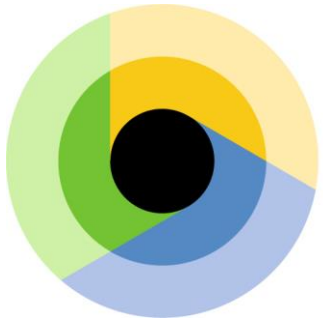
Mediterranean marine protected areas have higher biodiversity via increased evenness, not abundance

Shane A. Blowes, Jonathan M. Chase, Antonio Di Franco, Ori Frid, Nicholas J. Gotelli, Paolo Guidetti, Tiffany Knight, Felix May, Daniel J. McGlinn, Fiorenza Micheli, Enric Sala, Jonathan Belmaker



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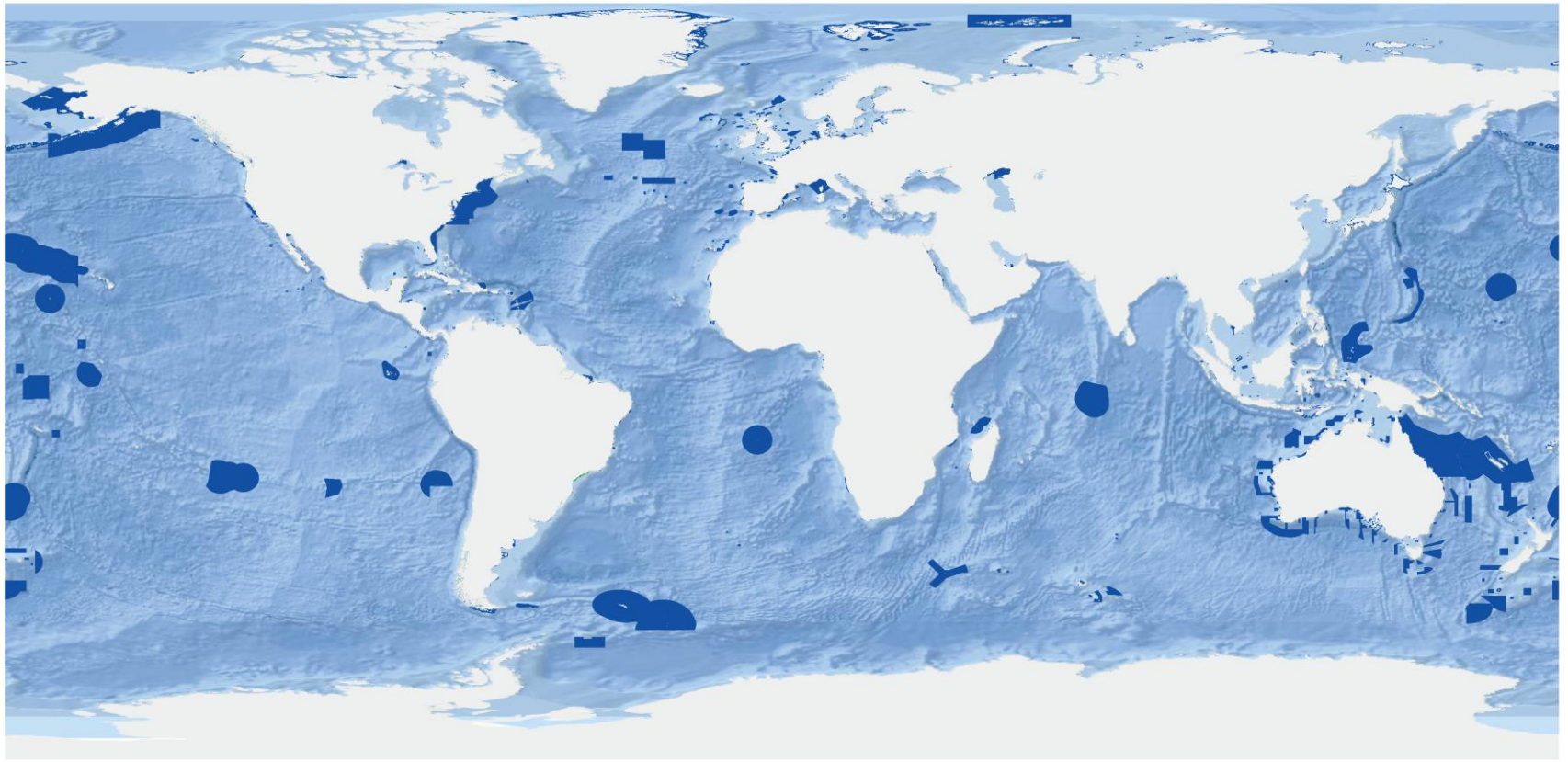
Protected areas and conservation



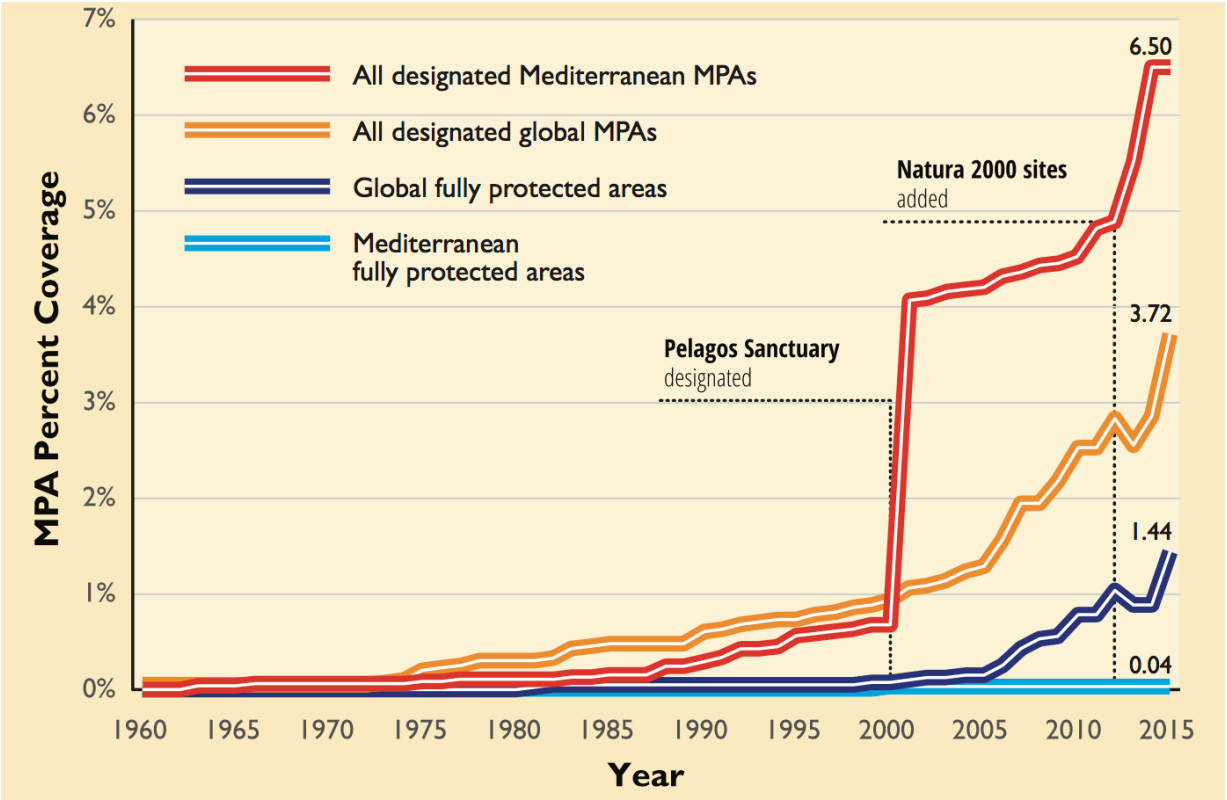
Source: IUCN and UNEP-WCMC (2016). The World Database on Protected Areas (WDPA) [On-line], December 2016, Cambridge, UK: UNEP-WCMC. Available at wwww.protectedplanet.net

UNEP WCMC

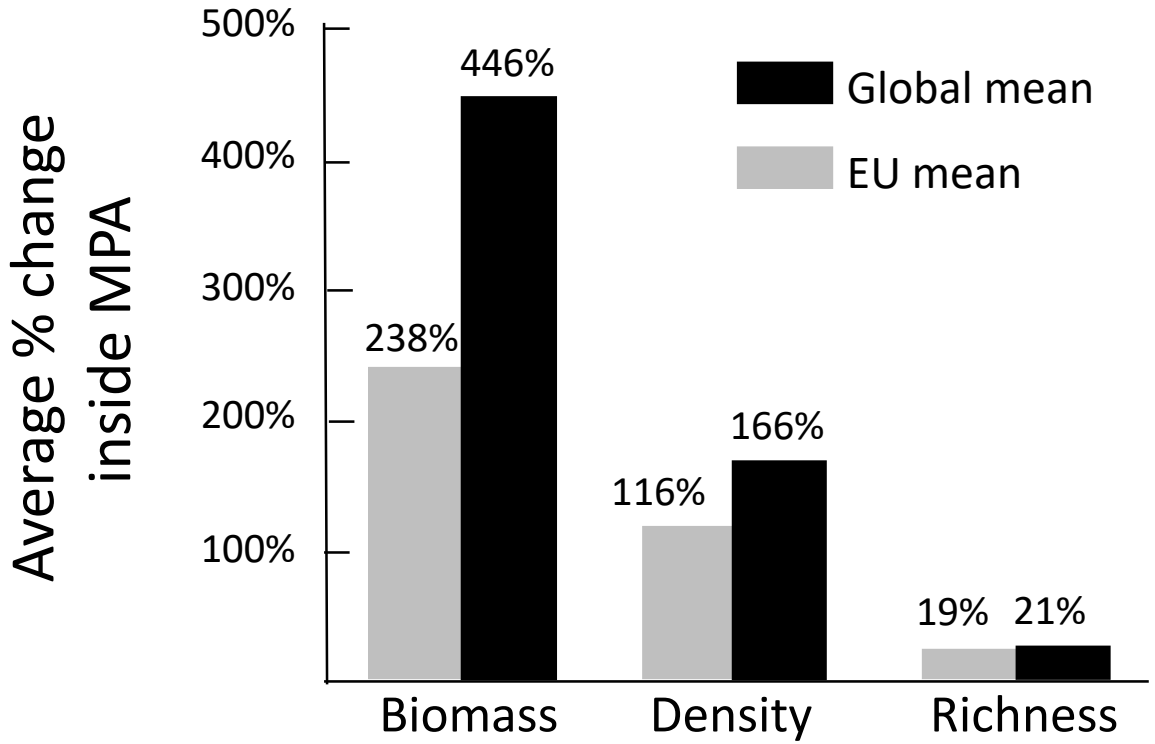
5.1% of the Global Ocean covered by marine protected areas
Exclusively No Take = 1.23%

IUCN WCPA WORLD COMMISSION ON PROTECTED AREAS

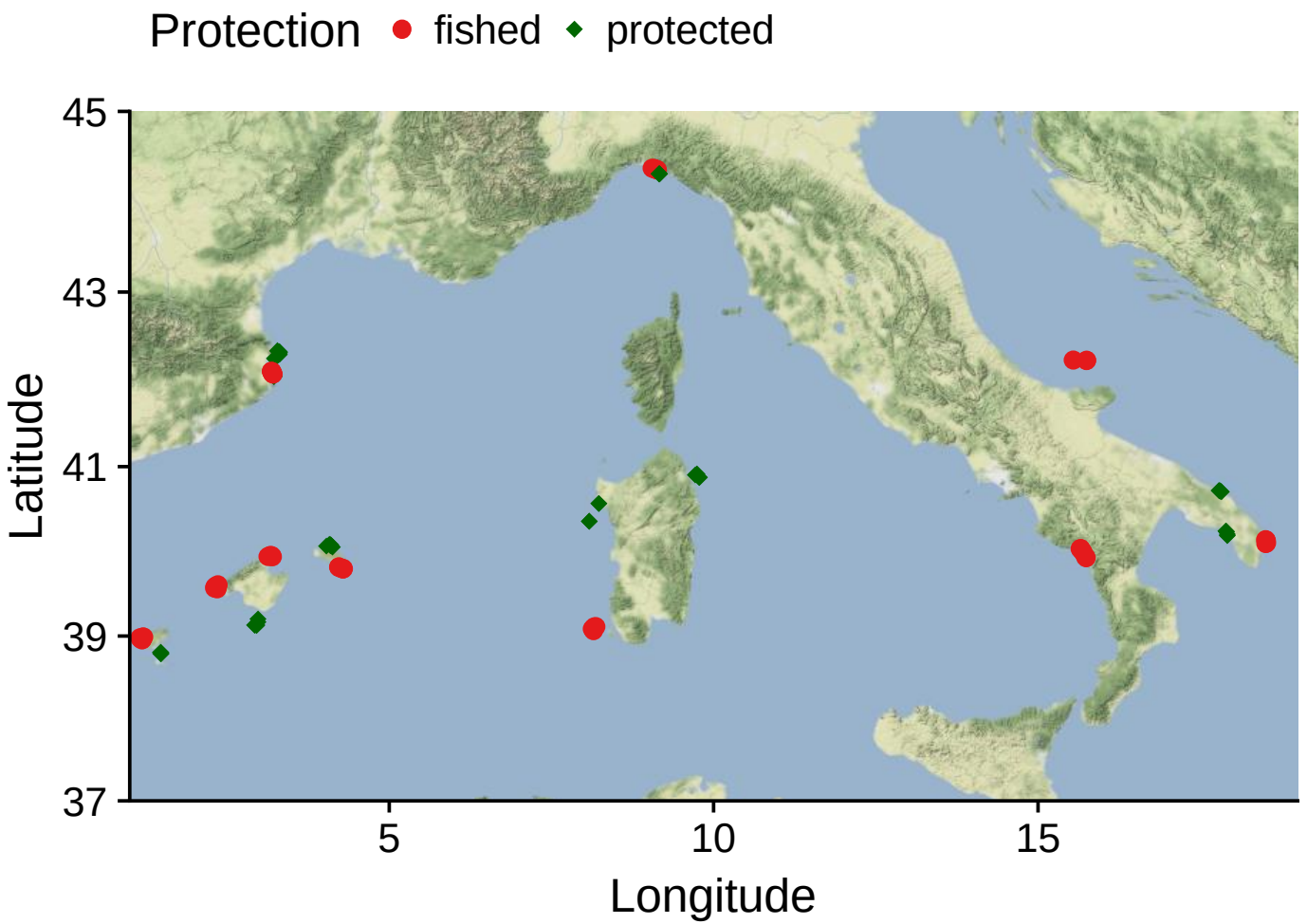
Protected areas and conservation



Protected areas and conservation



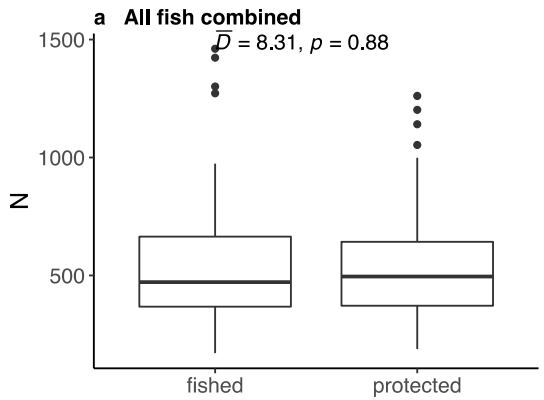
Mediterranean MPAs: α - scale

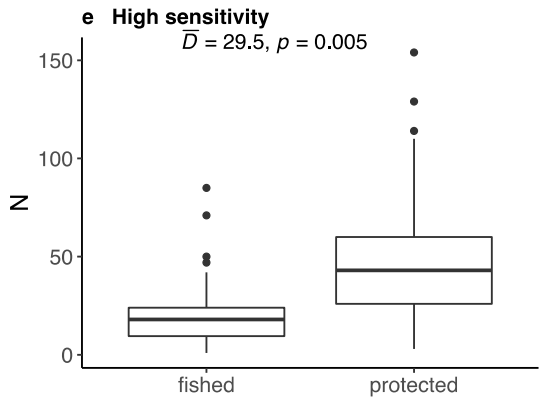


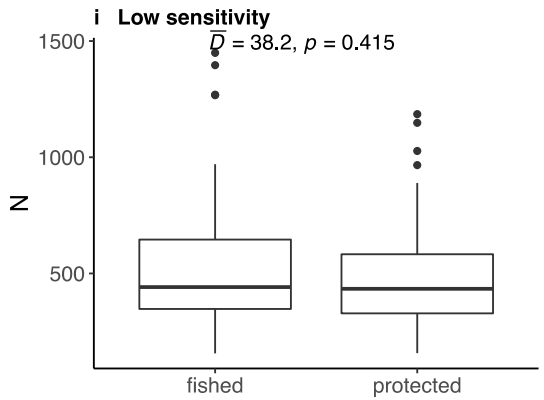
- 56 fished sites
- 55 protected sites
  - 3 transects per site
- Examine trait-dependence of protection effects

Sala *et al.* 2012 PLoS ONE, Guidetti *et al.* 2014 PLoS ONE, fishbase.org

Effect of protection in Mediterranean MPAs: α-scale

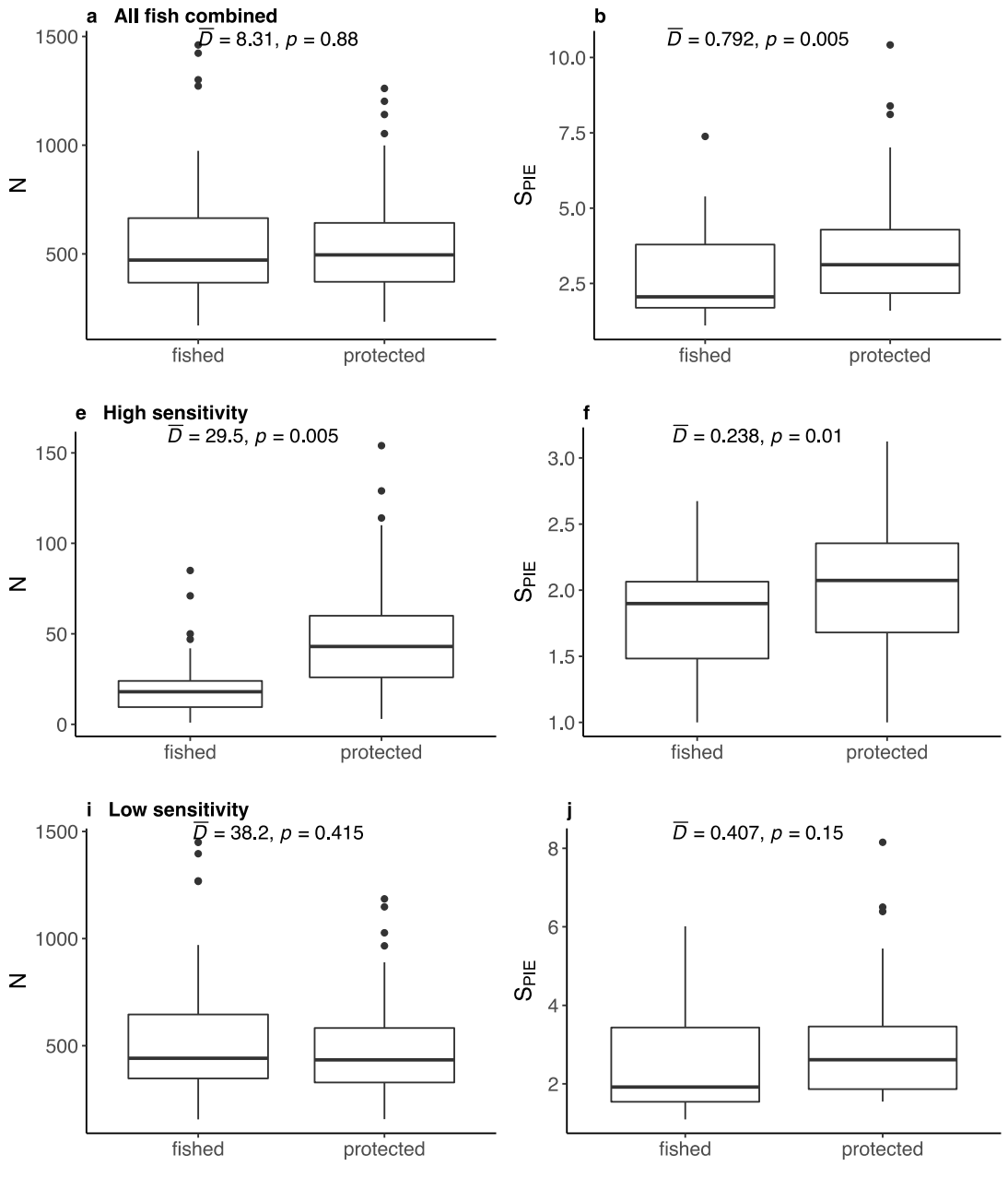




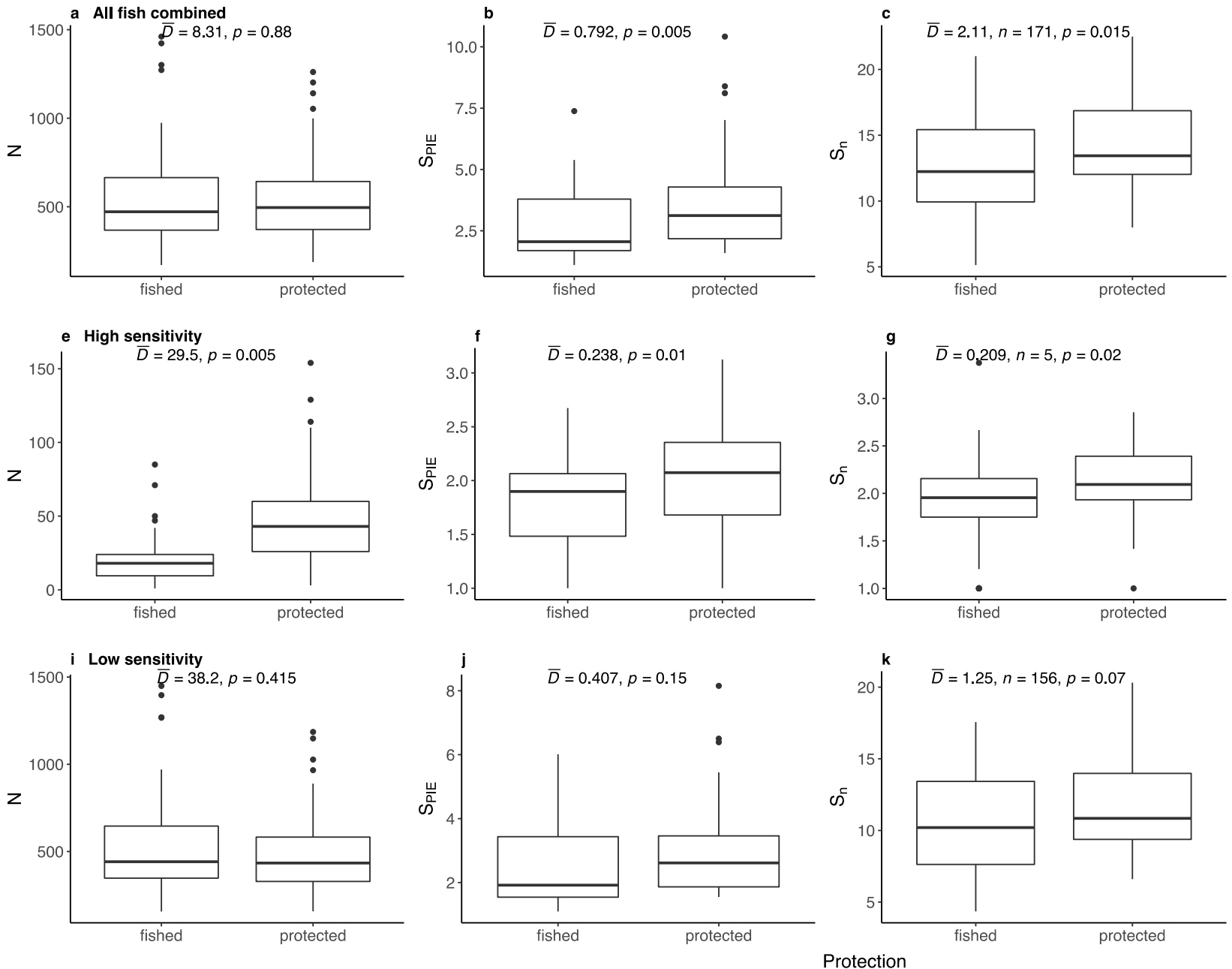


Protection

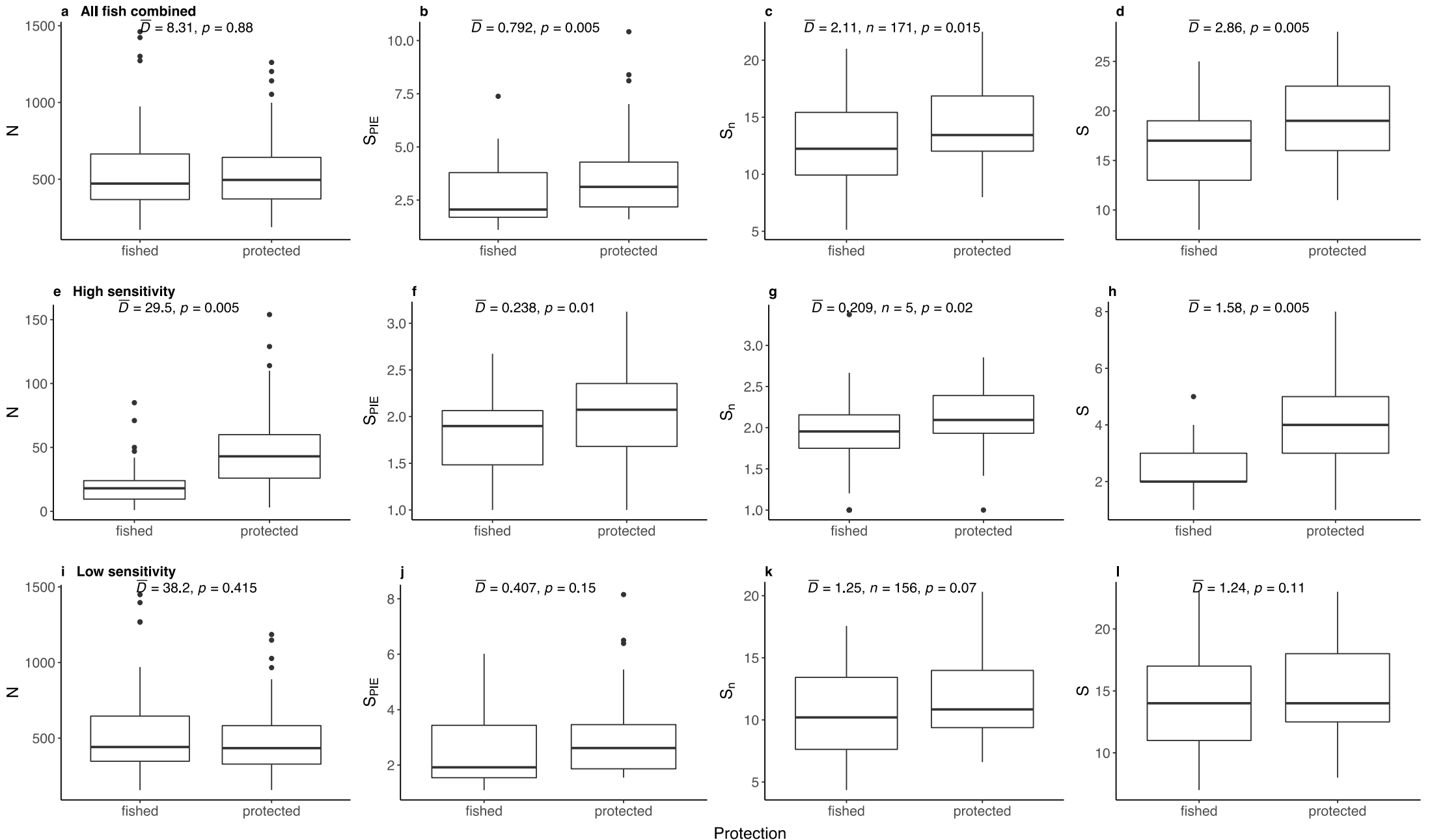
Effect of protection in Mediterranean MPAs: α-scale



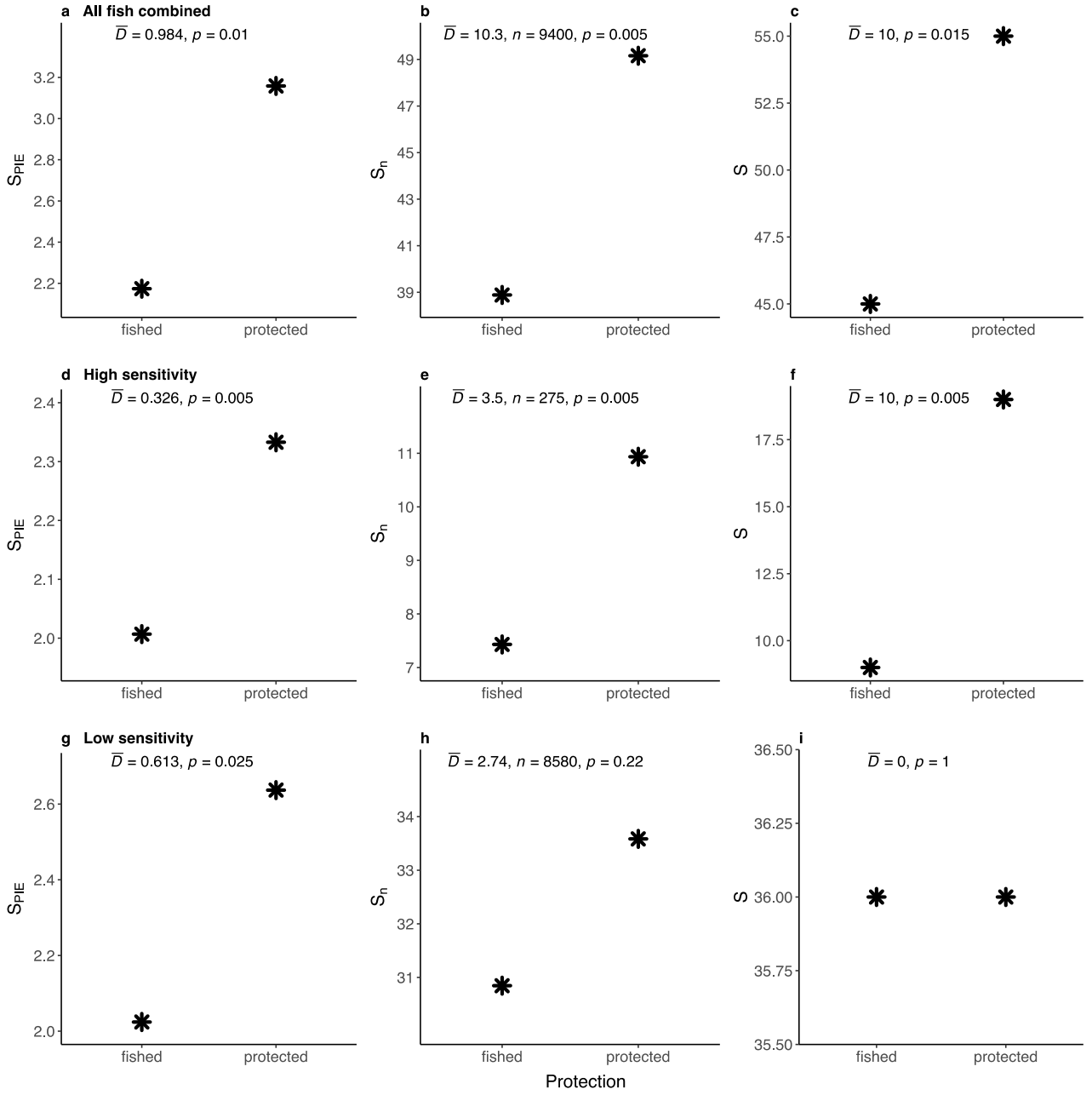
Effect of protection in Mediterranean MPAs: α-scale



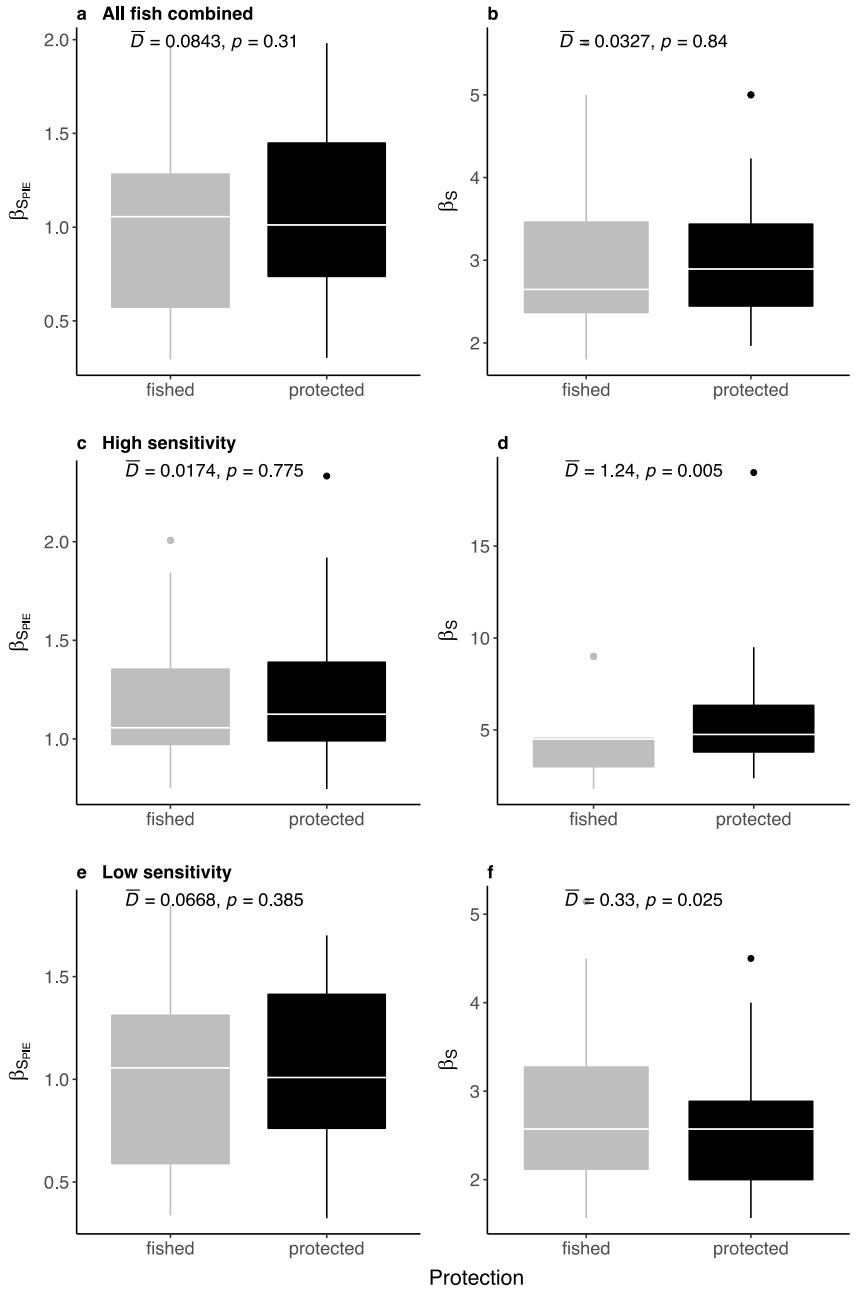
Effect of protection in Mediterranean MPAs: α-scale

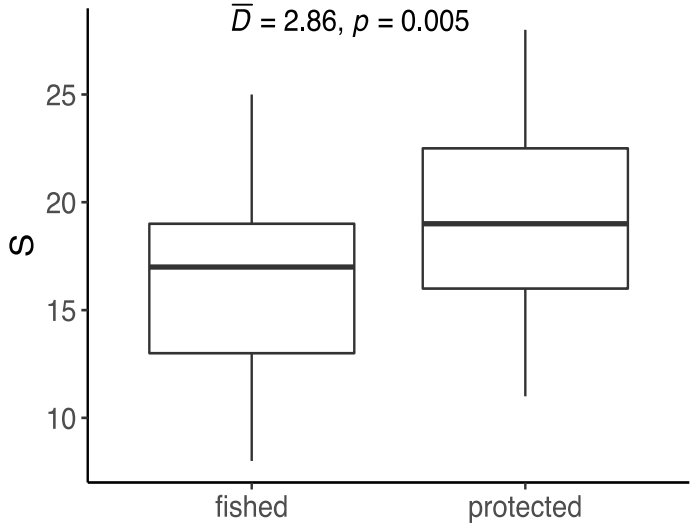


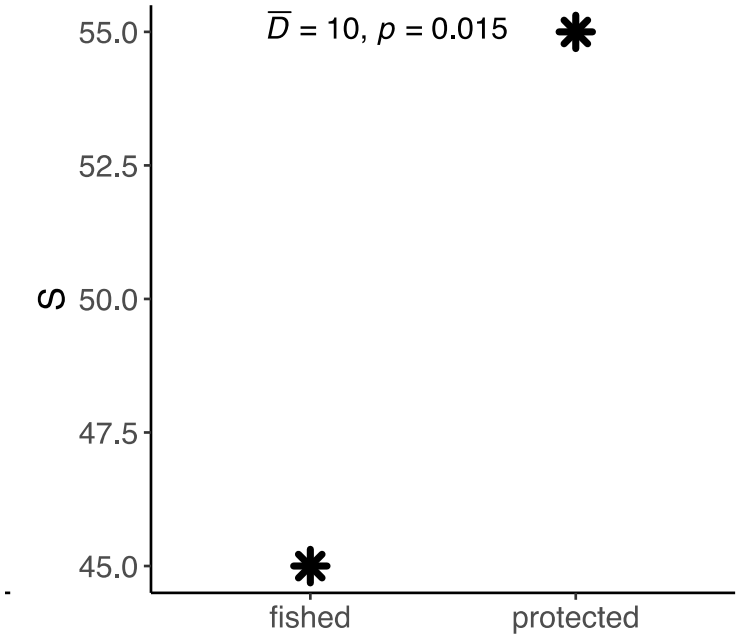
Effect of protection in Mediterranean MPAs: γ-scale



Effect of protection in Mediterranean MPAs: β - scale ($=\gamma/\alpha$)



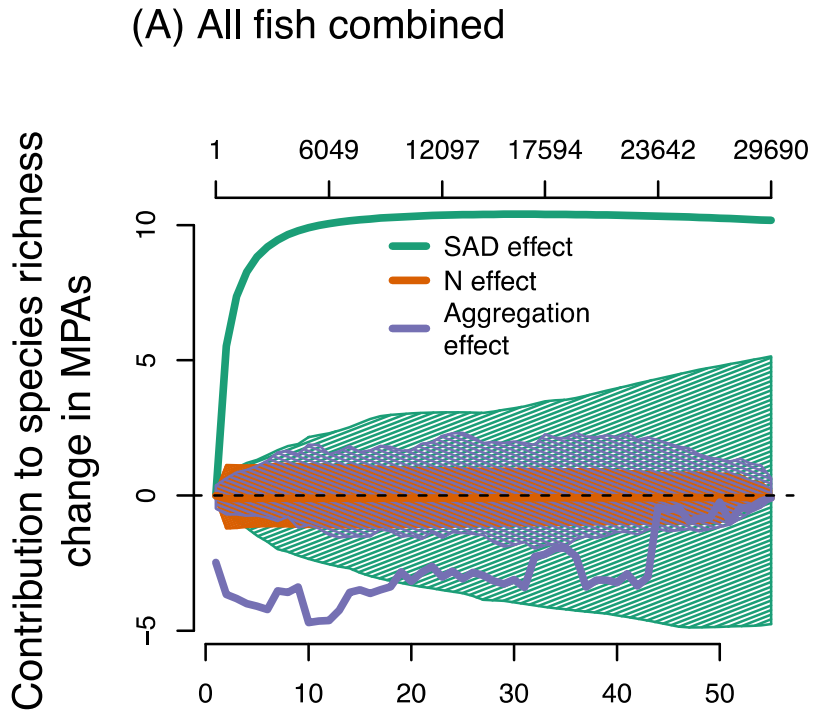




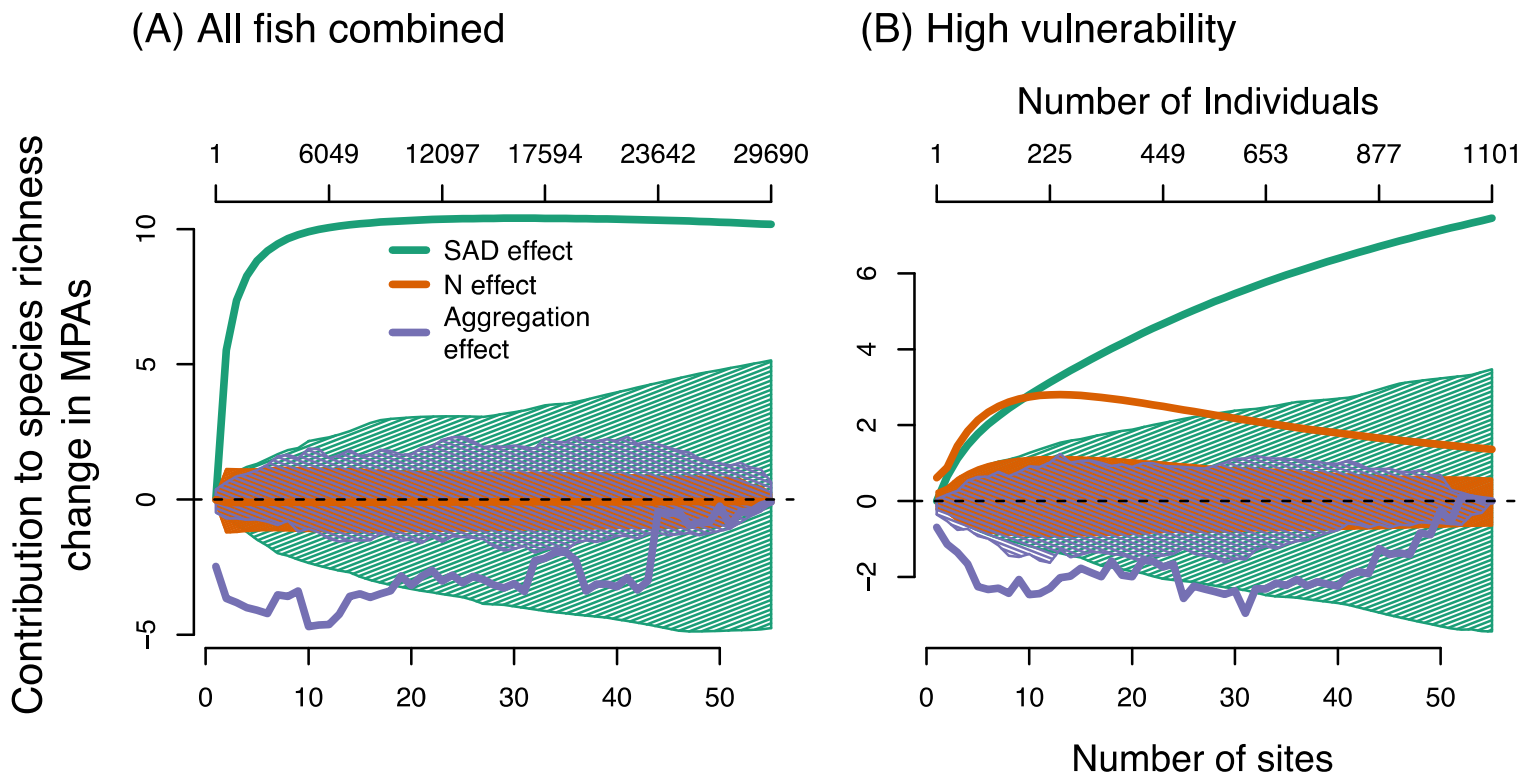
But…we want to quantify component contributions (N, SAD, aggregation) to MPA effect on species across scales.

McGlinn *et al.* 2018 bioRxiv, Xiao *et al.* 2018 https://github.com/MoBiodiv/mobr

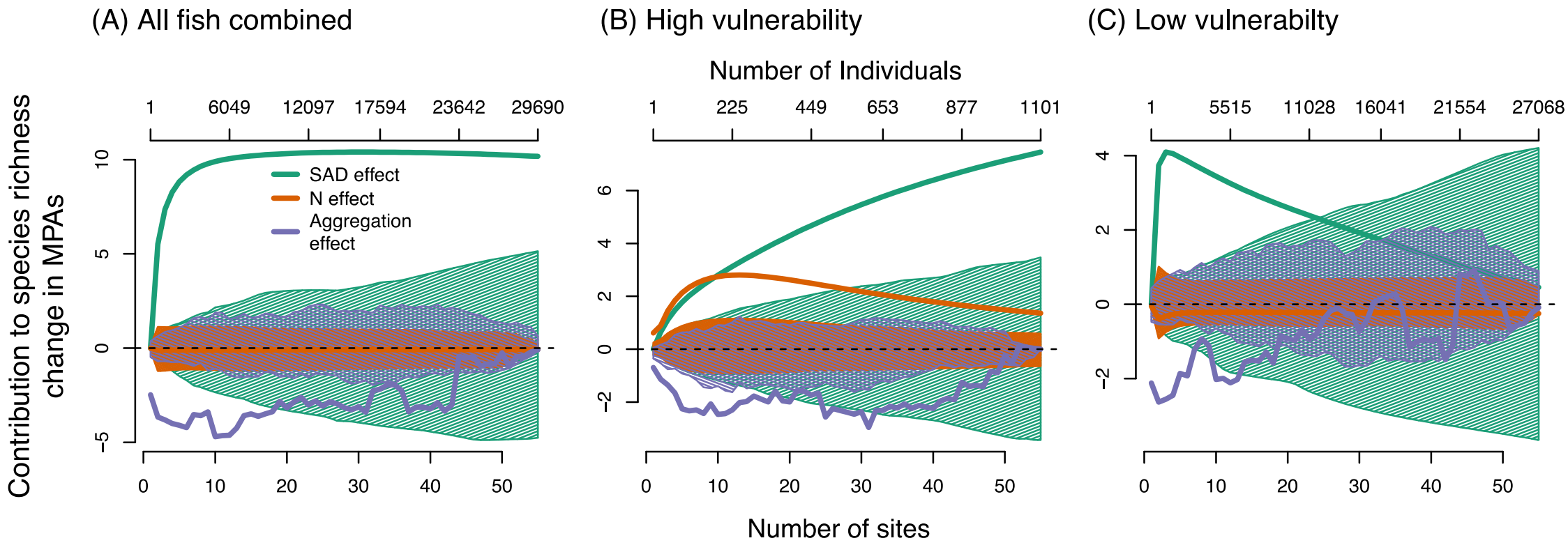
Effect of protection in Mediterranean MPAs: all-scales



Effect of protection in Mediterranean MPAs: all-scales

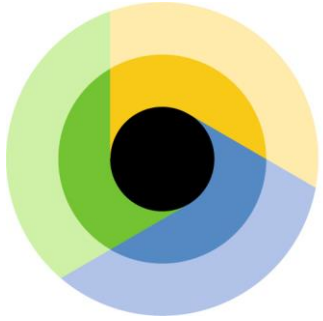


Effect of protection in Mediterranean MPAs: all-scales



Take home

- Changes to SAD dominate MPA effect on species richness
- Exploitation homogenizes the part of the fish community most sensitive to fishing
- Regional system of MPAs reverse this (by ↑ β-diversity)



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