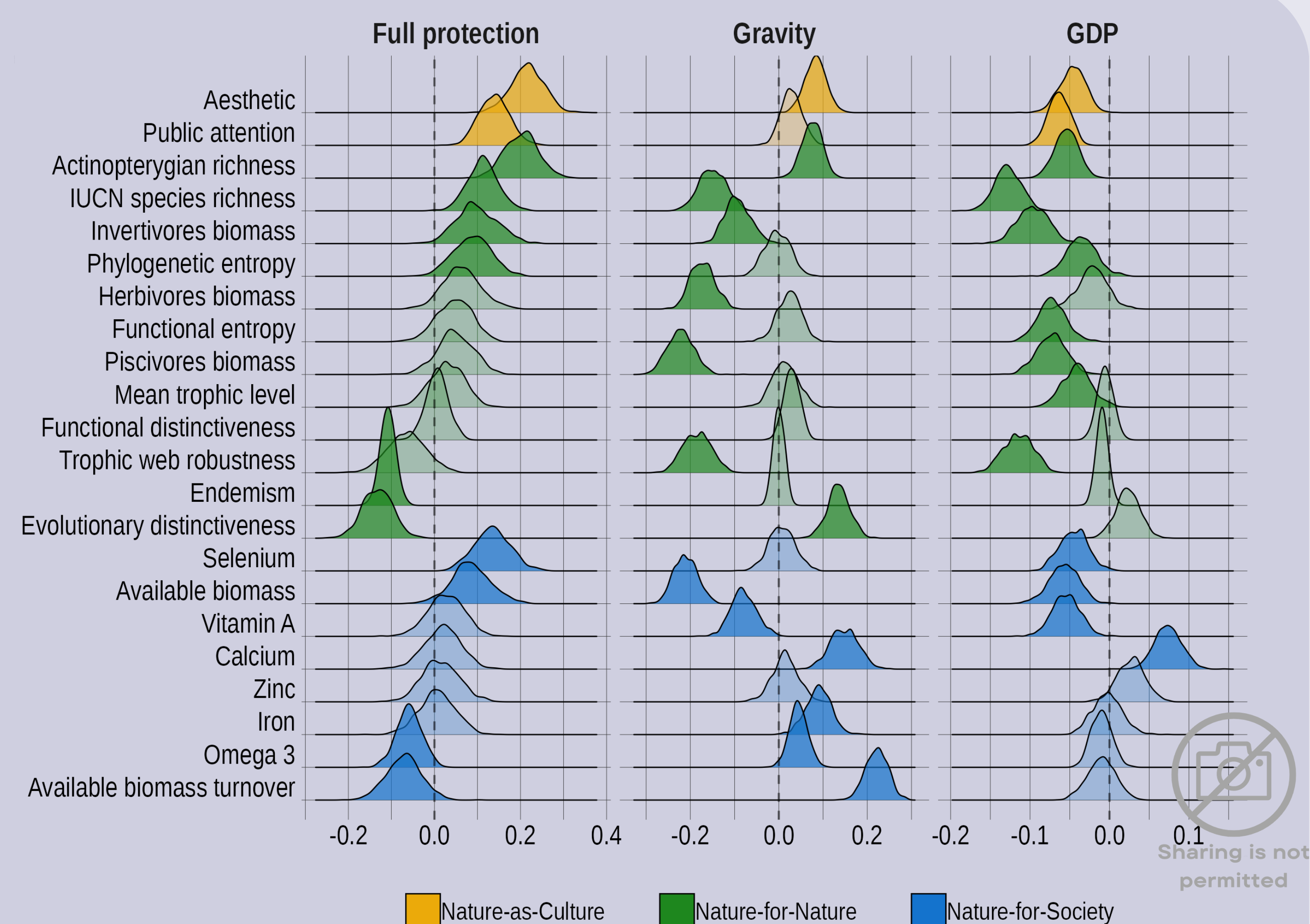
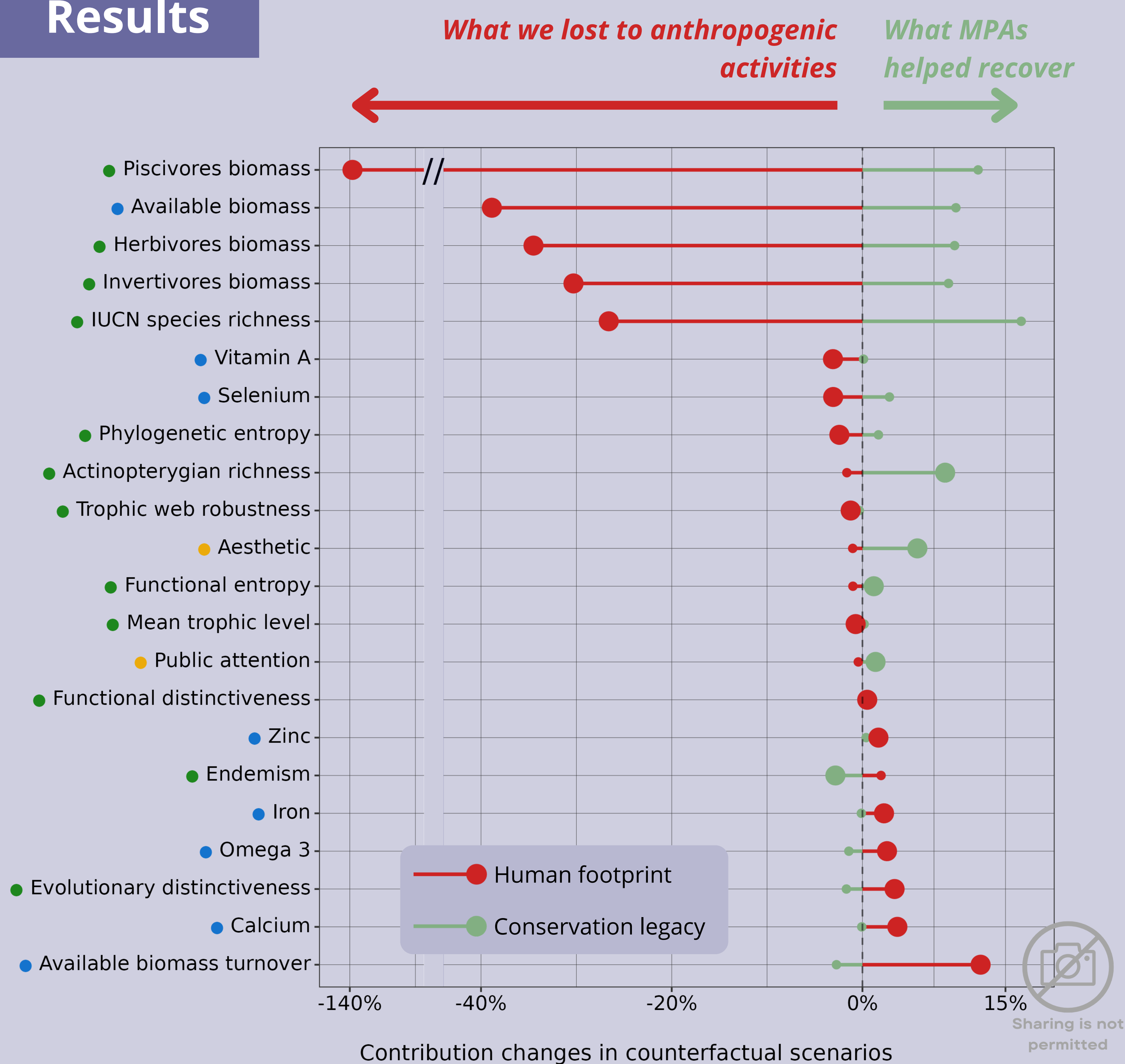
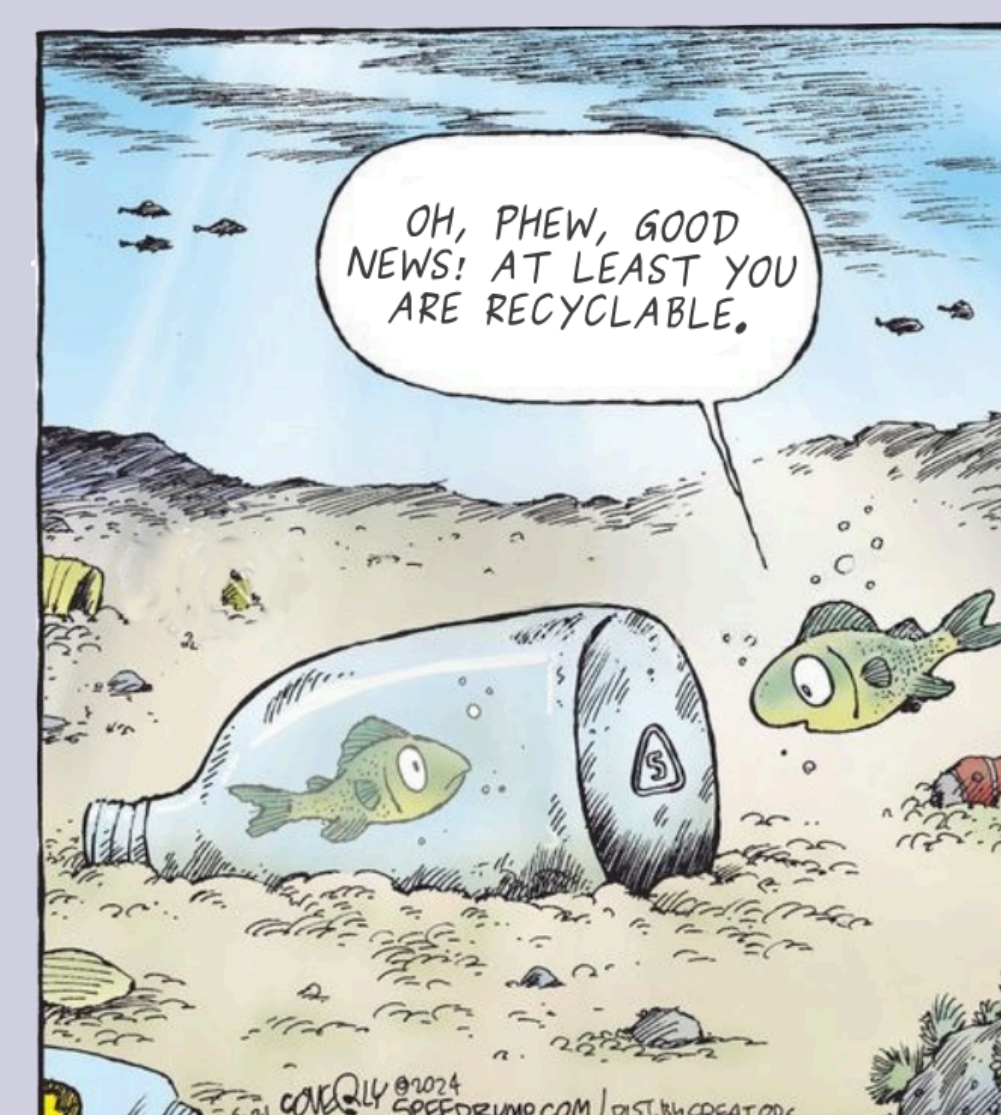


# Conservation only marginally mitigates the decline in tropical fish contributions

## Results



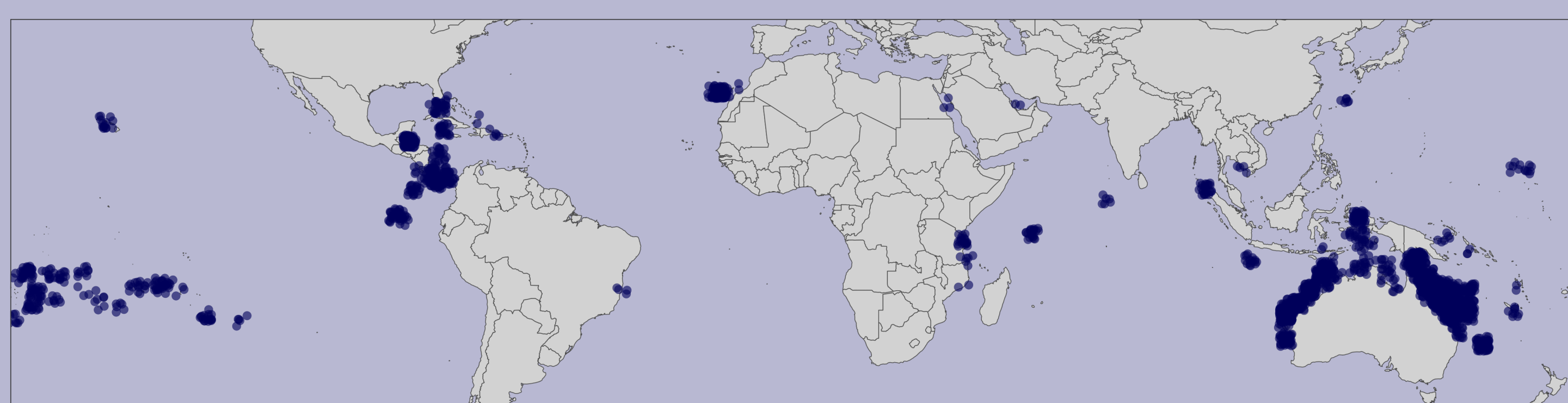
➤ **Effect sizes of anthropogenic covariates on fish contributions on tropical reefs.** "Gravity" = proxy of human pressure. "GDP" = Gross Domestic Product.



- Human caused major **biodiversity and biomass loss**
- MPAs alone can't reverse these impacts
- MPAs still support **cultural and emotional ties** to nature
- We must **rethink our relationship** with nature for lasting change

➤ **Marine Protected Areas (MPAs) are insufficient to restore most of reef fish community contributions in the face of anthropogenic activities.** Relative changes in fish contributions on tropical reefs under counterfactual scenarios of pseudo-pristine conditions or no conservation efforts.

## Methods



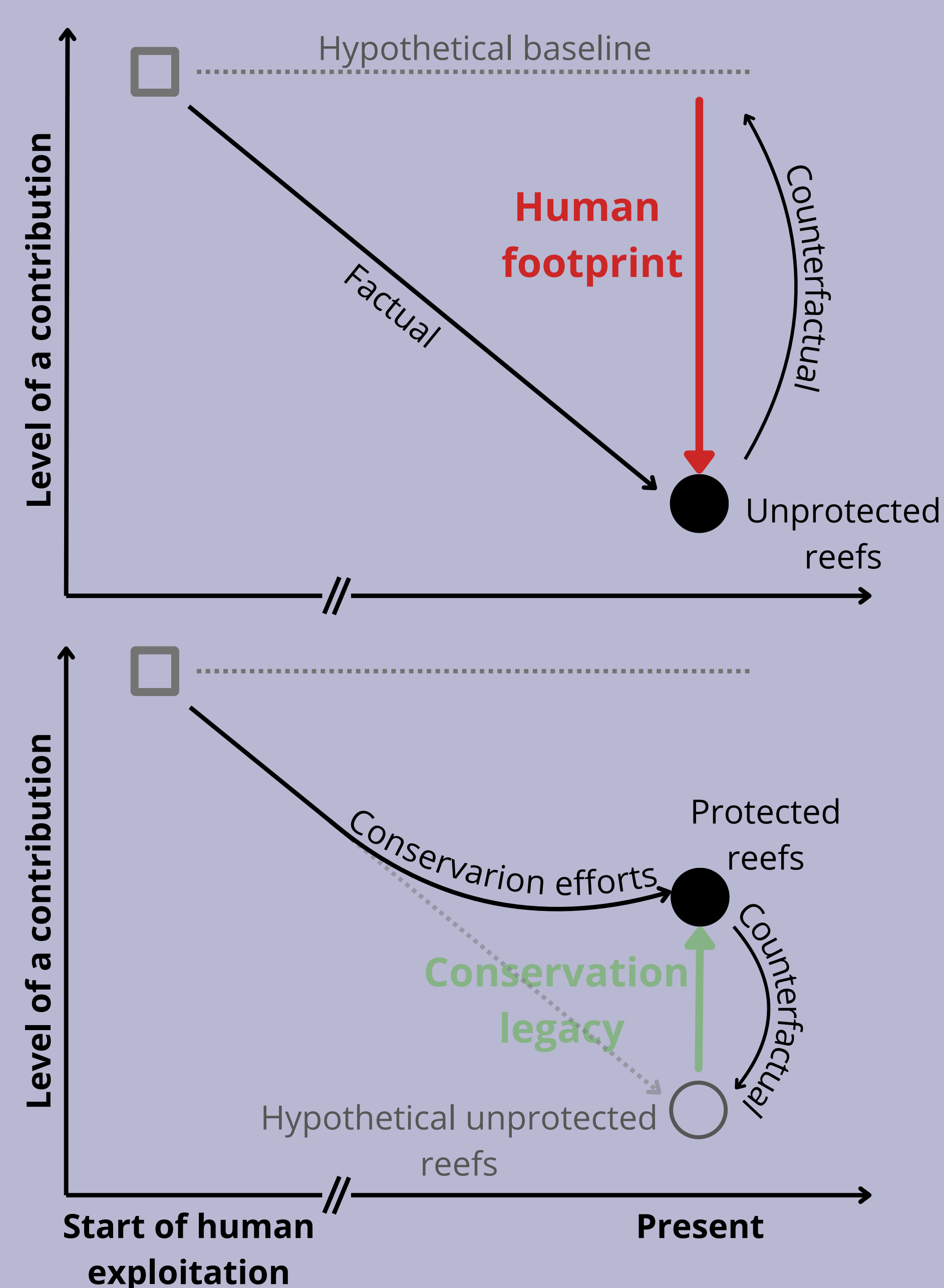
① **Underwater Visual Census** (n = 2,800 sites)  
Fish abundance and biomass

22 forms of fish contributions to nature and people

Covariates:

- Habitat
- Environment
- Human activities

② **Hierarchical Bayesian framework**



③ **Counterfactual scenarios**

Unprotected reefs modelled as pseudo-pristine:

- minimal gravity
- minimal commercial fishing
- maximal travel time to the nearest market
- protection status to 'full MPA'

Protected reefs modelled without conservation efforts:

- protection status to 'out MPA'
- mean commercial fishing

**Conservation marginally bends the declining curve of tropical fish contributions**

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