Enabling collaborative investment in sustainable infrastructure to restore catchment resilience

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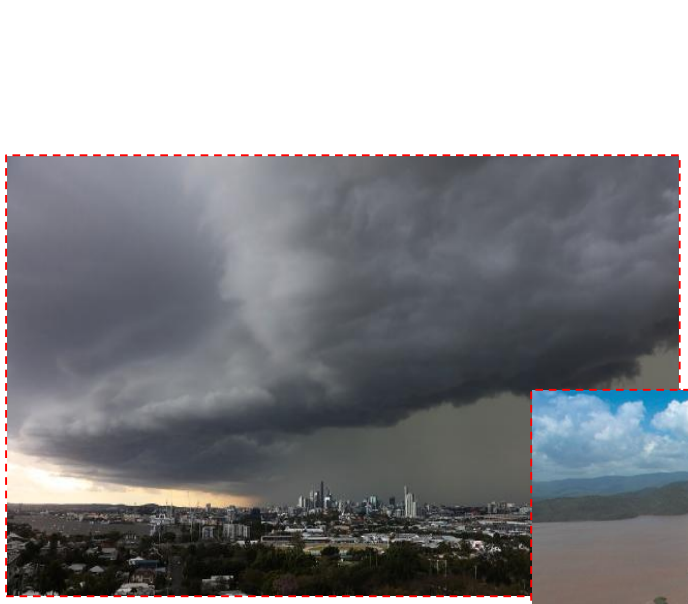
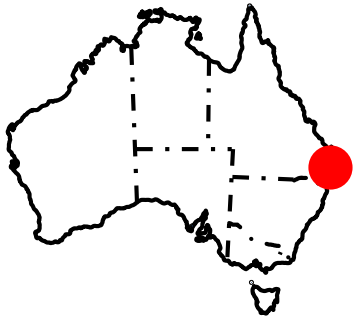
Sustainable Water Future Programme

Diffuse pollution - major threat to waterways





Justin Gilligan

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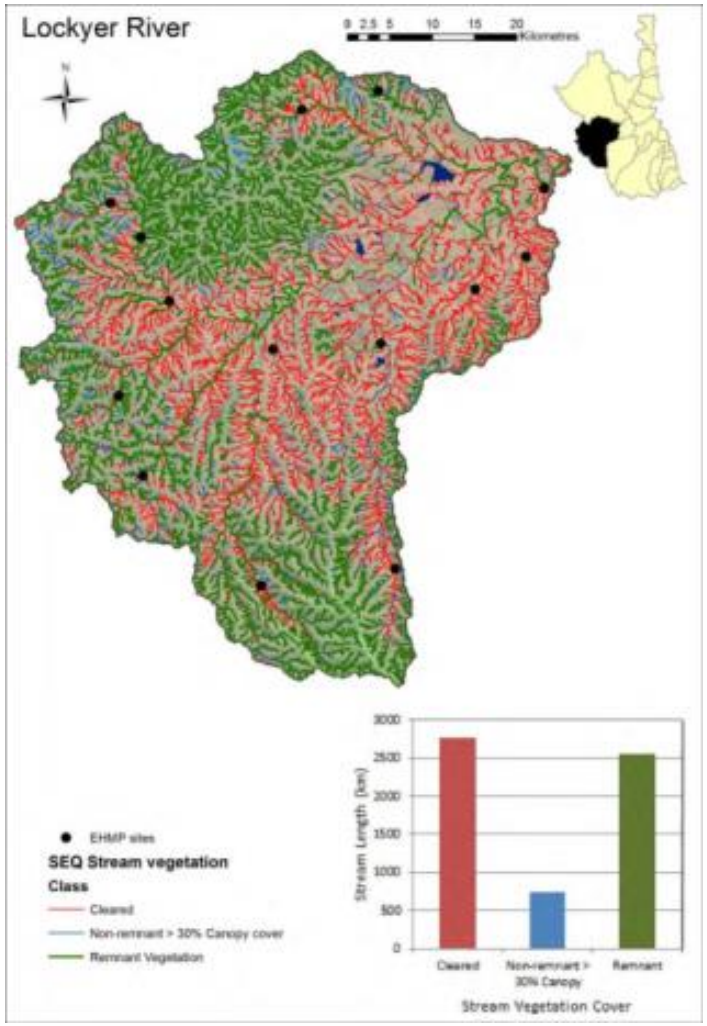
Healthy land & water

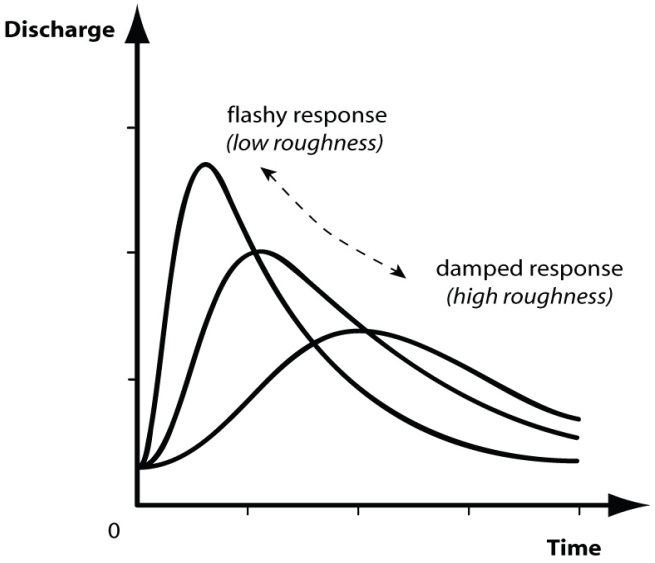
Major sources – degraded riparian lands

Legacy issues – clearing of catchment and riparian vegetation



Compounded by altered hydrology

- Reduced interception – cleared catchment vegetation
- Flashier flows in response to intense rain events
- Concentrated flow in gullies and channels



Not just an environmental problem

Significant economic and social costs

- flood damage to infrastructure
- loss of valuable farmland
- increased costs of water treatment
- costs of dredging
- loss of water storage

Drinking water threat for Brisbane as city escapes major flooding

JAMIE WALKER AND JARED OWENS THE AUSTRALIAN JANUARY 29, 2013 4:13PM

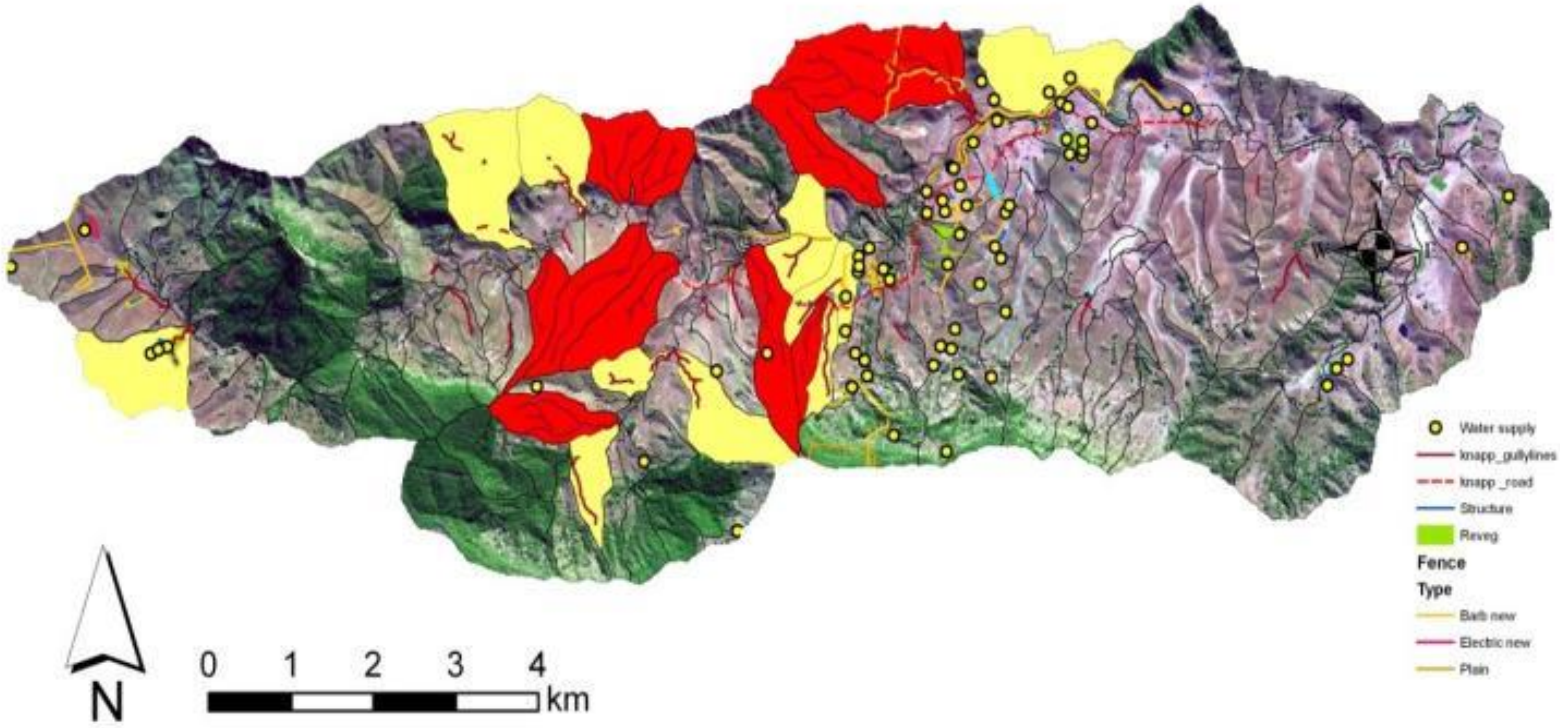
Need to make freshwater systems more resilient, especially in the face of climate change

Building Catchment Resilience – SE Queensland

- Local and state governments interested in reducing soil loss from farms and mitigating flood risk
- Urban water utility interested in nitrogen offsets
- Port Authority interested in reducing dredging costs
- Water supply utility interested in reducing costs of potable water treatment
- NGO and others interested in reducing threats to coastal ecosystems

Requires targeted investment

Spatial problem – often, most of the pollution comes from a small proportion of the channel network



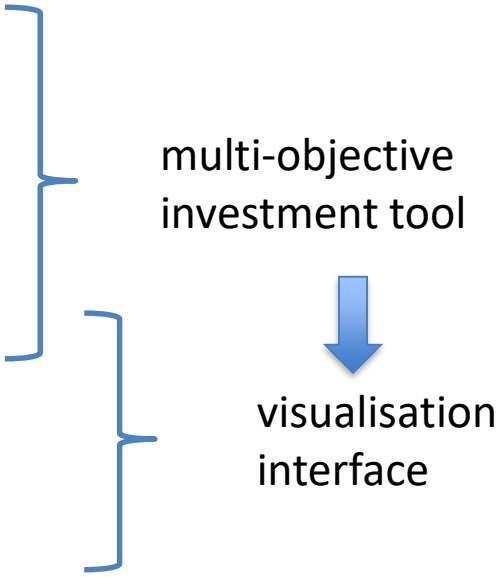
Red areas: ~10% catchment area, ~60% sediment supply
Yellow areas: ~10% catchment area; ~20% sediment supply

Challenges …

Our project:

How to:

- choose what actions where?
- optimize investment?
- reach consensus?
- build confidence?

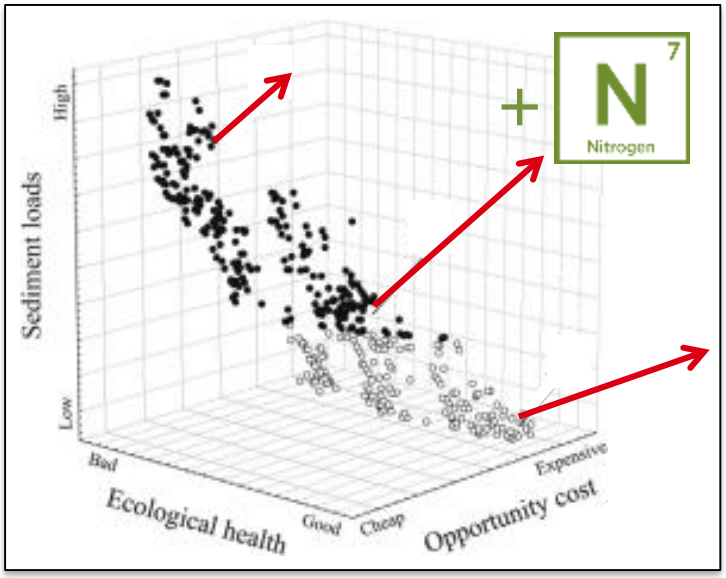


Multi-objective restoration planning

How to:

- choose what actions where?
- optimize investment to maximum benefits for least cost

restore gullies



Restore riparian zones

Hermoso *et al*. (2015). *Ecological Modelling* **316**, 168–175.

Visual interface

Visualize the outcomes of different scenarios

Engage communities - explore scenarios

What actions can we take?

- altered fire and/or grazing regimes in the upper catchment
- increased channel/riparian roughness (riparian restoration; in-stream leaky weirs; farm dams)
- increased floodplain connectivity (ponding water)

Quantify costs/benefits, e.g.:

- Reduced flood impact
- Improved water quality (sediment, denitrification)
- Improved stream health
- Carbon sequestration

Questions?

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