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INTEGRATED CATCHMENT MANAGEMENT
for the Motueka River

Integrated catchment management (ICM)

Integrating Research and Management in a Complex Catchment

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CAWTHRON
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Outline

- What is ICM?
- ICM for the Motueka River
- ICM as a process
- Info. management & uptake
- Collaborative learning
- Wrap-up and way forward

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Key messages

- Innovative & different approach
- Interdisciplinary
- Partnerships
- Stakeholders
- Issues analysis
- Takes time
- Build trust – relationships
- Dialogue important

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What is integrated catchment management?

An approach which recognises the catchment or river basin as the appropriate organising unit for research on ecosystem processes for the purpose of managing natural resources in a context that includes social, economic and political considerations.

ICM as a multi- dimensional partnership

…a way of thinking about community" interactions

ICM - definition

Integrated Catchment Management (ICM) is a **process** through which people can develop a vision, agree on shared values and behaviours, make informed decisions and act together to manage the natural resources of their catchment.

Various names are used (Total Catchment Management, Integrated Catchment Management, the Watershed Approach, Ecosystem Management) but they all share common elements - engaging stakeholders through a partnership approach, co-ordinating action across jurisdictions, systems thinking, and using a balanced approach to weigh concerns for sustainability against development.

ICM for the Motueka

Introduction

Map | Satellite map

The Motueka River catchment lies at the northwestern end of the South Island of New Zealand between 41°00' S and 41°45' S latitude, and 172°30' W and 173°00' W longitude.

Total catchment area is 2,170 km^2

The river delivers 95% of the freshwater inflow to Tasman Bay, a productive and shallow coastal water body of high economic, ecological and cultural significance.

The main stem of the Motueka rises in the Red Hills and flows for about 110 km in a SW-NE direction to the sea.

The river is joined from the east and west by a number of tributaries.

http://icm.landcareresearch.co.nz/

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Our catchment

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The major resource management issues in the Motueka include:

- debate over water resource allocation between different user groups, particularly horticulture and forestry;
- competition between in-stream and out-of-stream water uses, highlighted by the application in progress for a Water Conservation Order on parts of the Motueka River;
- water management issues arising from uncertainty about the degree and extent of linkages between surface and groundwater and how to manage these in an integrated manner;
- concerns about sediment and nutrient delivery into rivers from some land use activities, and the impact on the internationally renowned trout fishery in the Motueka River;
- the debate over aquaculture opportunities in Tasman Bay, with concerns about both the environmental impact of aquaculture and the potential impact of terrestrial land use on marine water quality and aquaculture.





Summary of issues & processes being addressed

The "big picture" questions are:

What maintains the productivity and biodiversity of the land and its associated waterways, the near-coastal and marine environment?

How do biophysical and socio-economic conditions affect productivity and biodiversity of the land, waterways, and the near-coastal and marine environment?

Resource management issues for all stakeholders can be grouped, for convenience, into six broad categories.

There is a strong element of linkage between most of these issues.

Resource management issues

- water quantity,
- sediment,
- water quality,
- aquatic ecology,
- riparian management, and
- Motueka Catchment – Tasman Bay interactions.

☐ Conceptual summary

"keeping a great catchment great"

The Motueka catchment, unlike many others in New Zealand or around the world, is in pretty good shape.

It is not broken, nor are the issues at a critical stage in terms of resource degradation.

A guiding philosophy of the research programme, our stakeholders and the community is thus to keep the catchment in good condition.

This leads to a management philosophy that:

"prevention is better than cure"

Future trends in the catchment

While it is always difficult to forecast the future, what is happening in the catchment now follows to some degree both national and international trends.

Some of these trends include:

- an increasing urban population
- a shift of traditional land use to lifestyle
- unknown impacts of climate change - increased variability
- increasing pressure on water resources
- increased environmental awareness
- increasing demand for additional service in tourism sector
- more partipatory governance/resource management

Communication/knowledge

Why develop this CD-Rom?

Integrated catchment management just doesn't happen.

One of the principles of an ICM approach is the development of a knowledge base for the catchment, i.e. the collection, organisation and dissemination of data, information, and knowledge about the catchment, resource use, issues, and people.

The purpose of the knowledge base is to promote information integration, synthesis, and delivery about integrated catchment management of the Motueka River.

This CD-ROM is but one of a number of ways that knowledge is being promoted.

There is also a web site, a technical report, an annual general meeting, and many other avenues for engaging in knowledge delivery and transfer between the many actors in the catchment.

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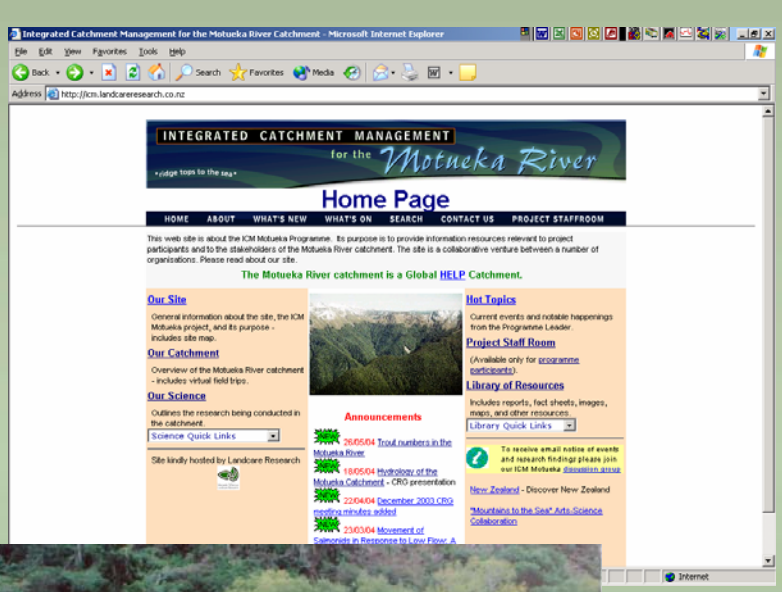
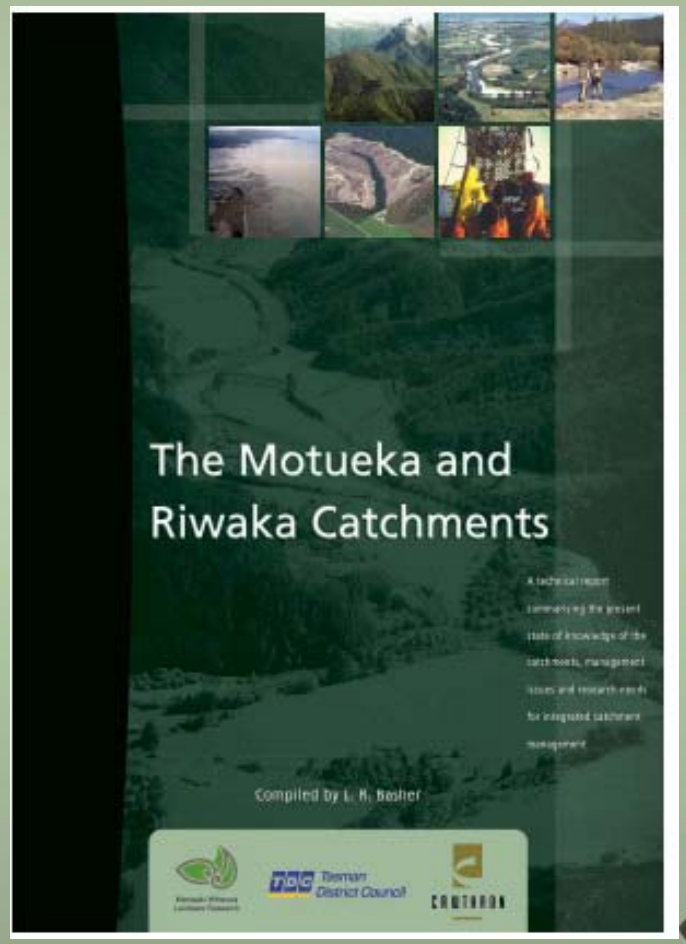
Communication/knowledge





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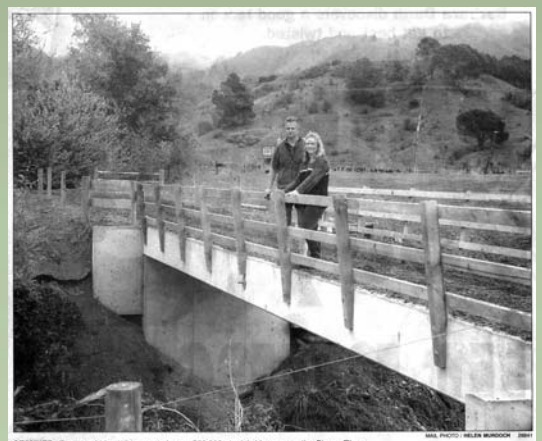
Successes so far – Water



SPANNED: Frank and Lisa White on their new $50,000 stock bridge across the Sherry River.

Bridge over troubled waters

By Helen Murdoch

Tomorrow's opening of a $50,000 stock bridge across the Sherry River marks the start of a combined project between farmers and the Tasman District Council to improve the river's health.

Dairy farmers Frank and Lisa White commissioned the concrete span bridge from The-In Construction to provide permanent access to 30ha of their 271ha farm.

Mr White said their 260-cow herd would no longer have to tackle the slippery steep-banked ford twice a day and the river would not cut off access to valuable grazing when it was in flood.

"Building the bridge has always been part of the farm plan," Mr White said.

The couple have owned the farm for about a year.

Mr White said the cows used to slip, fall and bump each other when they went across the ford.

Rising river levels had also led to stock being marooned in the paddocks away from the milking shed.

Mrs White said the Tasman District Council had helped with the project and waived resource consent and building consent fees.

The river was the subject of the first known national scientific study on the effect of cows crossing a waterway to and from milking.

The study, which included the use of video cameras, graphically illustrated the natural tendency of stock to defecate in water (5 times more likely than elsewhere), and the resulting high bacteria levels.

Council policy planner Martin Workm said the Whites' bridge was an example farmers taking positive action to protect environment.

Water quality monitoring of the river 2000 had identified high bacterial cou certain times.

Fish and Game had previously raised cerns about the health of the river before the monitoring, which was part of the Motueka integrated catchment project.

This involved the ... Andrews Research and other ... the impact of ... coastal mar...

NEWS

Water order praised

Fourteen years of negotiation over

By Bernadette Cooney

A decision to place a water conservation order on parts of the Motueka River has been applauded by Nelson Marlborough Fish and Game.

... Ward, said from Auckland today he was pleased to hear the order had finally been gazetted after 14 years of negotiation.

"There's quite a level of personal satisfaction in seeing this come to pass," he said.

"I congratulate Fish and Game and Nelson anglers for their dedication and ability to work through the issues, which certainly created a lot of misunderstanding early on. People thought we wanted to lock the river up and throw away the key."

... Marlborough Fish and ... welcomed ... sus-

... er Lewis Metcalfe said primary producers now had some assurance over access to a reasonable level of water flow for irrigation.

"Water is vital for the primary sector and the socio-economic well-being of the community. However, a balance had to be found between primary sector demands and the environment, and this is what has occurred," Mr Metcalfe said.

Ms Hobbs said the order would allow parts of the river to be kept in its natural state.

"The Motueka River has many outstanding characteristics, including the scientifically important karst geological formations, blue duck habitats and brown trout fisheries," she said.

"It is important that these characteristics and the river's other natural features are protected by the conservation order."

news extra

Farmers and scientists join up to sweeten the Sherry River

While farmers are frequently criticised for the effects of dairying on the environment, positive developments are often ignored. **Simon Towle** reports on work along the Sherry River in Tasman District, where farmers have joined forces with scientists and the district council.

Dairy farmers have traditionally locked horns both with local councils and Fish and Game New Zealand for contaminating the country's natural waterways. However, compelling science has now persuaded farmers in Tasman District to invest considerable effort and money to clean up the Sherry River in a case that could prove a model example for the rest of the country.

Even long-time dirty-dairying campaigner Bryce Johnson, director of Fish and Game, enthusiastically describes the project as "a ... of the envi-

... new information in December 2001, "the Sherry farmers undertook to take action. In a short period of time, the crossing on Frank and Lisa White's property where the experiment was carried out has now been bri... In addition, another farmer, Rod O'... is using a bridge instead of taking ... through the river."

He says two other bridges ... ning stages and substantial ... ing to keep stock out ... Tasman Distric... cial assistance ...

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Changing Course

What have we been doing?	What should we be doing?
Traditional Approach	Innovative Approach
Creating Impervious Surfaces	Minimizing Impervious Surfaces
Minimizing Buffer Zones	Maximizing Buffer Zones
Draining Wetlands	Creating Wetlands
Stormwater Piping	Detaining Stormwater
End of Pipe Treatment	Source Control
Point Source Pollution	Focus on Non-Point Source Pollution
Expanding Water Supplies	Controlling Demand (Water Smart)
Dealing with Single Pollutants	Cumulative Effects
Dealing with Single Wells & Supplies	Using a Watershed Framework
Creating Dams and Reservoirs	Demolishing Old Dams
Flood Irrigation	Innovative Irrigation

Summary

- Involvement of stakeholders
- Scoping the issues
- Knowing what we know
- Plan of action
- Implementation, monitoring & evaluation
- Always with big picture in mind
- Always aware of the connections

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The Q's?

- What's there?
- What's the condition?
- What are the functions?
- Can we do anything about it?
- What should we do, and where?
- What would the benefits be?

"where in the catchment should I start and what should I do first"

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The Big Question?

Can our New Zealand native plants perform E & SC functions as well as introduced plants?

In geotechnical terms, how do we quantify the benefits of vegetation to soil stabilisation?

What do we want from our plants?

- Rapid growth -->> surface cover
- Resilience/wide environmental tolerance
- Root depth - anchor plant
- Root spread – overlap with adjacent plants
- Strong surface root mat – hydraulic protection
- High root biomass – more the better
- Root occupancy – biggest volume
- Root strength – stronger roots more resistant to external forces

2 recent strands of root work

Riparian plant trial

554 plants from age classes 1-5 yr

Common name	Botanical name
Karamu	*Coprosma robusta*
Ribbonwood	*Plagianthus regius*
Kowhai	*Sophora tetraptera*
Lemonwood	*Pittosporum eugenoides*
Kohuhu	*Pittosporum tenuifolium*
Lacebark	*Hoheria populnea*
Mapou	*Myrsine australis*
Fivefinger	*Pseudopanax arboreus*
Cabbage tree	*Cordyline australis*
Rewarewa	*Knightia excelsa*
Manuka	*Leptospermum scoparium*
Tutu	*Coriaria arborea*

Marden, Rowan, Phillips (in press)

Cabbage trees

13 plants age 2-25 yr

Czernin (2002)

Czernin & Phillips (in prep)

Root spread

Pittosporum tenuifolium (kohuhu)

Coprosma robusta (karamu)

Cordyline australis (ti kouka)

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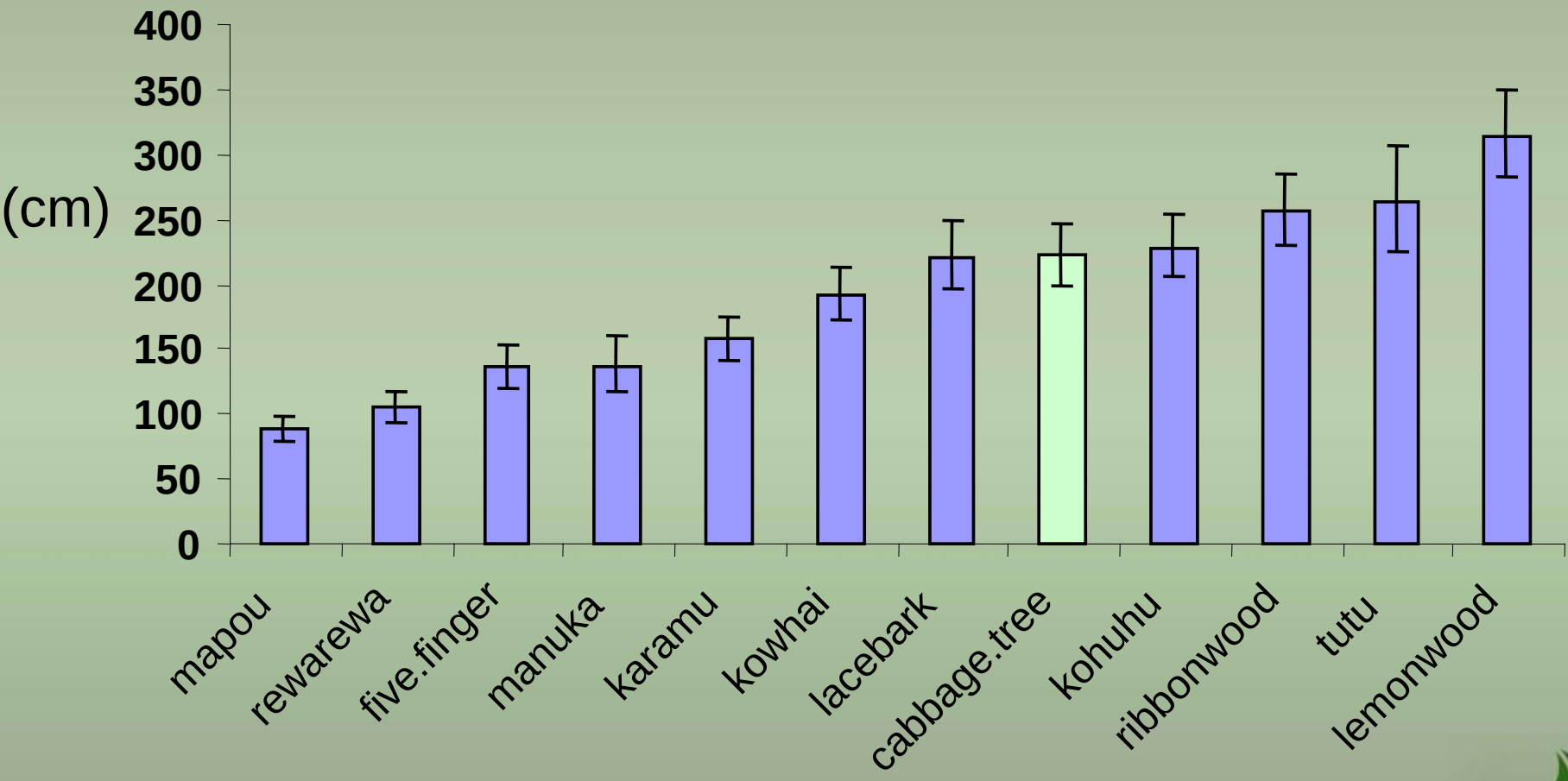
Mean max. root spread – 5 year old



Marden, Rowan, Phillips (in press)

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Root depth – 5 year old

Marden, Rowan, Phillips (in press)

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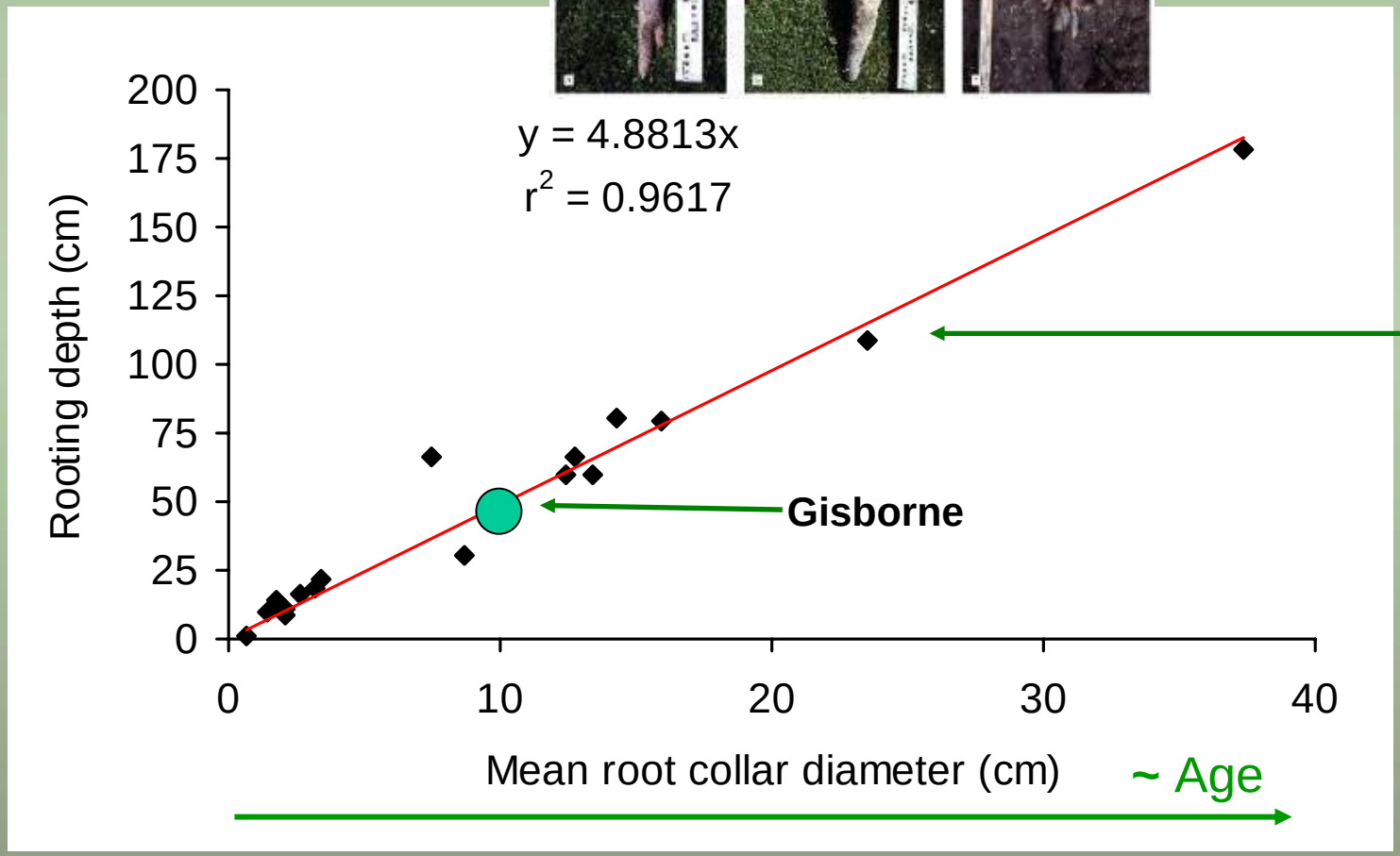
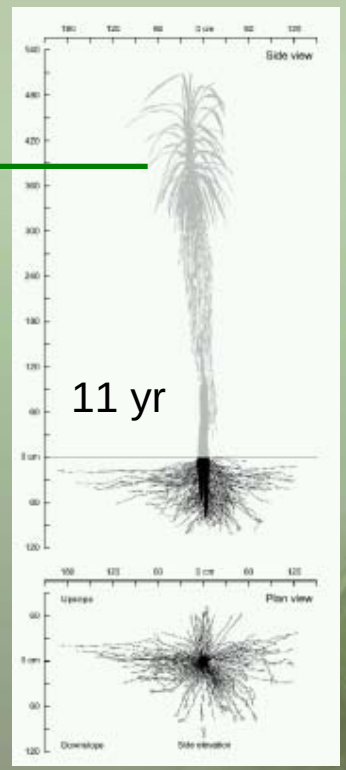
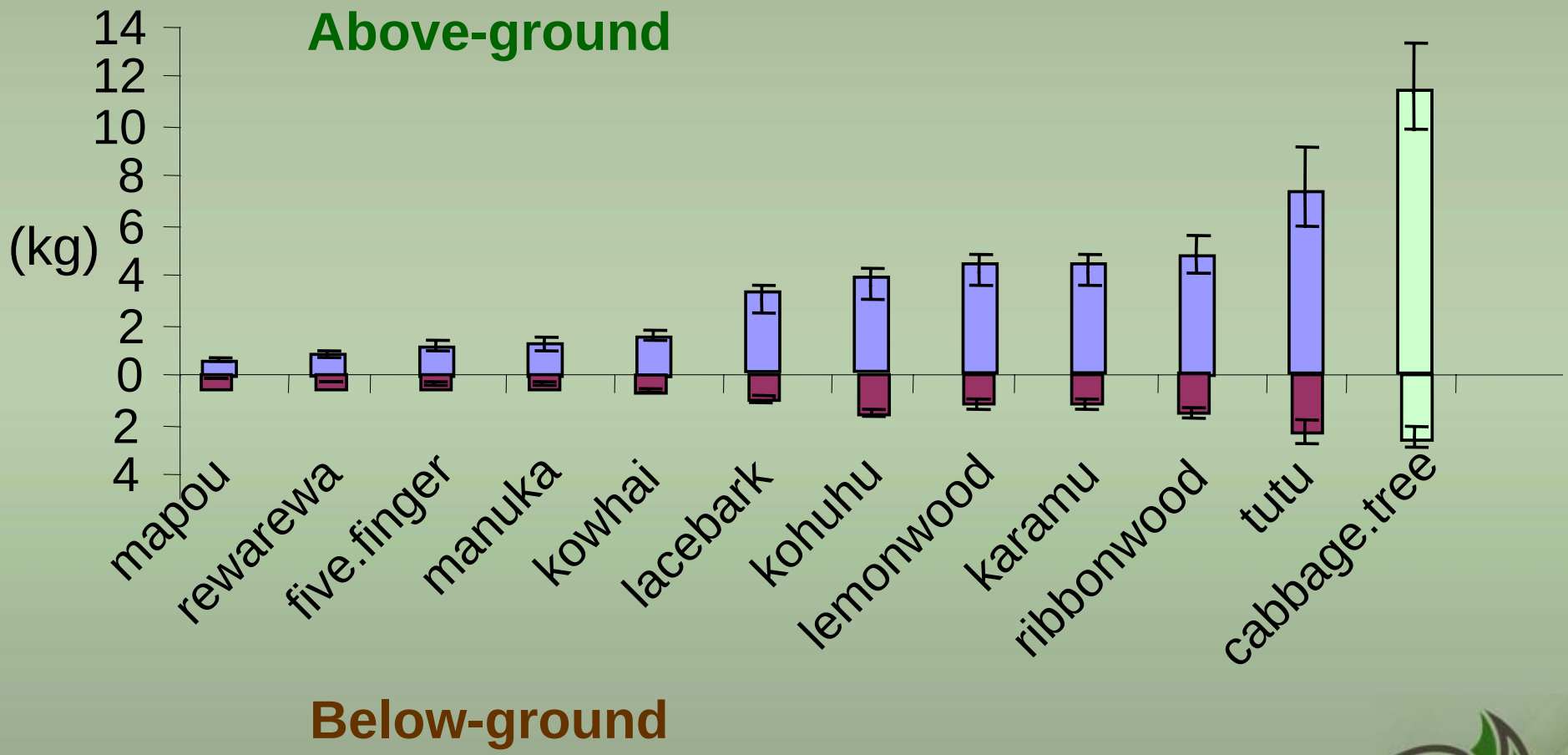
Root depth – cabbage tree





Czernin & Phillips (in prep)

Biomass – 5 year old



Marden, Rowan, Phillips (in press)

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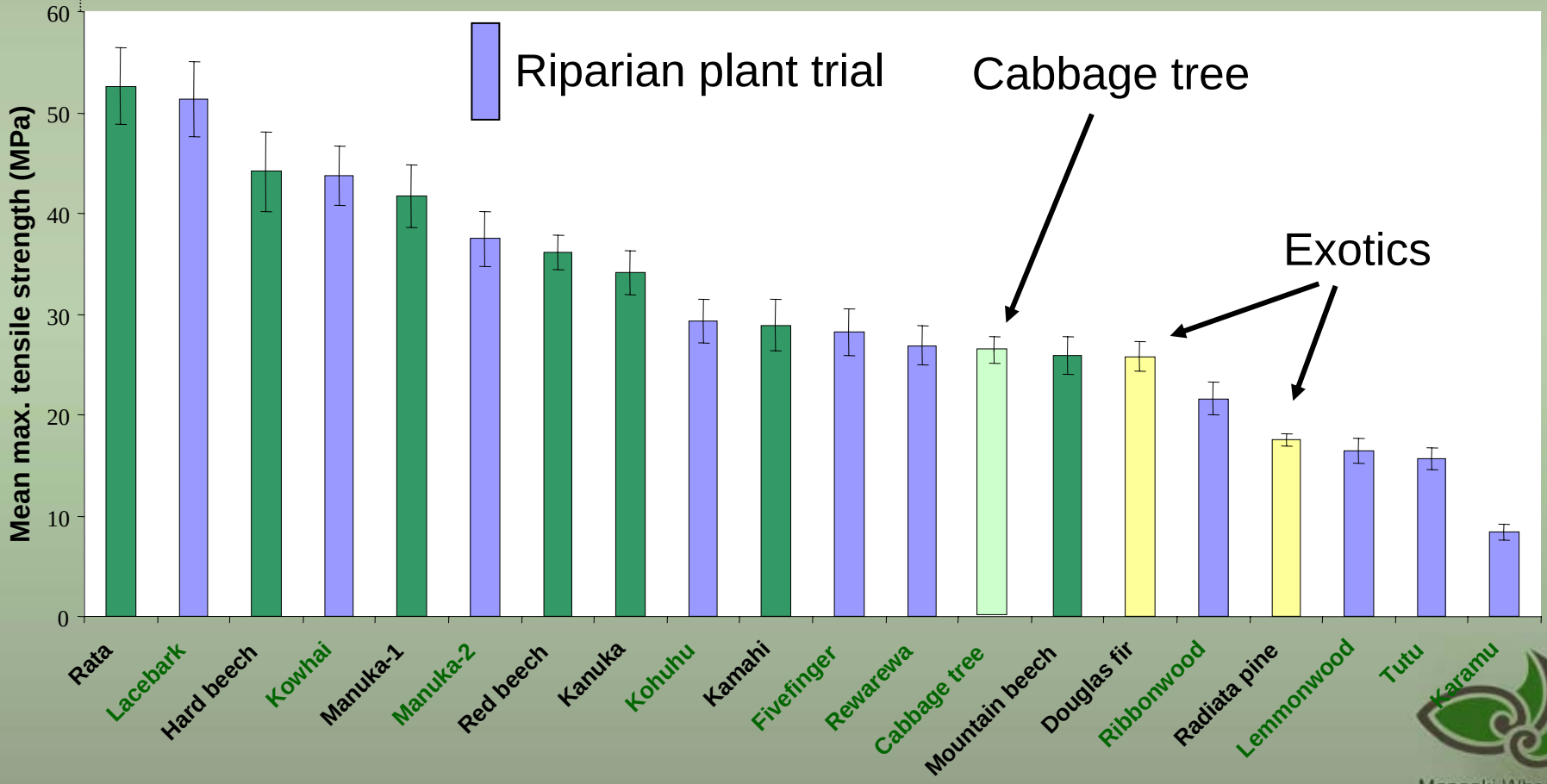
Root tensile strength – natives & others

(1 - 4 mm diameter)

Willows 30 - 125 MPa



Watson & Marden (2005)

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What to use?

Ecologically designed vs functional performance?

- Colonisers – moss and ferns
- Depth – cabbage tree, ribbonwood
- Spread – lemonwood, ribbonwood
- Above gd biomass – cabbage tree, tutu
- Below gd biomass – cabbage tree, tutu
- Tree height – lacebark, ribbonwood, cab. tree
- Canopy spread – tutu, karamu
- Root strength – lacebark, kanuka, kohuhu

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Implications for bank stabilization - small streams

- no limitations, provided that bank height is not more than ~2 m and channel bed is stable
- success depends on density - formation of dense canopy & full root occupancy of the soil
- shallow soil stabilisation after 3-5 years
- improvement in deeper slope stabilisation expected within 7-10 years of establishment
- species can withstand breakage and over-topple

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Implications for bank stabilization - large streams

- lack of roots in deeper soil layers limits usefulness in streams where bank undercutting occurs
- ineffective if bank height exceeds effective rooting depth ~ 2 m.
- banks would need to be graded and unstable channel beds artificially regraded prior to planting

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Pictorially ……..

Avondale Stream, existing channel, May 2004

Avondale Stream, *Carex* added

Avondale Stream, *Juncus* added

Avondale Stream, native trees added

Existing channel has little in-stream cover

Riparian grasses provide cover & spawning habitat

Cabbage trees suitable above the wetland grasses

Summary – natives in general

- NZ natives take longer to grow cf exotics – but not slow
- Some natives can regenerate, eg cabbage trees - good
- Woody plants effective after about 5 years
- Change the ecological mix to suit the site
- Mixed plantings of natives and exotics?
- More work needed on functional performance

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