The use of willows in the rivers of the Bay of Plenty region, New Zealand

Presenters

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Introduction

Vegetation along the river margins:

- A buffer of vegetation along a river bank provides:
  - A soft edge that absorbs flood waters.
  - Deflection of strong currents from the river edge.
  - Root strengthening of the banks.

Introduction (cont'd)

  - A vegetated zone to absorb erosion.
  - Easy re-establishment to reclaim losses.
- It provides a flexible boundary and a management zone between the active channel and human assets.

Introduction (cont'd)

WILLOWS & POPLARS

Willows and poplars are used extensively along New Zealand river banks as they:

- Establish easily;
- Are fast growing;
- Can be managed as an edge vegetation buffer.

On-going management is, though, essential, because of its characteristics

Key attributes of willows

- River edge plant tolerant of wide range of conditions.
- Grows rapidly even in poor soils and gravels.
- Fine fibrous root mat that stabilises land.
- Grows from small cuttings to buried trunks.
- Sprouts and grows quickly while producing a large number of fine roots.
- Wide range of species and varieties available.

Activities that utilise willows

- Flood damage repairs – quick method for repairs with immediate growth.
- Live groynes as anchored/trenched trees.
- Reclaiming active channel with live transplanted willows and pole planting.
- River bank strengthening by layering/topping.

Activities that utilise willows (cont'd)

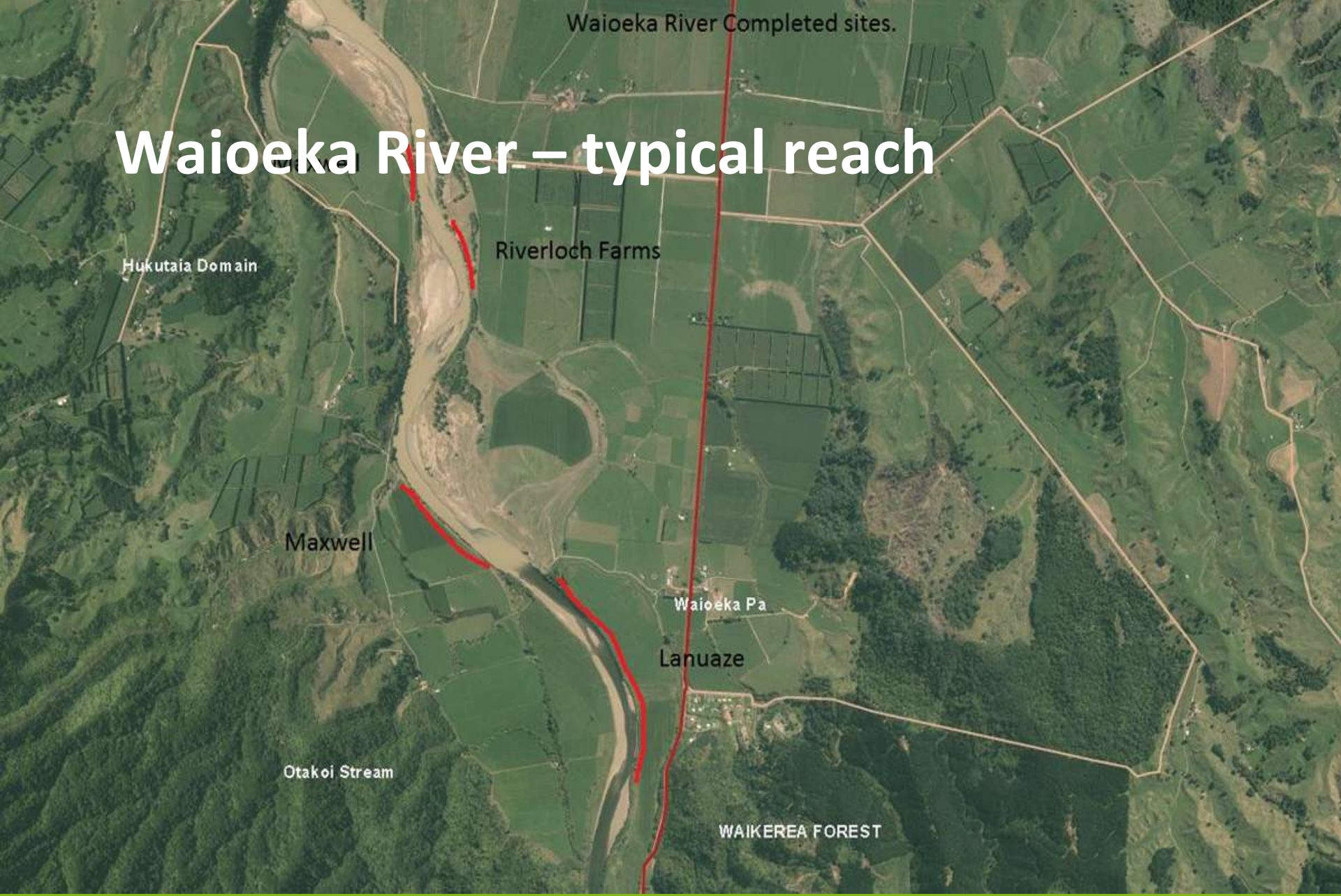
- Maintaining diffuse boundary and slow berm velocities.
- Maintaining protective buffer zones and riparian planting.

Beneficial effects of willows along river margins

- Reduced lateral erosion.
- Improved meander alignment and reduced channel distortions.
- Vegetation cover at the river edge.
- Reduced sediment input from bank erosion.
- Natural filter of debris and suspended load.

Examples

- Waioeka River
- Waimana River
- Whakatāne River
- Rangitaiki River



Waioeka River – typical reach

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Lanauze site – post 2010 flood

Front line vegetative protection and stop bank severely damaged

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Lanauze site – prior to repairs

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Preparation works at site

Included – stop bank reposition; bank battered to 4:1; rock stubb groynes; willow trench groynes; willow planting

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Lanauze site completed
(October/November 2013)

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Waioeka River – Lanauze at February 2014

Note: Willow groynes, stubb rock groynes, plantings

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Lanauze – February 2014

Note: Willow growth of groynes and layered willows

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Pole planting – erosion repair site

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Typical bank erosion — prior to pole planting (August 2013)

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Pole planting site at present (December 2013)

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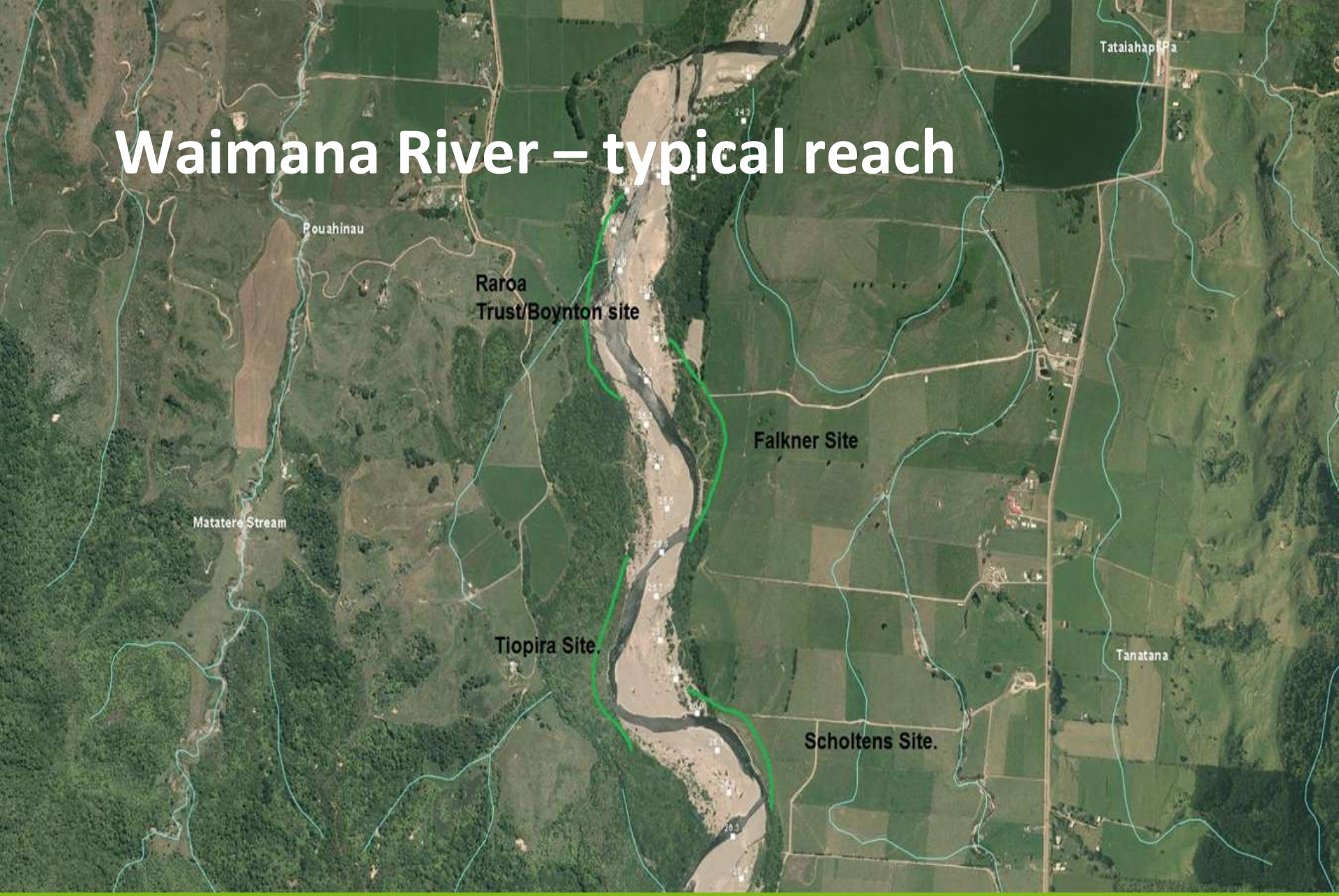
Waimana River – typical reach



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Falkners site – post 2012 flood

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Falkners site – prior to repairs

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Repair works

Includes: rock groynes, willows, rail irons and wire rope

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Waimana River, Falkners site – at present

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Whakatāne River – post 2012 flood

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River bank erosion and meander mis-alignment – prior to repair works

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Repair works completed

Works include: trenched willow groynes and willow planting

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Whakatāne River – Watene (February 2014)

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Rangitaiki River, Penitito – post flood damage repairs (2010)

Note: entrenched river channel

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Rangitaiki River – Penitito site

During works (November 2013) – benching/lowering river bank for rock toe strengthening/willow planting

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Completed works – rock toe strengthening benching and willows - December (2013)

Note: Willows have been mulched on opposite bank

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Rangitaiki River – Penitito rock toe lining and willow planting (February 2014)

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Penitito site (February 2014)

Note: Willow pole growth and mulching on opposite bank

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Examples

Willow maintenance

Willow layering over flood damage

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Willow topping and layering

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Mulching willows – to reduce height/weight allowing rejuvenation of trees

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Large willows causing toppling concerns - being topped/mulched

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Willows programmed for mulching / layering – upstream following slide

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Rangitaiki River

Typical reach – willows layered/mulched plus sites planned for same works

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Comparison foreground topping/ mulching 2012 - background not topped

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Beneficial effects of willows along river margins

Summary

- Reduced lateral erosion of river banks.
- Improved meander alignment and reduced channel distortions.
- Vegetation margin along the river and vegetation cover at the river edge.
- Natural tree lined river edges

Beneficial effects of willows along river margins (cont'd)

- Reduced sediment input from bank erosion.
- Natural filter of debris and suspended load.

Where to from here?

- Ongoing willow breeding programme?
- Improve disease resistance
- Consistency of application / outcome driven
- Wider (public and other agency) perceptions of willows vs natives

Dynamic tool in our toolbox