NbS support ecosystem health: what's the evidence?

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We asked:

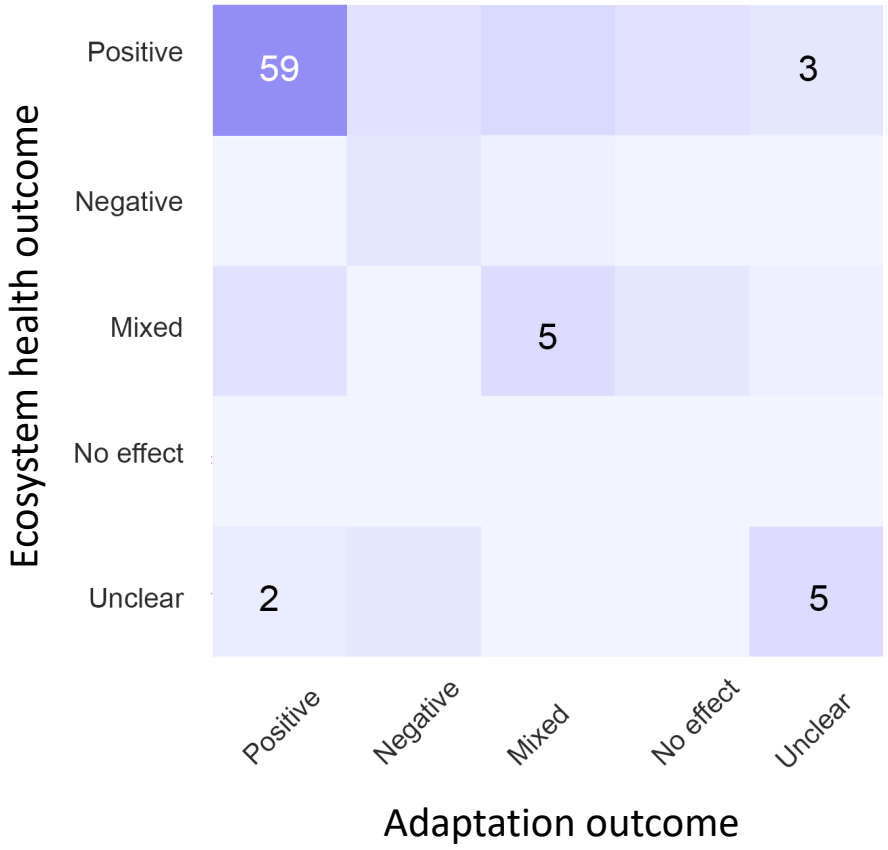
1. What's the evidence for NbS for adaptation successfully supporting ecosystem health?
2. How have effects on ecosystem health been assessed?
3. How can we improve these assessments?

Our approach:

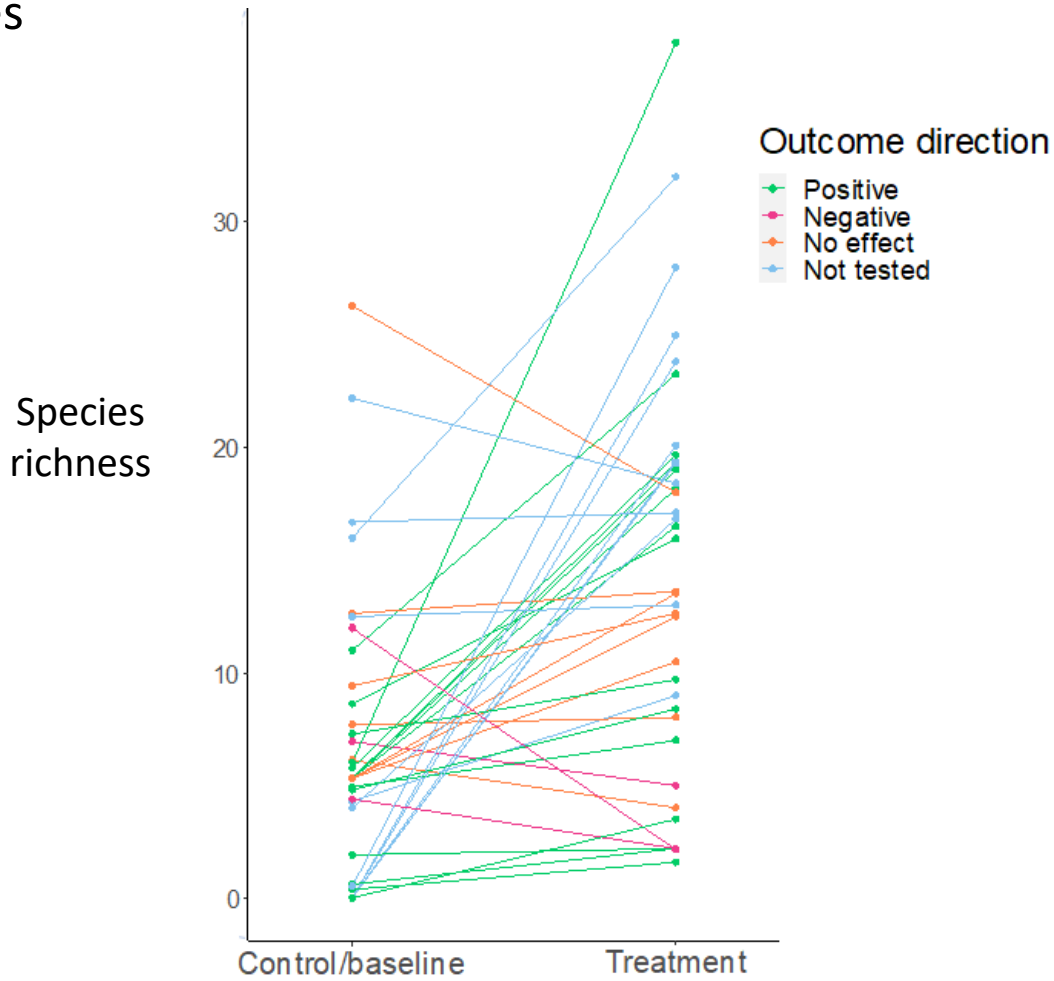
- Systematic review of 80 papers
  - 109 interventions addressing an impact of climate change
  - Range of intervention types and habitats
- Categorised how studies reported effects on ecosystem health

Win-wins were common:

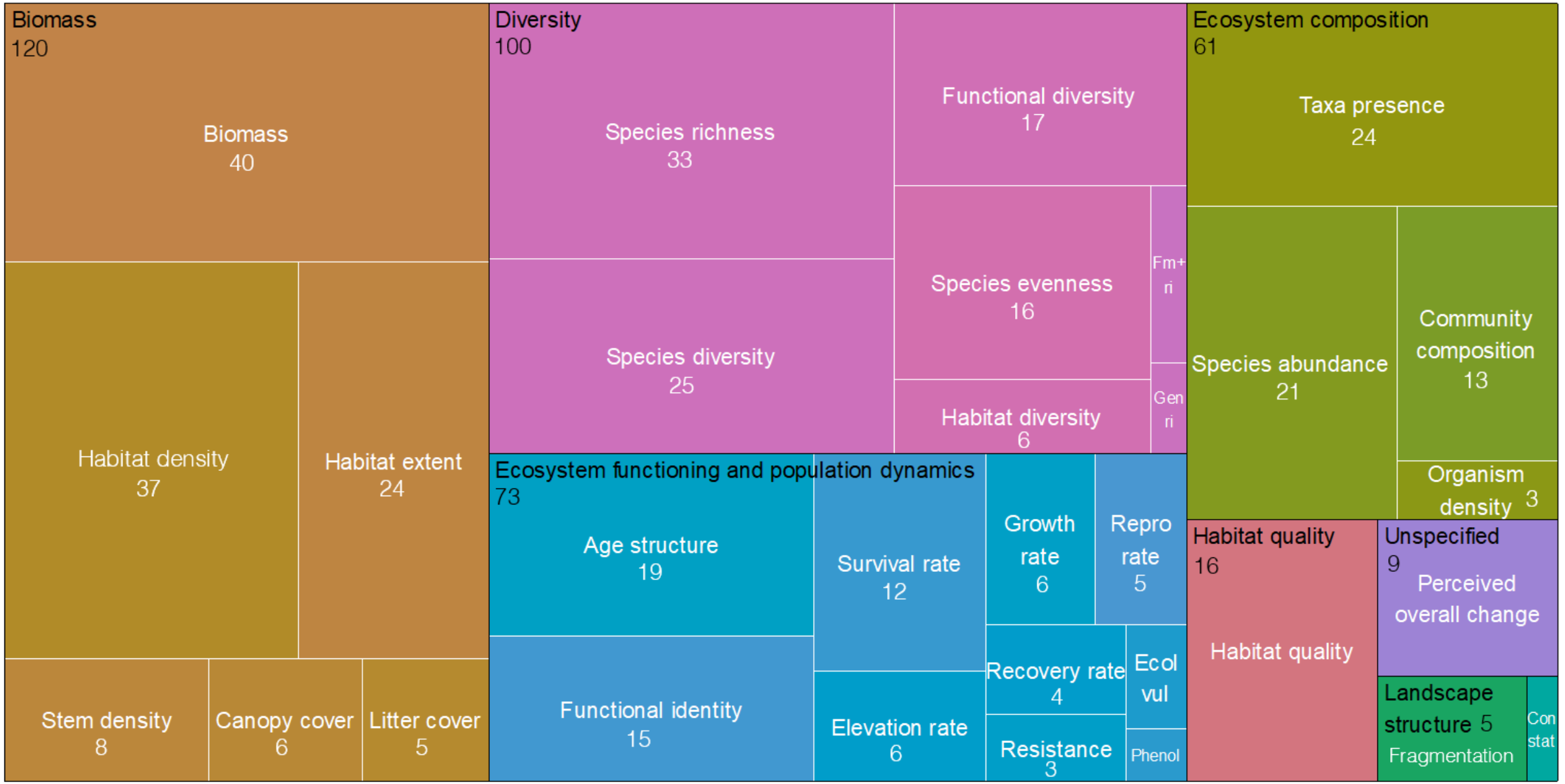
88% of interventions with positive adaptation outcomes also had positive ecosystem health outcomes



67% average increase in species richness

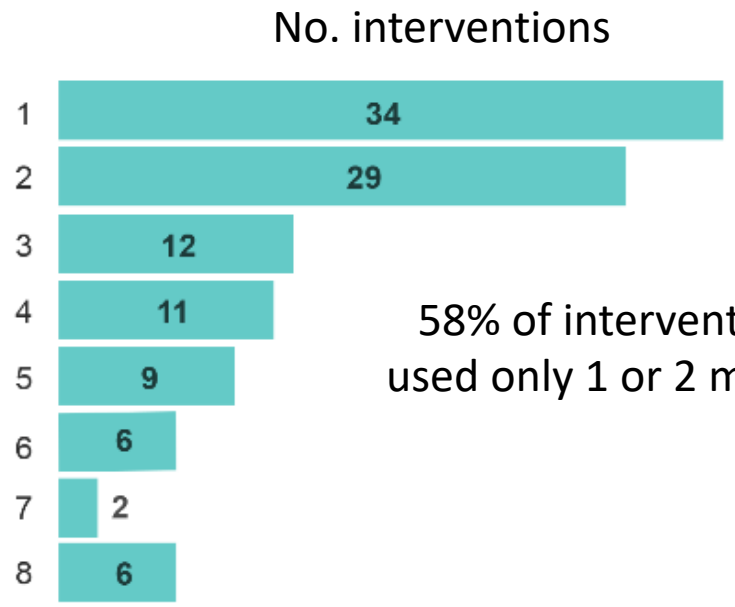


Metric categories were focused on biomass and diversity – across 109 interventions



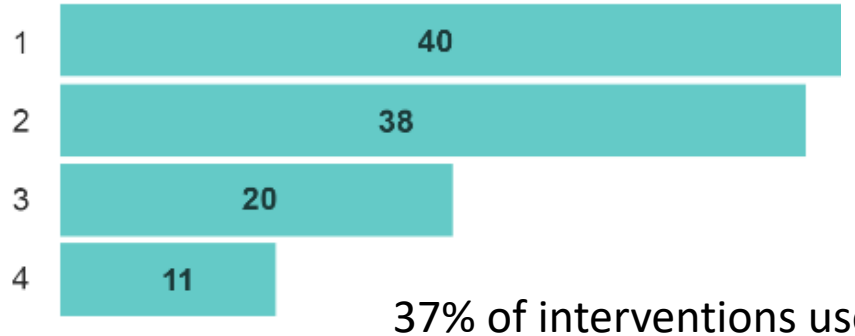
Ecosystem health assessments were often narrow

No. ecosystem health **metrics** per intervention



58% of interventions used only 1 or 2 metrics

No. ecosystem health metric **categories** per intervention



37% of interventions used only 1 metric category

Other limitations:

- Taxonomic bias: 50% of interventions only had evidence for plants
- Species suitability: 57% of outcomes did not distinguish between native and non-native species

How can we improve ecosystem health assessments?

1. Aim for at least three types of **metric**: structural, taxonomic and functional (Lyashevska and Farnsworth 2012)
2. Use **indicators** of health specific to an ecosystem, e.g. structural heterogeneity for natural forest regeneration (Poorter et al. 2021)
3. Good **taxonomic** coverage; living and non-living
4. Record if species are **non-native**, and if they may pose a risk
5. **Local communities** must inform metric choices
6. Consider **traditional and indigenous knowledge** systems
7. **Standardise** approaches across comparable NbS; citizen science
8. Development of assessment **tools** e.g. remote sensing, acoustics, eDNA

In final review stages for Frontiers in Environmental Science:
Characterising the evidence on biodiversity outcomes of nature-based solutions for climate change adaptation.
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