Australian Rivers Institute

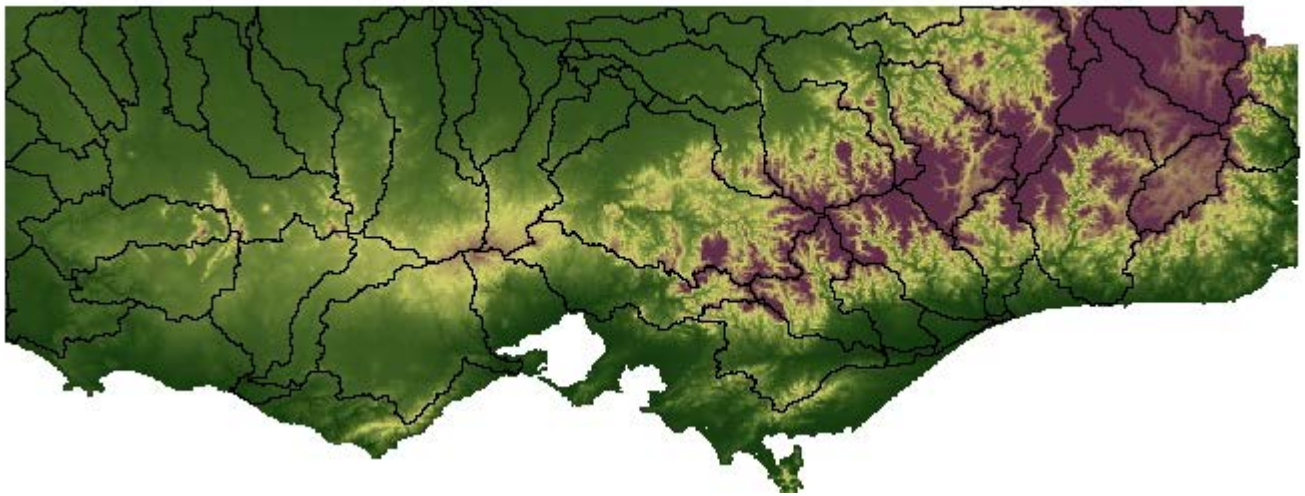
in 10 minutes

the past, present and future of freshwater conservation planning

simon linke, virgilio hermoso
australian rivers institute

conservation planning

- across a landscape, given limited budget: where to allocate conservation and restoration effort?
- maximum efficiency -> healthy environment and minimum impact on stakeholders



the principle of complementarity

unit								rich
A								5
B								5
C								3
D								3
E								4

the principle of complementarity

unit								rich
A	x	x	x	x			x	5
B	x	x	x	x			x	5
C	x	x					x	3
D			x	x	x			3
E	x	x				x	x	4

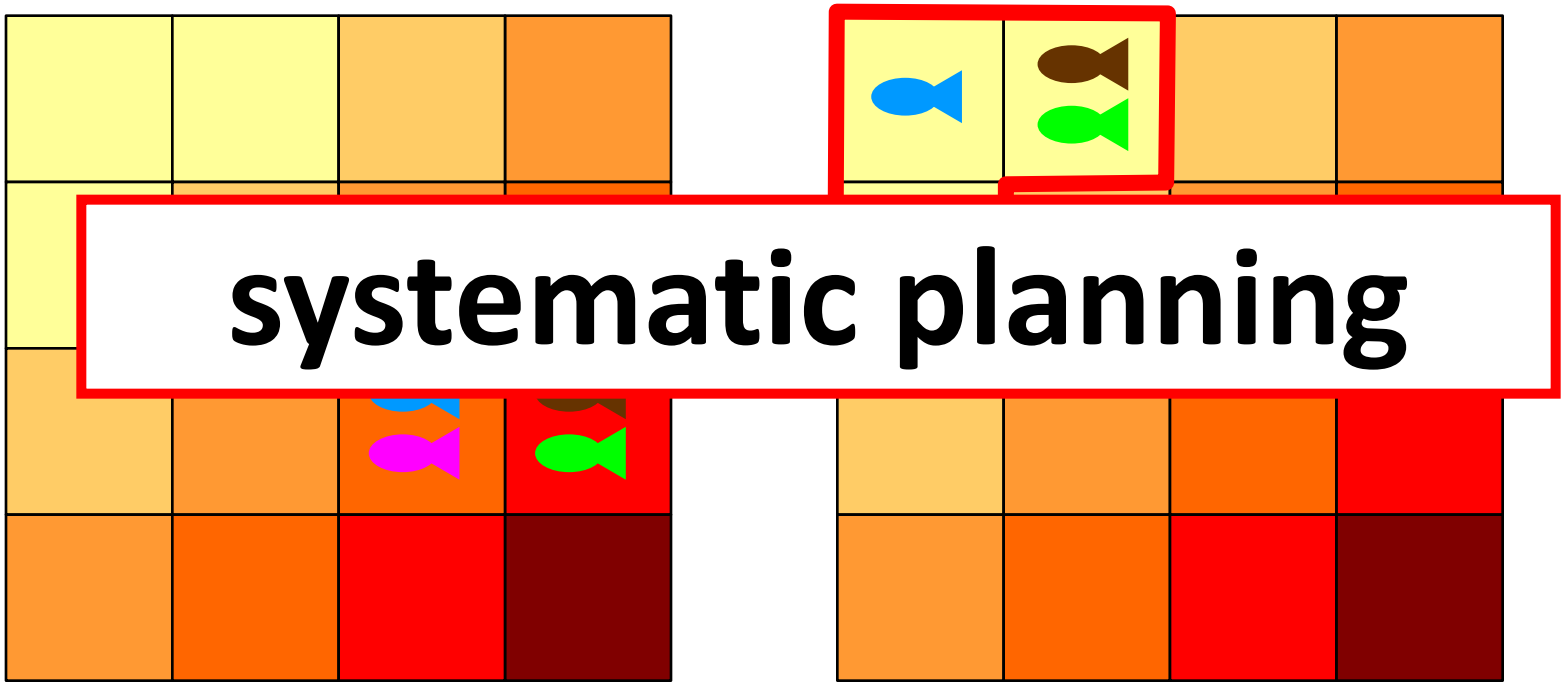
A + B → miss 2 taxa

only way to cover all taxa: D + E

complementarity

one needs to include cost

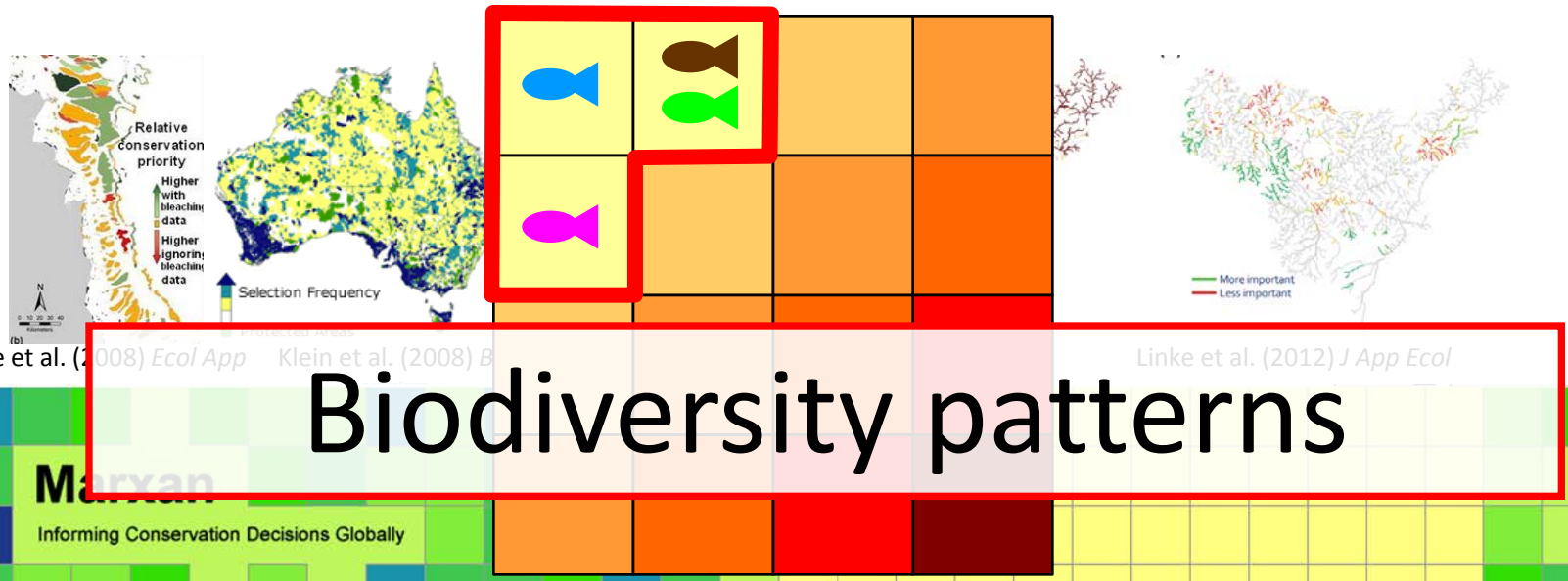
cost-effectiveness



- expensive +

optimisation algorithms

$$Objective\ function = \sum_{planning\ units} Cost + \sum_{features} Feature\ Penalty$$



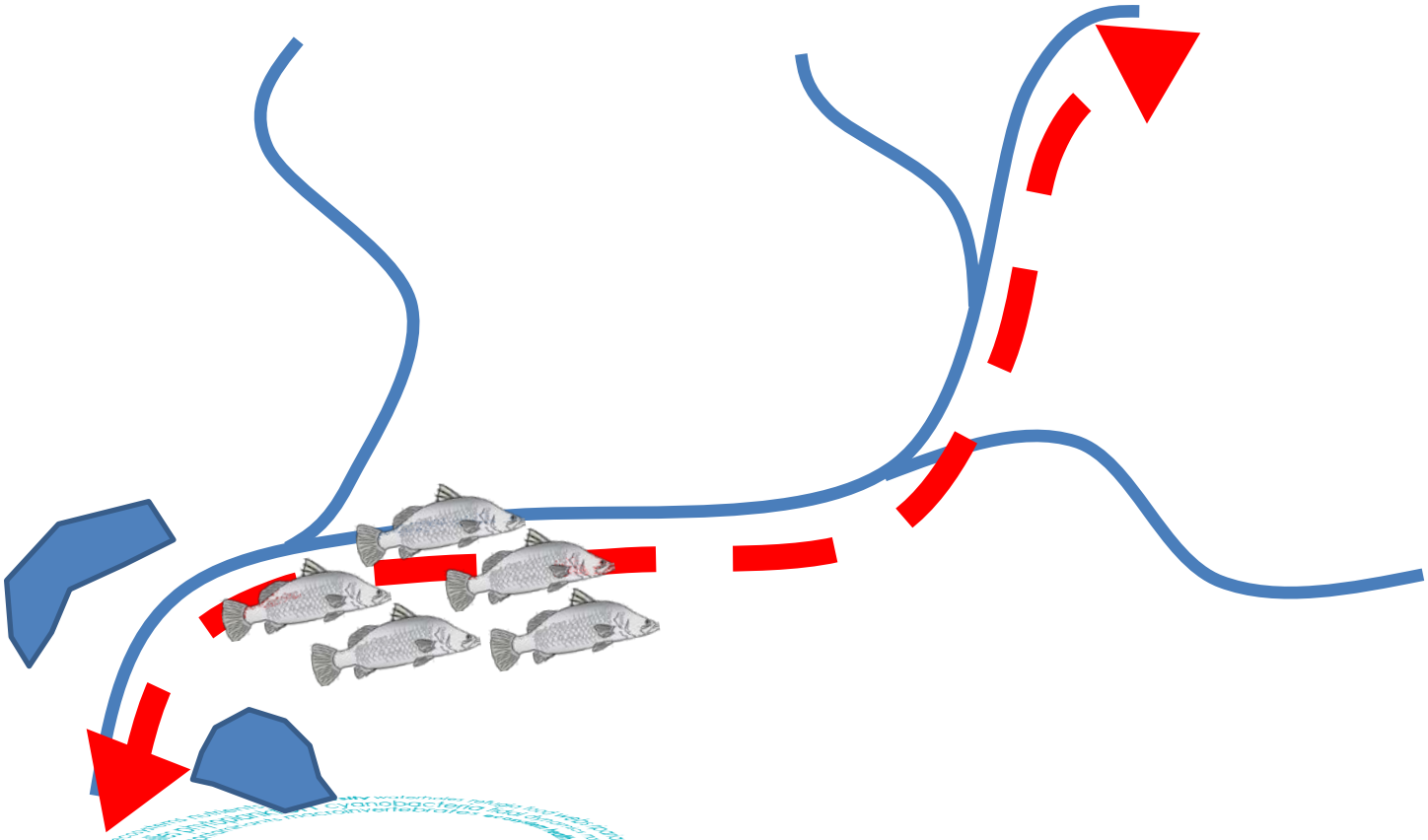
Game et al. (2008) *Ecol App* Klein et al. (2008) *B* Linke et al. (2012) *J App Ecol*

Biodiversity patterns

Marxan

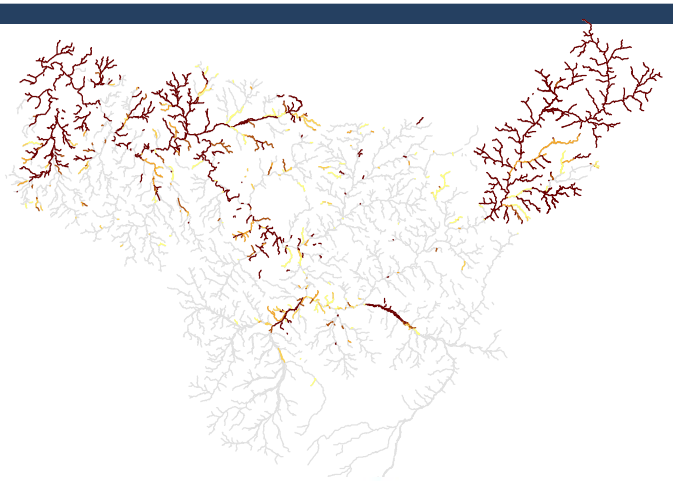
Informing Conservation Decisions Globally

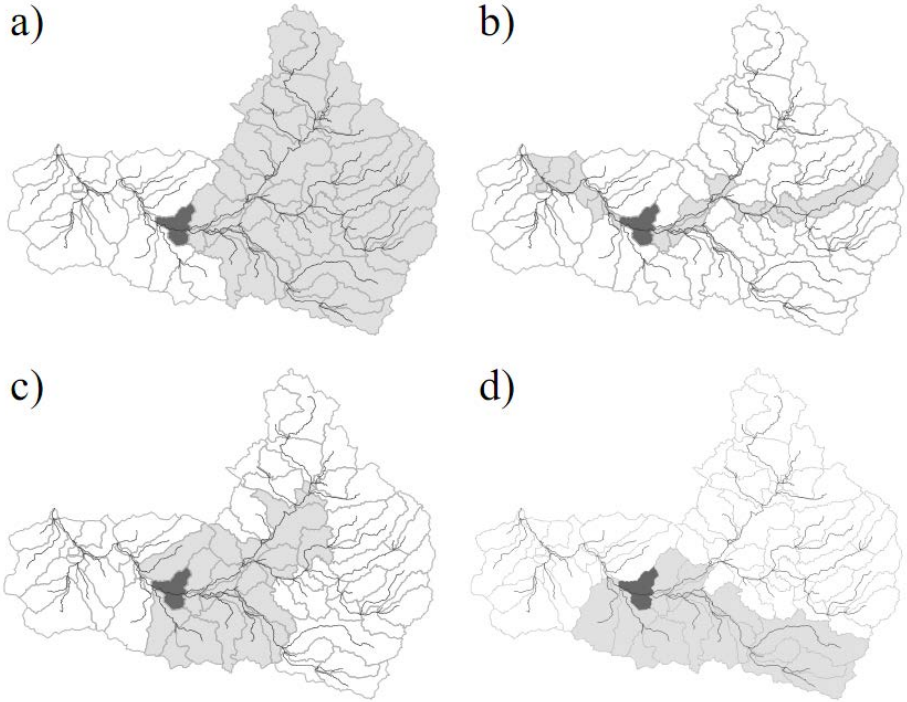
… but what about processes?



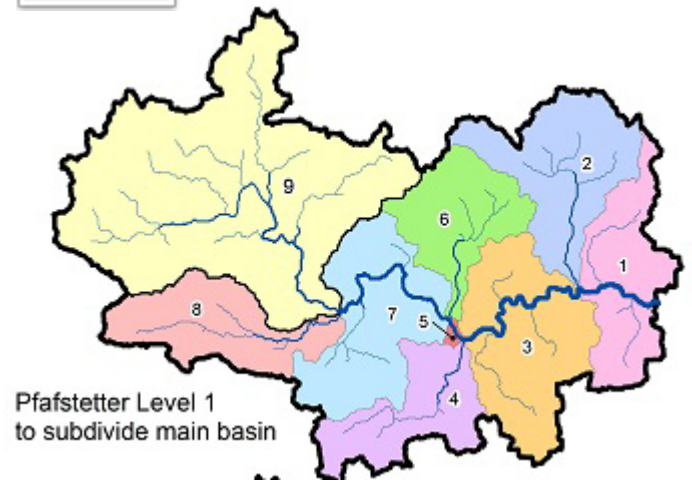
… but what about processes?

largely resolved: spatial aggregation





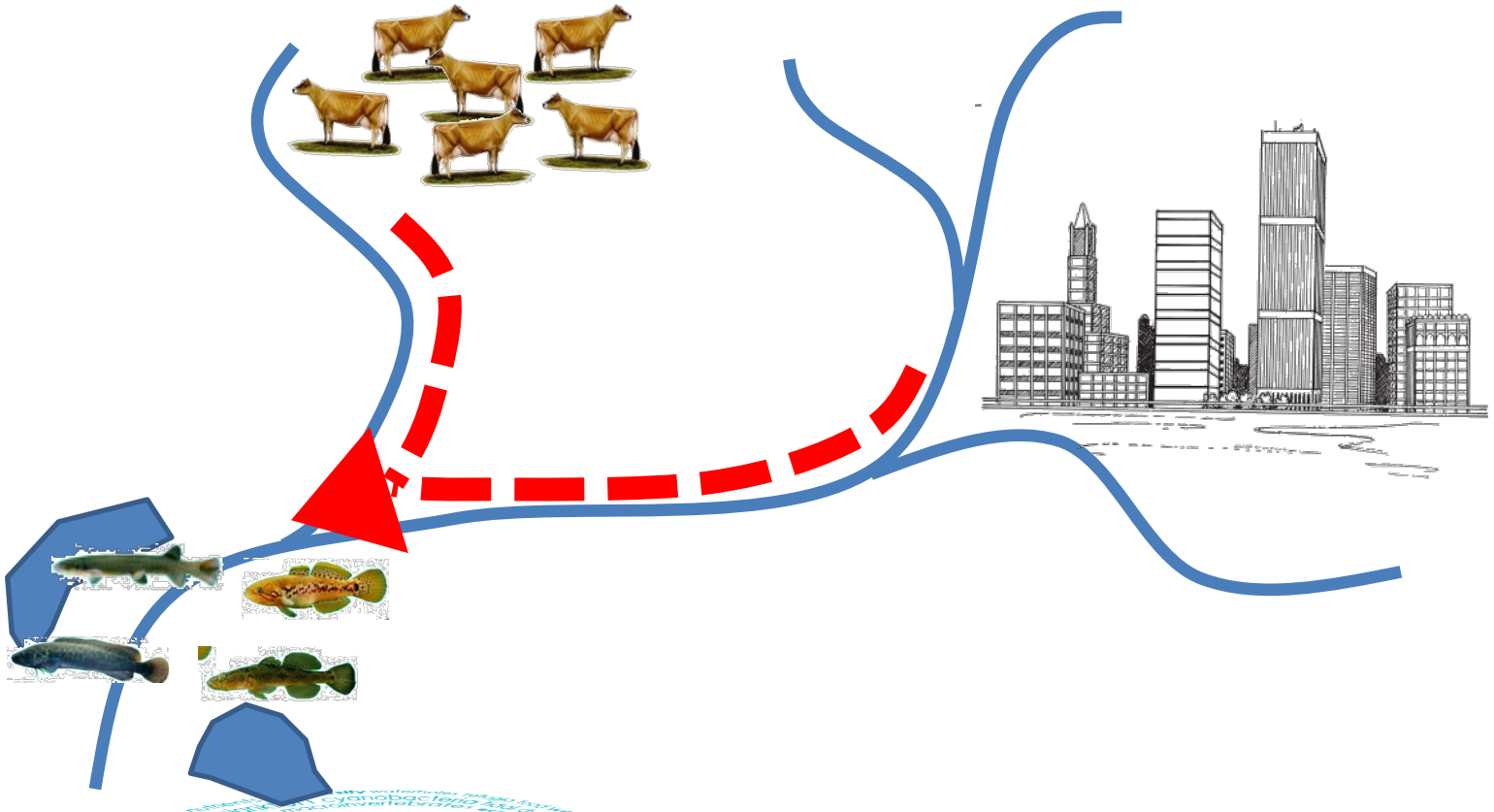
HydroSHEDS



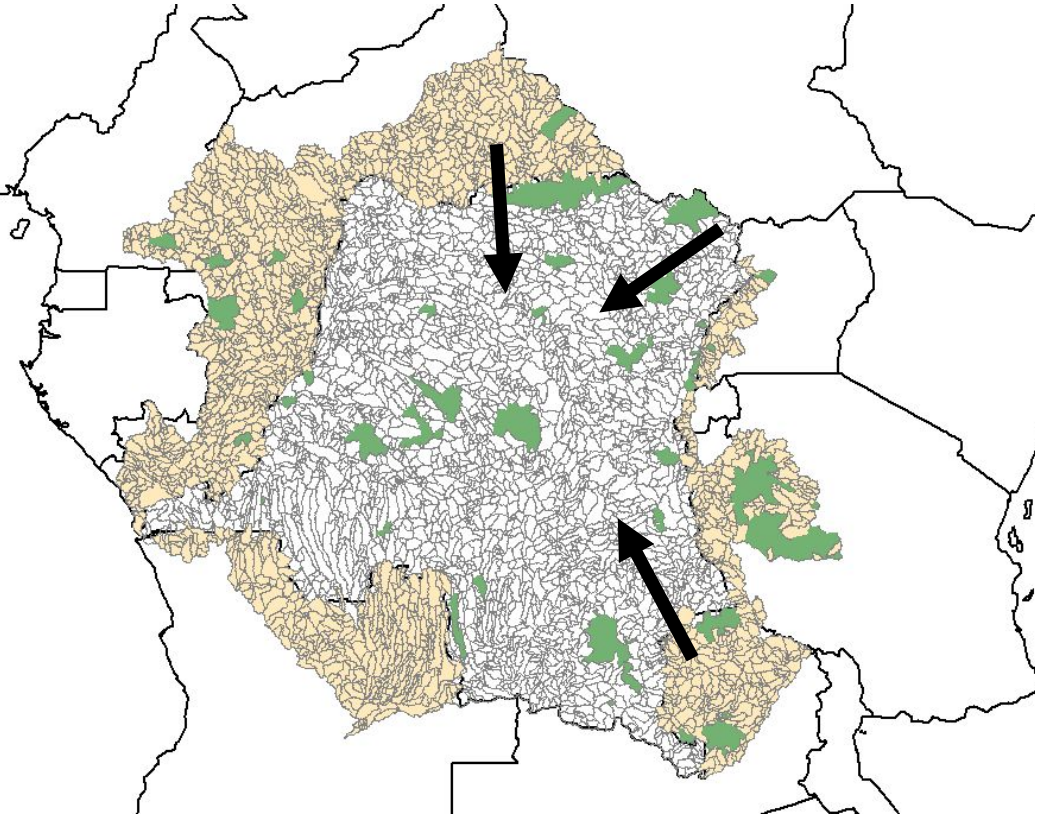
Australian Rivers Institute

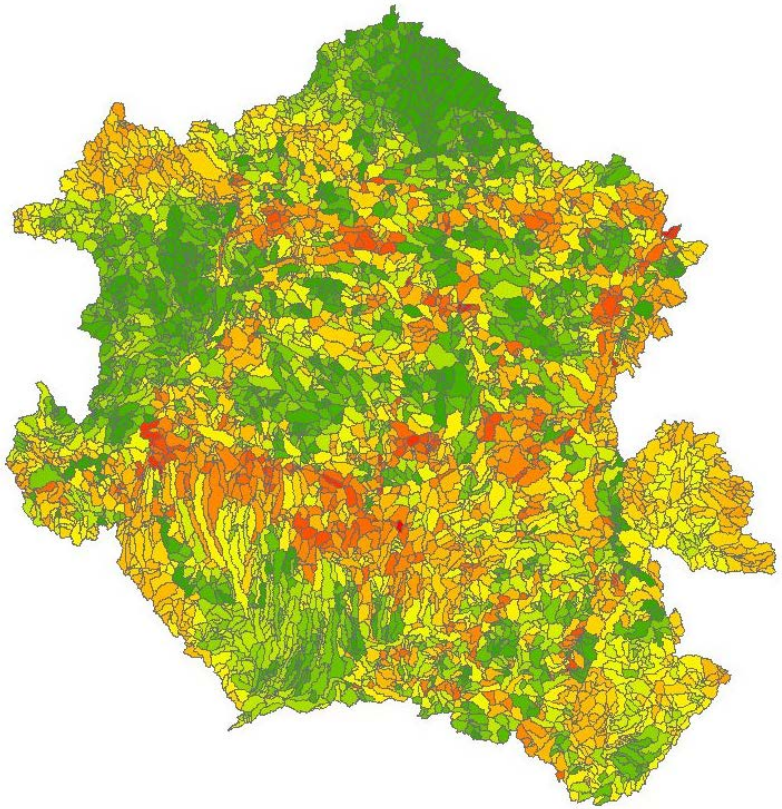
www.rivers.edu.au

… but what about processes?



largely resolved: river condition



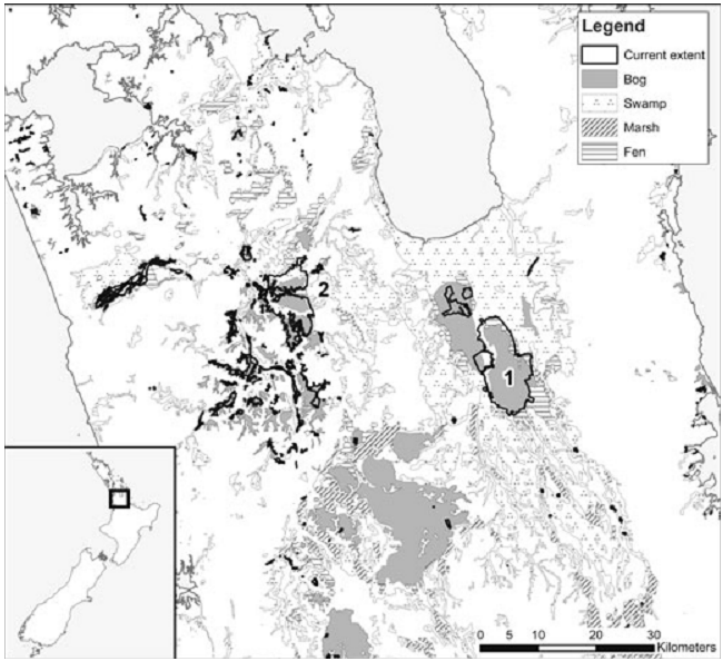


work in progress

more research needed

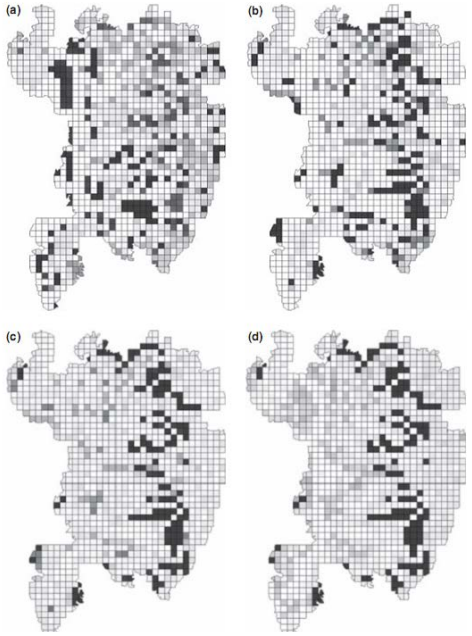
wetlands

- connections not explicitly addressed



Applying systematic conservation planning principles to palustrine and inland saline wetlands of New Zealand

ANNE-GAELLE E. AUSSEIL*, W. LINDSAY CHADDERTON†, PHILIPPE GERBEAUX‡, R.T. THEO STEPHENS§ AND JOHN R. LEATHWICK*

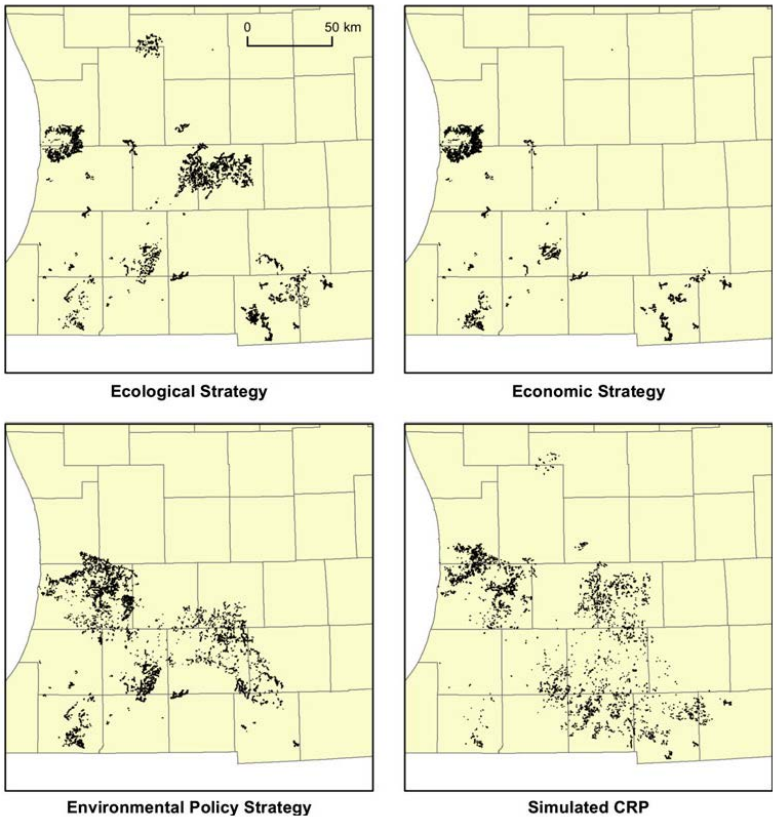


Planning for reserve adequacy in dynamic landscapes; maximizing future representation of vegetation communities under flood disturbance in the Pantanal wetland

Reinaldo Lourival[1,2,3]*, Martin Drechsler[4], Matthew E. Watts[2], Edward T. Game[1] and Hugh P. Possingham[2]

more research needed

how to integrate lakes



A Multi-objective, Return on Investment Analysis for Freshwater Conservation Planning

Daniel Boyd Kramer,[1]* Tao Zhang,[2] Kendra Spence Cheruvelil,[3] Arika Ligmann-Zielinska,[4] and Patricia A. Soranno[5]

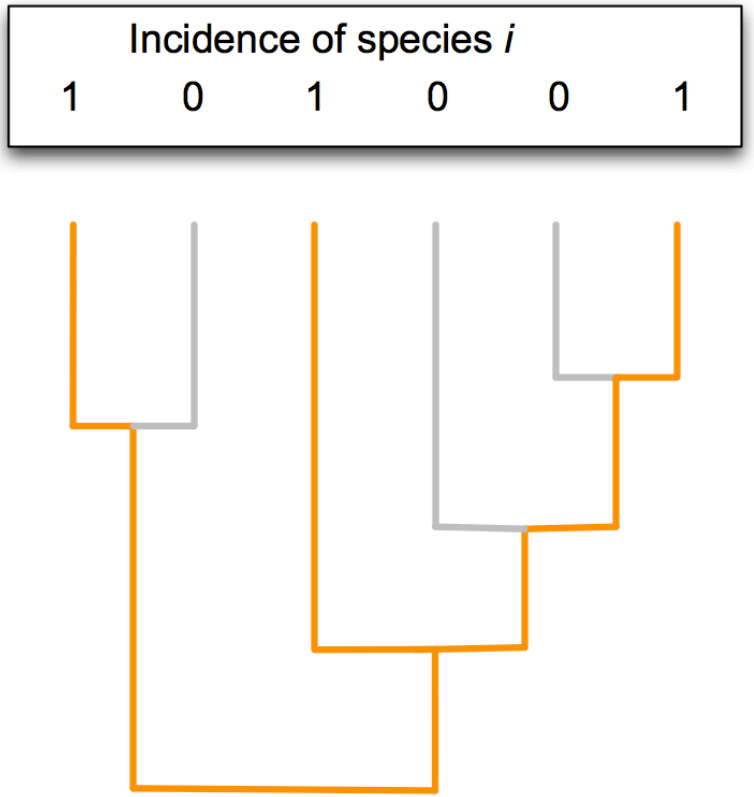
Linke, Hermoso, Thieme (in prep)
Conservation planning in the Congo basin

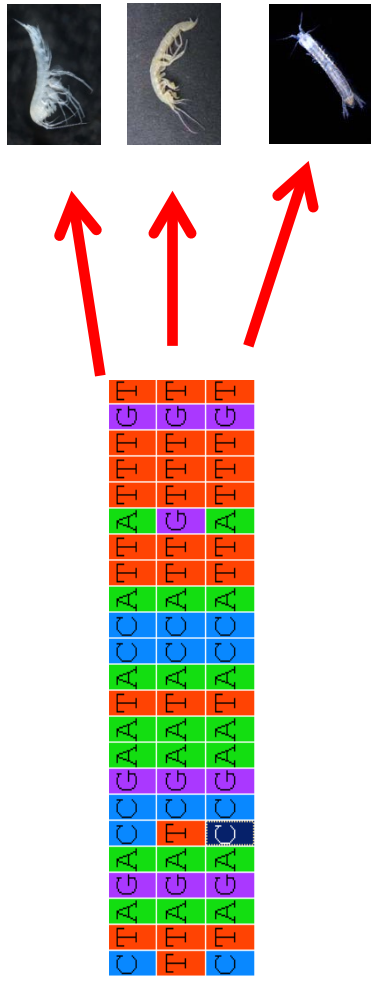
more research needed

genetic processes

maria gulbrandsen asmyhr

an estimated 77% of stygofauna in Australia remains undescribed





Australian Rivers Institute

largely unresolved

largely unresolved
temporal scheduling

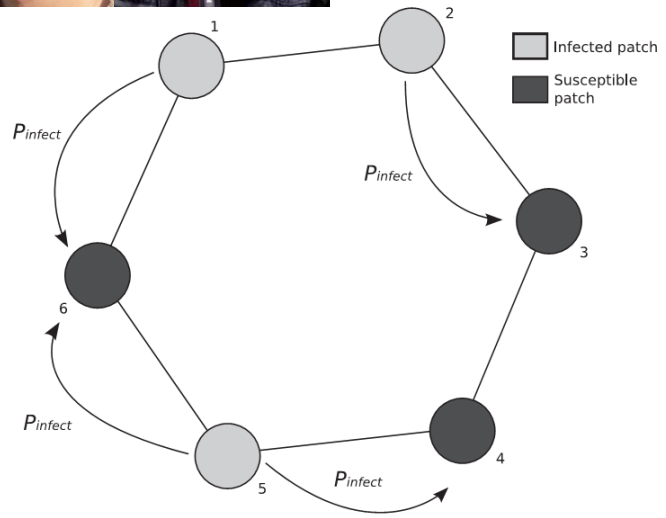
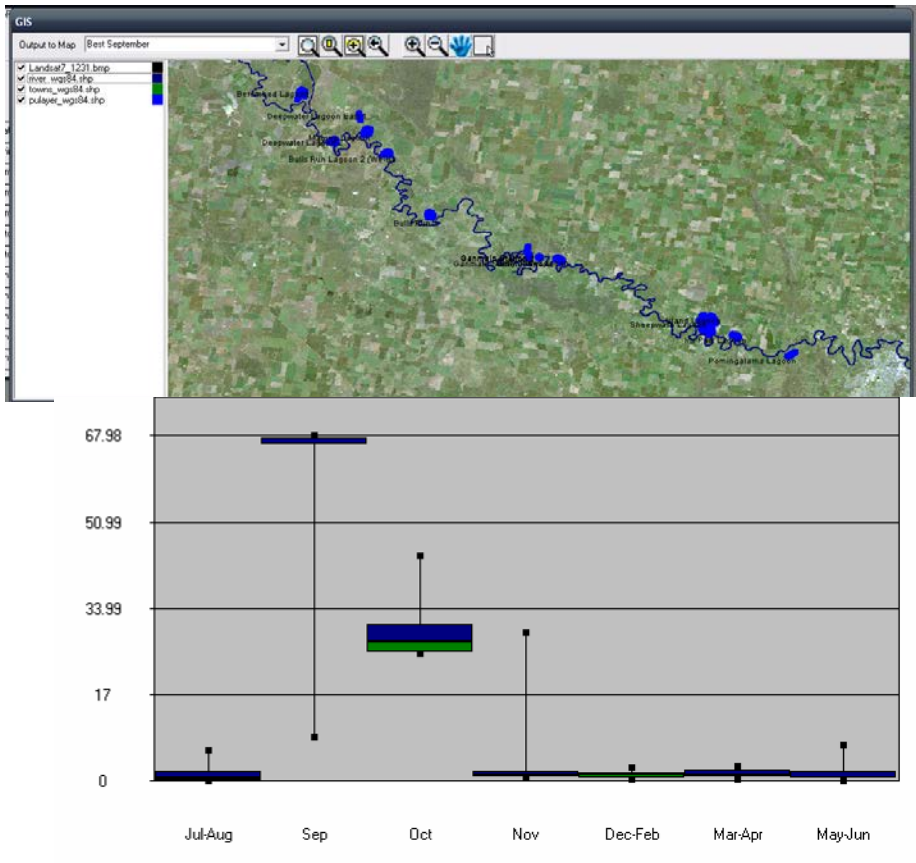


Fig. 2. The 6-patch ring structured metapopulation for the optimal eradication problem. Susceptible patches adjacent to infected patches can become infected with probability $P_{\text{infect}} \times I$, where I is the number of infected neighbours. Infected patches may only recover if managed. Managed patches recover with probability P_{recover}. For the 6-patch network, the number of possible states are $2^6 = 64$.

Beyond stochastic dynamic programming: a heuristic sampling method for optimizing conservation decisions in very large state spaces

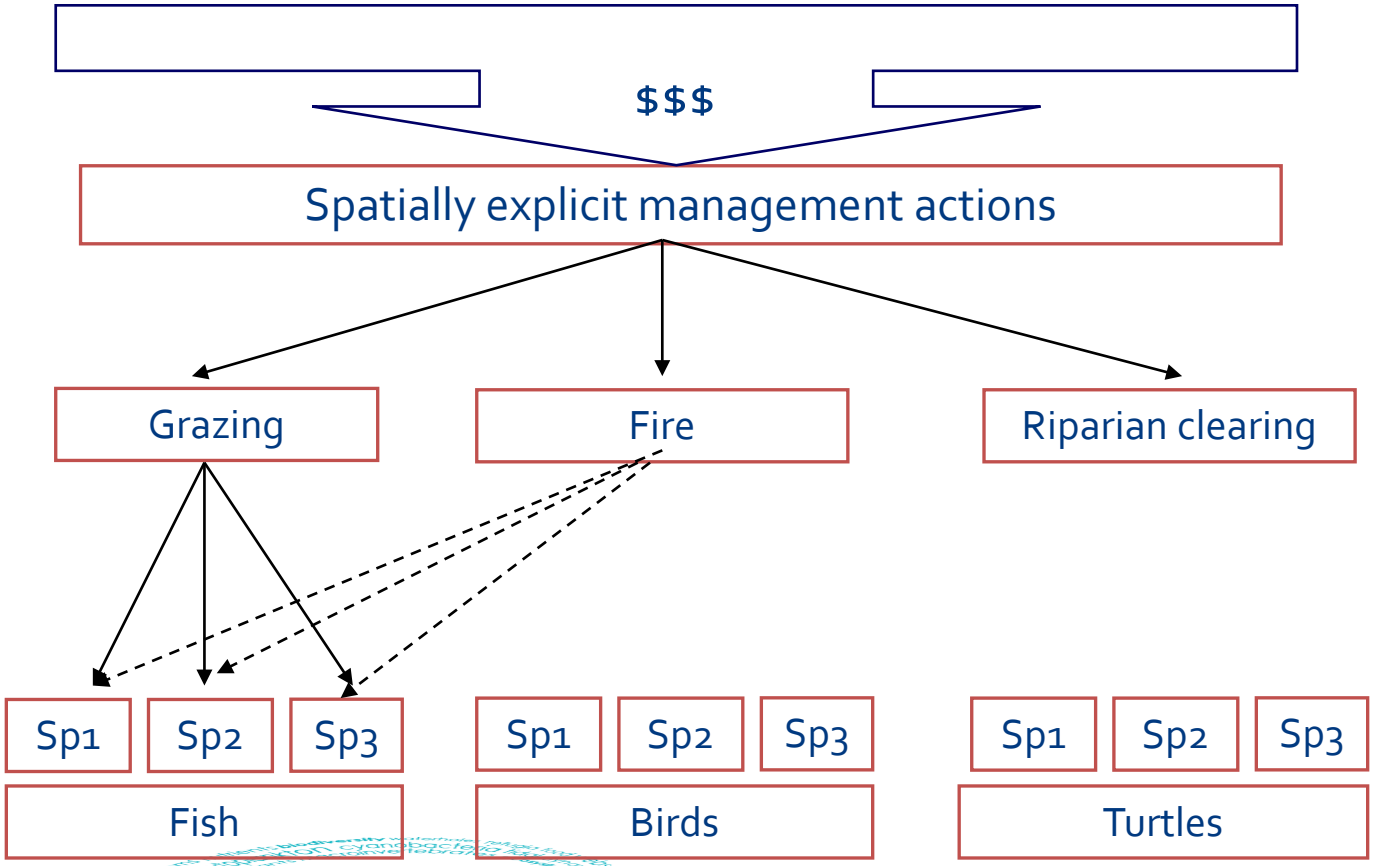
Sam Nicol[1]* and Iadine Chadès[2]



Testing the waters: optimising environmental water allocations

[1]Linke, S., [1]McMahon, J., [1]Januchowski-Hartley, S.R., [1]Olley, J., [2]Turak, E., [2]Blakey, R., [3]Watts, M. and [3]Possingham, H.

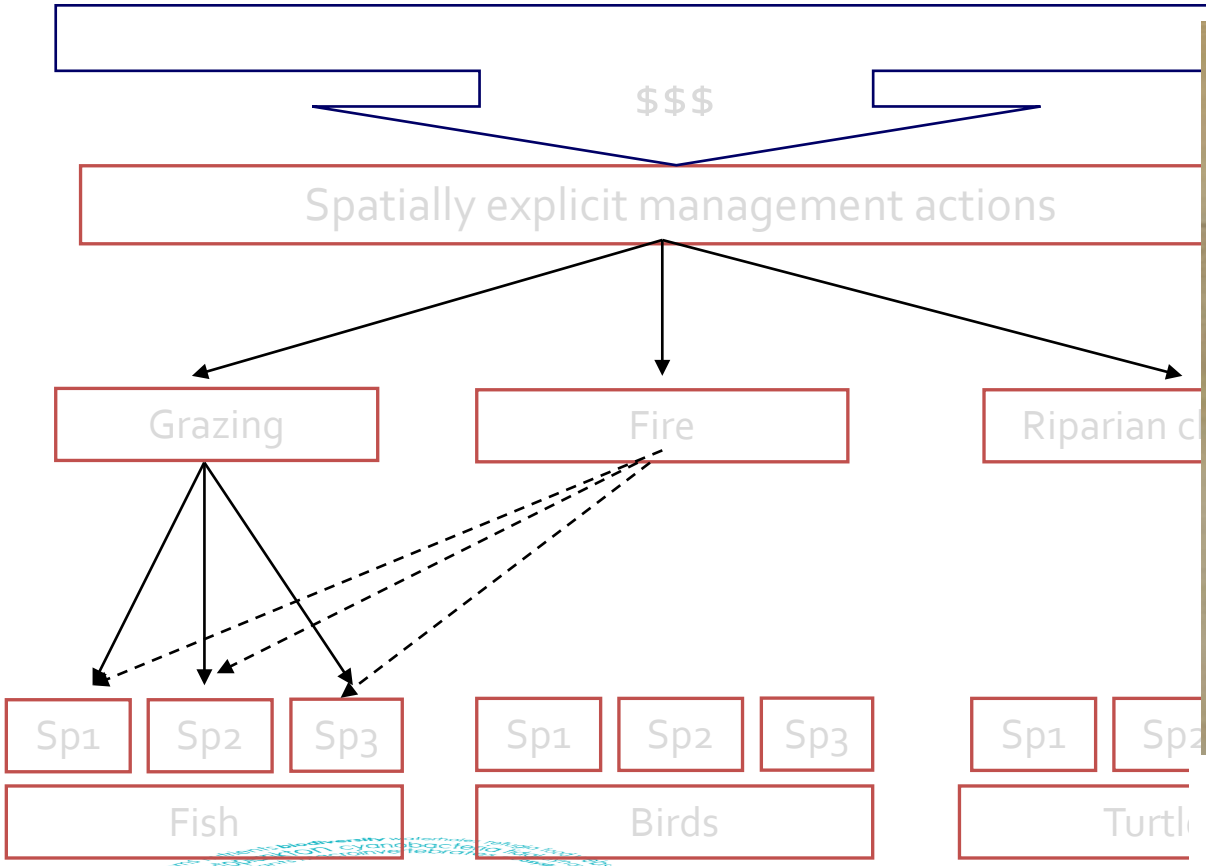
largely unresolved
multi- disturbance/ multi- response



Australian Rivers Institute

HE PRETTY MUCH SOLVED IT!

ARC DP– systematic planning beyond conservation



Dr Lorenzo Cattarino

Australian Rivers Institute

conclusions

- much has been achieved in the last 10 years
- some realms (lakes, wetlands) have been largely ignored
- a more process-based view needs to be taken