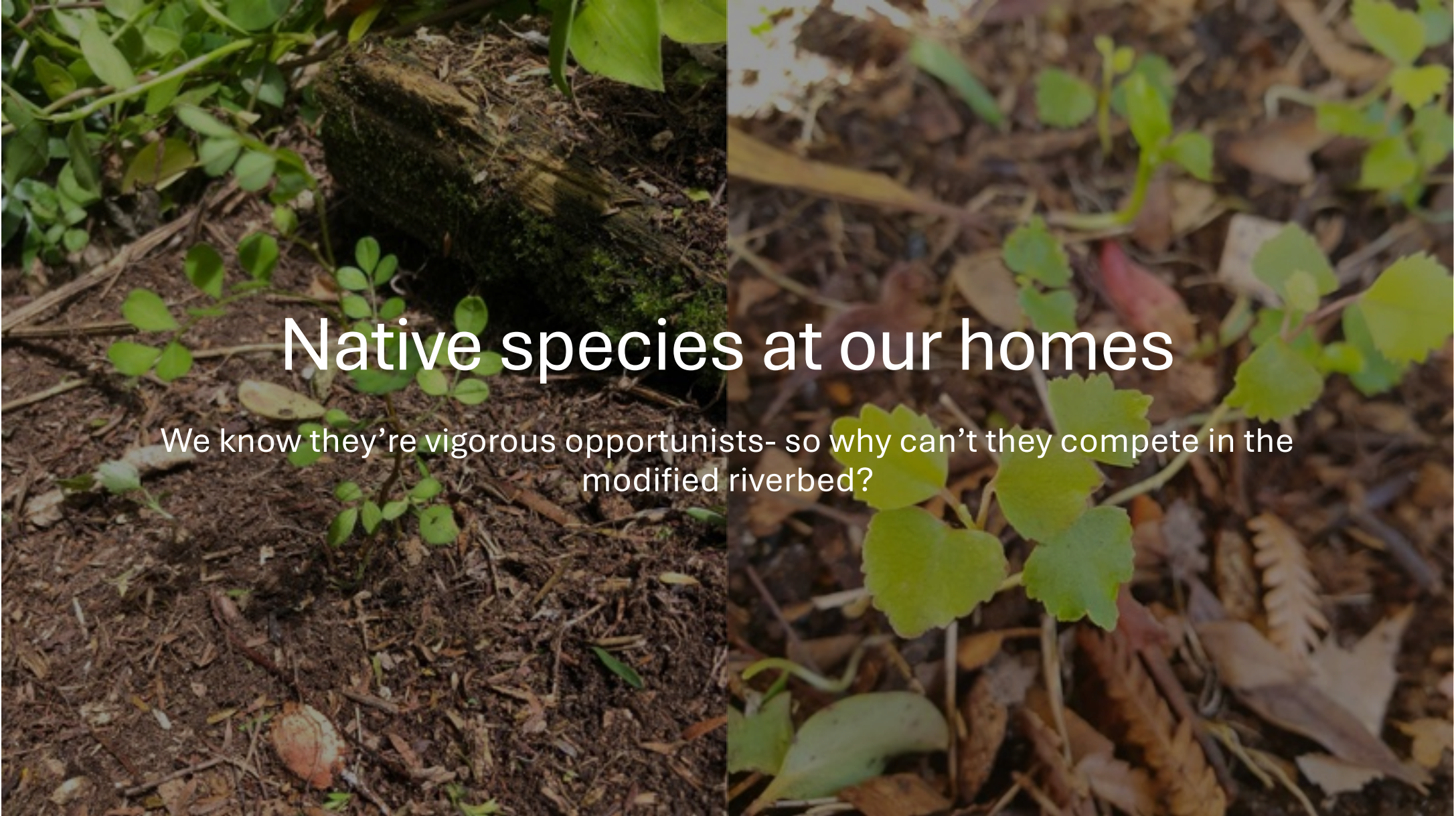
High-light, High-disturbance Modified Braided River Berms



Resulting disconnection of ecological processes

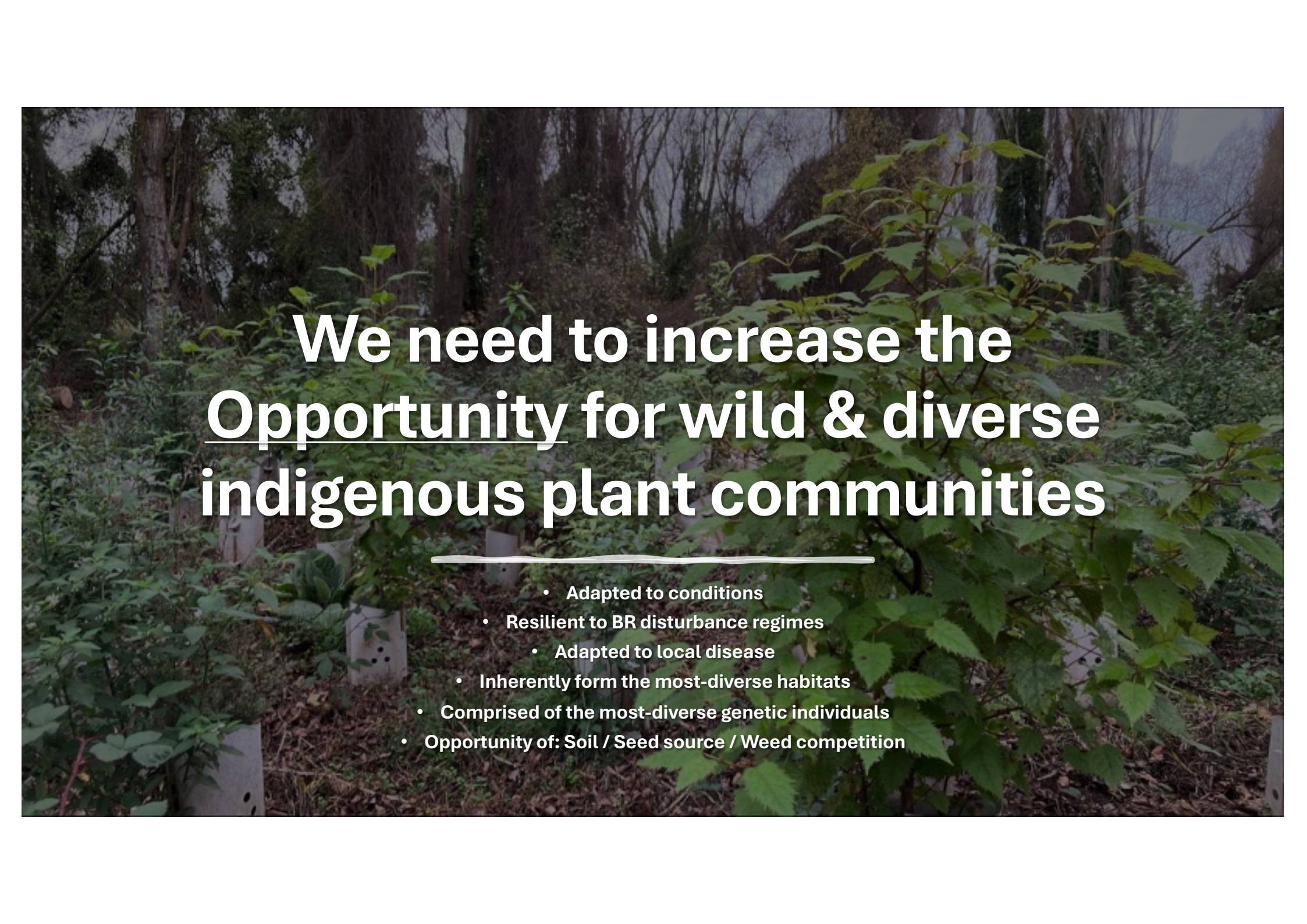
- Soil thing was **slow** now fast,
- **Statures** were typically lower, now taller and more rapid.
- Huge seed sources were cleared or removed
- 90+% habitat reduction for forest cover and wetland extent.





Native species at our homes

We know they're vigorous opportunists- so why can't they compete in the modified riverbed?



We need to increase the Opportunity for wild & diverse indigenous plant communities

- Adapted to conditions
- Resilient to BR disturbance regimes
- Adapted to local disease
- Inherently form the most-diverse habitats
- Comprised of the most-diverse genetic individuals
- Opportunity of: Soil / Seed source / Weed competition

Colin D. Meurk* and Graeme M. J. Hall
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*Author for correspondence (E-mail: meurkc@landcareresearch.co.nz)

Street/playground
Noble Tree Grove

10 m
10 m
0.01 ha

Neighbourhood
Habitat Patch

125 m
25 m
25 m
Core 0.06 ha
Total area 1.56 ha
Buffer zone
skin

District/Suburb
Core Sanctuary

250 m
150 m
150 m
250 m
core 2.25 ha
Total area 6.25 ha

Upper headwaters

- High naturalness
- Landscape scale weed control

High country & foothills

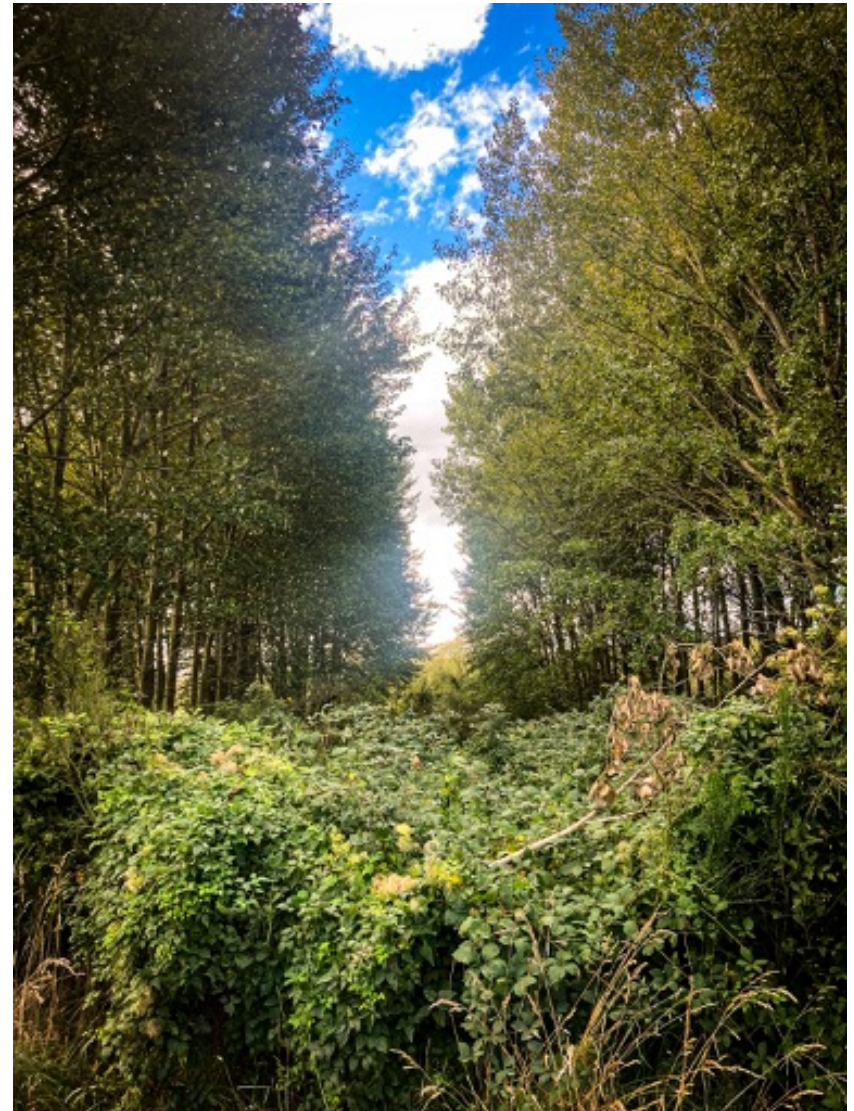
- Mixed and patchy
- Landscape scale weed control + reserve management

Plains reaches

- Low naturalness and scattered remnants
- Reserve creation
- Establish corridor

Encourage and enable wild seed movement from high-naturalness areas into created reserves.

High-light, High-disturbance, highly modified Berms

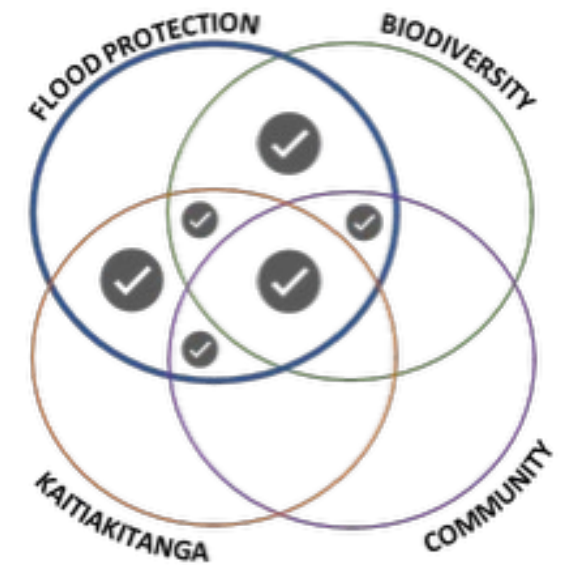




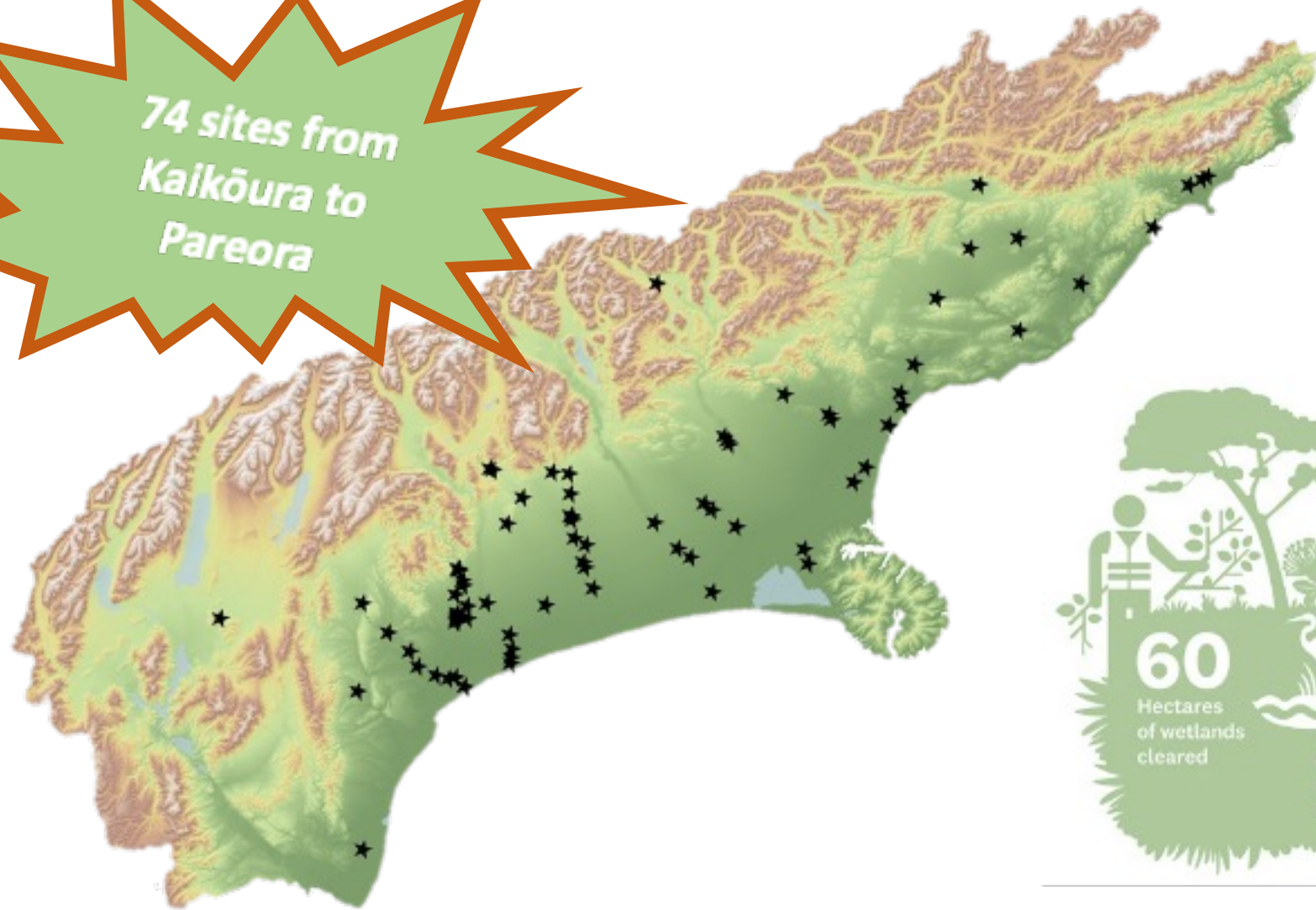


The Berm Transition Project.

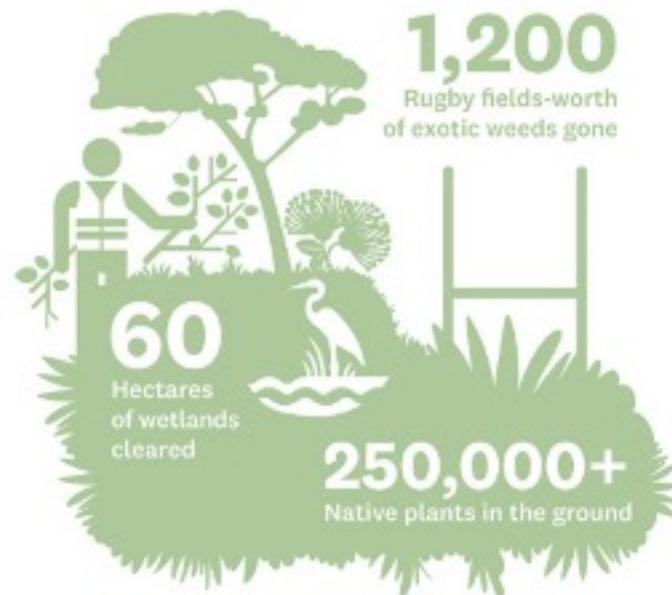
Jan '20 – Dec '23



*74 sites from
Kaikōura to
Pareora*



1,200
Rugby fields-worth
of exotic weeds gone



The sub-canopy planting Strategy

Where wild seedlings occur in the berm they are often on edges or driplines.

Where juveniles persist and establish they are usually in the leeward/sheltered side of existing stands.

We began to copy this and found the same was true for planted seedlings.

This became “sub-canopy planting”, the planting specification for Berm transition.



Figure 7: Example of block planting arrangement amongst poplar and willow on the Ashburton River (photo: September 2022)

Sub-canopy planting - Objectives

WHAT

- Applied restoration work to berm conditions

WHY

- Support flood protection vegetation
- Reduce Berm weeds and management cost
- Enhance Berm habitat - diversify
- Improve amenity and facilitate public engagement

HOW

- Targeting soil, cover (protection) and remnant seed sources



Figure 6: Example of row planting arrangement amongst flood protection tree rows on the Ashburton River (photo: September 2022)



Figure 7: Example of block planting arrangement amongst poplar and willow on the Ashburton River (photo: September 2022)





Selwyn 01, August 2022



Selwyn 01, February 2025



Selwyn 02, August 2022



Selwyn 02, February 2025



Ashburton 02, October 2022



Ashburton 02, March 2025



Upper Hinds 29 August 2022



Upper Hinds 27 March 2025





Opihi SH1 30 August 2022



Opihi SH1 26 September 2024

Lloyd road Orari November 2023



Lloyd road Orari April 2025



Ashburton 06, August 2022c



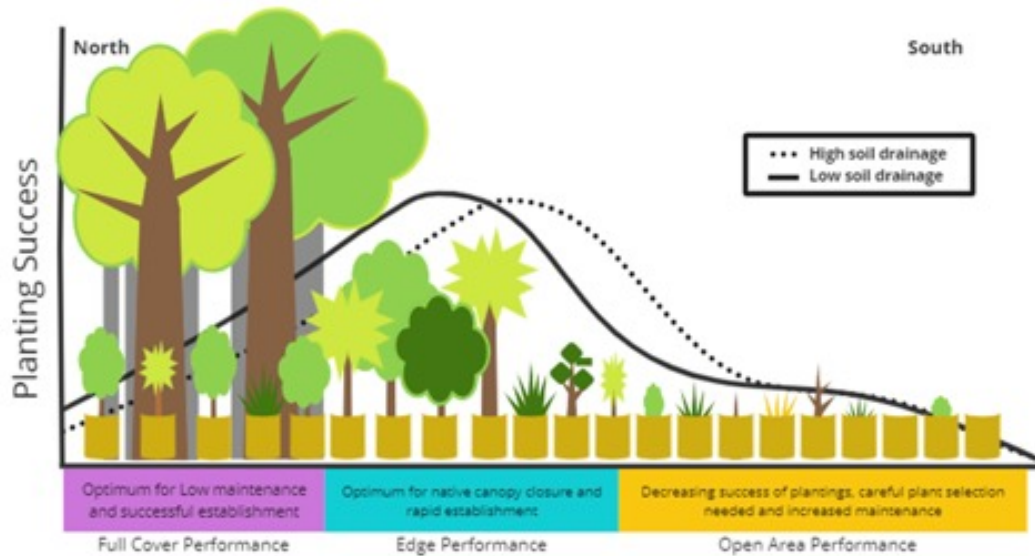
Ashburton 06, March 2025



Orari '25



Sub-canopy planting - Outcomes



- Two zones for two timeframes for different immediate objectives: Edge Work planting and Full Cover Planting
- Edge-work planting achieving near canopy closure after 2.5 years
- New weed-free areas supporting native function

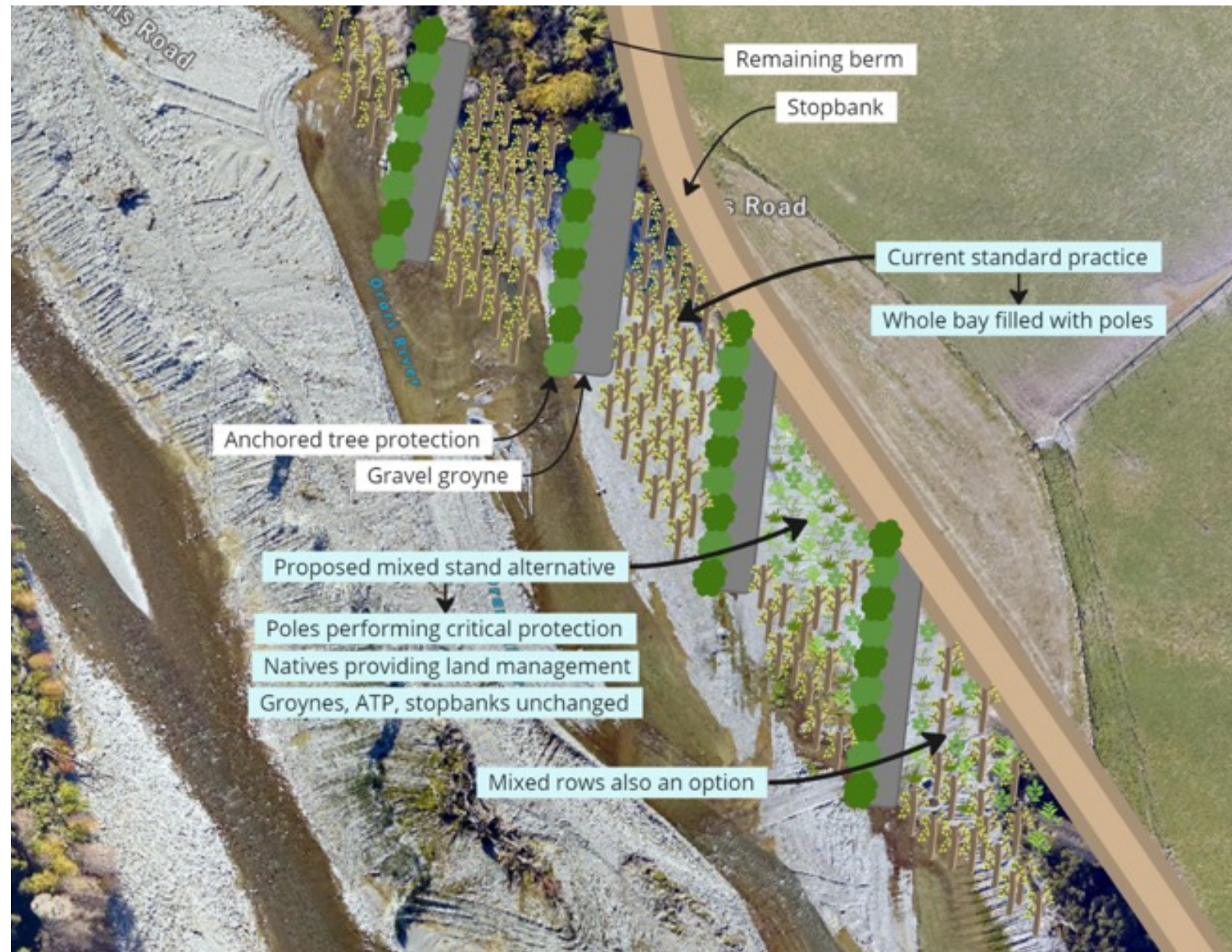


Front-line protection



Scour Bays – Native Plants as Flood Protection Assets

- Developed a novel technique for installing natives into river gravels
- Will increase resilience of flood protection assets while also adding biodiv. values
- With this method will be able to reduce the number of willows used outside of critical protection







A photograph of a forest floor. A tree trunk with rough, grey bark is on the right. At its base, there is a dense cluster of green plants, including ferns and small leafy seedlings. To the left of the tree, a single green seedling with several pointed leaves grows from a mossy log. The ground is covered with brown, fallen leaves and twigs. A person's hand is visible in the bottom left corner, holding a small object.

Recruitment and regeneration monitoring,
new measures of success; new economic plant options



Lots of recruits

Rakahuri, multi-value project August-September 2025

Improved braiding opportunity

Decreased weed density

Increased habitat value for *Lycaena tama*

Overall Improved conveyance & natural character



Flood protection + Habitat creation





Variation in understorey floristic composition regeneration and fire hazard under *Acacia* invaded forest canopy in New Zealand

Md Azharul Alam^{*}, Timothy J. Curran, Jon J. Sullivan

Department of Pest-management and Conservation, Lincoln University, Lincoln 7647, New Zealand

“...Acacia species and other exotic species at the sites were comparatively higher in flammability than most of the native species in the area and can potentially increase the flammability of the invaded forest area if not managed appropriately.”

Beneficial insects guide

Case study: Native planting around arable land



Canterbury farmer & native forester,
John Evans.

Farm profile

Location	Ashburton, Canterbury
Farm type	Mixed arable
Farm size	271 hectares

Native planting profile

Native planting area	2.5 ha
Native planting began	2011
Native planting location(s)	Started around an irrigation pond margin, then distributed across difficult-to-manage areas (corners, edges, wet patches, shelter belts) to form linked habitats
Native planting approach	Started small and expanded over time

Motivation for planting natives

John began planting after taking part in a Trees for Bees programme, starting on the margin of an irrigation pond because it was difficult to crop and manage. The initial planting focused on plants attractive to honey bees. The following year he planted the other half of the pond's edge with native species selected to support a wider range of beneficial insects, then continued adding small plantings in difficult-to-manage areas so they linked up across the farm. The aim was to create connected habitats and floral resources for beneficial insects and support pest control in the cropping system.

What worked well

- Accessing expert advice early to select plants associated with beneficial insects
- Using sleeves so herbicide could be used around seedlings for early weed control
- Using trickle irrigation at the pond site for the first 2 years to help plant establishment.

What we learned along the way

- Weed control is the biggest challenge early on; grass competition can quickly dry out and outcompete young plants
- There is a 'messy middle' before canopy closure when weeds persist but spraying becomes more complicated.

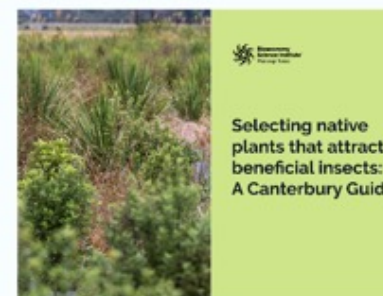
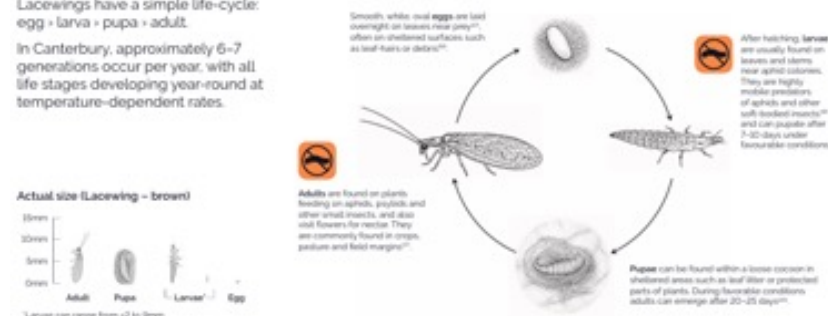
"You've got to get used to weeds until the canopy closes over...there is an end, it does work."



Life-cycle (Lacewing – brown)

Lacewings have a simple life-cycle: egg → larva → pupa → adult.

In Canterbury, approximately 6–7 generations occur per year, with all life stages developing year-round at temperature-dependent rates.



Selecting native plants that attract beneficial insects: A Canterbury Guide

Download the guide

[Find out more](#) →



You can find our reports

- Recruitment monitoring/ planting success and strategy, weeding success and strategy, Annual project reports et al – on our website: [Whakahaumanu Ngā Awa ā Pākihi \(Braided River Revival\) | Environment Canterbury](#)
- Also can see previous presentations: [presentation to resilient rivers group](#)





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