



Outcomes of nature-based solutions for biodiversity & ecosystem health



Isabel Key, Megan Macgillivray, Alexandre Chausson, Beth Turner, Nathalie Seddon
Nature-based Solutions Initiative, University of Oxford

CONTEXT

Nature-based solutions (NbS) should deliver benefits for nature by improving ecosystem health, and increasing biodiversity where appropriate. However, empirical evidence for these types of outcomes is currently dispersed, and the quality of this evidence unknown¹.

RESEARCH QUESTIONS

1. Do NbS have measurable benefits for biodiversity and ecosystem health?
2. What is the quality of evidence for these outcomes?

METHODS

A synthesis and meta-analysis of the biodiversity and ecosystem health outcomes of NbS across 74 studies. The studies were a subset from a systematic review of interventions addressing climate impacts in any ecosystem, except agricultural or urban².

Contact

isabel.key@zoo.ox.ac.uk

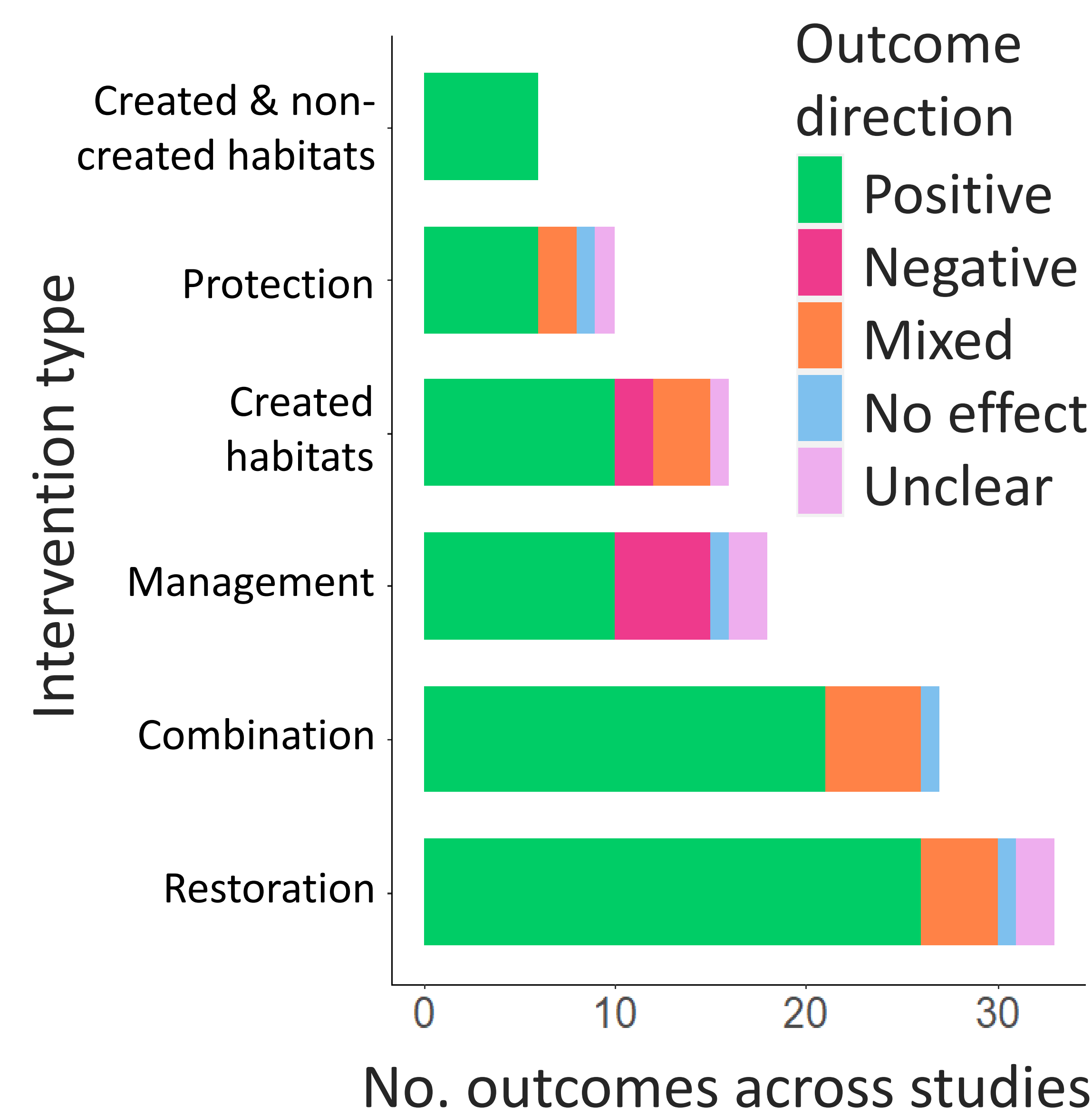
References

1. Seddon et al. 2021. Global Change Biology.
2. Chausson, Turner et al. 2020. Global Change Biology. The review of biodiversity & ecosystem health outcomes includes a subset of studies from this paper, with the search extended to April 2020.



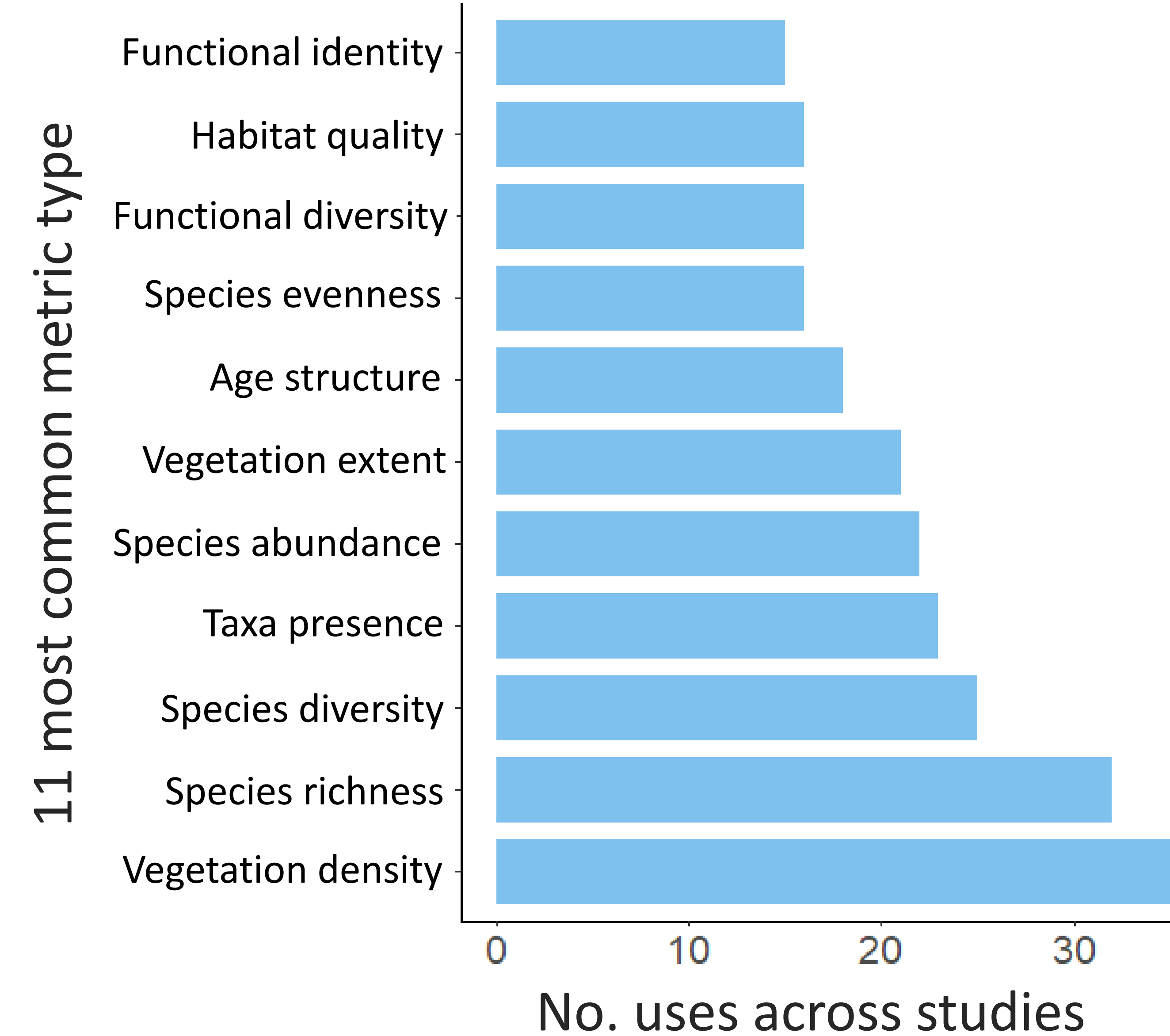
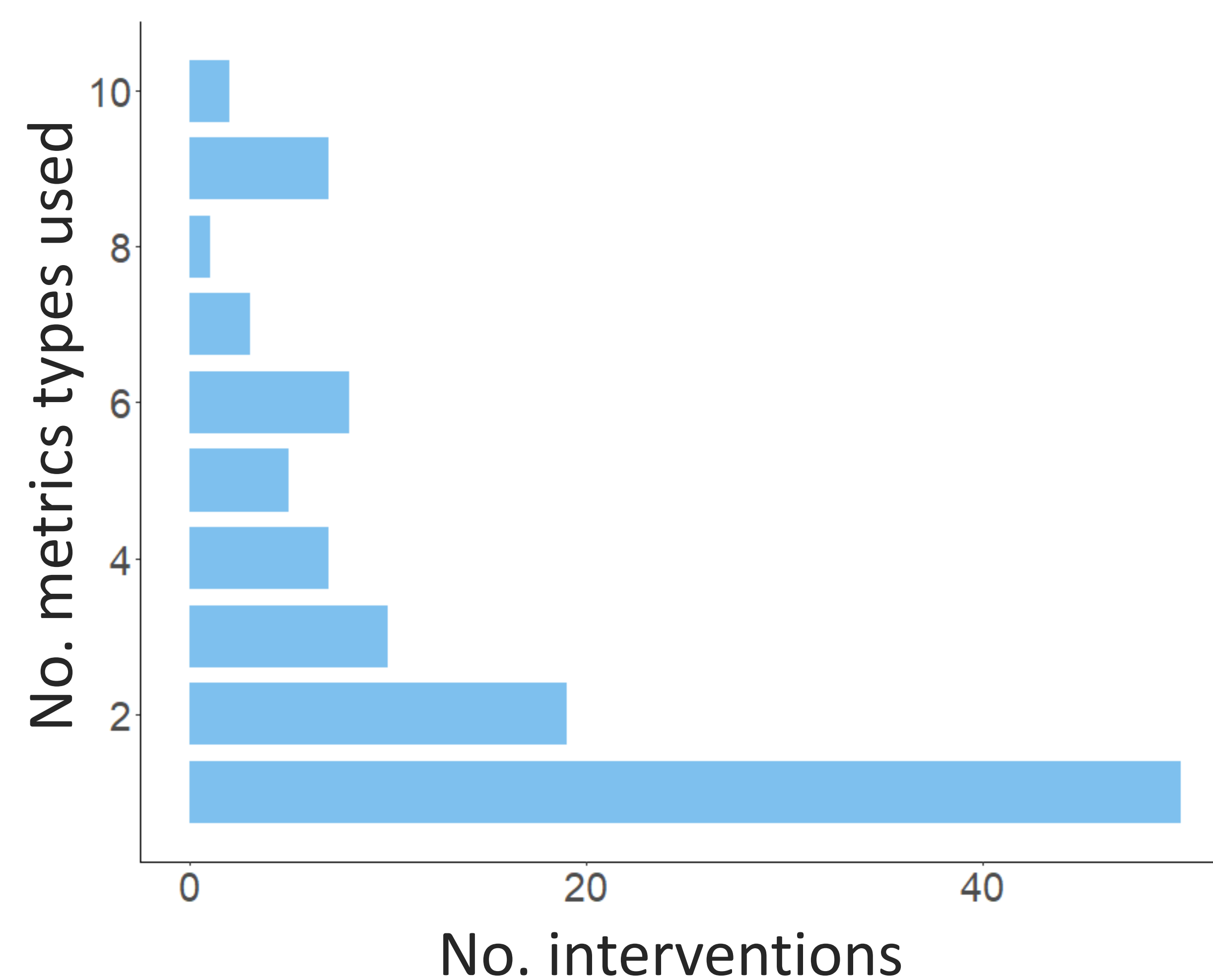
RESULTS

1. NbS most often benefit biodiversity or ecosystem health



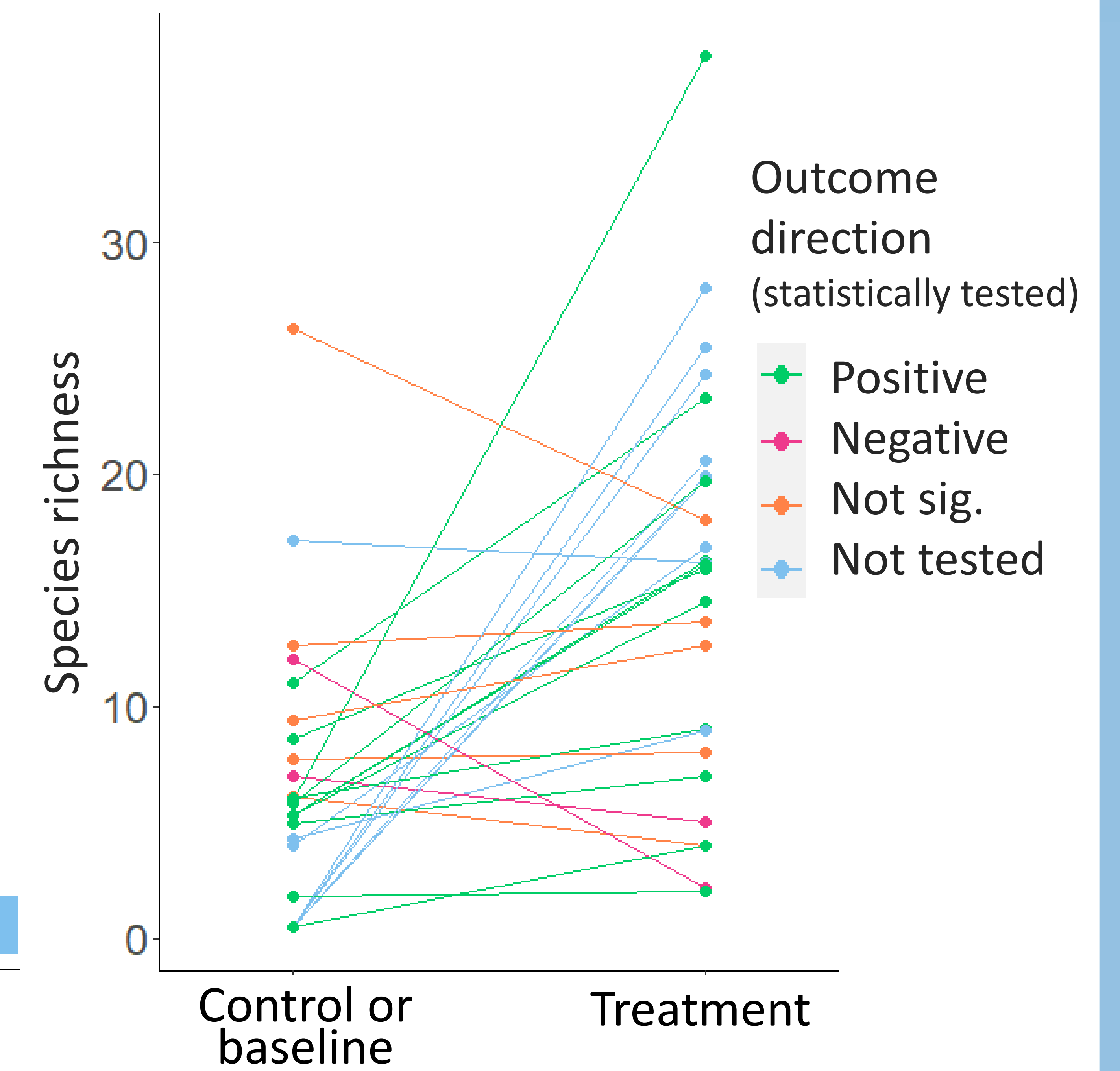
Most interventions had positive outcomes. Negative outcomes were restricted to management interventions and created habitats (e.g. plantations).

2. Evidence quality is sometimes limited



The most common metrics assessed vegetation quantity, or taxonomic diversity. Functional metrics were underrepresented.

- The outcomes of most interventions were measured with just one metric.
- Nine interventions used a measure of vegetation quantity as the only metric.
- 60% of outcomes didn't differentiate between native & non-native species.
- Taxonomic bias towards plants (77% of outcomes).
- Only 10% of studies reporting species richness controlled for sampling effort.



Species richness on average increased 3.15-fold (geometric mean effect size; CI: 1.74-5.88) in response to the intervention, where reported.

CONCLUSIONS

- There is evidence for NbS benefitting biodiversity and ecosystem health. However, the quality of evidence for these outcomes is often weak.
- NbS projects should be assessed more comprehensively using a broader suite of metrics for biodiversity/ecosystem health, and should control for confounding factors such as sampling effort.