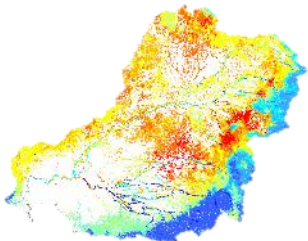


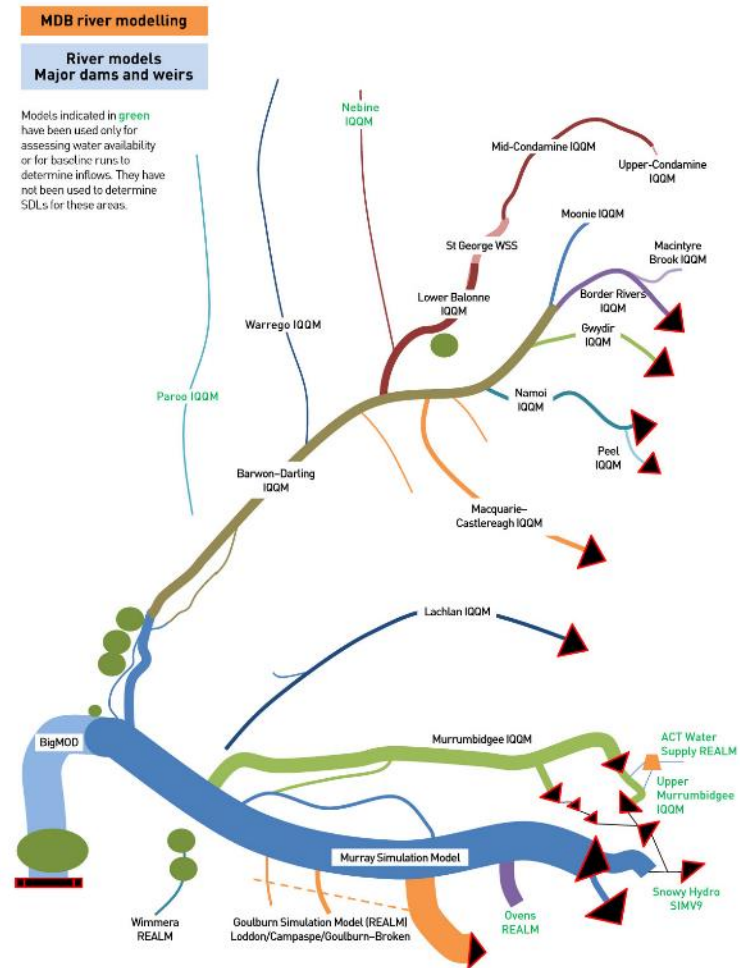
Protecting our catchments to conserve biodiversity in rivers and streams

Nick Bond

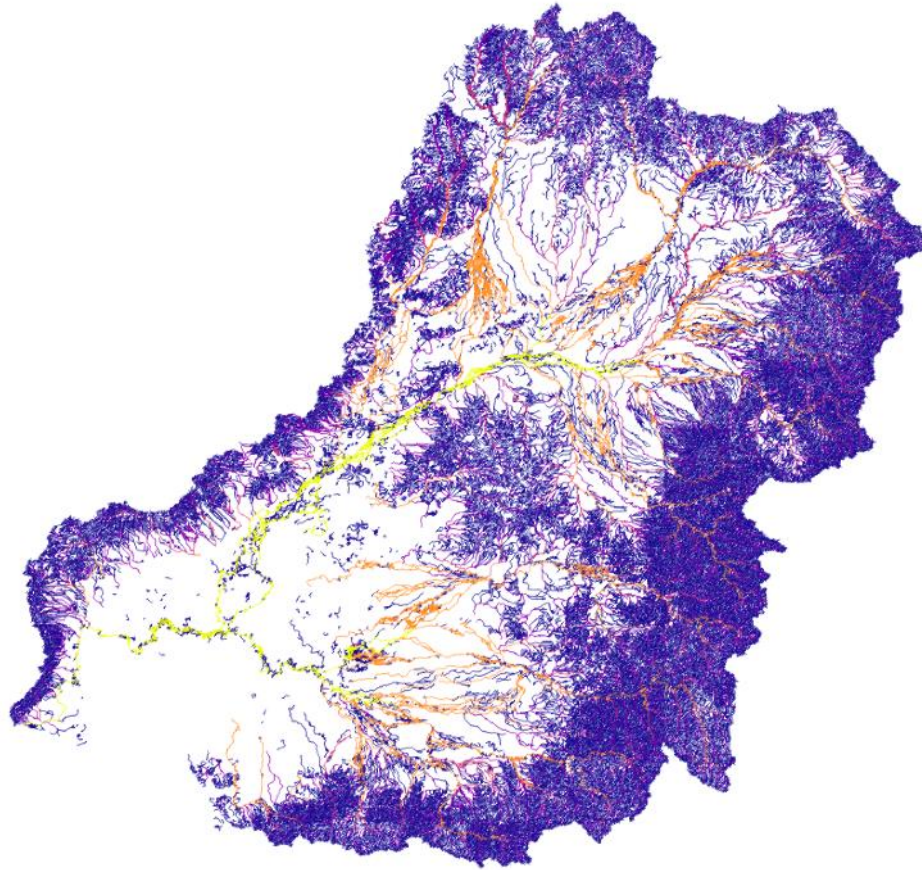
Latrobe University,
Albury/Wodonga, Australia



Different representations of the river network



Different representations of the river network







Basin scale perspective...

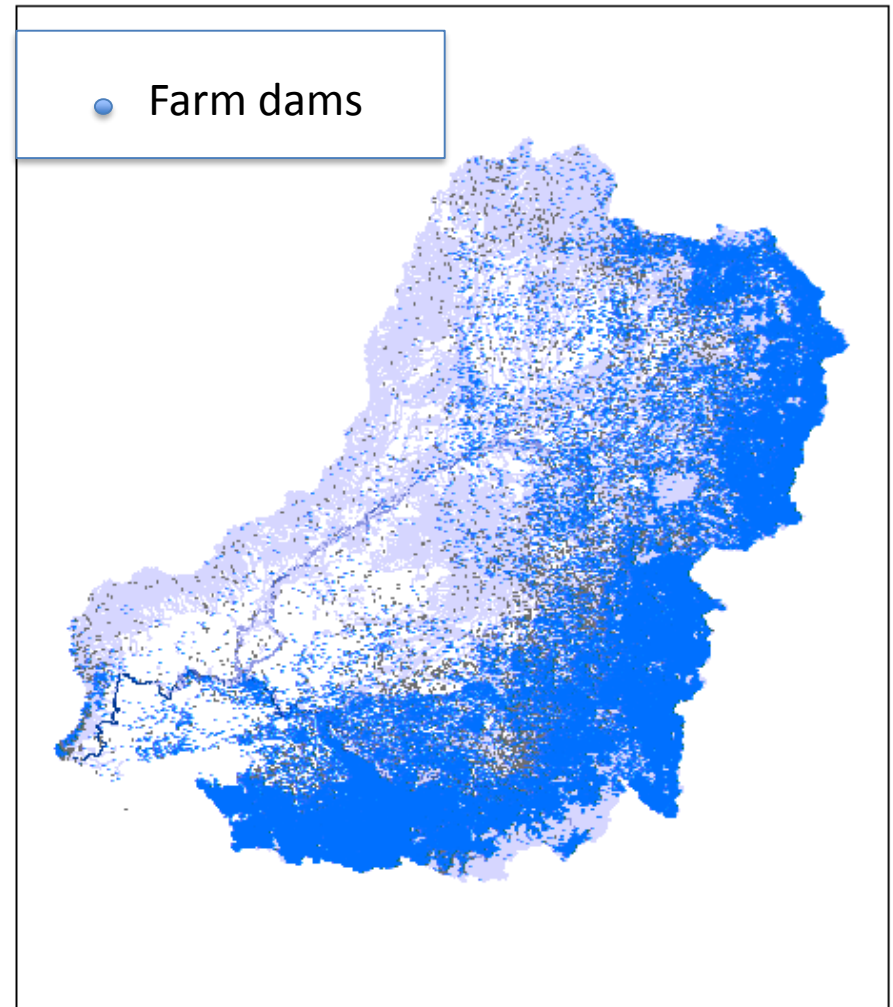
492956 large off-channel dams

217584 small farm dams

~2,380 GL is intercepted by farm dams (MDBA Data)

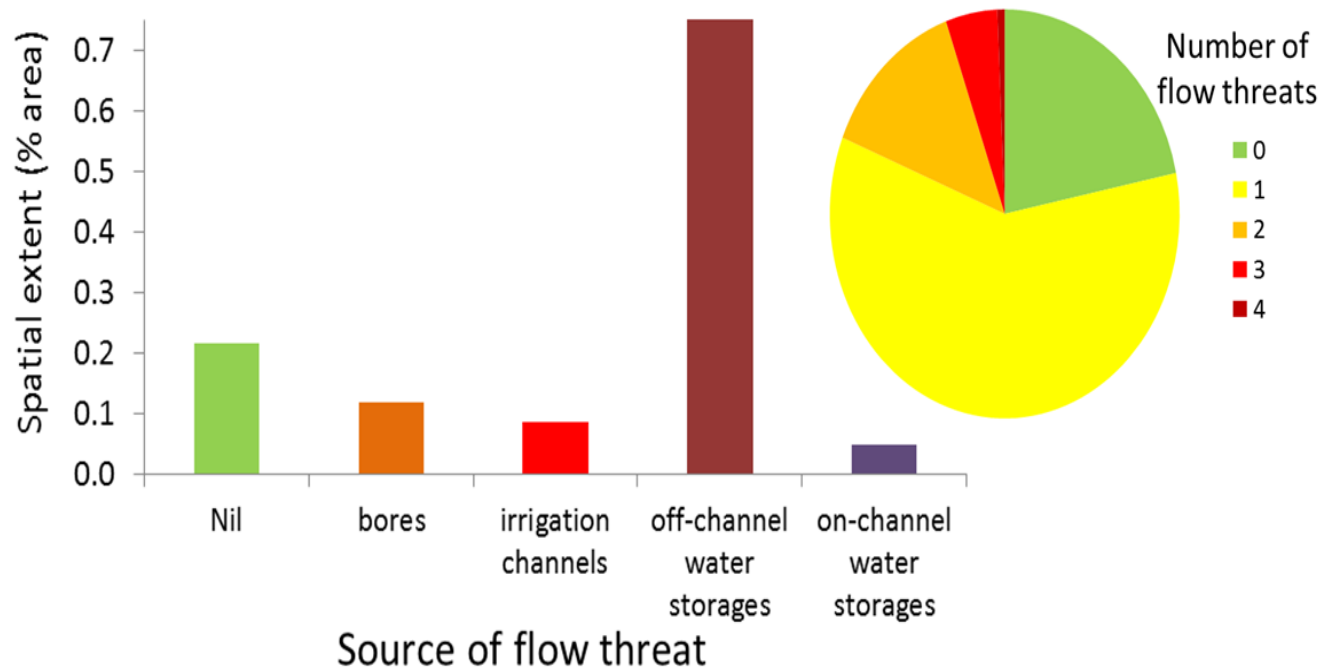
~10% of water use across MDB

This volume essentially unchanged by the Commonwealth Water recovery process



Source: MDBA

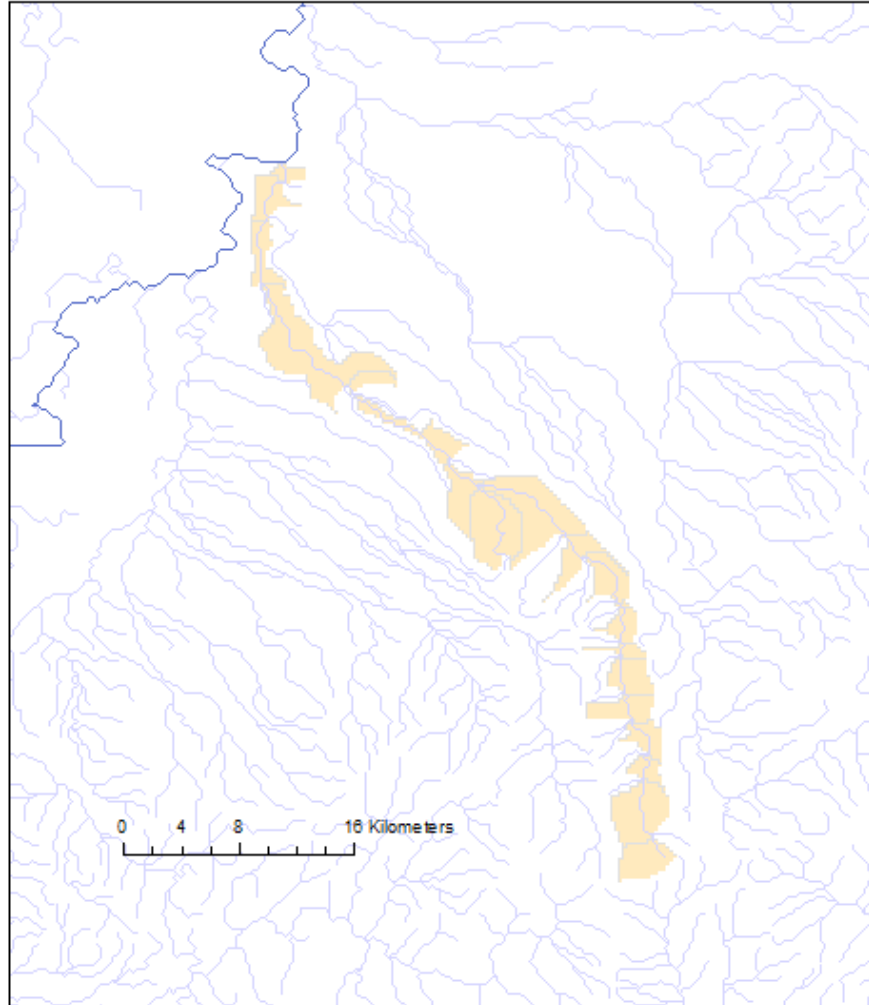
Farm dams affect a large proportion of the total stream length within the basin



Source: Bunn et al. (2014). Environmental Water Cluster.
CSIRO Water for a Healthy Country Flagship, Australia.

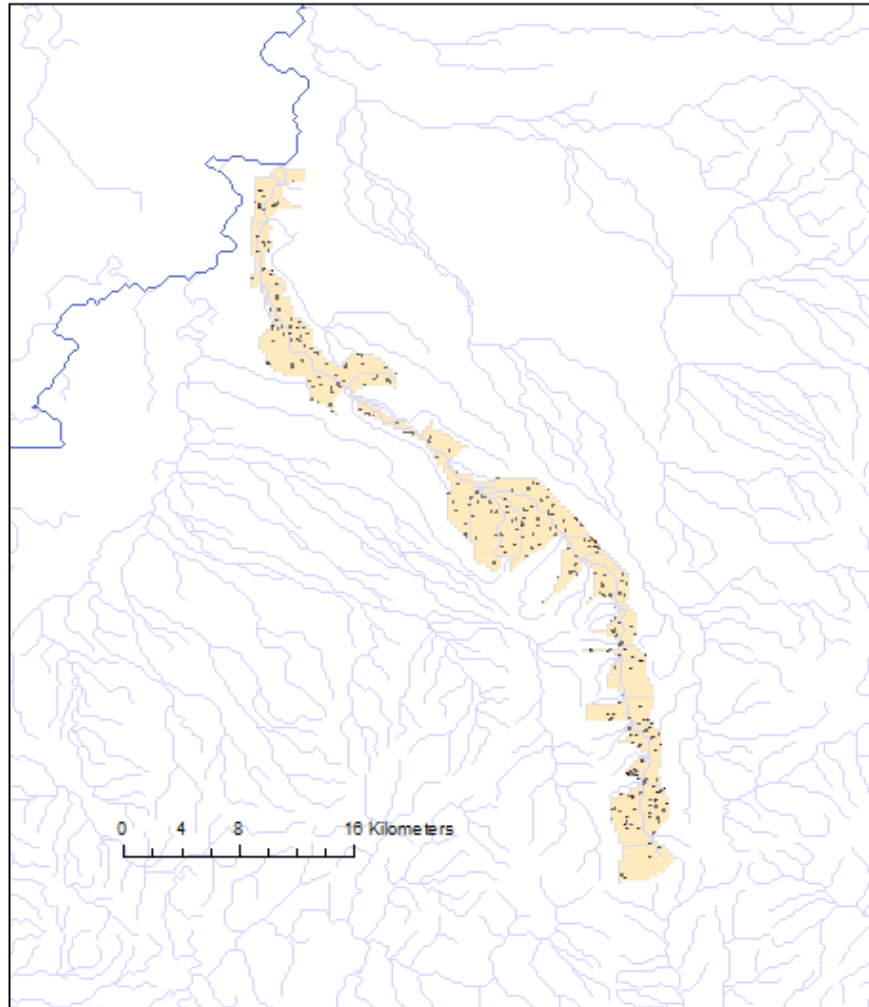
Impacts on individual waterways

Castle Ck, Euroa



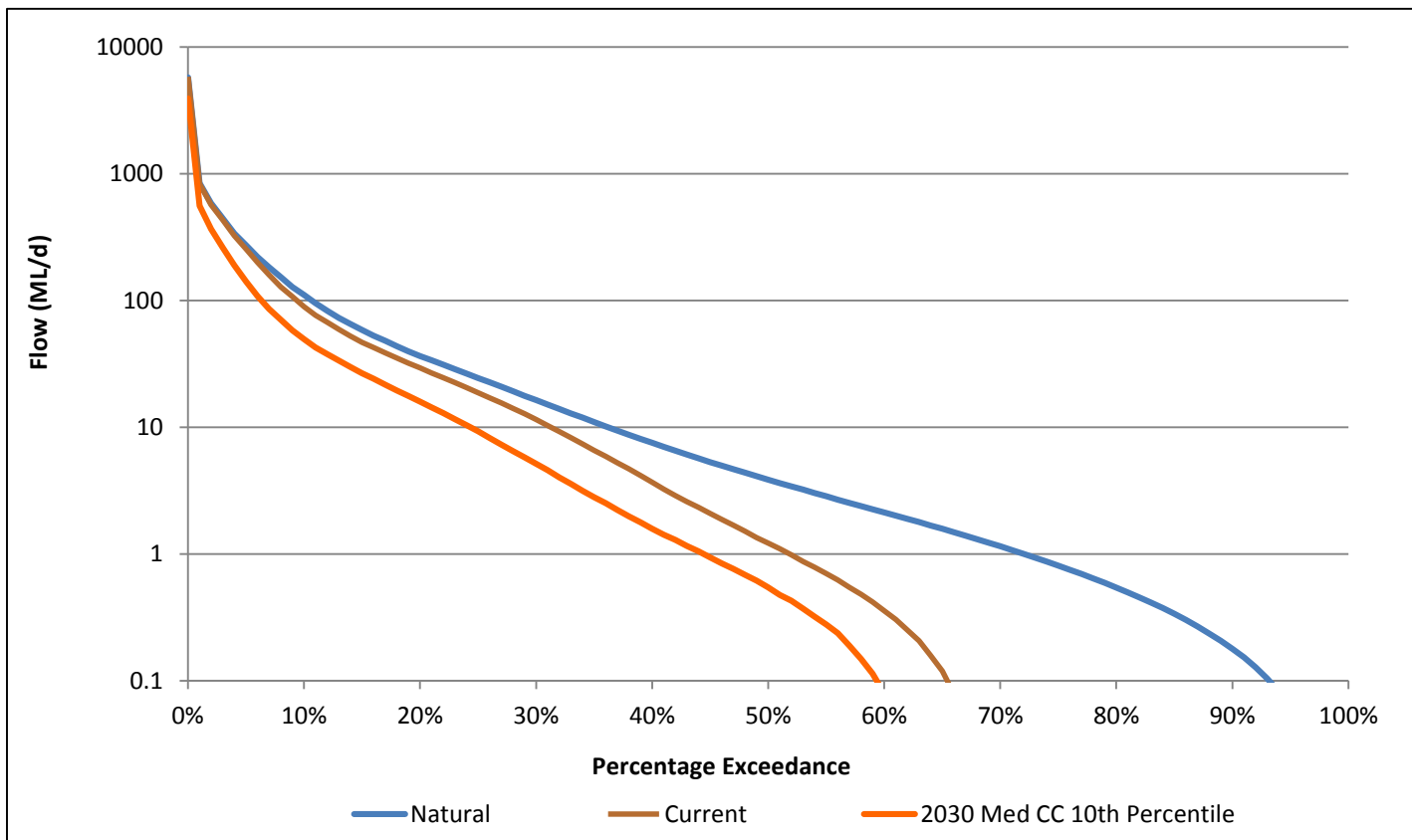
Impacts on individual waterways

Castle Ck, Euroa

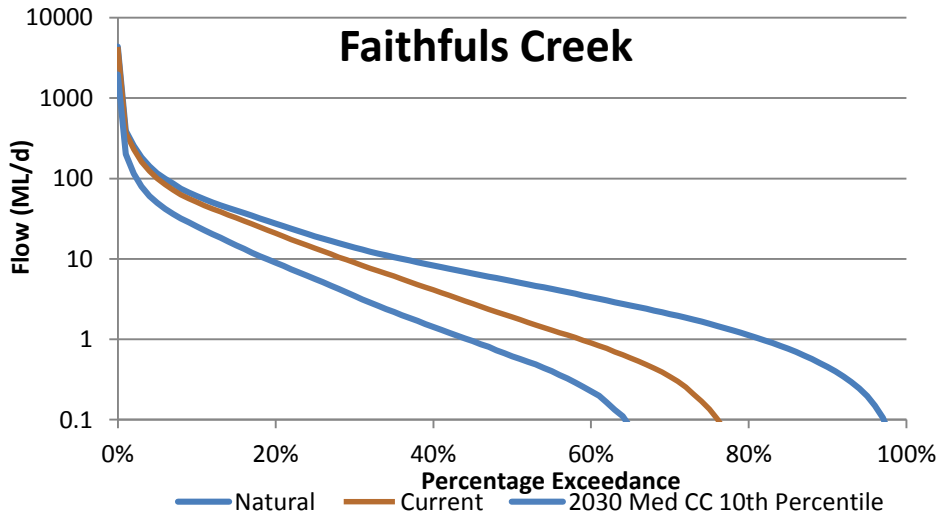
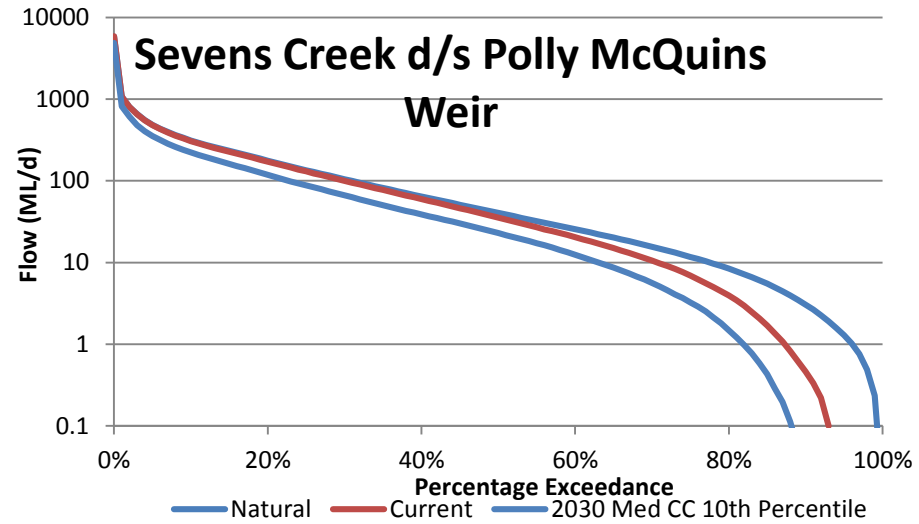
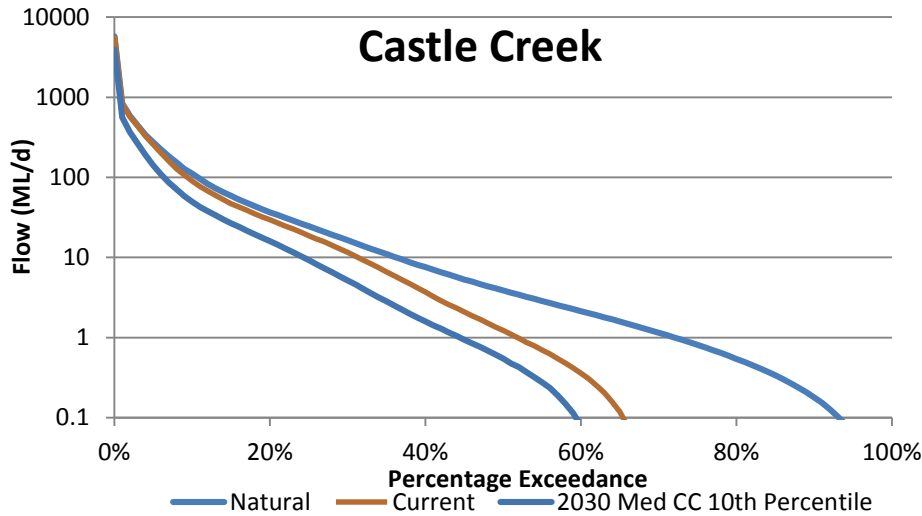


● Farm dams

What about the impacts on flow permanence?



Exacerbated flow stress

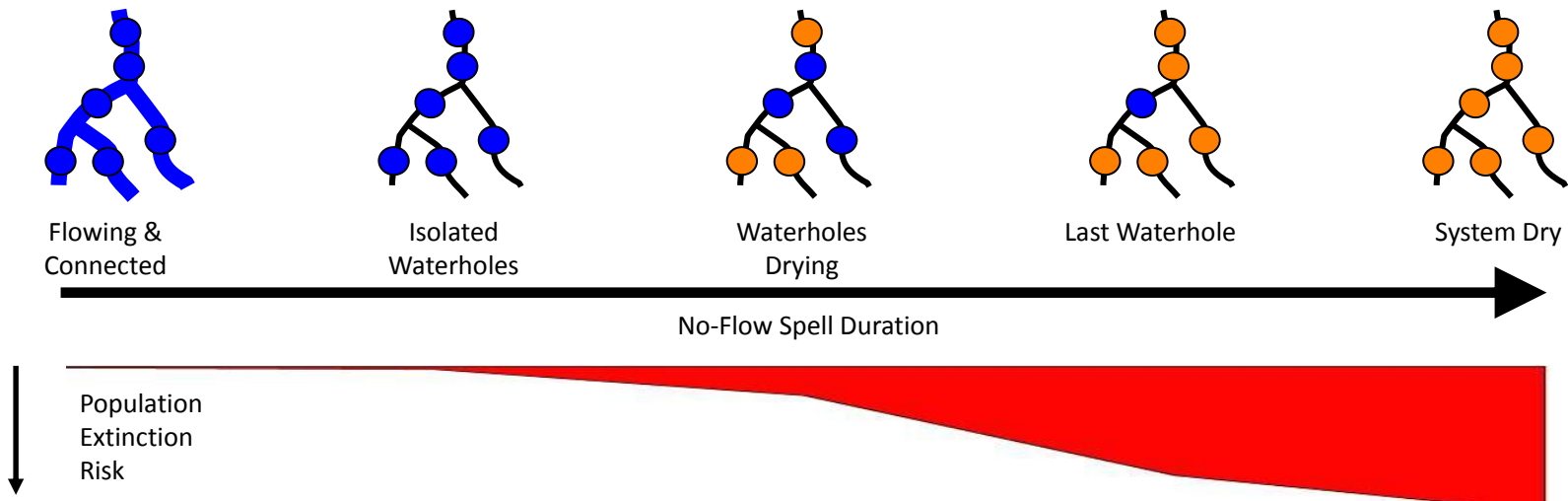


Drought refuges

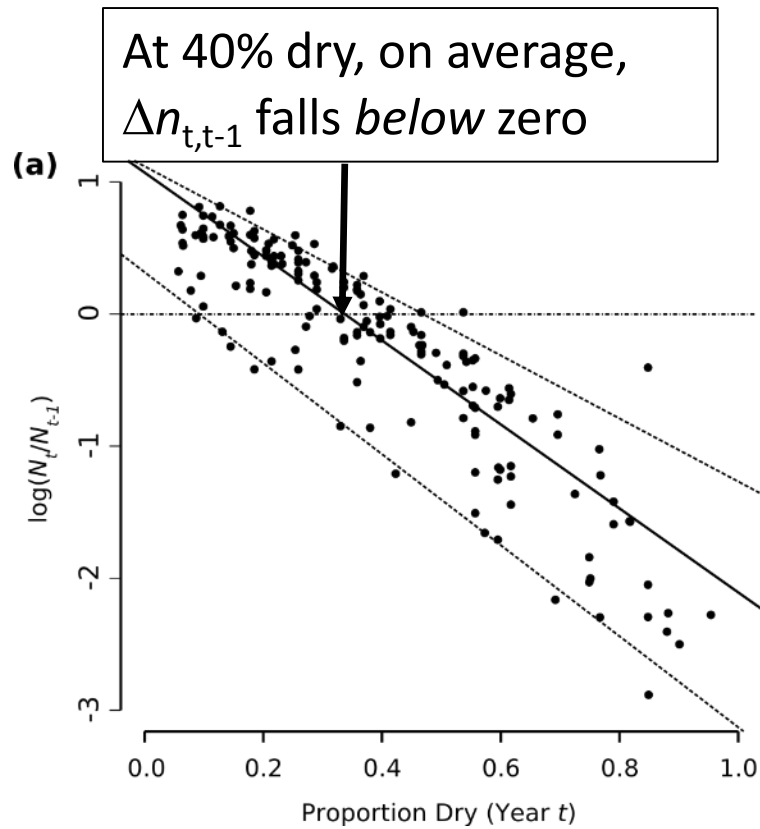


Research questions

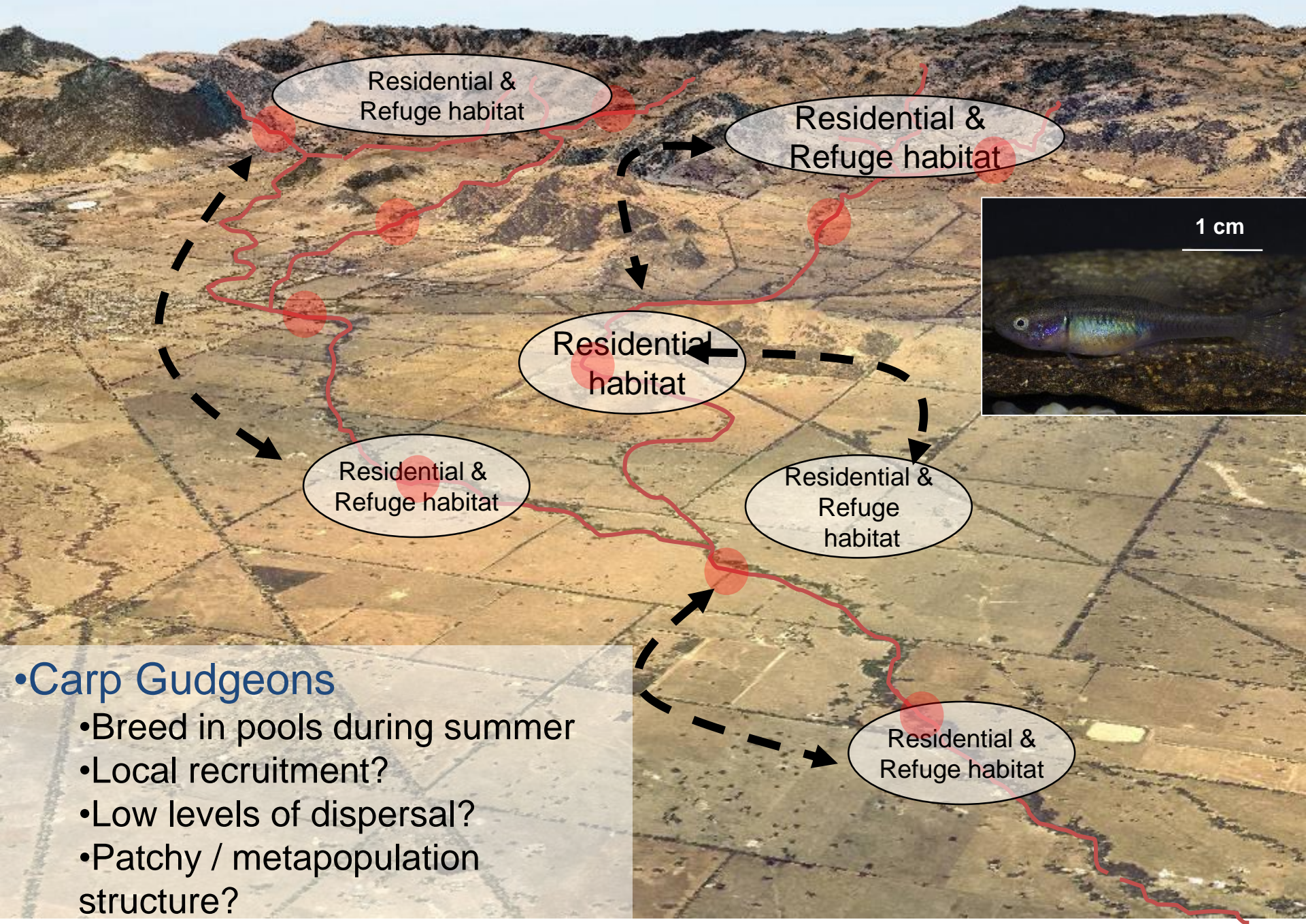
- How do risks of local (waterhole) and river-scape scale extinction change in response to changes in habitat dynamics and persistence?



Carp gudgeon
Population dynamics



Based on simulated long-term climatic record, 45% of years streams contract to more than 60% dry



Residential &
Refuge habitat

Residential &
Refuge habitat

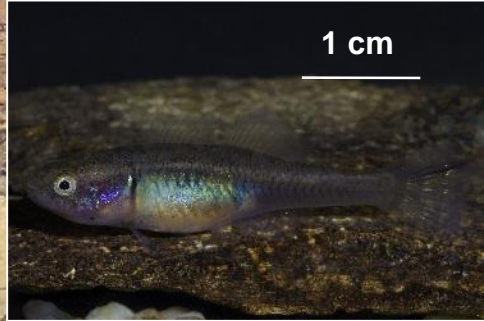
Residential
habitat

Residential &
Refuge habitat

Residential &
Refuge
habitat

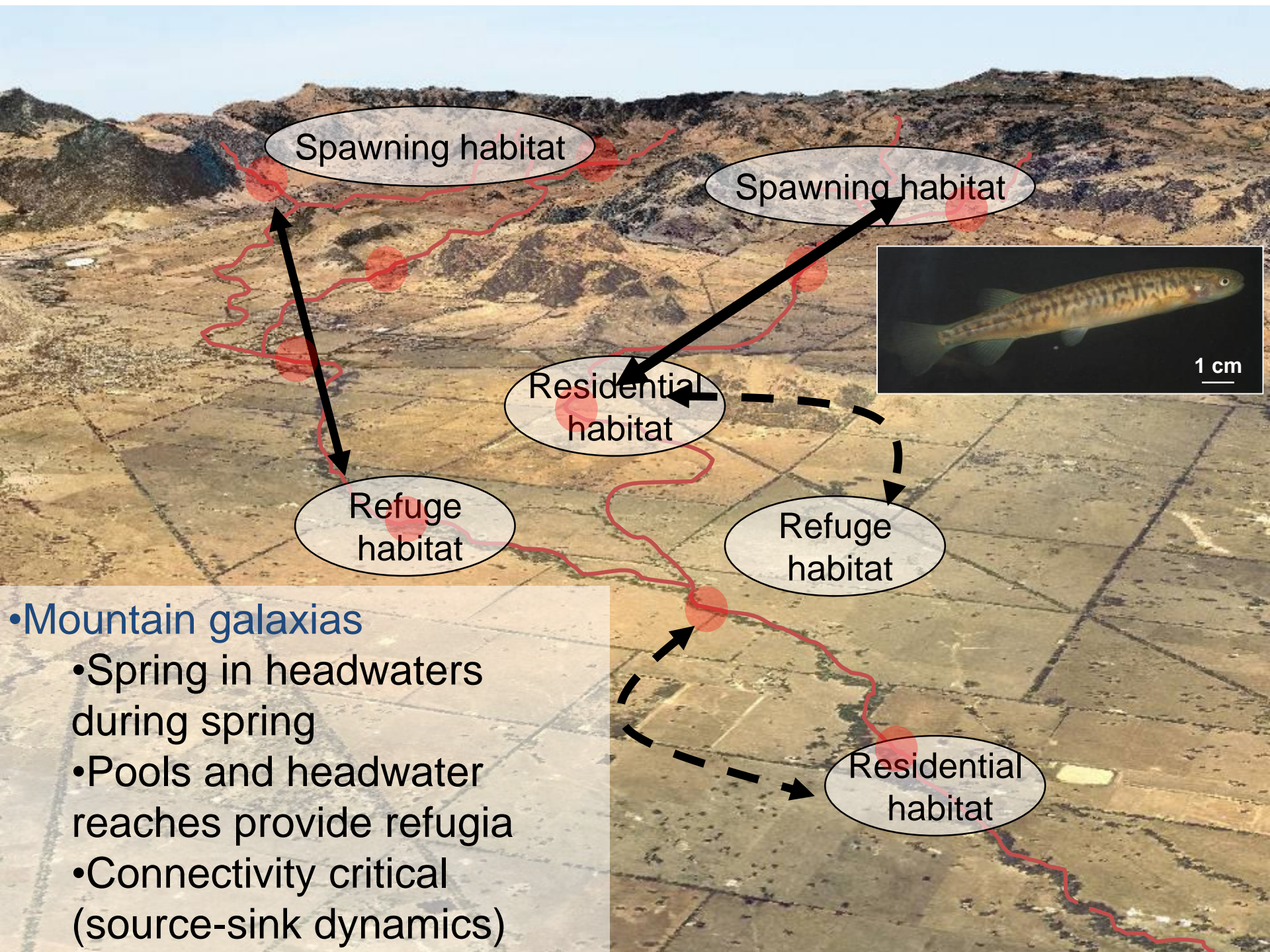
Residential &
Refuge habitat

1 cm



•Carp Gudgeons

- Breed in pools during summer
- Local recruitment?
- Low levels of dispersal?
- Patchy / metapopulation structure?



Spawning habitat

Spawning habitat

Residential habitat

Refuge habitat

Refuge habitat

Residential habitat

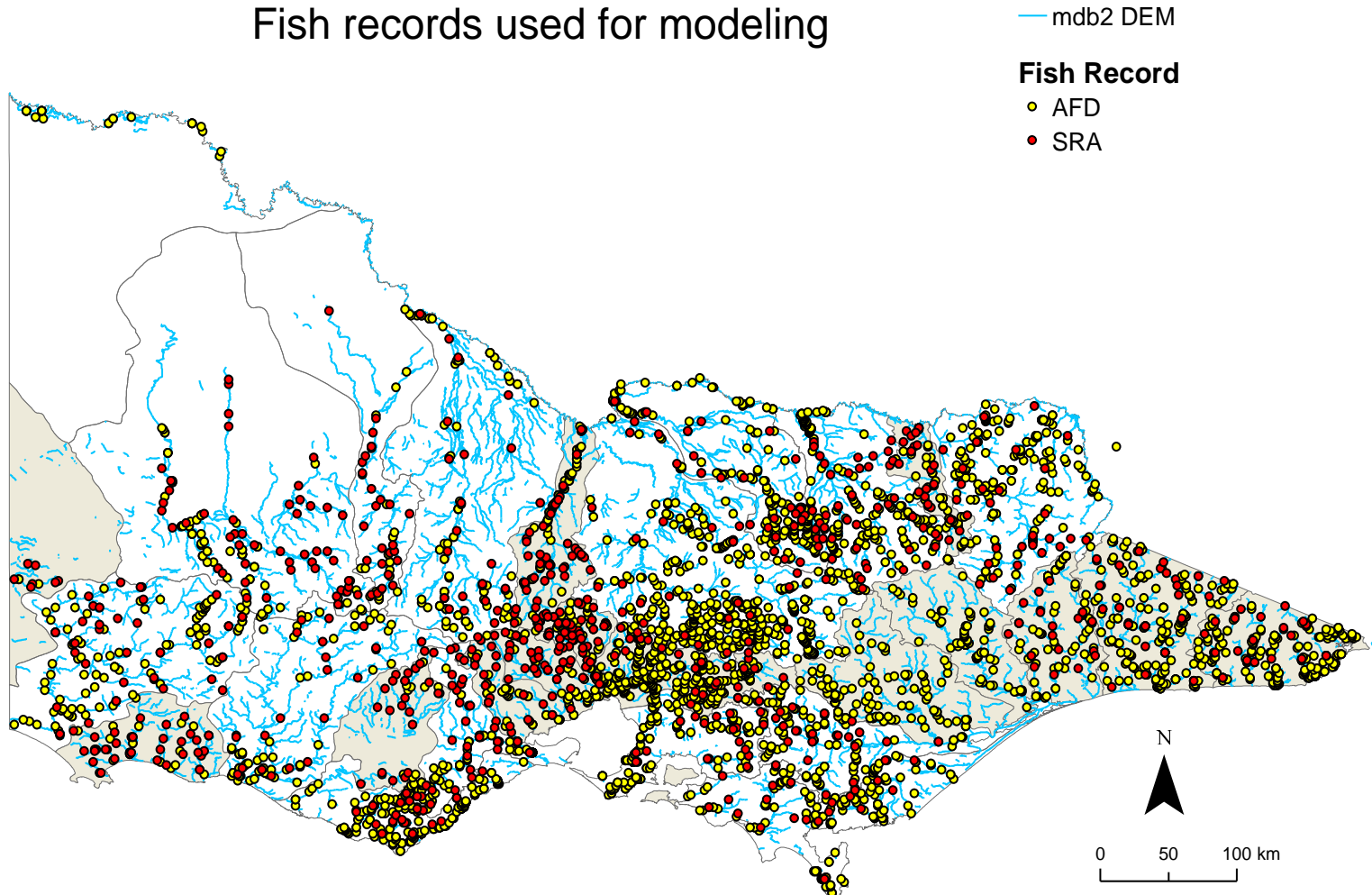
1 cm

• Mountain galaxias

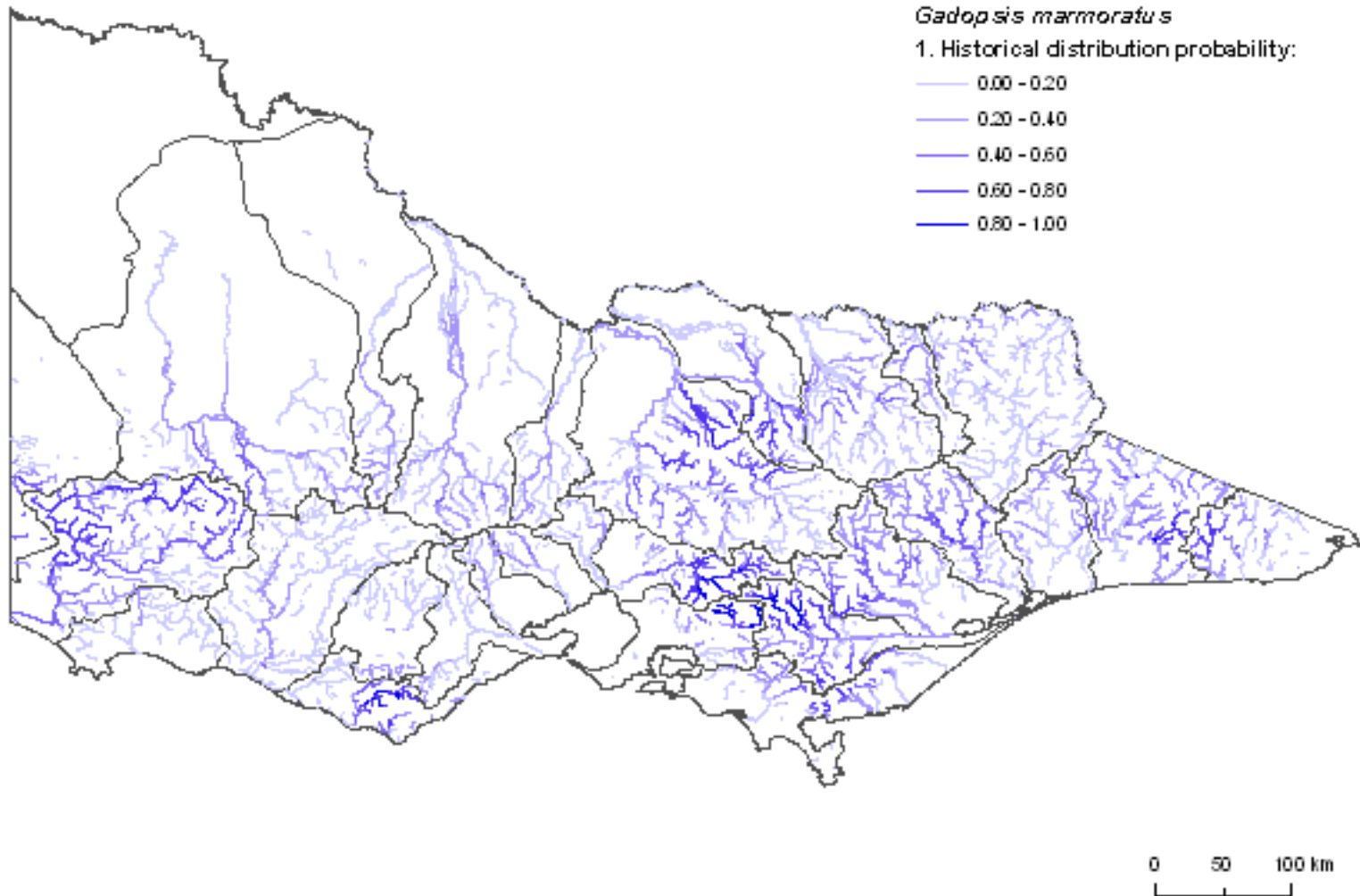
- Spring in headwaters during spring
- Pools and headwater reaches provide refugia
- Connectivity critical (source-sink dynamics)

Hydrology influences across whole catchments

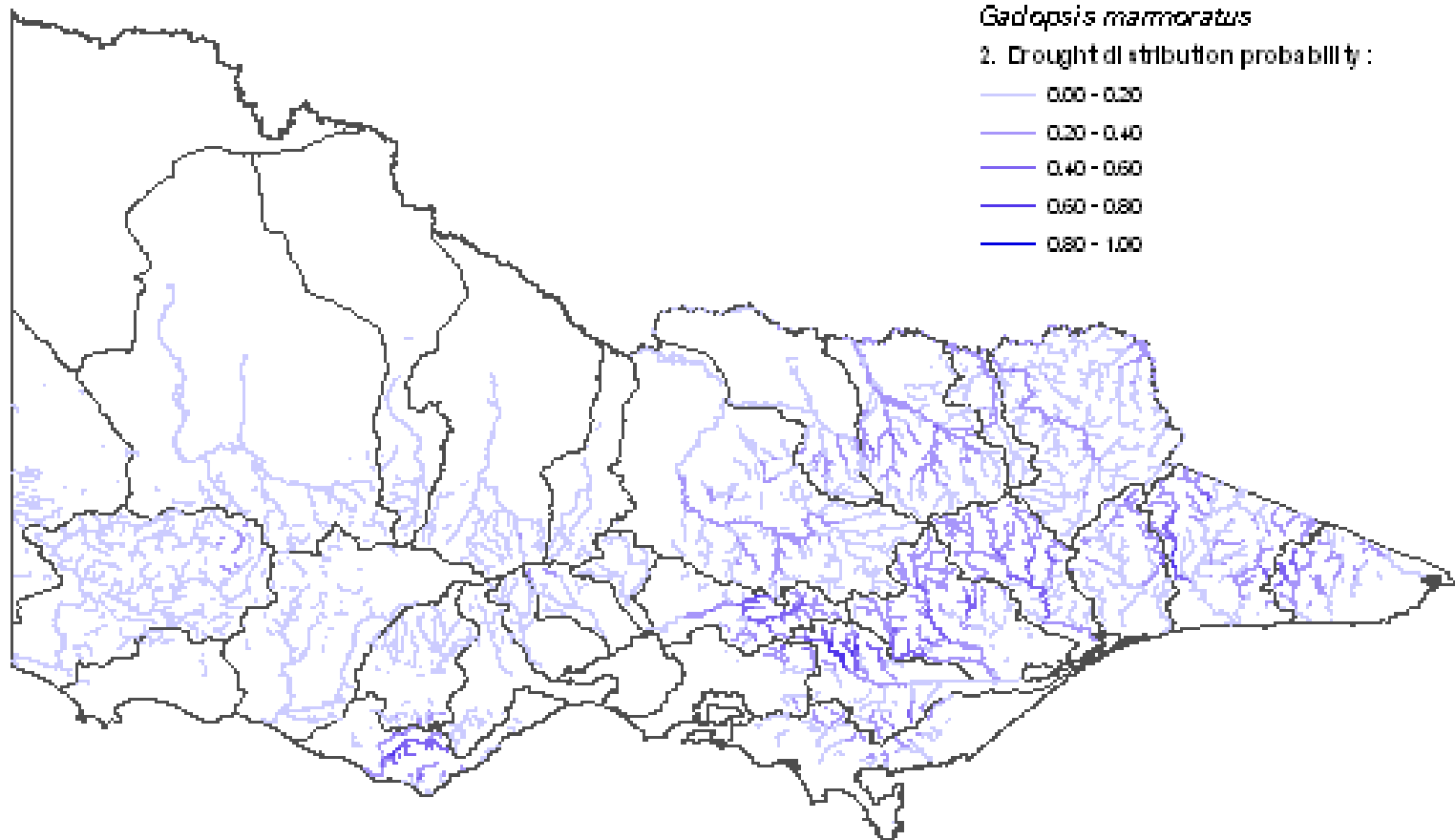
Fish records used for modeling



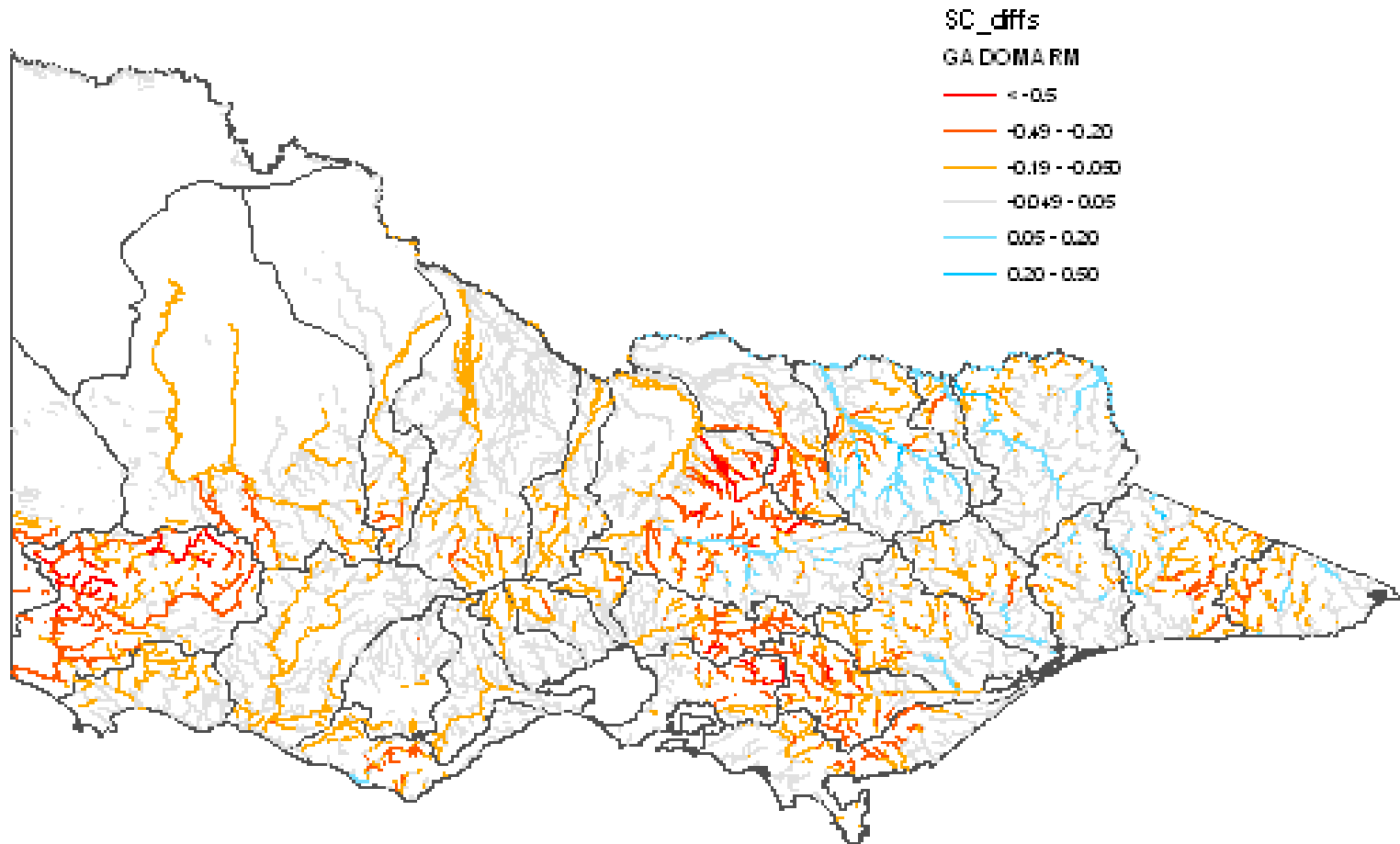
Predicted baseline range – River blackfish



Predicted future range – River blackfish



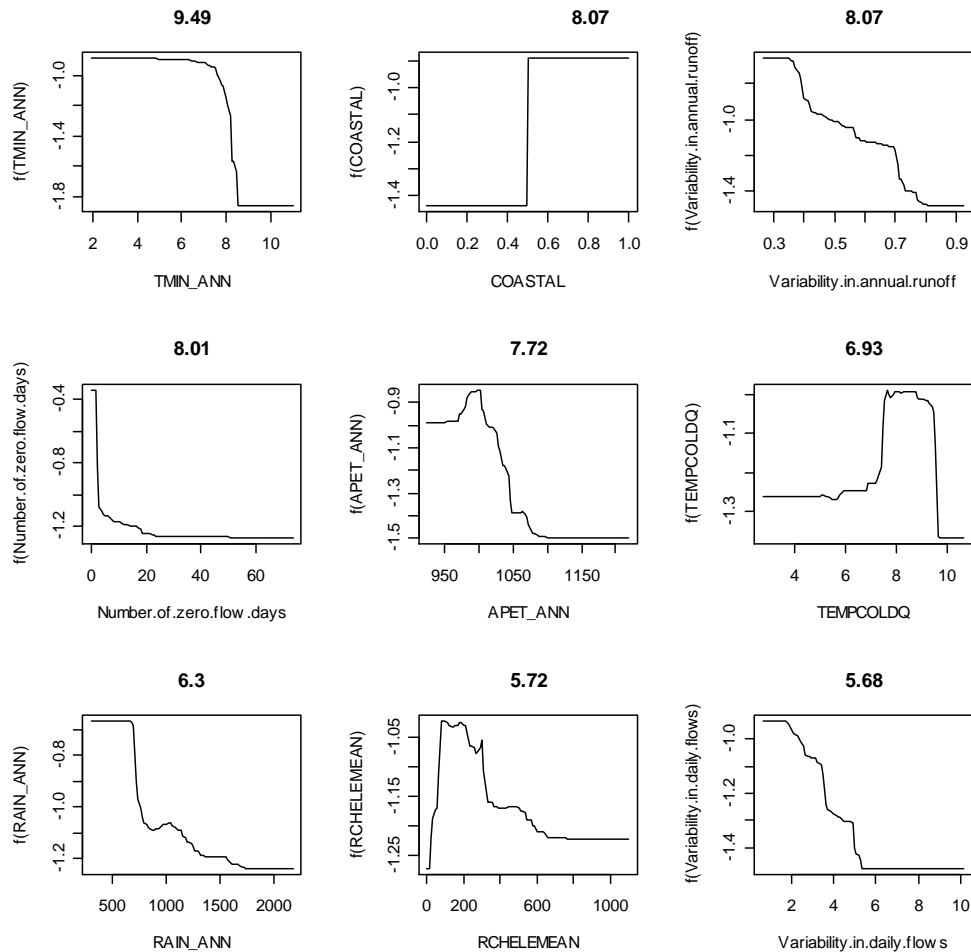
Predicted distribution change – River blackfish



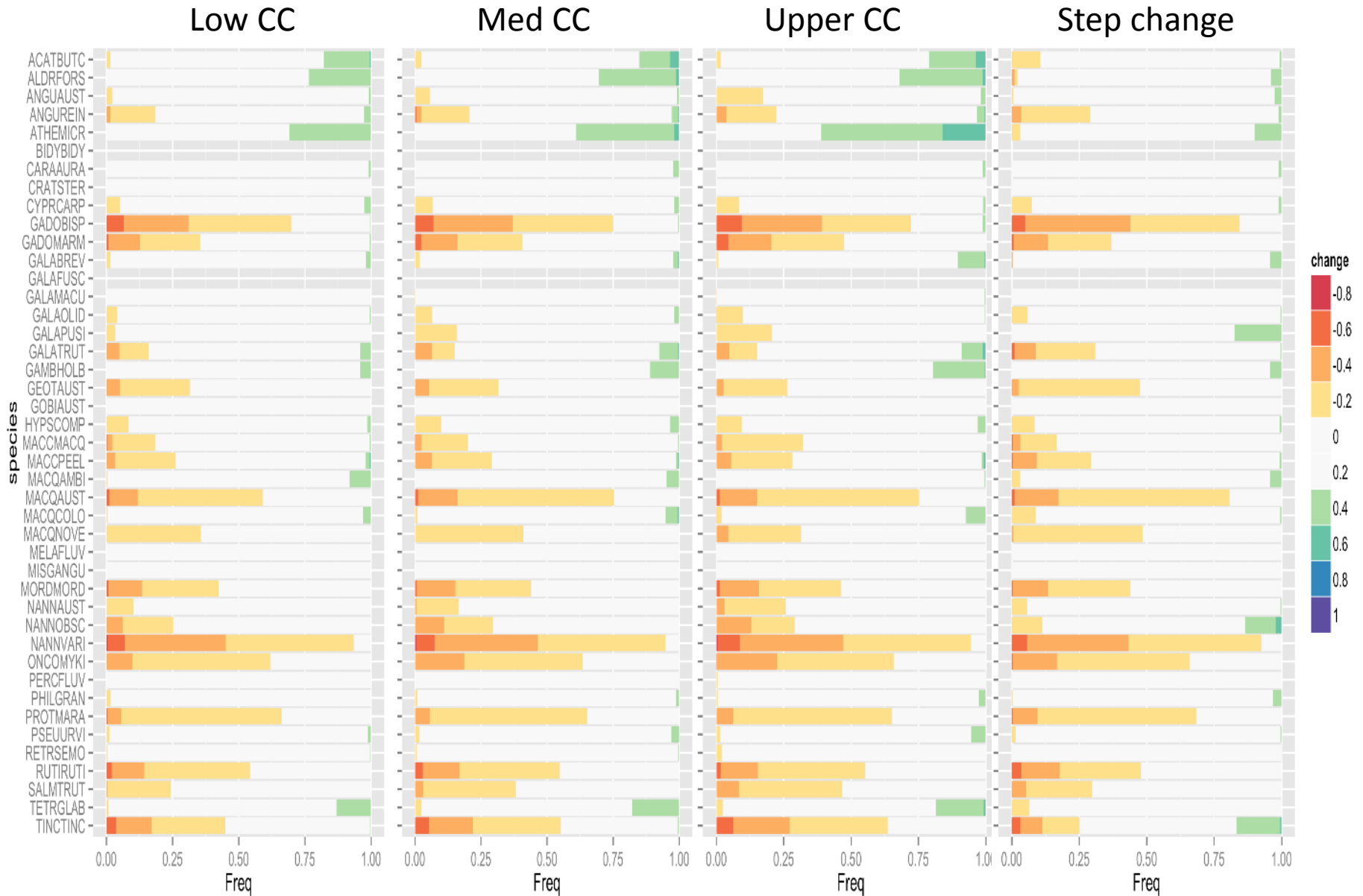
0 50 100 km

Environmental correlates for species occurrence

River blackfish (*Gadopsis marmoratus*)




Scenario Predictions






Key messages


- Even temporary flow loss can strongly alter communities
- Current policy does not adequately address cumulative impacts of farm dams on small waterways
- Impacts are manageable via low-flow bypass system)

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Cattle National  

 Low-flow drains, weirs to benefit environment 11 months, 1 week ago

Low-flow drains, weirs to benefit environment

Alli Kuchel
14 Jul 2017, 7:30 a.m. Cattle National



NEW CATCHMENT: Department of Environment, Water and Natural Resources acting program leader Andy Harrison and SA Murray-Darling Basin NRM board chair Sharon Starick assess a new low-flow water catchment bypass.

A LOW-FLOW water project in the Mount Lofly Ranges has developed a two-fold advantage – helping rejuvenate the environment as well as furthering the agricultural industry.

Investing \$13.48 million into 500 low-flow water devices at strategically-located dams and water courses, the Flows for the Future program aims to

Lastly, it's not just about water...



A scenic landscape featuring a body of water in the foreground, reflecting the sky and clouds. The water is calm, creating a clear mirror image of the scene above. In the middle ground, there is a line of green grass and a dense forest of trees. The sky is a clear, bright blue with a few scattered white clouds. The overall atmosphere is peaceful and natural.

Thank you!