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Biodiversity on farms

The multiple benefits of restoring habitat on farms

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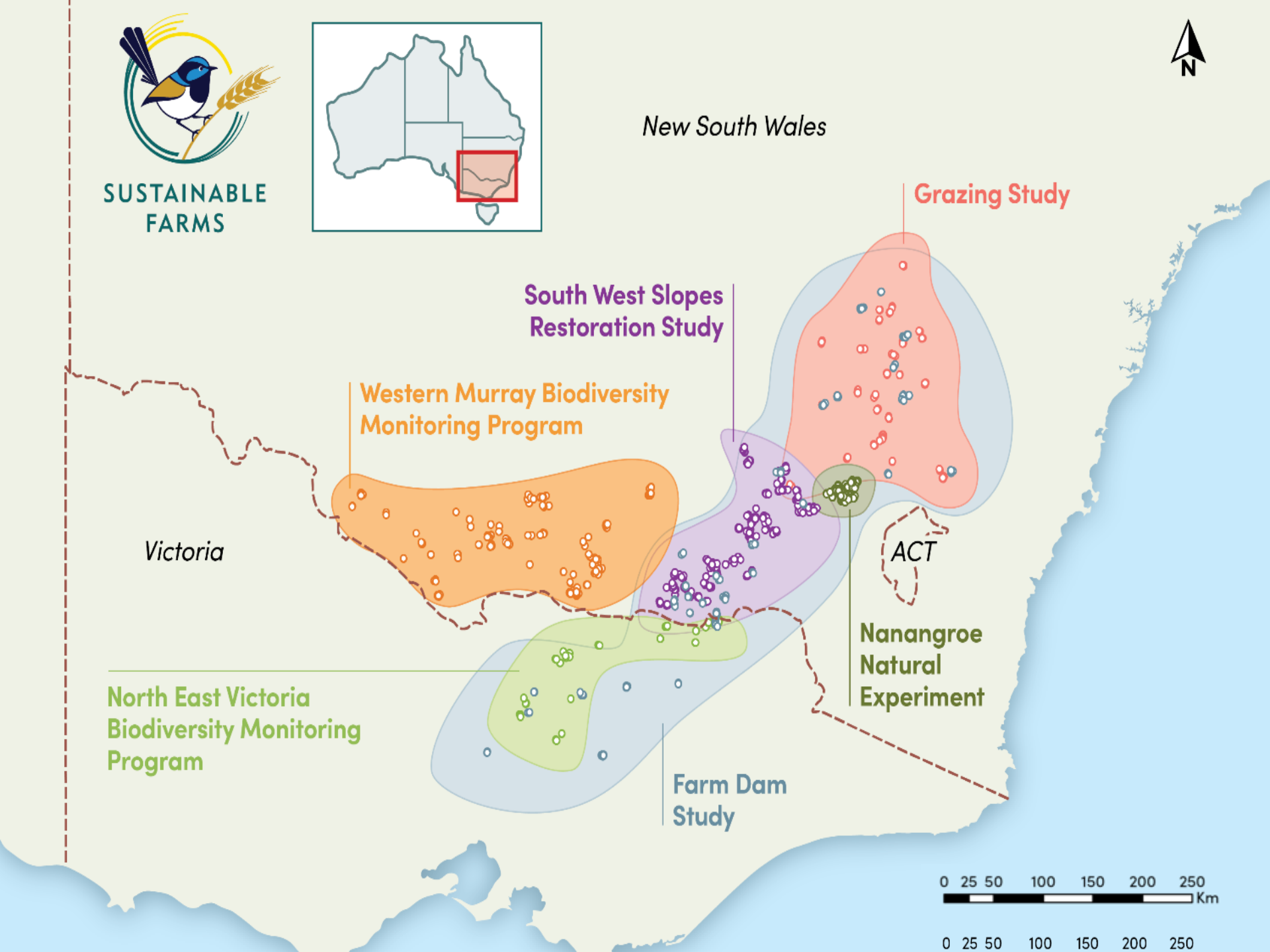
David Smith | Senior Research Officer | Fenner School | ANU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New South Wales
Grazing Study
South West Slopes Restoration Study
Western Murray Biodiversity Monitoring Program
Victoria
ACT
Nanangroe Natural Experiment
North East Victoria Biodiversity Monitoring Program
Farm Dam Study
N
0 25 50 100 150 200 250 Km
0 25 50 100 150 200 250

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23 years – 838 sites, varying in condition & management

Tree planting

Mixed farming landscape

Protecting remnant trees

Enhancing remnants with plantings

Protecting waterways

Remnant paddock trees

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Projects to improve natural assets on farms

Enhance farm dams

Establish shelterbelts and other plantings

Protect remnant woodlands

Protect creeks, wetlands and riparian zones

Protect paddock trees and grow new ones

Maintain native perennial grasses

Protect rocky outcrops

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What makes a good planting?

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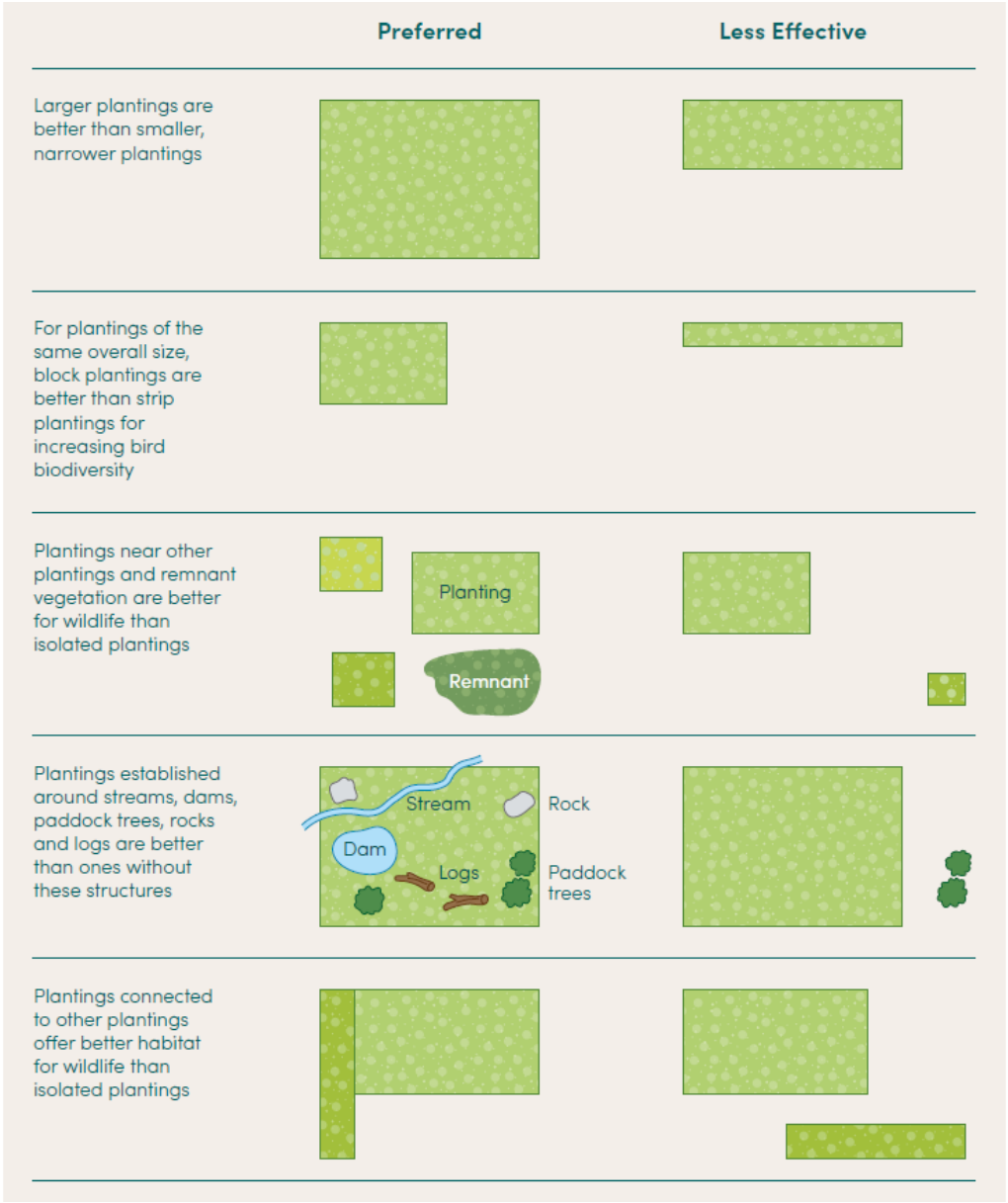

Attributes of a good planting ...

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Plantings, biodiversity and grazing

- As plantings age = loss of fences/or removed
- Grazed vs ungrazed plantings over time
- Grazing alters leaf litter & midstorey cover
- Path analysis shows –ve impacts on birds and reptiles

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Climate, weather, plantings and resilience

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Plantings = critical refugia for biodiversity

- Small bird species (+ species of conservation concern) in plantings
- Migratory bird species associated with plantings
- Plantings = drought refuges; +ve effects not seen in mesic periods

Diamond Firetail

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Restoration & key threatening processes

- Noisy Miner - aggressive native species
- KTP in woodlands
- Replantings with understorey = few miners
- Understorey intervention = drives down miners – takes > 8 years

Lindenmayer et al. 2010 (Biol Cons); Lindenmayer et al. 2018 (Rest. Ecol)

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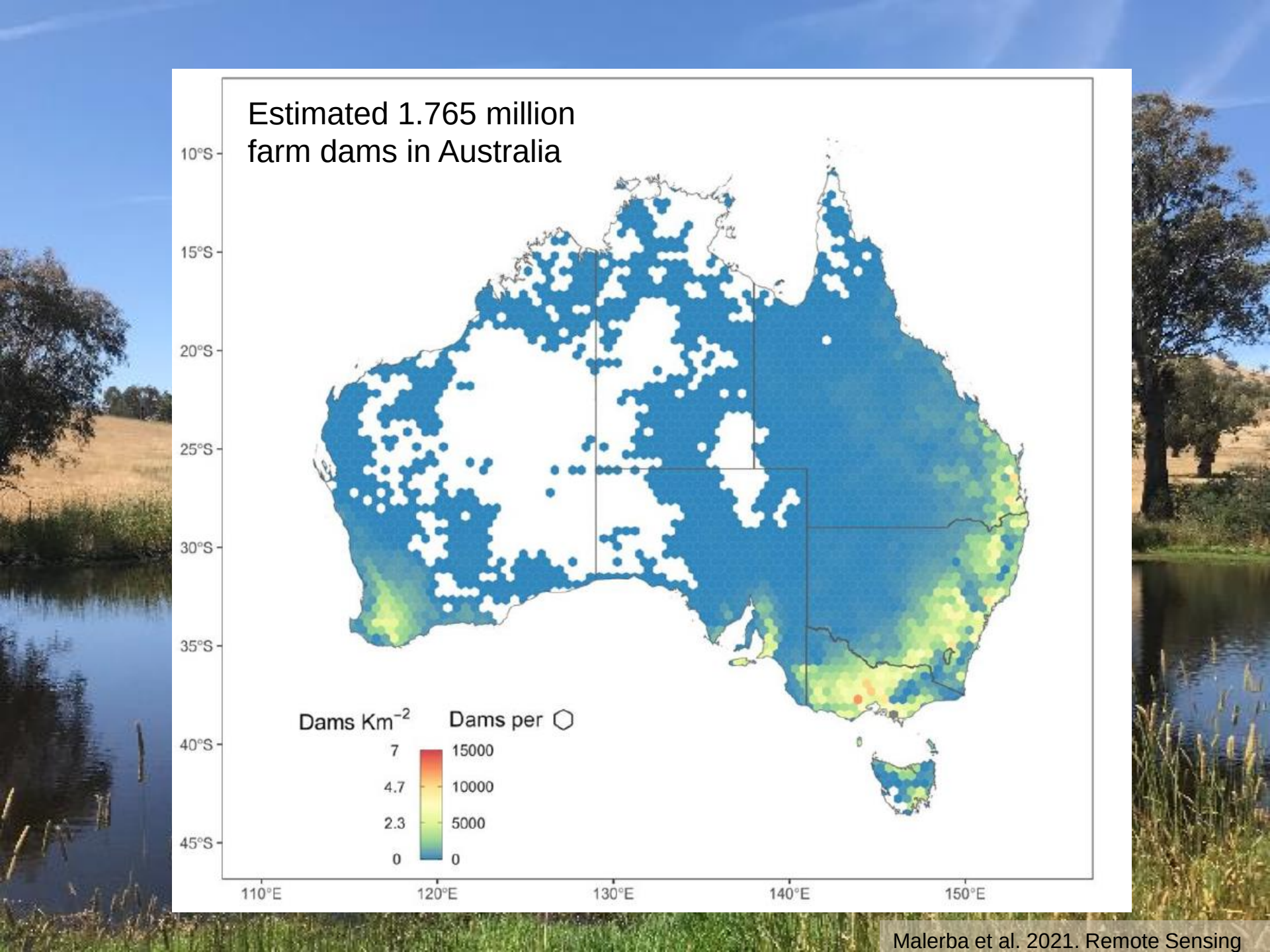
Tackle despots with trees not guns



Malerba et al. 2021. Remote Sensing

Water and livestock production

- Digestion
- Temperature regulation
- High palatability = increased consumption = increased feed intake
- More manure in water = less water consumption = less feed consumption

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Farm dam study (2020-2022)

- Sampling four times per year at **128 dams**
  - Field-based water testing
  - Vegetation surveys
  - Biodiversity surveys
- Lab water analysis (**46 dams**)

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Unfenced dam

Fenced dam

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Factors influencing water quality

Mechanical damage by livestock

Direct defecation & urination

Low ground cover

Treatment type

Enhanced dam

Rotationally grazed

Continuously grazed

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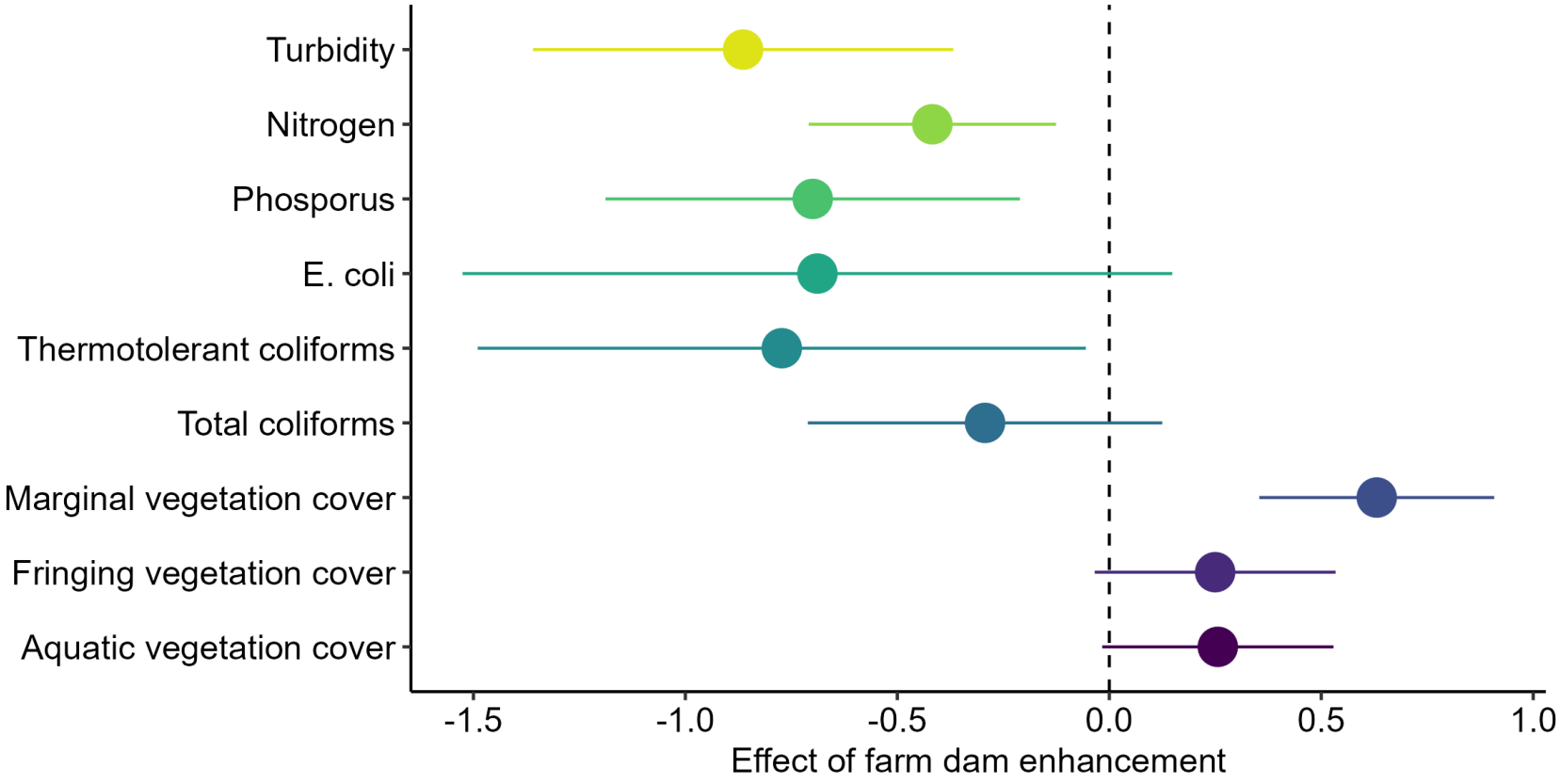
Effect of dam enhancement



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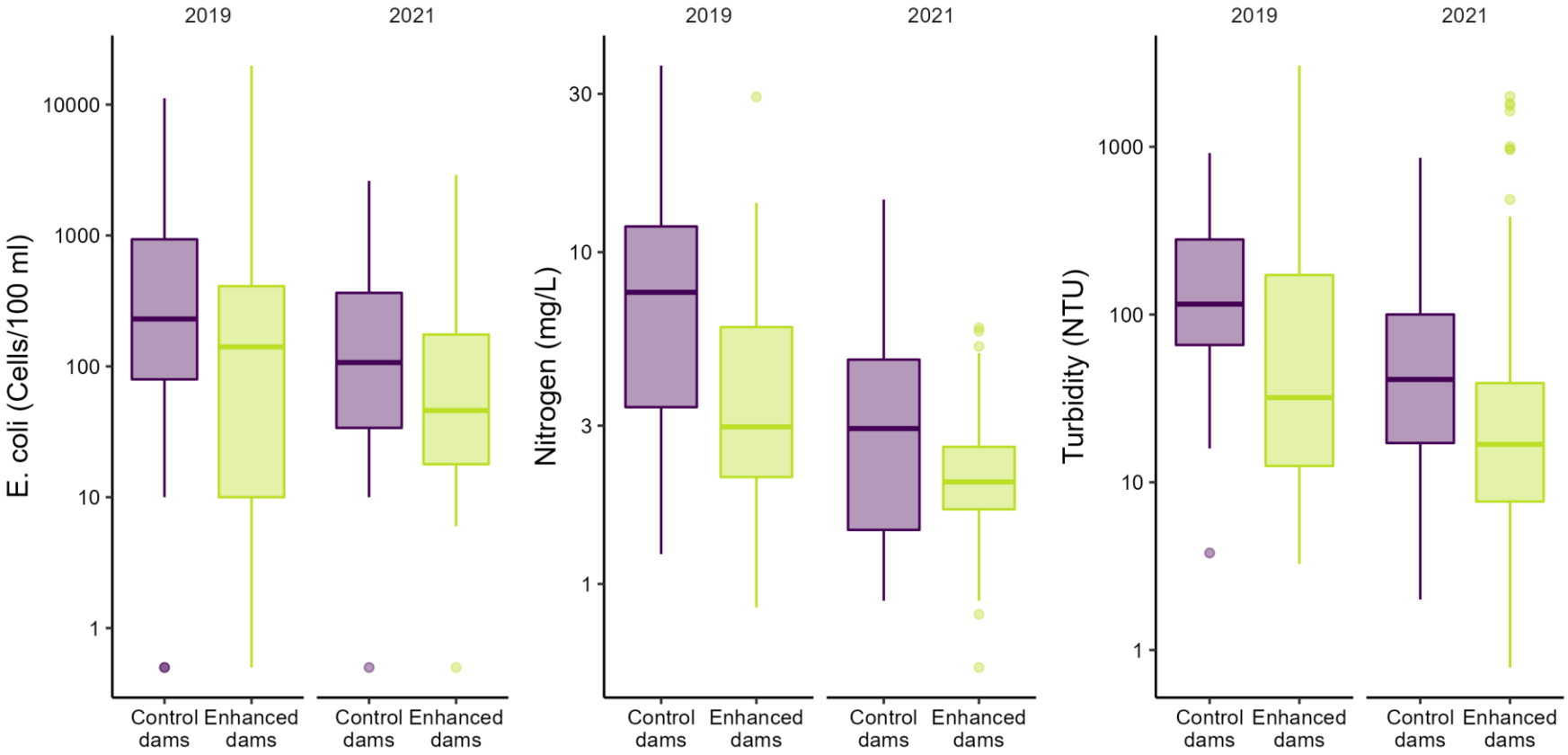
Effect of drought on water quality



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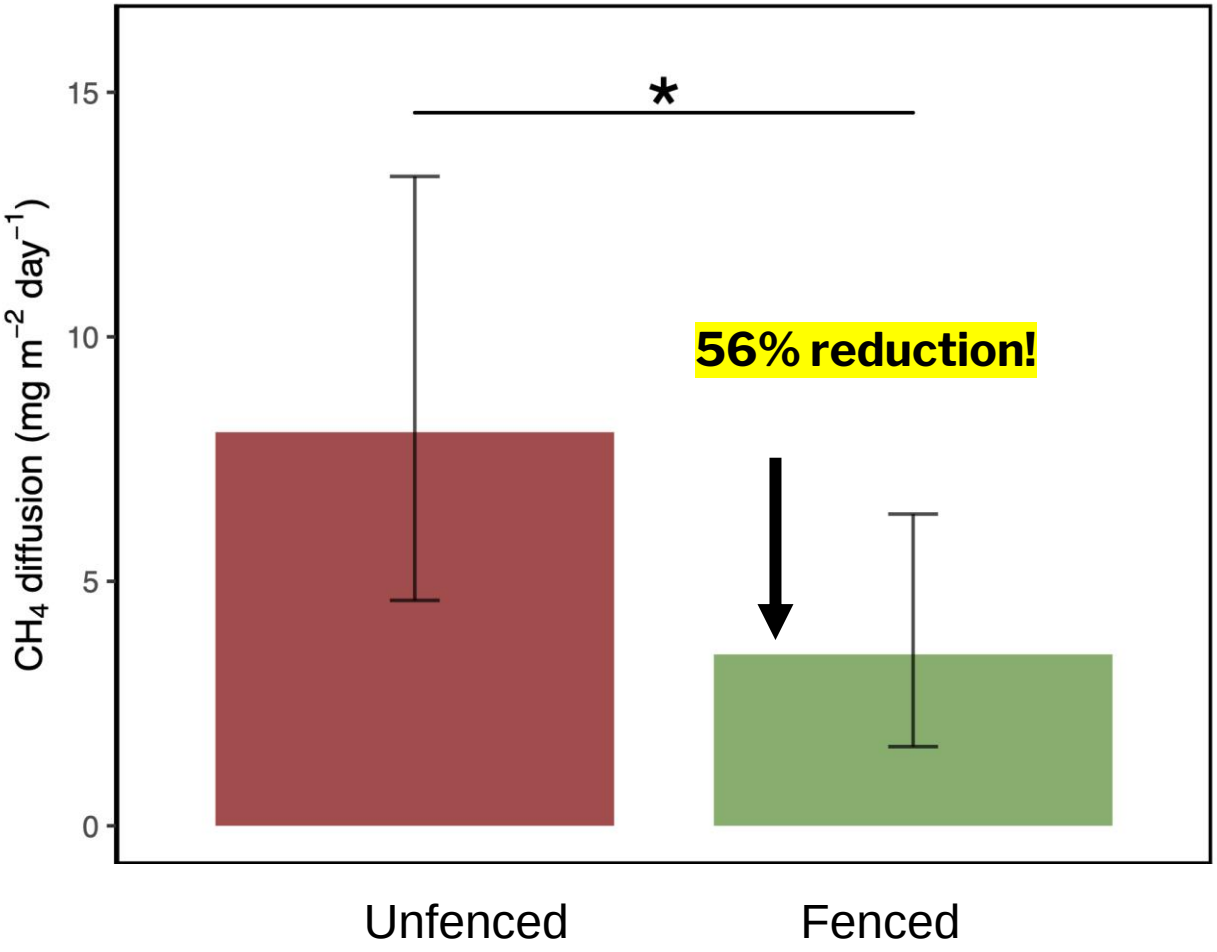
Reduction in methane emissions



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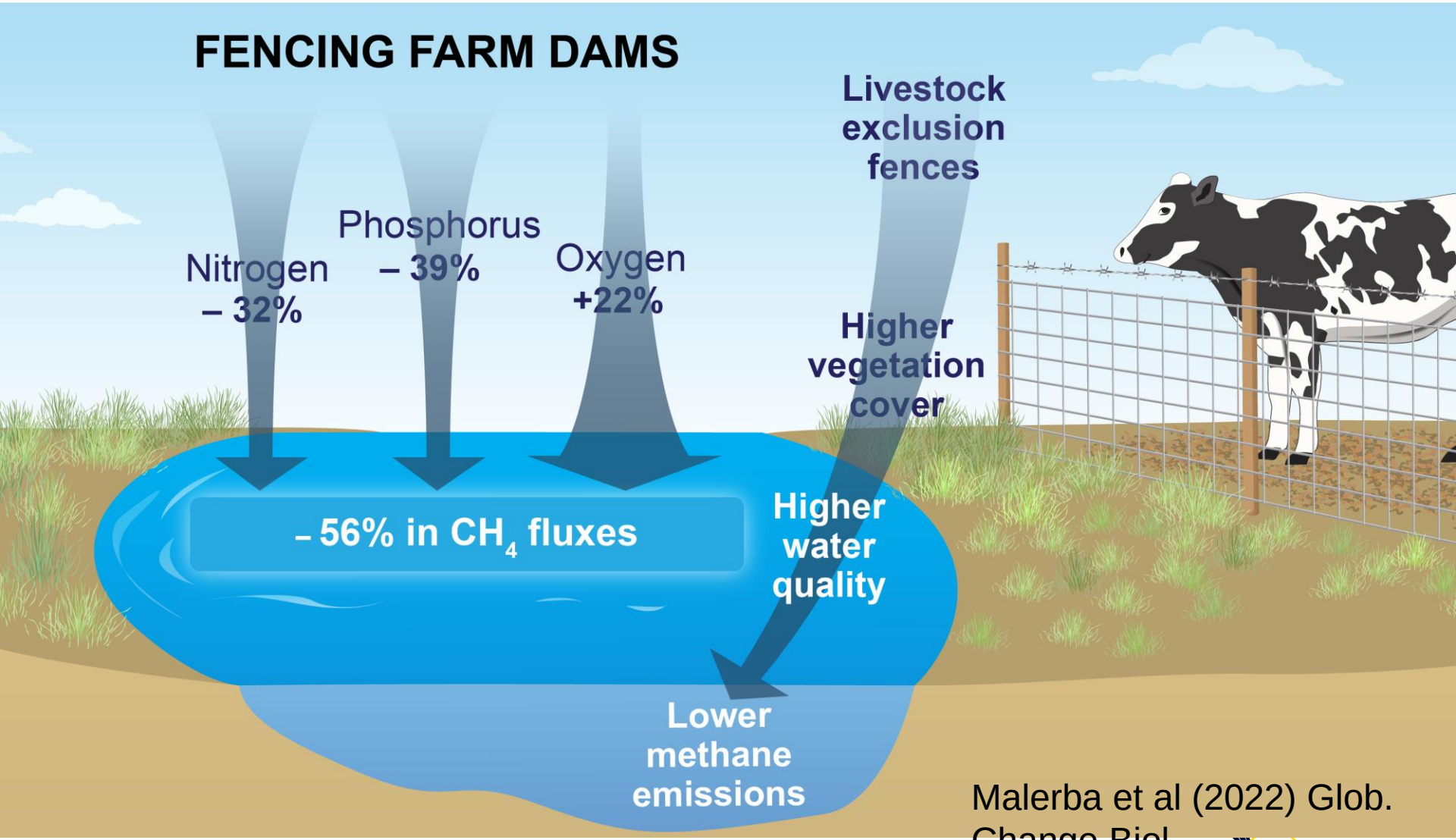

Malerba et al (2022) Glob. Change Biol.

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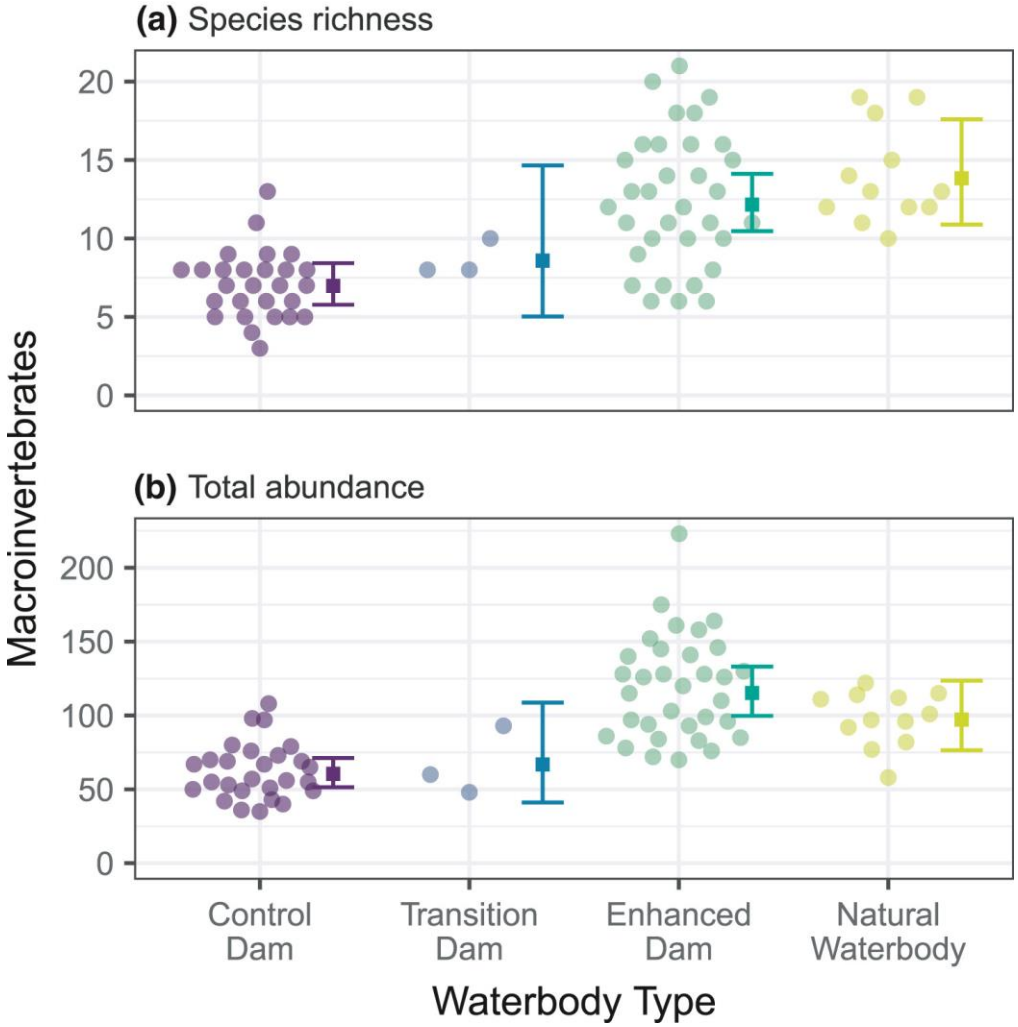
Freshwater macroinvertebrates



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Bird breeding

Enhanced dam

Control dam

Dry planting

- 29 sites across 6 farms in NSW Southwest slopes

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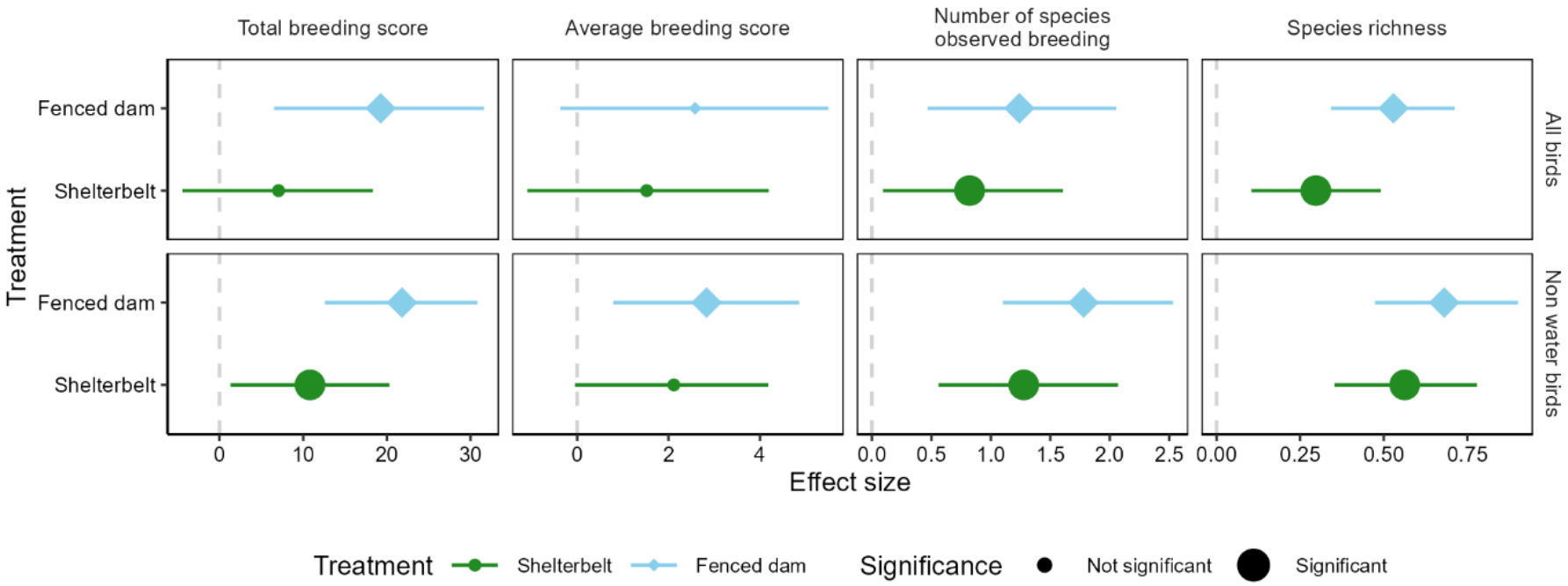
Bird breeding



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Summary - Enhancing farm dams can lead to:

- Decreased turbidity, nitrogen, phosphorus, *E. coli*, faecal coliforms
- Improved water quality during drought
- Increased vegetation
- Decreased methane emissions
- Increased abundance and diversity of waterbugs
- Increased bird breeding activity

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