Landcare Research
Manaaki Whenua

ICM

Integrated Catchment Management

Chris Phillips & the ICM team

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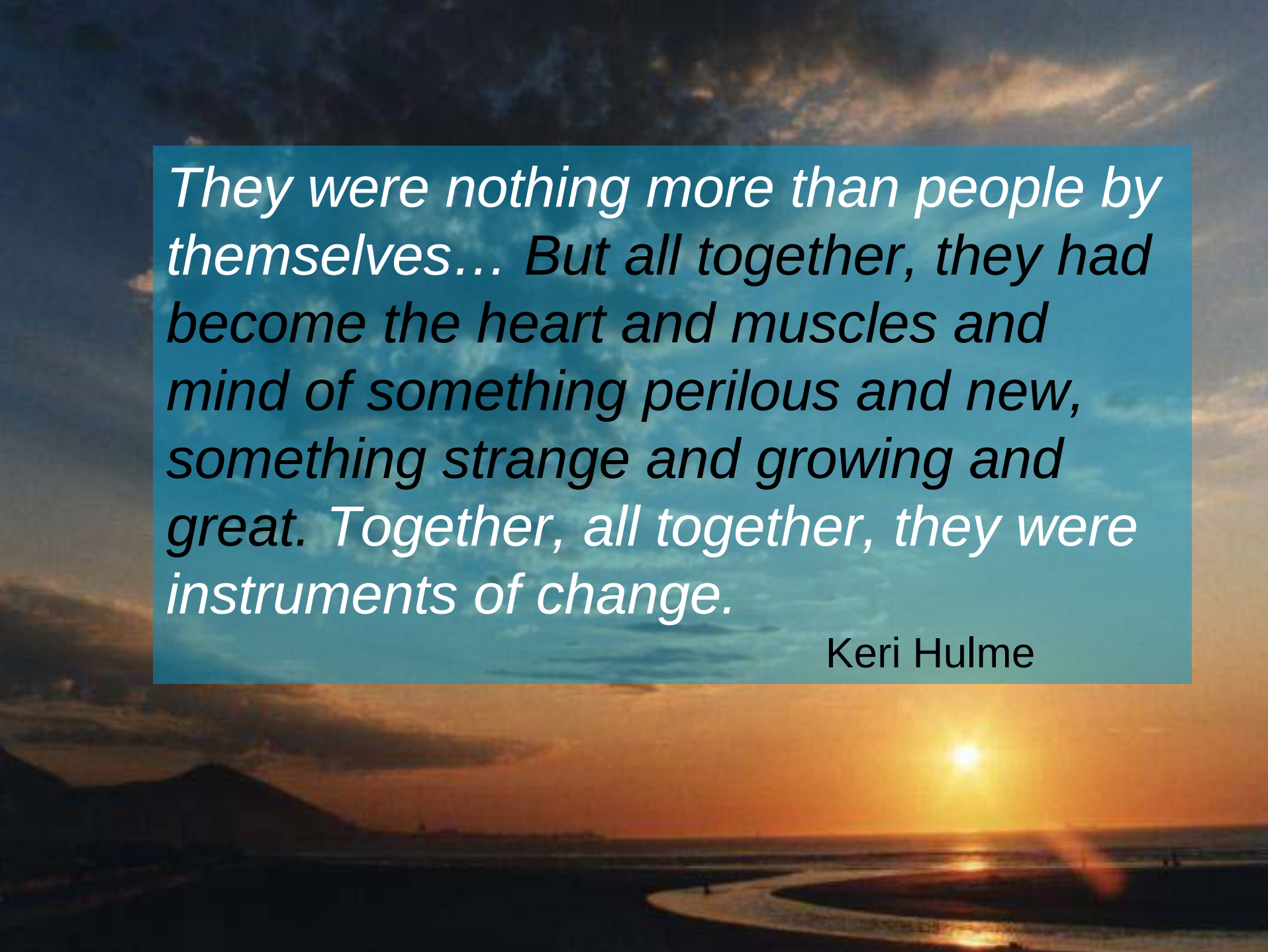
CAWTHRON

TDC Tasman District Council

in this talk …..

- Some context
- The Motueka ICM
- A story
- Some successes
- Take home messages


They were nothing more than people by themselves… But all together, they had become the heart and muscles and mind of something perilous and new, something strange and growing and great. Together, all together, they were instruments of change.
Keri Hulme

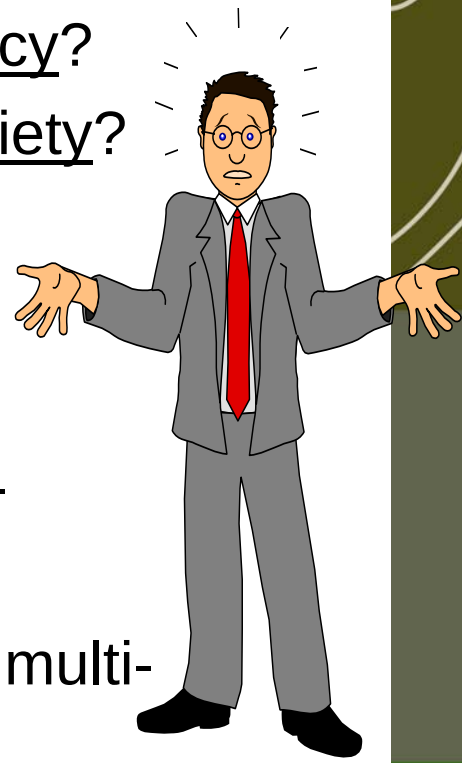
Learning points

- Big picture
- Wide eyes
- Everything is connected to everything else
- No such thing as a free lunch
- Many names for the same thing
- People make the difference


“One good conversation can shift the direction of change forever”
- Linda Lambert
(Author & founder of Center for Educational Leadership at California State University)

Emerging issues in natural resource management

- How do we bridge the gap between science & policy?
- How do we bridge the gap between science & society?
- How do we make science useful?
- How do we move from inter- to multi- to trans-disciplinarity?
- How do we create science teams to conduct multi- & trans- disciplinary research?
- How do we create science institutions to carry out multi-disciplinary research?



Emerging trends in natural resource management

The social face of catchment management

Learning communities and organisations

Knowledge management

Integrated and inter-disciplinary approaches

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:(Total Catchment Management, Integrated Catchment Management, the Watershed Approach, Ecosystem Management) 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.

What is ICM?

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

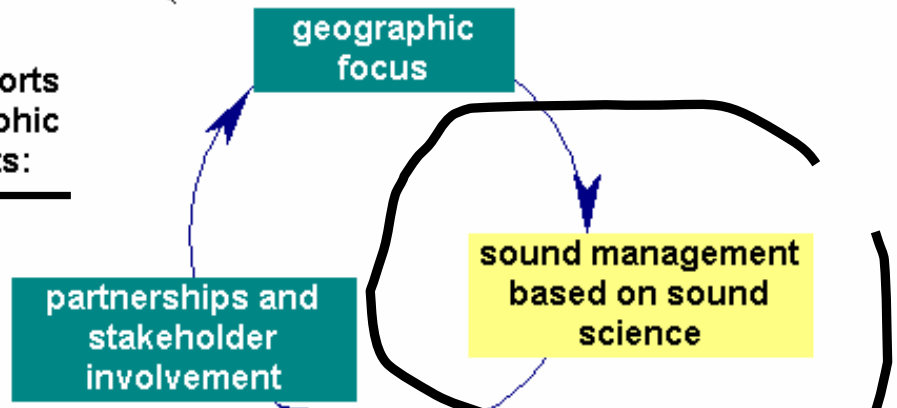
…a way of thinking about community" interactions

What about Planning?

Catchment approach

click to see details

The catchment approach focuses efforts within hydrologically defined geographic areas and consists of three components:



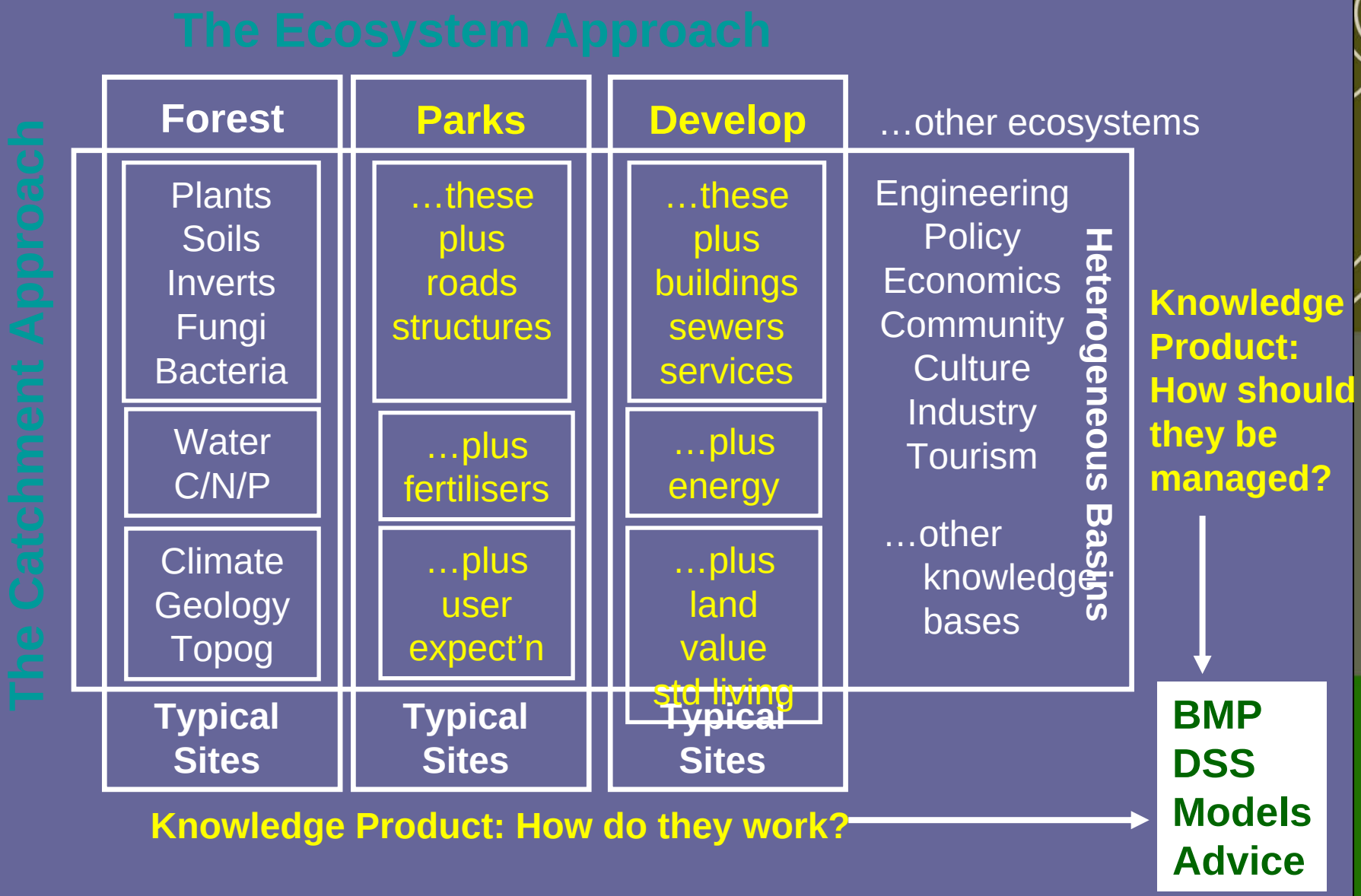
- sound scientific data, tools, and techniques are critical to inform the catchment management process
- catchment stakeholders employ scientific input in an iterative fashion in various stages of the management process
- stakeholders' actions are based upon shared information and a common understanding of the roles, priorities, and responsibilities of all involved parties
- the iterative nature of the catchment approach encourages partners to set goals and targets and to make progress based on available information while continuing analysis and verification in areas where information is incomplete
- catchment approaches should not be viewed as an additional bureaucratic layer; rather catchment approaches should consist of improvements in coordination of current programmes and processes to increase efficiency and efficacy

Greenway/blueway planning process

Common elements of any planning process

- Decisions – vision, partnerships, roles, concensus
- Issues & inventory – boundaries, knowledge, info mgmt
- Objectives – actions, who, how, where, when
- Planning/Design – alternatives, regulations etc
- Implementation
- Monitoring & Evaluation

Rural Catchments, Urban Catchments…….



Case study

- Motueka River - rural

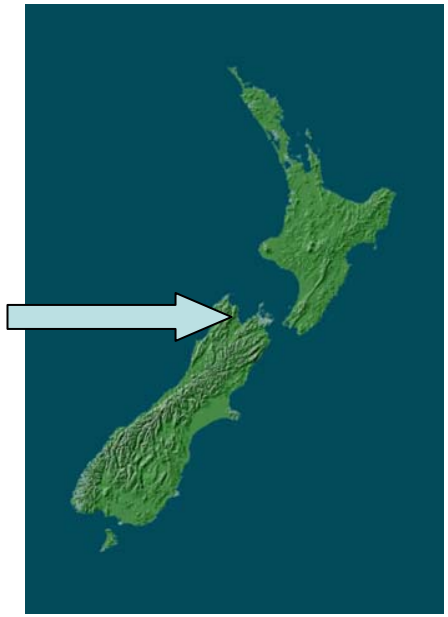
INTEGRATED CATCHMENT MANAGEMENT

for the Motueka River

•ridge tops to the sea•

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

Where is the Motueka?



Ridge tops to the sea

ICM Motueka Research Programme

http://icm.landcareresearch.co.nz

Goal: undertake research to help improve the management of land, freshwater, and near-coastal environments in catchments with multiple, interacting, and potentially conflicting land and water uses.

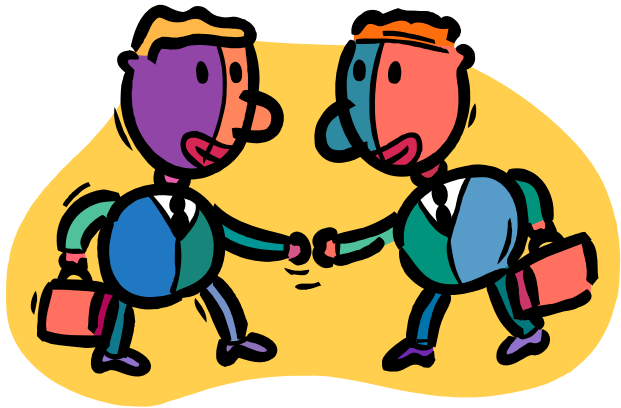
A starting point – my view

Without a common level of understanding of the issues, information and knowledge related to those issues, real change will struggle to occur.

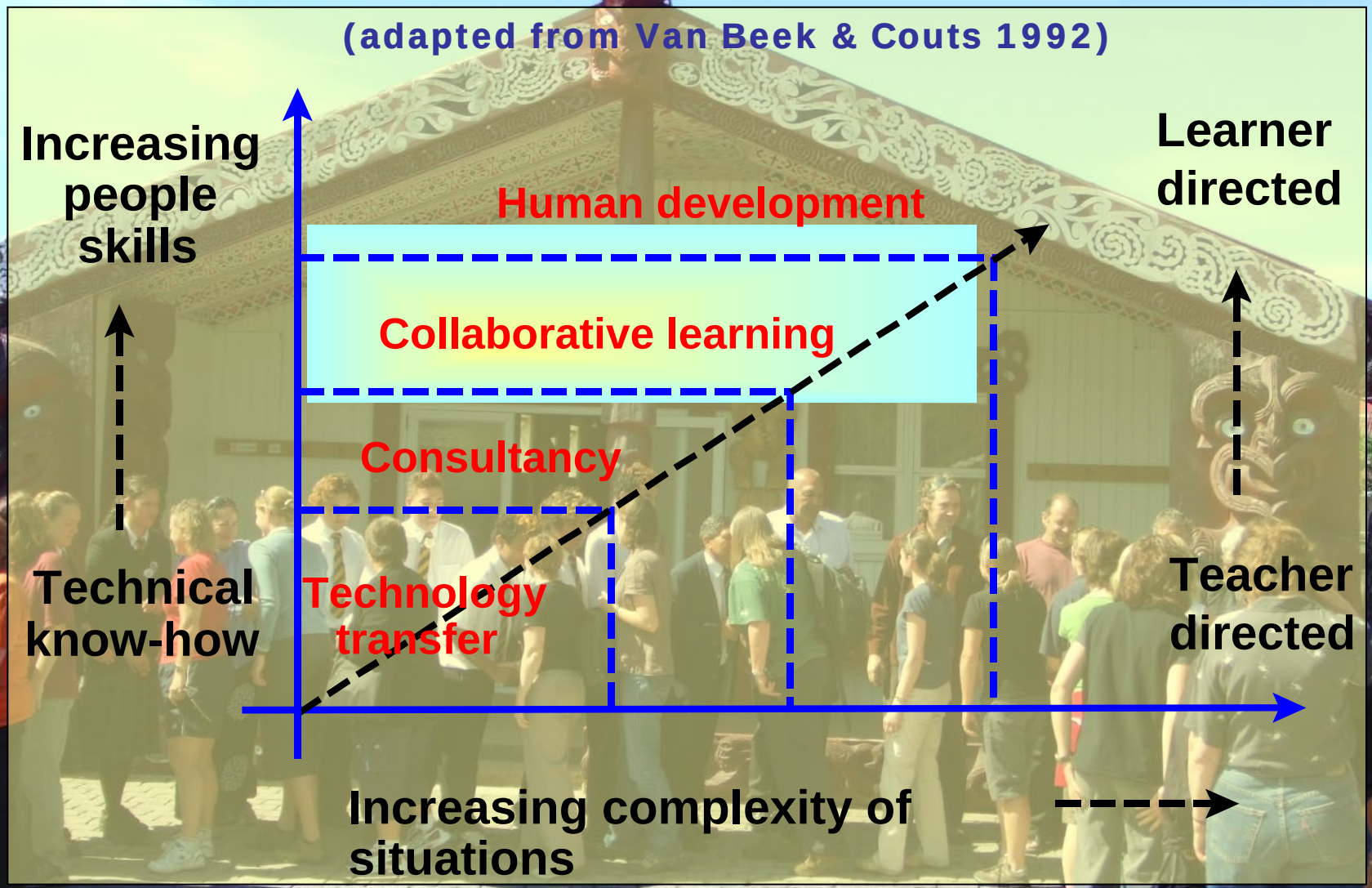
Collaborative or social learning

“Learning that occurs only when people engage one another, sharing diverse perspectives and experiences to develop a common framework of understanding and basis for joint action”.

Exploring social learning in the development of collaborative natural resource management. (Thesis, 2001. Tania Marie Schusler)



Different approaches to developing and sharing information for decision making



Motueka Catchment Issues

- Competition for scare resources
- Influence of forestry on water & sediment
- Use of riparian zones for multiple purposes
- Concern about microbial and nitrogen levels
- Effects of gravel harvesting
- Aquatic biota decline
- Marine intensification
- Cumulative effects
- Urban-rural divide
- Institutions
- ……..

Much the same types of resource management issues you can find in any catchment anywhere in the world!

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.





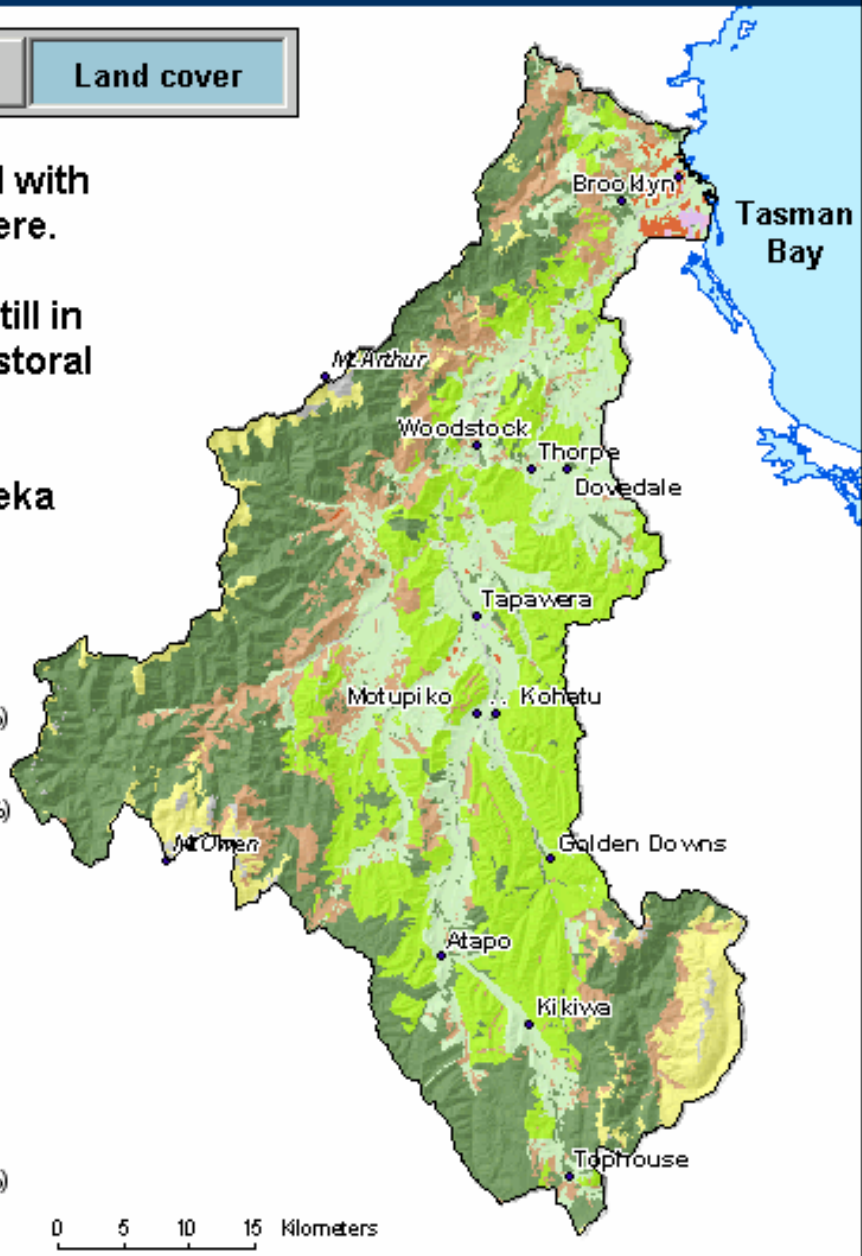
Ridge-tops to the sea

Geology | Soils | Land cover

The catchment was originally almost entirely forested with podocarp species in the lowlands and beech elsewhere.

Today the catchment is largely rural, though 35% is still in native forest, 25% in plantation forest, and 20% in pastoral agriculture.

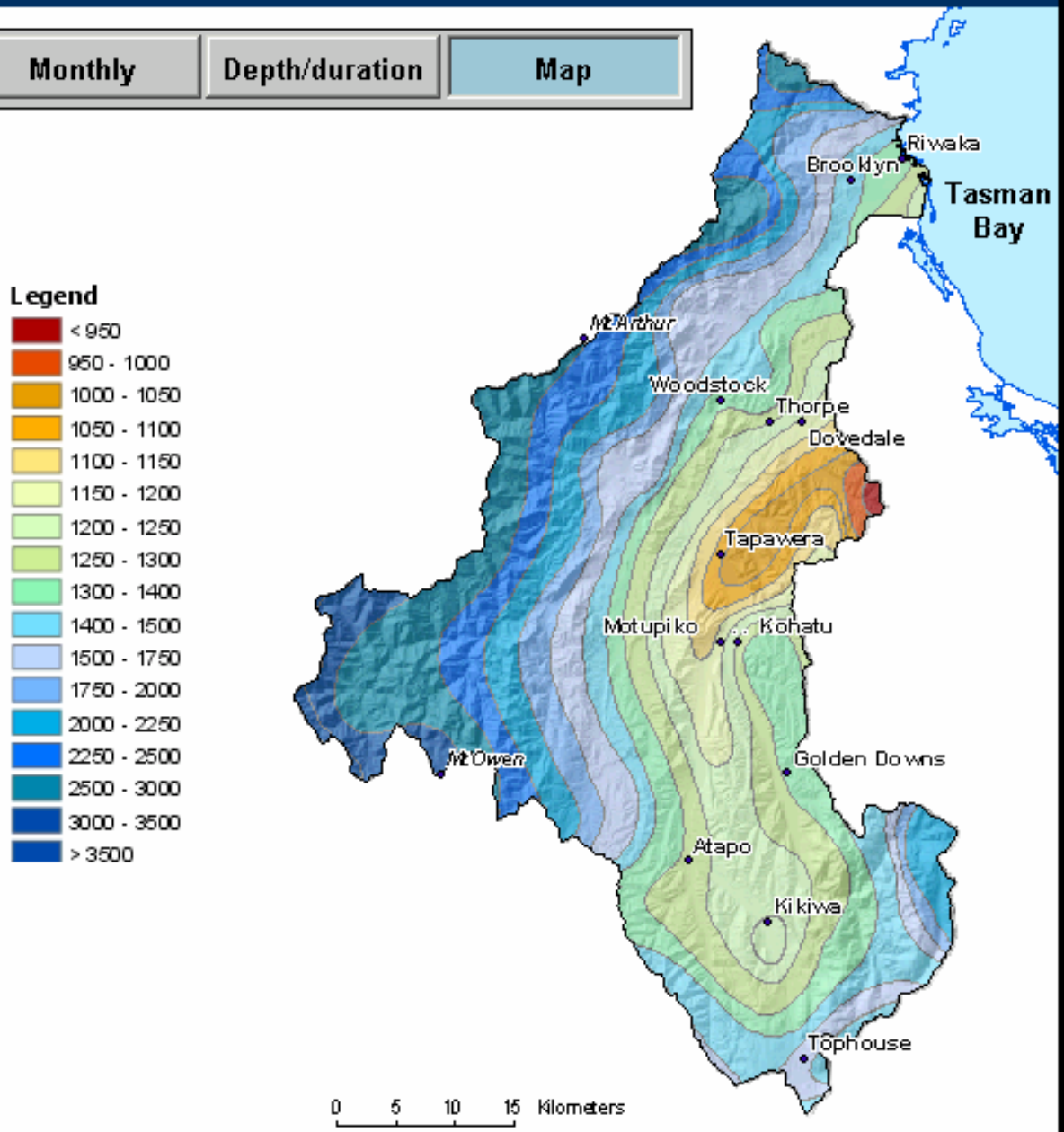
The only significant urban centre is the town of Motueka near the coast.



- [ ] Rivers
- [ ] Roads
- [x] Place names
- [ ] Ecological boundaries
- catchment boundary

Climate - Rainfall

Rainfalls highest in the west and south and lowest in the east.



Present land use

Conservation | Exotic forest | Pastoral | Horticulture

The Motueka catchment has a range of land uses.

The major productive land uses are production forestry (25% of catchment area), sheep and beef farming (19%), and limited but increasing dairying.

Horticulture (manily pipfruit, berryfruit, hops, vegetables) occupies a small, but expanding, area and is a major water user.

A large area of the catchment (55%) is conservation land and are important for soil and water conservation and biodiversity.

The Motueka River discharges into highly productive coastal and shallow marine ecosystems in Tasman Bay, providing a major source of freshwater and nutrients and influencing the ecology of a large area of western Tasman Bay.

The estuarine and coastal area around the mouth of the Motueka River is an important area for a range of fish and shellfish, with cockles being commercially harvested near the mouth of the Riwaka River.

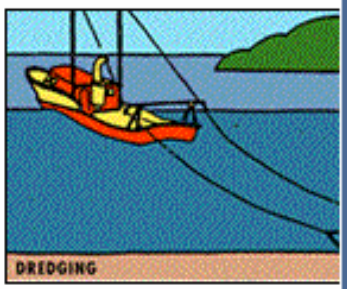
Tasman Bay supports a wide variety of planktonic and benthic organisms and fish. Scallop harvesting is a major recreational activity and commercial industry in Tasman Bay, and there have been recent applications to establish mussel farms.

The Abel Tasman National Park, and associated Tonga Island Marine Reserve, which support significant fish stocks and marine mammals (seals and dolphins) are relatively close to the mouth of the Motueka River and are influenced by the Motueka River plume.

High sediment loads during floods in the Motueka River are believed to be associated with poor recruitment and growth of scallops in the plume of the river. Conversely, organic matter and other nutrients from terrestrial sources may play an important role in shellfish nutrition.

The coastal and marine waters influenced by the Motueka plume of fresh water have significant existing fishery values (scallops, fin fish, cockles), and the potential for an increase in marine farming activities (for scallops, mussels, oysters).

Key questions concern the influence of land use on the quantity and quality of freshwater delivered to the marine environment; understanding the functioning of the food web within Tasman Bay; and the opportunity for, and effects of, marine farming on water quality.



- How important are organic matter, sediment, and nutrients delivered from the land for the functioning of the coastal and marine system?
- What are the risks to marine farming from activities on land?
- What are the factors that control primary and secondary production in Tasman Bay (notably fish and shellfish)?
- What are the dynamics of water circulation and biogeochemical processing in the near-coastal and coastal zones?
- What is the sustainable carrying capacity for marine farming?
- Where and how could marine farms be most sustainably developed?

"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"

Communication/knowledge

Integrated catchment management just doesn't happen.

icm.landcareresearch.co.nz

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.

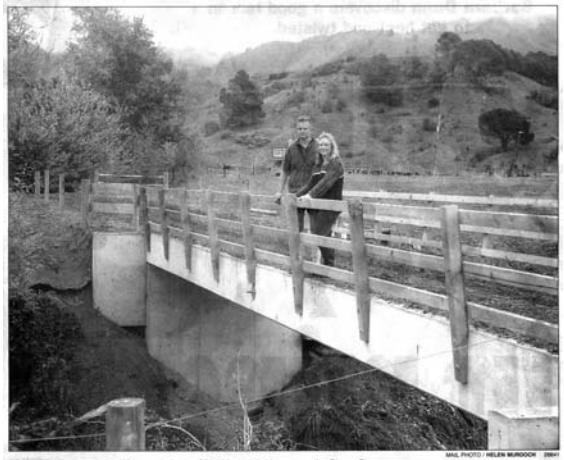
There is also a web site, a technical report, an annual general meeting, and many other avenues for engaging in knowledge delivery and transfer between the many actors in the catchment.

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

Story – Sherry River



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 Thelin 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 (50 times more likely than elsewhere), and the resulting high bacteria levels.

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

Water quality monitoring of the river since 2000 had identified high bacterial counts at certain times.

Fish and Game had previously raised concerns about the health of the river before the monitoring, which was part of the Motueka I[n]tegrated catchment project.

This involved the council, Landcare [r]esearch and other scientific groups in a stud[y] the impact of land uses on the catchment coastal marine area.

The initial findings were presented t[o] eight major landowners in the Sherry area, who expressed concern about the ria levels but asked for more monitoring done.

It was carried out at four sites and sh[ow]ed the bacteria levels increased down the [r]iver particularly below the four dairy farms.

But it was recognised that dry stock has an impact.

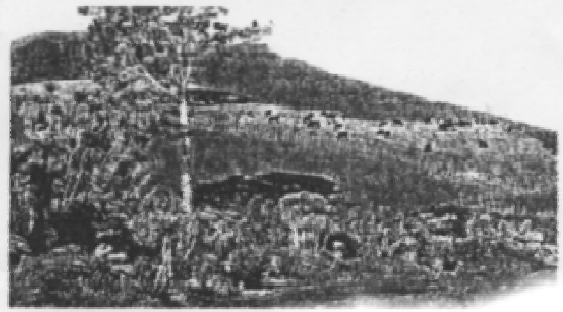
The study showed that a herd of 246 crossing the river raised the concentra[tion] of e.coli - an indicator of bacteria levels - to more than 50,000 per 100ml of water, well [a]bove national swimming guideline.

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.

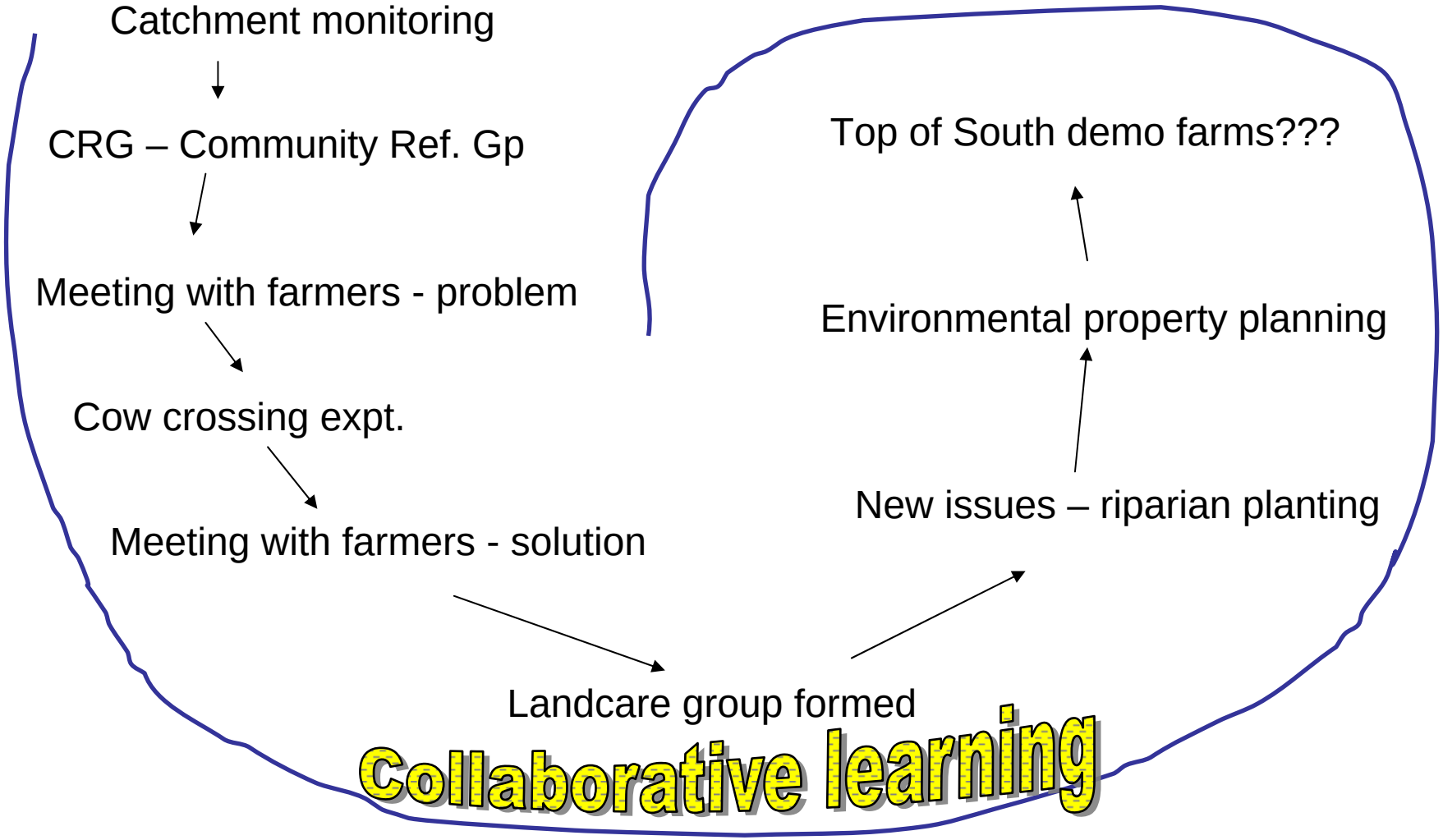
Even long-time dirty-dairying campaigner Bryce Johnson, director of Fish and Game, enthusiastically describes the project as "a good news st[ory] ... and the envi-



new information in December 2001, "th[e] Sherry farmers undertook to take action. In a short period of time, the crossing on Fran[k] and Lisa White's property where the expe[ri]ment was carried out has now been brid[ged]. In addition, another farmer, Rod O'[C]... is using a bridge instead of taking ... through the river."

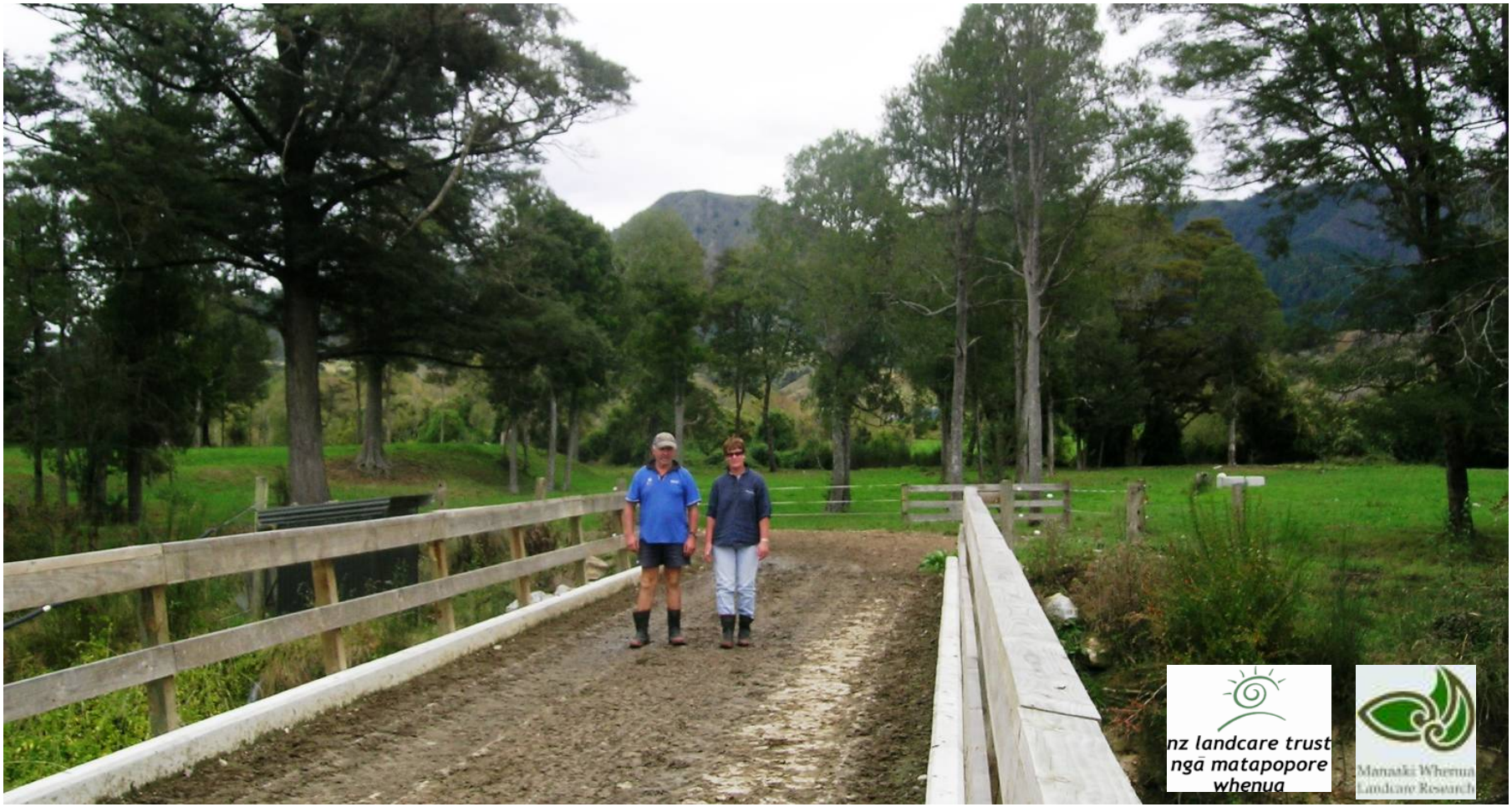
He says two other bridges ar[e] ning stages and substantial f[un]ding to keep stock out ... Tasman District ... cial assistance ...

How did it happen?

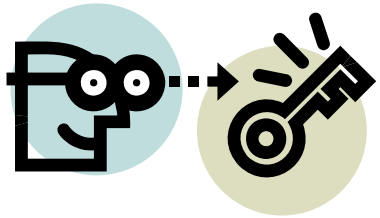


Sherry River Catchment Group

‘Improving Water Quality through on farm actions’



Successes



- understanding of biophysical processes
  - (i.e.,what's there and how it works)
- role of social science
  - on-going facilitation and keeping us on the pathway
- understanding of integration
- multi-pronged communication
- linking science with catchment players
- building trust & building relationships
  - 'walking alongside' others on the journey
- breaking down institutional barriers

Summary – case study

- Involvement of stakeholders
- Scoping the issues
- Knowing what we know, knowing who knows what, knowing what's going on = KM
- Plan of action
- Implementation, monitoring & evaluation
- Always with big picture in mind
- Always aware of the connections


Wrap up time

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

New Emphasis | Protective Measures

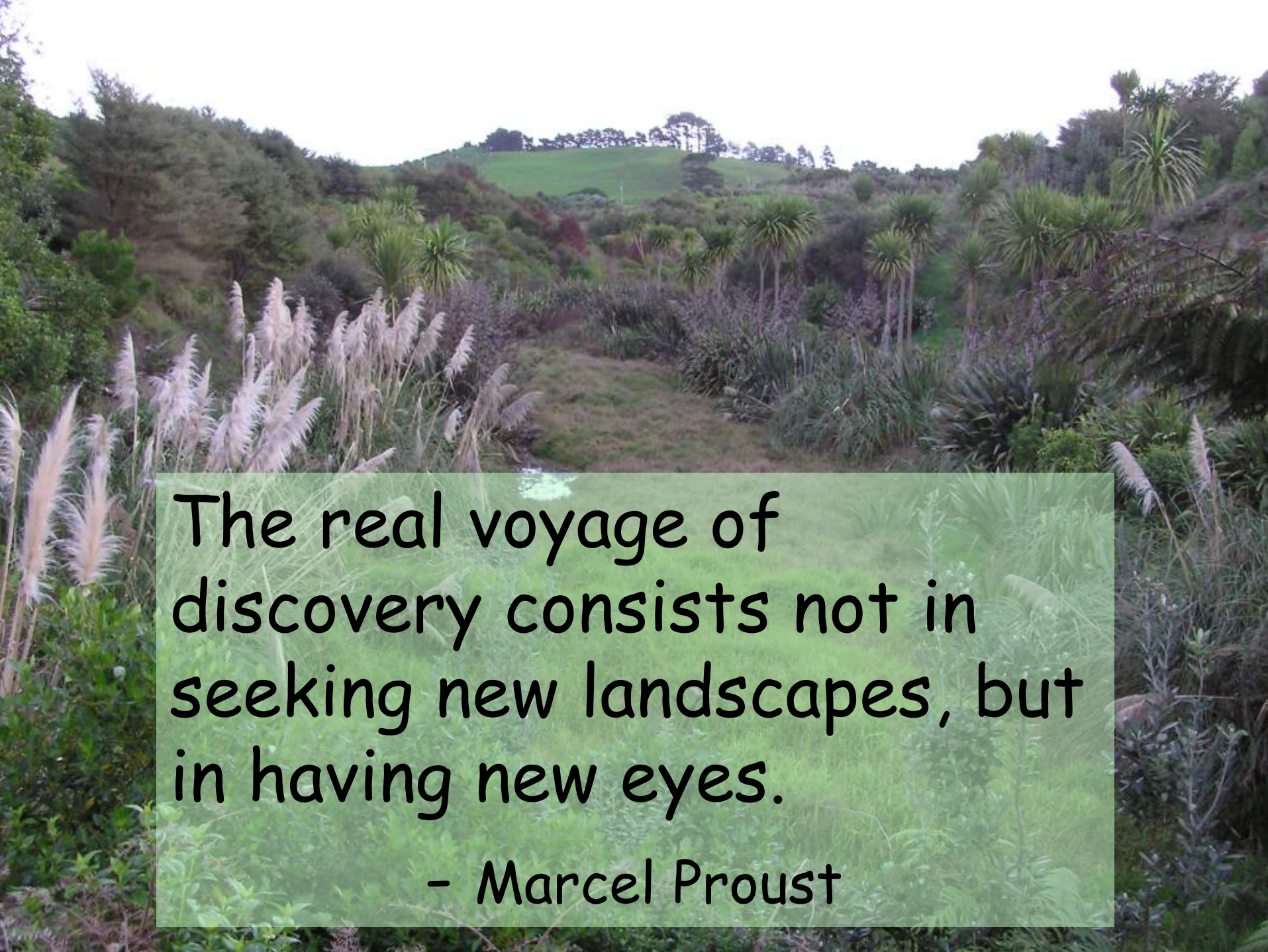
New Emphasis
Change from end-of-pipe treatment to pollution prevention
New concern about chronic effects (invisible) rather than acute effects (visible)
Awareness that point sources are under control but non-point sources of pollution are not
Awareness that technological solutions have limits and change of behaviour is needed
Cost of solutions are increasing rapidly. "User pay or polluter pay" principle needs to be applied

Effective Catchment Management
Develop understanding of catchment processes (users, uses, impact, variability)
Identify and rank problems to be solved and benefits to be gained from restoration
Identify clear and obtainable goals
Compare management alternatives and develop a list of best management options
Determine economic impacts and legal implications of proposed options
Determine several good management strategies for decision makers

Key messages

- Innovative approach but not rocket science
- Inter- (multi-) (trans-) disciplinary – big melting pot
- Partnerships, trust, relationships
- Stakeholders
- Issues analysis
- Goal setting
- Takes time – longer than most realise
- Dialogue is important – F2F and technology

In the end it's all about people!


The real voyage of discovery consists not in seeking new landscapes, but in having new eyes.
- Marcel Proust