

"from ridge tops to the sea"

Integrated Catchment Management

THE SCIENCE OF INTEGRATED CATCHMENT MANAGEMENT: Implications for Dairy Farming

Andrew Fenemor, Landcare Research, Nelson

with thanks to the whole ICM research team 2000-2011





QUESTIONS ABOUT THE FUTURE

1. Are there limits to where we can intensify land use in NZ?
2. How can I comply with catchment water quality limits if I'm just one contributor?
3. What about those other activities that cause the problems downstream?
4. How can I minimise costs that come with regulations around water?

ICM – offering solutions

- Managing multiple issues in an integrated way
- Ridge tops to the sea
- Economic benefit while maintaining environmental, social and cultural values
- Working with communities



What ICM means

Integrated

...together

Catchment

...scale

Management

...action

ICM is a **process** driven by **issues**

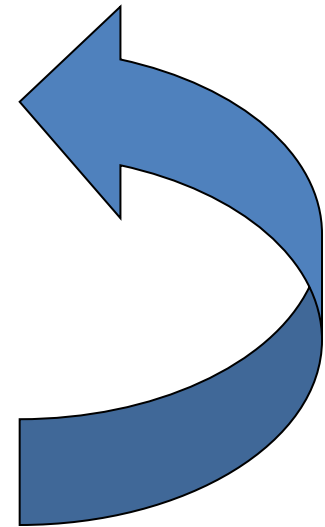
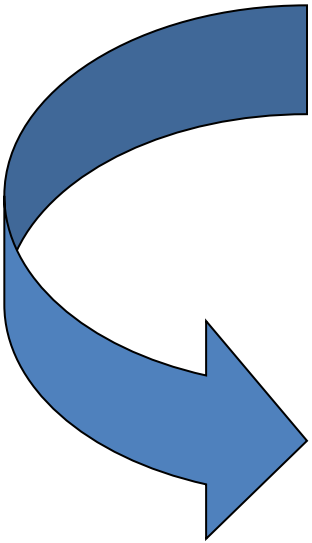
2 pillars for ICM

Community Resilience

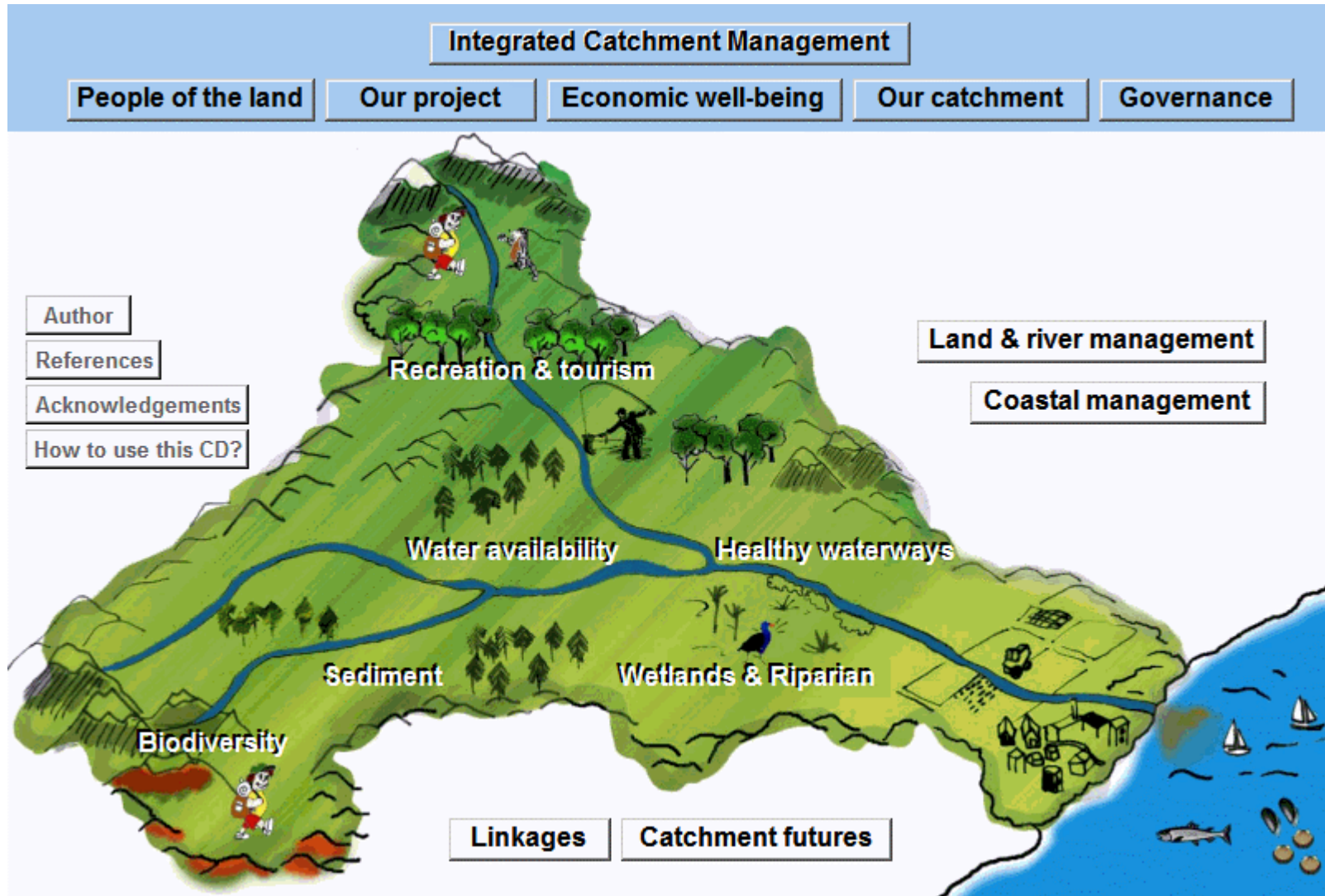
Networks – trust – awareness –
collaboration – wellbeing –
high social capital

Ecosystem Resilience

Biophysical sustainability – robustness –
environmental targets met



Motueka catchment



‘5 Big Picture’ ICM Themes

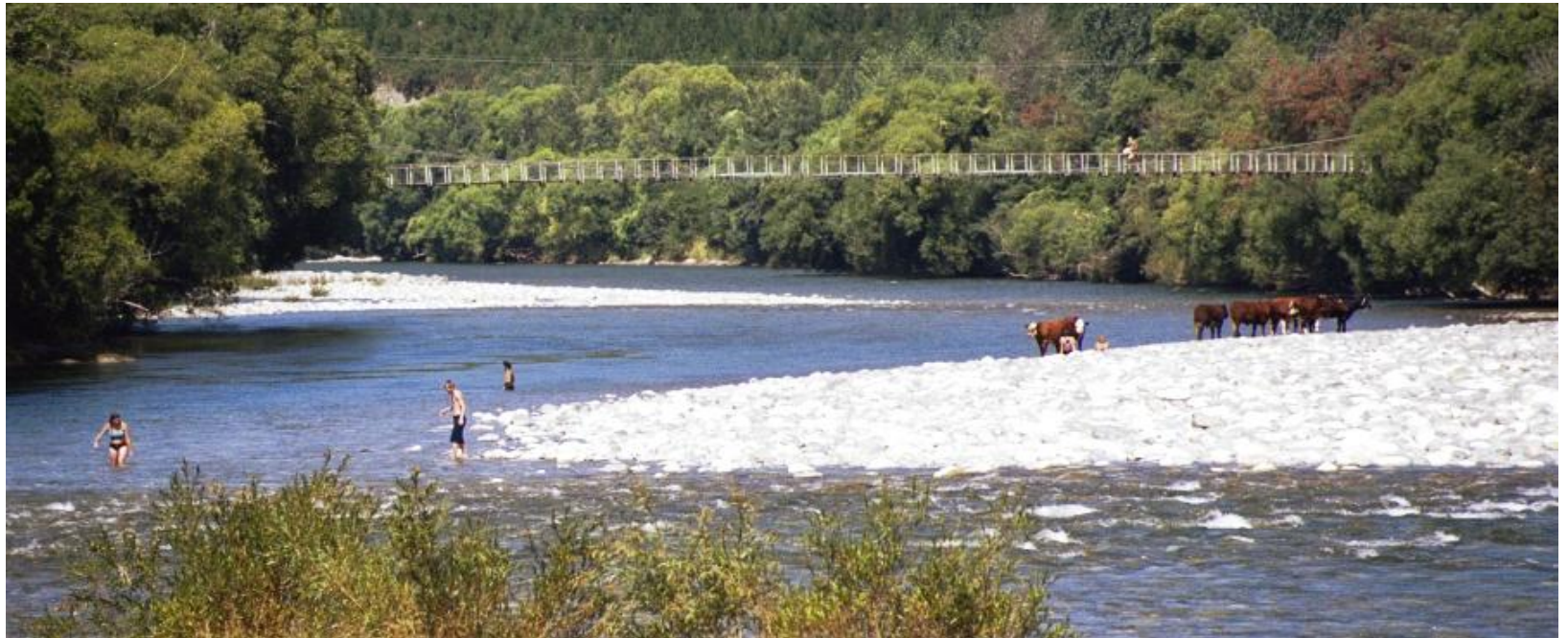
1. Managing Land Uses in harmony with Freshwater
2. Water Allocation & Governance
3. Catchment –Coastal Interactions
4. Integrative Modelling to Manage Cumulative Effects
5. Build human capital, Facilitate community action



"from ridge tops to the sea"

Integrated Catchment Management

Managing land uses in harmony with freshwater



Contaminant losses from the Sherry

From data collected by Rob Merrilees & Bill Booth

Thanks to Rob Davies-Colley NIWA for this data

- Compared to low flows, **floods** carried
 92% of bacteria (98% in lower Mot)
 74% of total phosphorus
 63% of ammonia
 during 9.5% of the year Oct 08-Oct 09

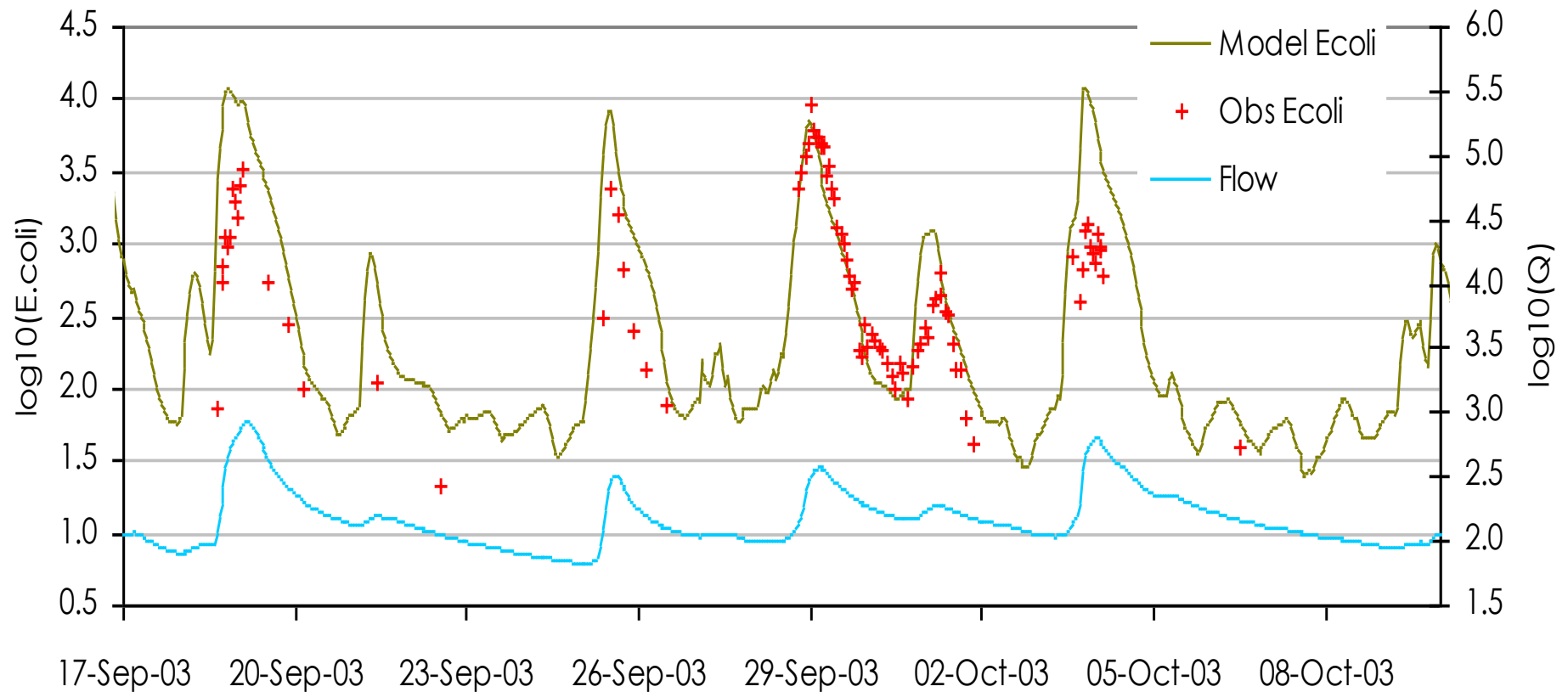
Contaminant losses from the Sherry

- But **low flows** carried away
55% of total nitrogen
78% of nitrate
during 90.5% of the year Oct 08-Oct 09

Contaminant losses from the Sherry

- Compared to dairy catchments in Southland, Taranaki, Waikato... Sherry has lower nutrient and bacterial losses
- **Bacteria** flushed with first rain (some stored in river channel) **but where do they go?**

E. coli in lower Motueka River

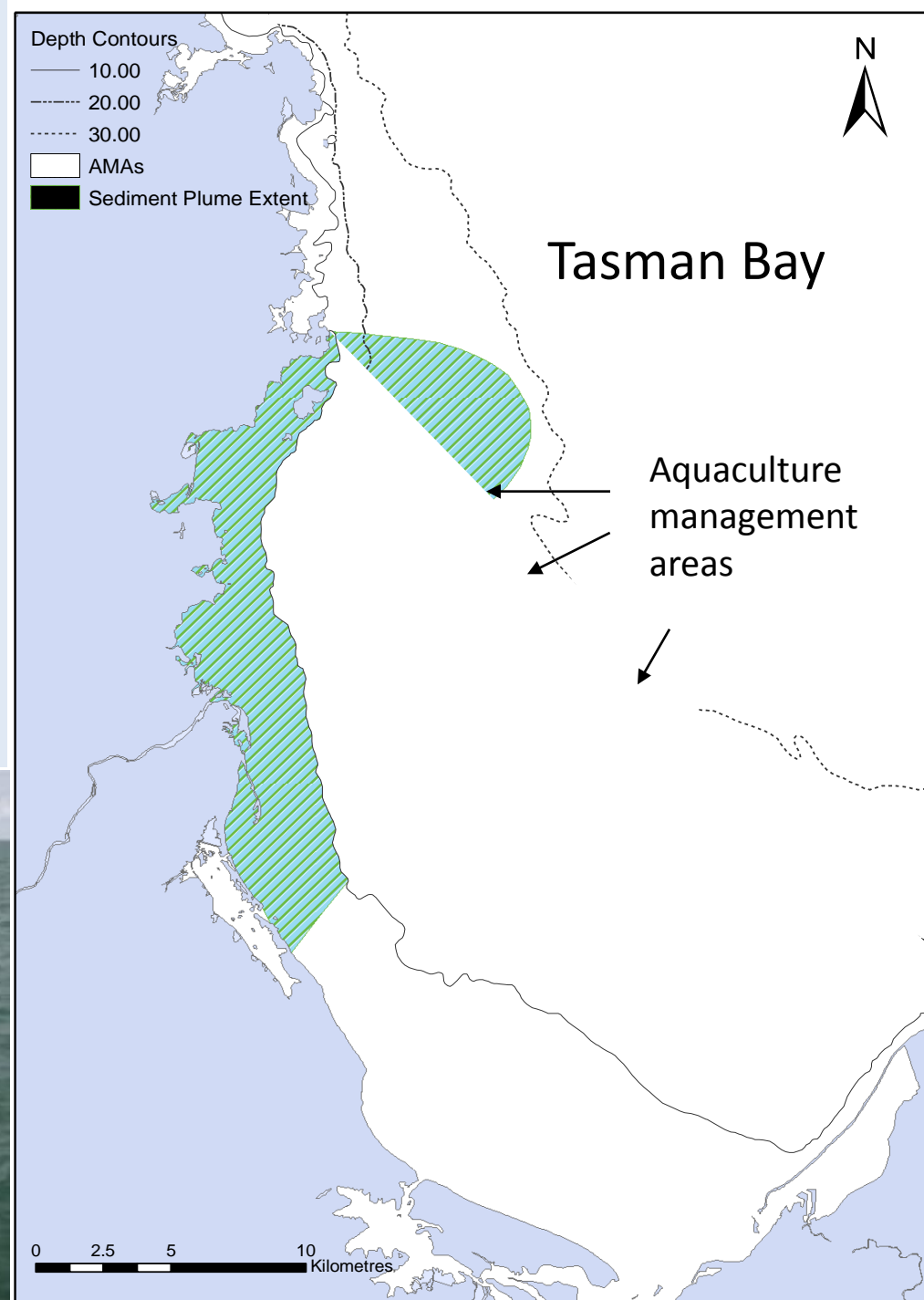


98% of faecal pollution from the Mot Catchment is transported in stormflows

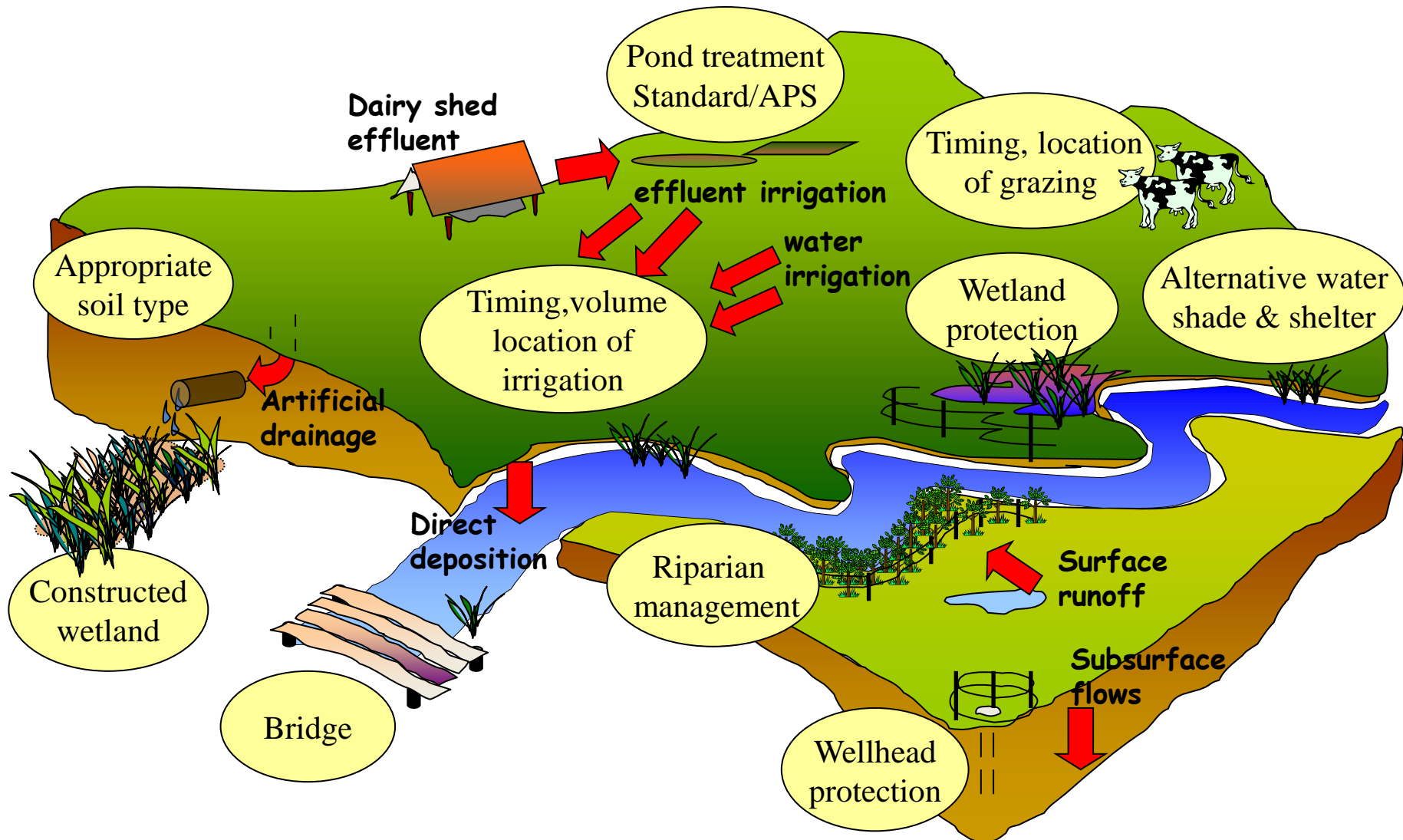
**180 km² river plume
depositional area**

based on

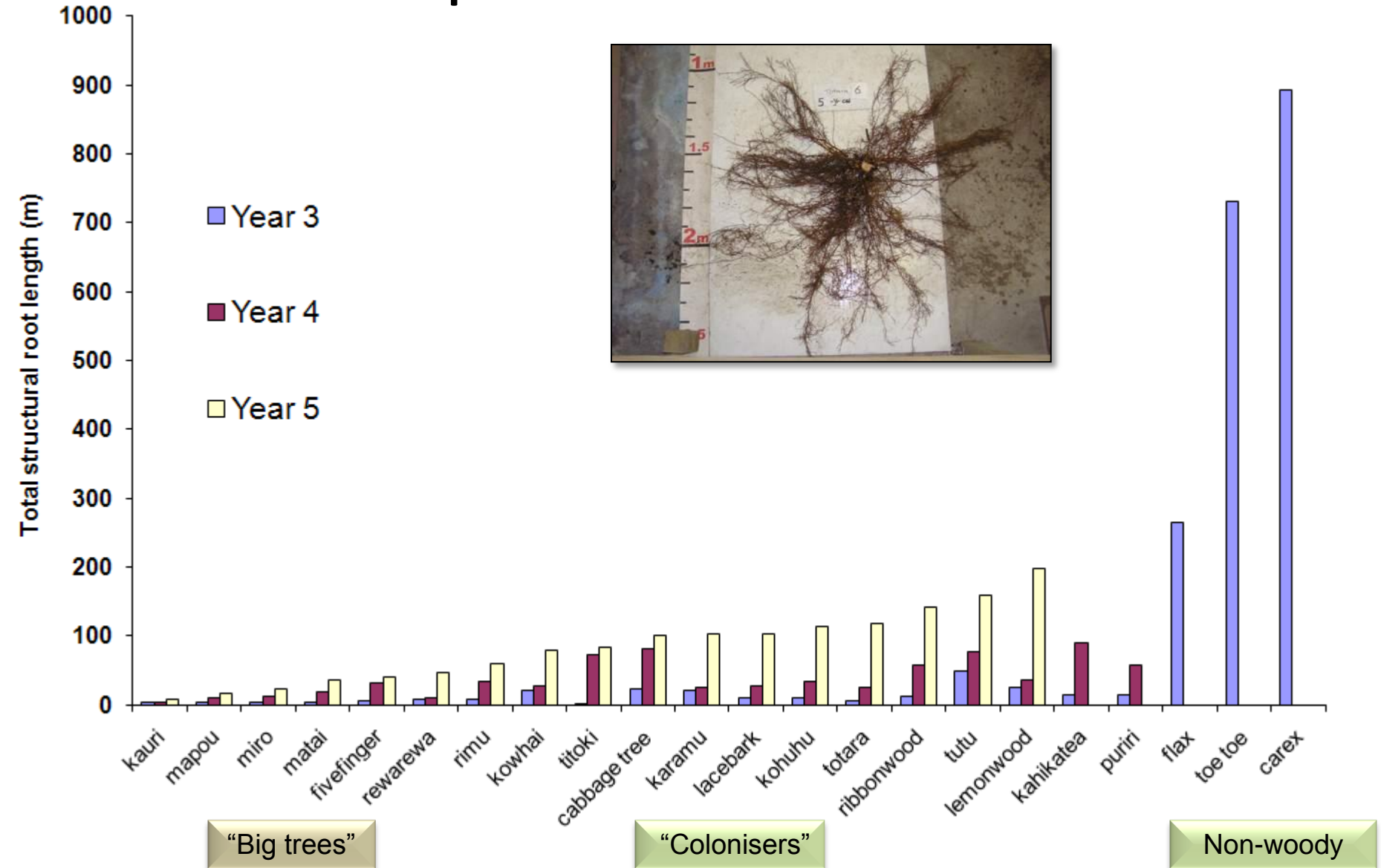
**composites of
multiple benthic
indicators**



Faecal pollution mitigation (BMPs)



Native plants & soil reinforcement



Czernin & Phillips 2005: *NZ Journal of Botany* 43: 851-864.
Marden et al. 2005: *Plant & Soil* 278: 95-105.

Riparian Plant Trial, Sherry River



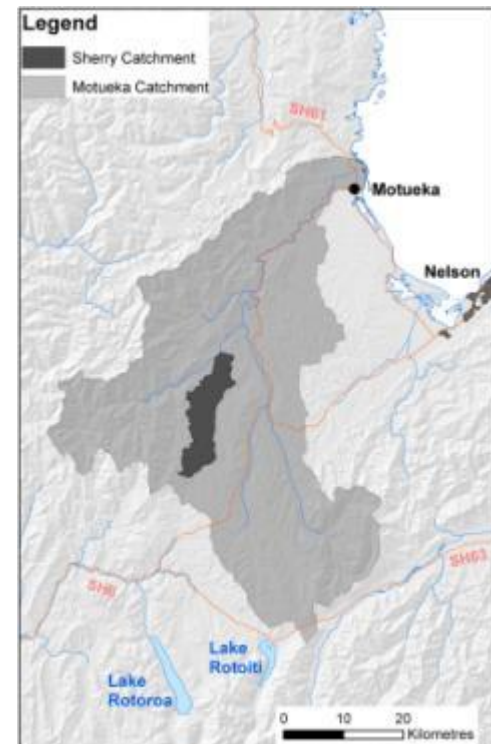
Chemical weed control
cheapest and most effective

Ledgard & Henley 2009: Best bet guidelines for riparian planting.
Ledgard et al. 2011: *NZ Journal of Marine & Freshwater Research*.

"from ridge tops to the sea"

Integrated Catchment Management

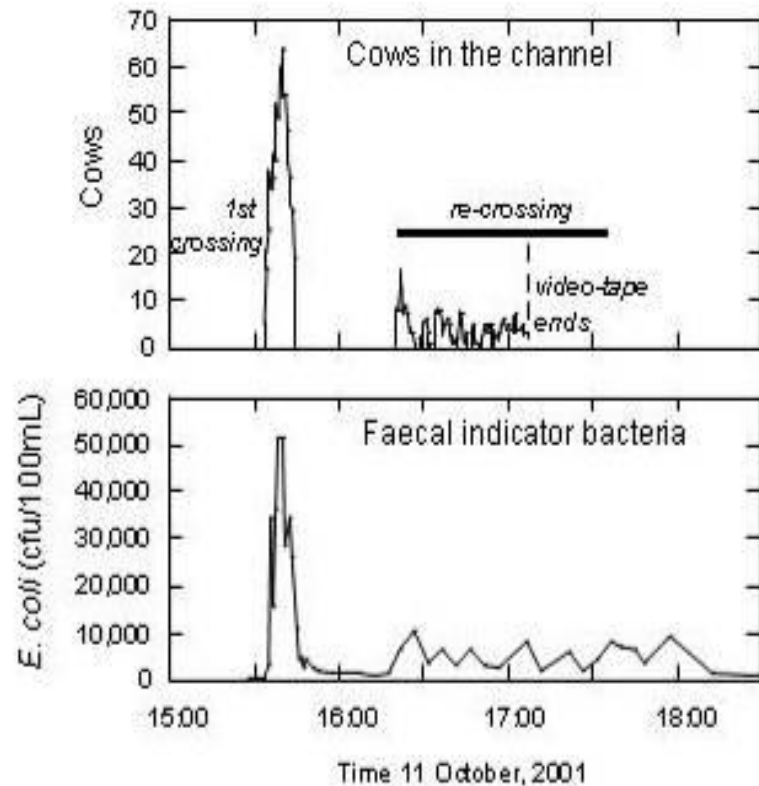
Collaboration & Science
encourage farmers to improve
water quality



Cows crossing streams



- 400% increase in *E. Coli* during cow crossings
- Cows 50x more likely to defecate in water



Bridges replace cow crossings



Bridge over troubled waters

By Simon Towle

After years of trouble and uncertainty, the Sherry River in the Tasman District has finally seen a bridge. The bridge, which was built by the Tasman District Council, is a concrete structure with wooden railings. It is a significant improvement on the old wooden bridge, which was in poor condition and had to be closed for several years. The new bridge is a concrete structure with wooden railings. It is a significant improvement on the old wooden bridge, which was in poor condition and had to be closed for several years.



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 looked down 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 to a state that could prove a model example for the rest of the country.

Backing these dairy-dairying campaigners, **Simon Towle**, director of Fish and Game, enthusiastically describes the project as "a small town."

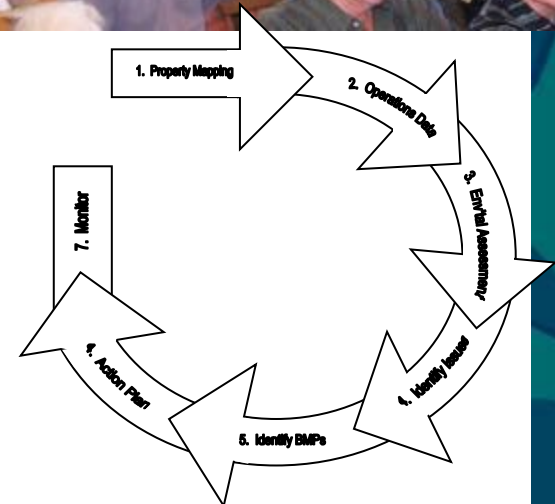


new information: In December 2001, "the Sherry farmers undertook to take action. In a short period of time, the council on Farm and Fish and Game's property where the experiment was carried out has now been built. In addition, another farmer, Neil (?), is using a bridge instead of taking through the river."

He says two other bridges are being built and another 10-15 are being built in the future.

Simon Towle
Fish and Game

.. and Landowner Environmental Plans aim to reduce contamination by 80% ..



Example LEP actions

Stream fencing
Riparian planting
Stream culverts
Wetland protection
Stock Troughs
Nutrient Management
Erosion plantings
Stormwater control
Deferred effluent irrigation



So why did landowners participate?

7 ingredients for collaborative success

1. Institutional encouragement & support (incl \$\$)

“We need support from Council and science to reach our goal”

“The independent facilitation by NZ Landcare Trust kept us on track”



7 ingredients for collaborative success

2. Good relationships between stakeholders

“Working together shares the load and helps to keep everyone focused.”

“The landowners here regard this valley as our place and our home.”

“ICM works with landowners; offending farmers doesn't.”



7 ingredients for collaborative success

3. Clear roles and goals

“We want our children to be able to swim in the river again.”

“We want to minimise farming’s impact on the environment. I want our farming business, in the dairy industry 50 years from now.”



7 ingredients for collaborative success

4. Quality of leadership

“Leadership emerged from the landowners rather than being dictated by any formal election process.”

“Council rules need to be in place to pull up major transgressions.”



7 ingredients for collaborative success

5. Good information & communication

“The information on existing water quality and where it was worst, surprised some landowners”

“The objectivity and non-judgemental nature of the advice was appreciated”

“having a field day or meeting meant we discussed a wide range of issues beyond those for which the event was organised.”



7 ingredients for collaborative success

6. Opportunities to develop common understanding, and share knowledge and skills

“Field days were opportunities to see what the neighbours are doing, to talk about environmental issues among different land-use types, and to air differences.”

“Best Practices can only minimise adverse environmental effects, not remove them entirely.”



7 ingredients for collaborative success

7. Measure and celebrate success

“Our community has seen measurable results from the efforts of the local catchment group and I think that inspires us to keep working at it.”

“This project has helped lessen our environmental impact – and many have also been practical business investments.”

“Expenditure (without labour) over the past five years totalled \$270,000, plus ‘thousands of dollars’ by forestry landowners. For the next two years, planned expenditure is about \$150,000.”



ICM – a model for sustainable land & water management





QUESTIONS ABOUT THE FUTURE

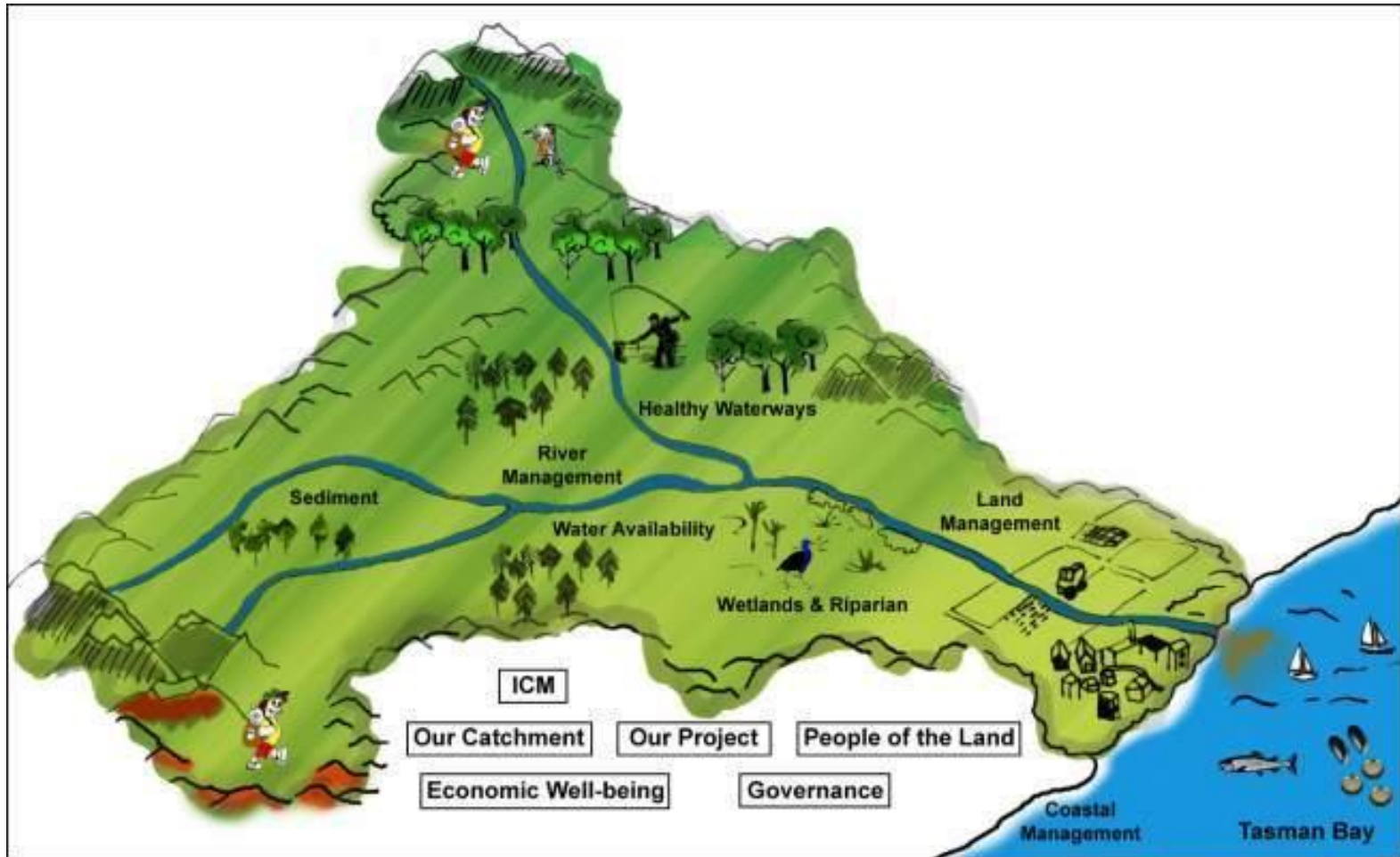
1. Are there limits to where we can intensify land use in NZ?
2. How can I comply with catchment water quality limits if I'm just one contributor?
3. What about those other activities that cause the problems downstream?
4. How can I minimise costs that come with regulations around water?



icm.landcareresearch.co.nz



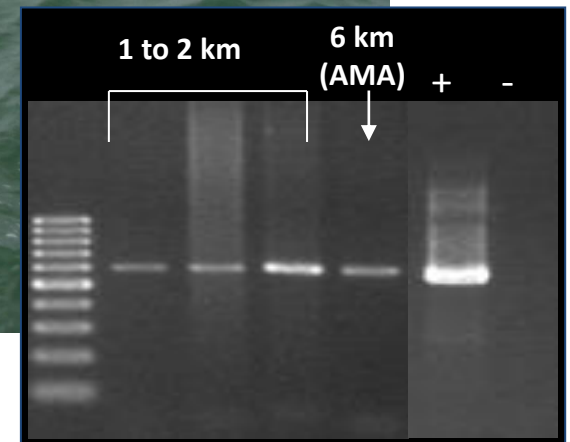
10 ICM 'Lessons'



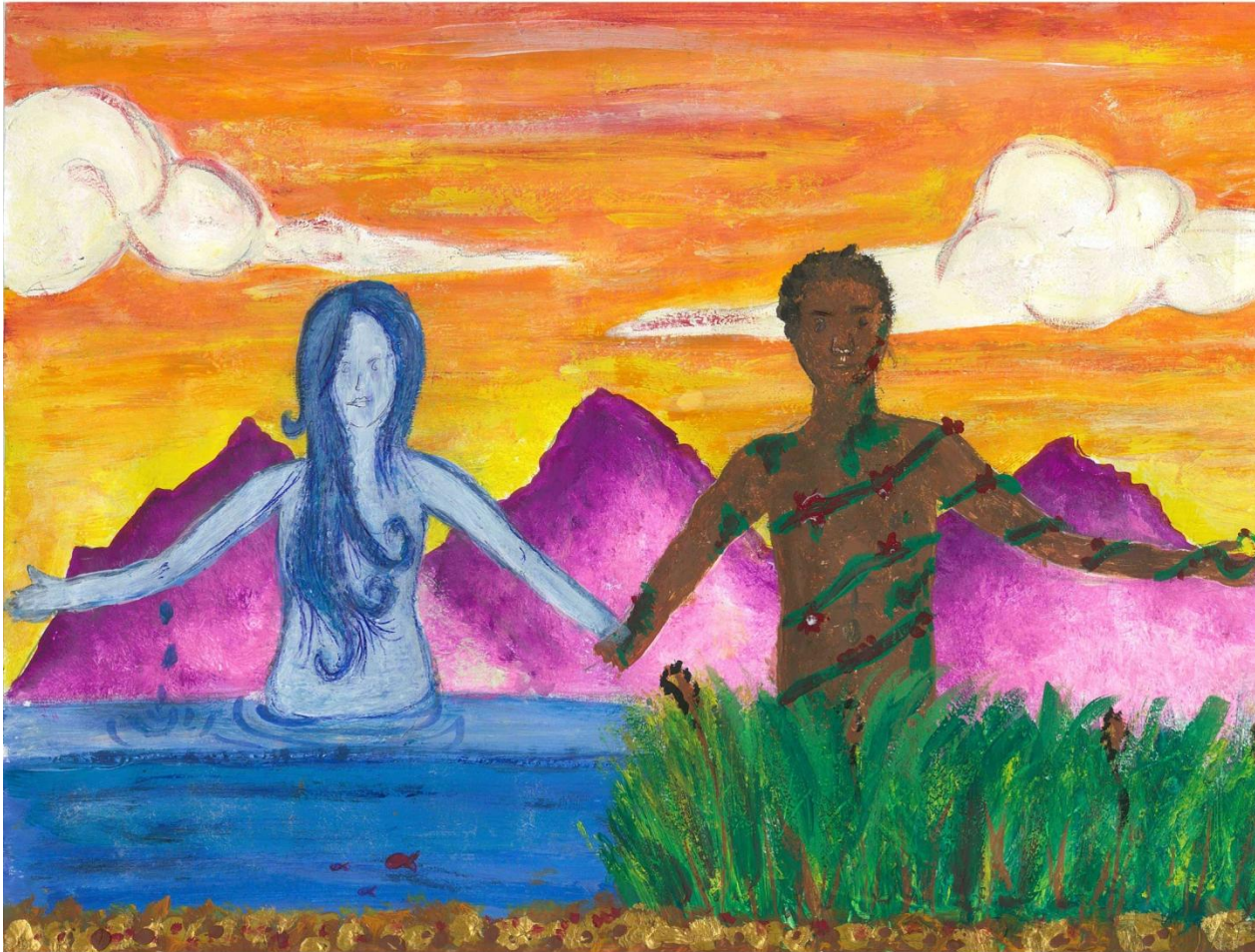
ICM is about people, people, people



Catchments extend off the coast



Everything is connected to everything else



"All is One" Tegan Lamont, Motueka High School

Look at different scales – zoom in, zoom out

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 good news story" and the envi-

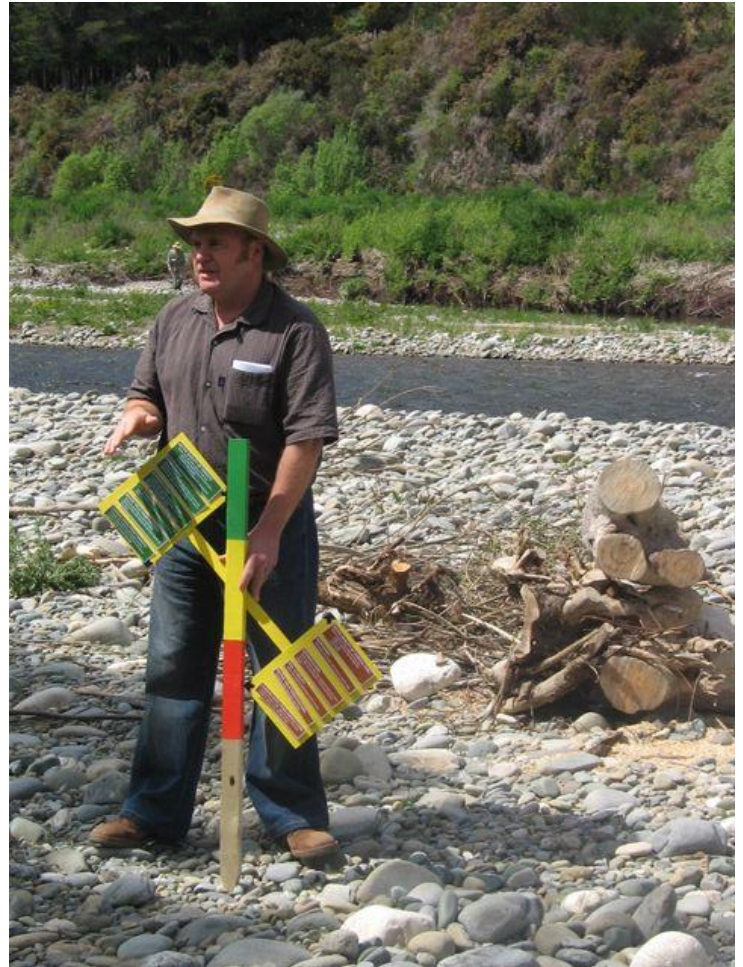


new information in December 2001, "the Sherry farmers undertook to take action. In a short period of time, the crossing on Frank and Lisa White's property where the experiment was carried out has now been bridged. In addition, another farmer, Rod O'P, is using a bridge instead of taking stock through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

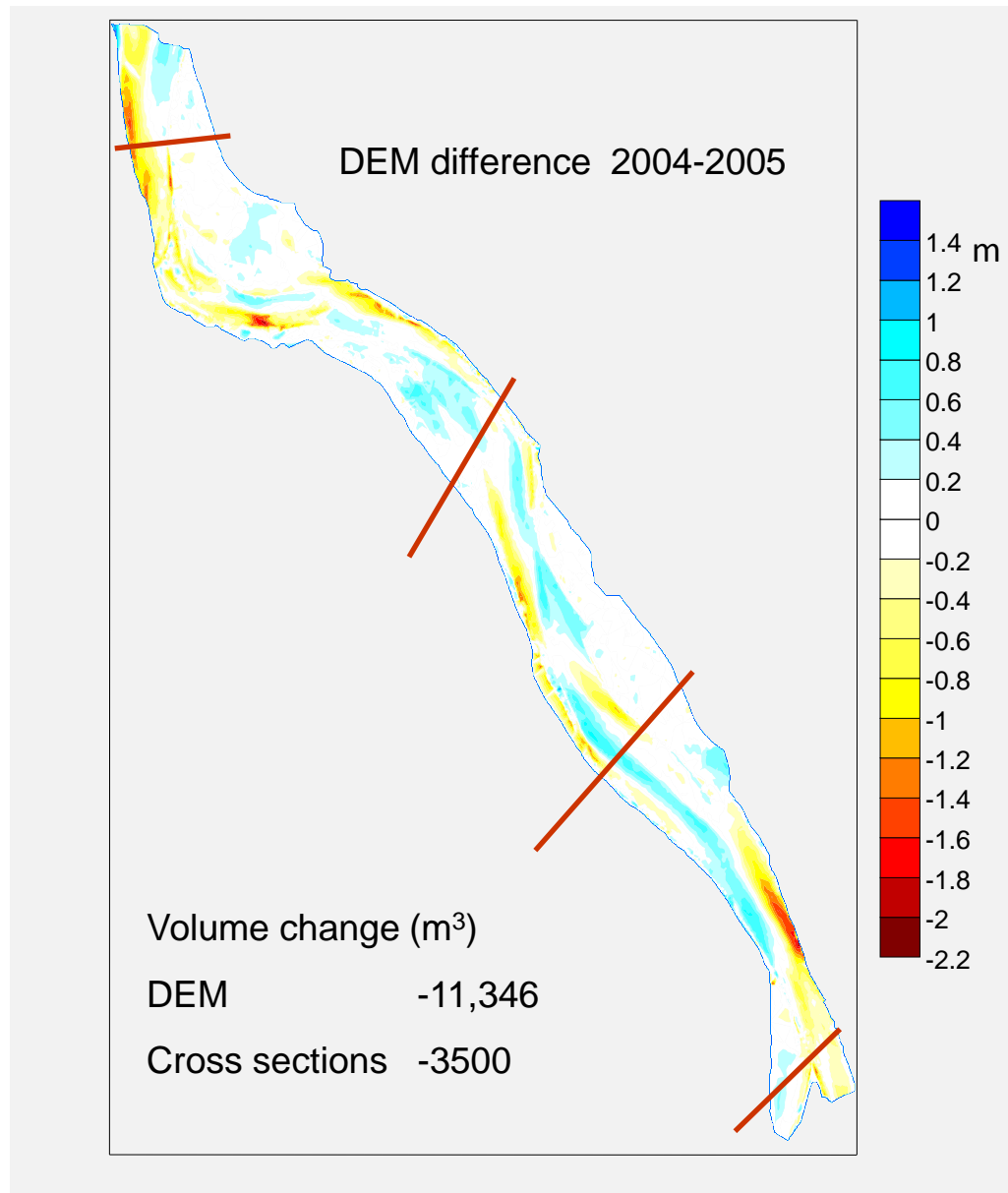
He says two other bridges are in the planning stages and substantial financial assistance is being sought to keep stock out of the river.

Tasman District Council assistance is available for farmers who want to improve their land.

Relationships take time



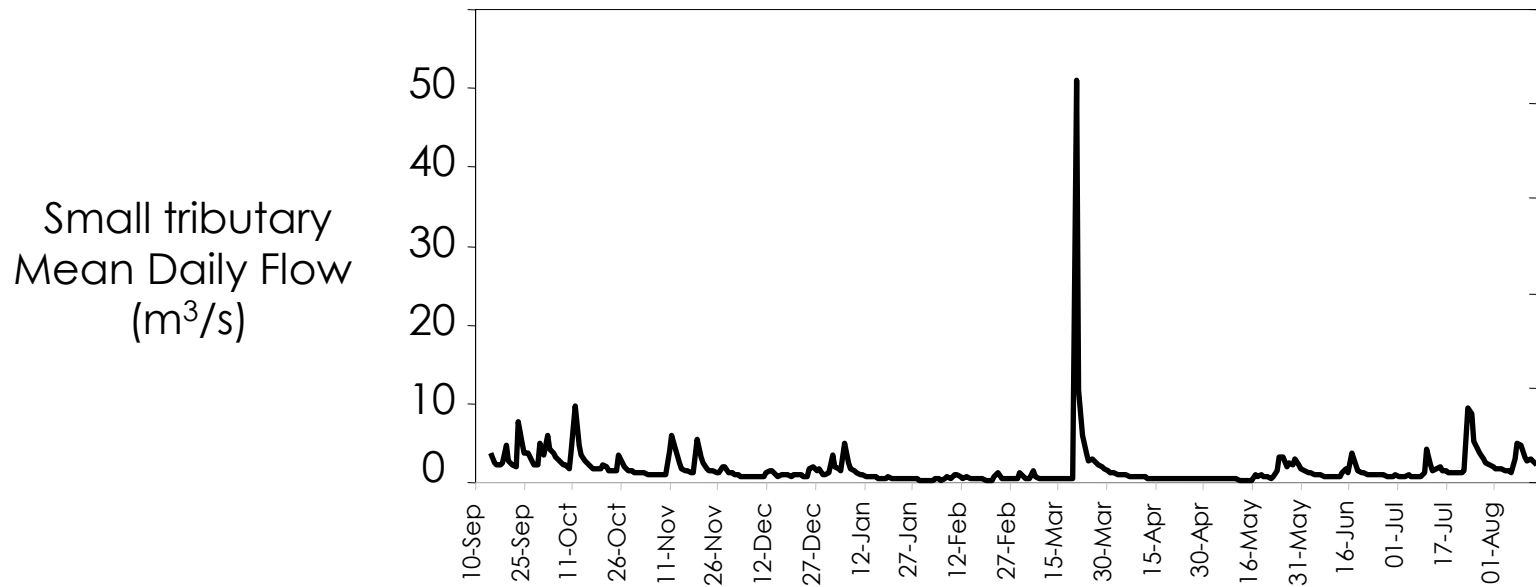
Collaboration beats confrontation



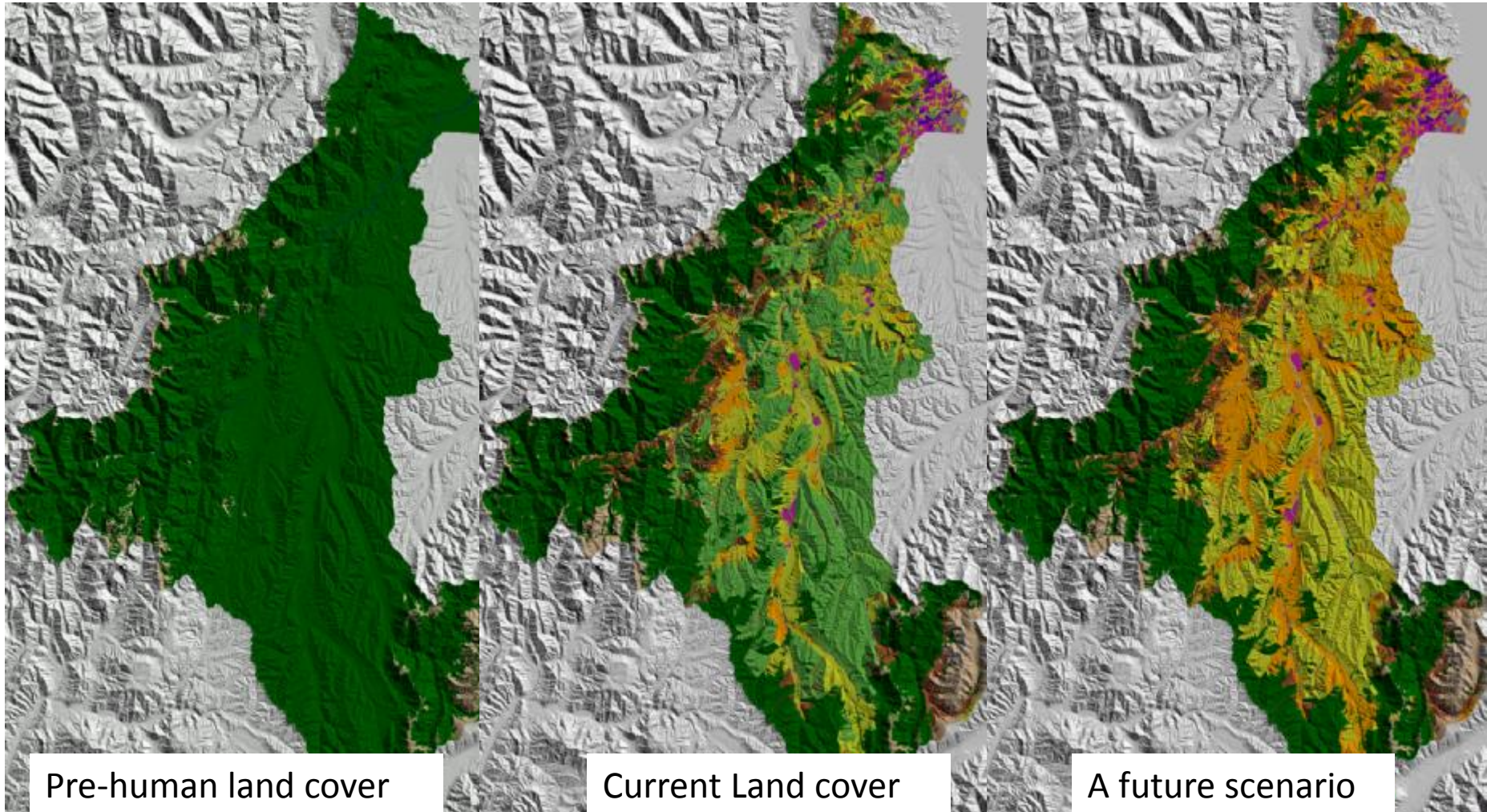
Manage expectations



Critical events have long lasting consequences



Communities need to design their future not wait for it to happen



Long-term datasets are critical for understanding changes in the environment

