Stakeholder engagement in nature (biodiversity) conservation science – need or must?

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Stakeholder engagement in nature conservation science – need or must?

- Phases of interactions with nature
- Examples for incomplete knowledge in conservation science
- Ways of discourse
- Engaged research

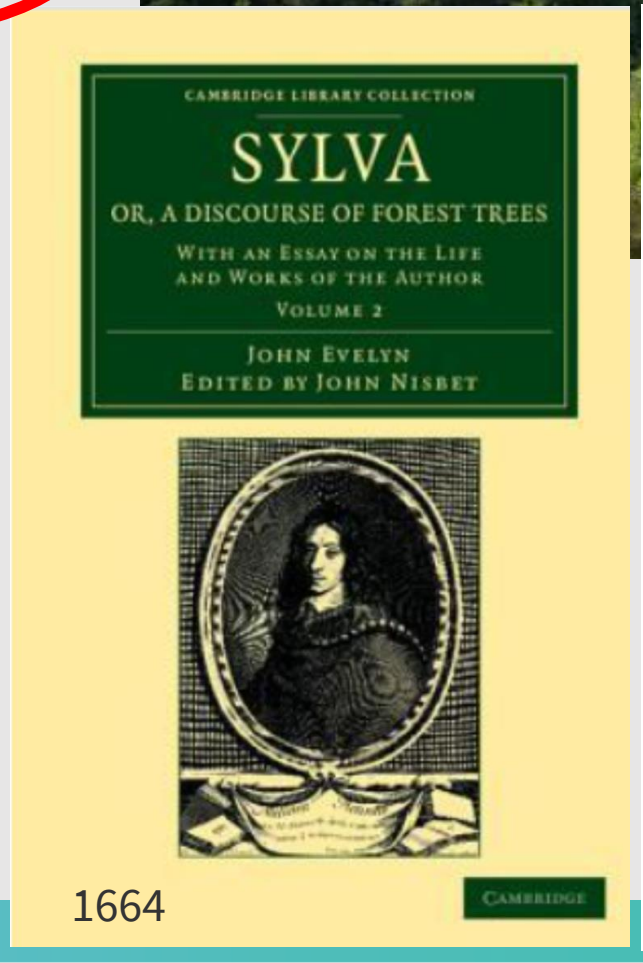
Human – nature interactions – Fighting against nature

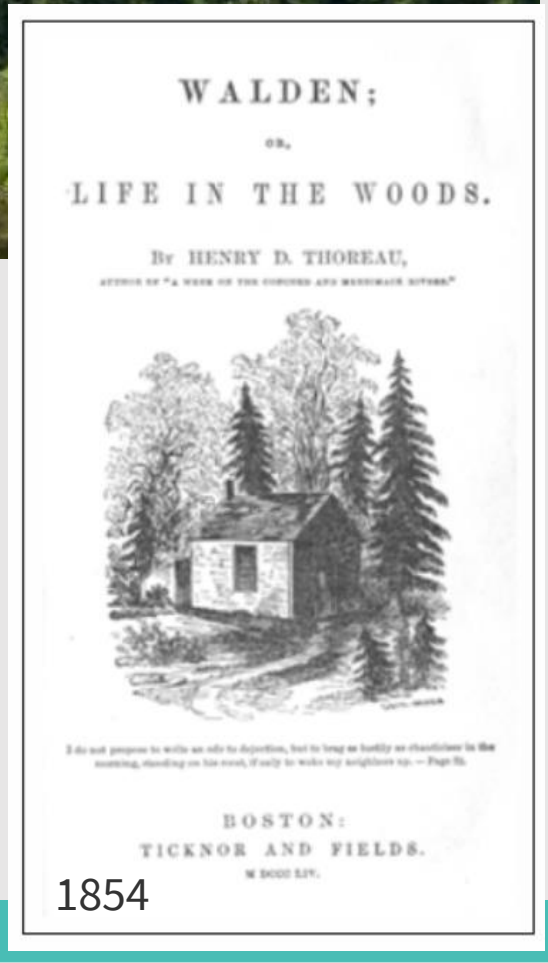
Source: stock.Adobe.com

Human : Nature (1:0)

Source: stock.Adobe.com

Human – nature interactions – nature conservation





- Depletion of natural resources
- Intrinsic value of the nature

” We can never have enough of nature… We need to witness our own limits transgressed, and some life pasturing freely where we never wander..”(Thorow 1854)

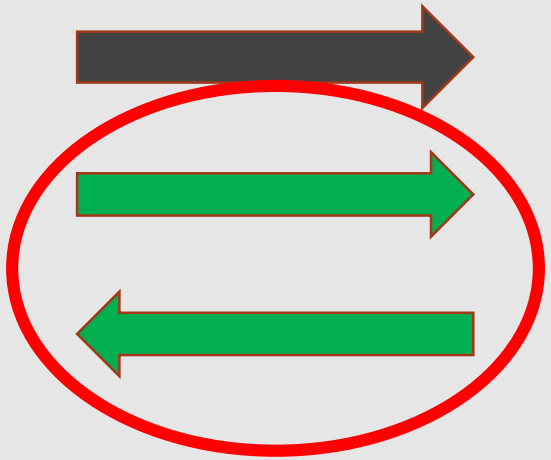
Images: stock.Adobe.com

Human – nature interactions – nature conservation

- Depletion of natural resources
- Intrinsic value; Protect for future generations Natural parks, protected areas
- IUCN (1948<),UNESCO
- Convention on Biological Diversity (1993) sustainable development concept

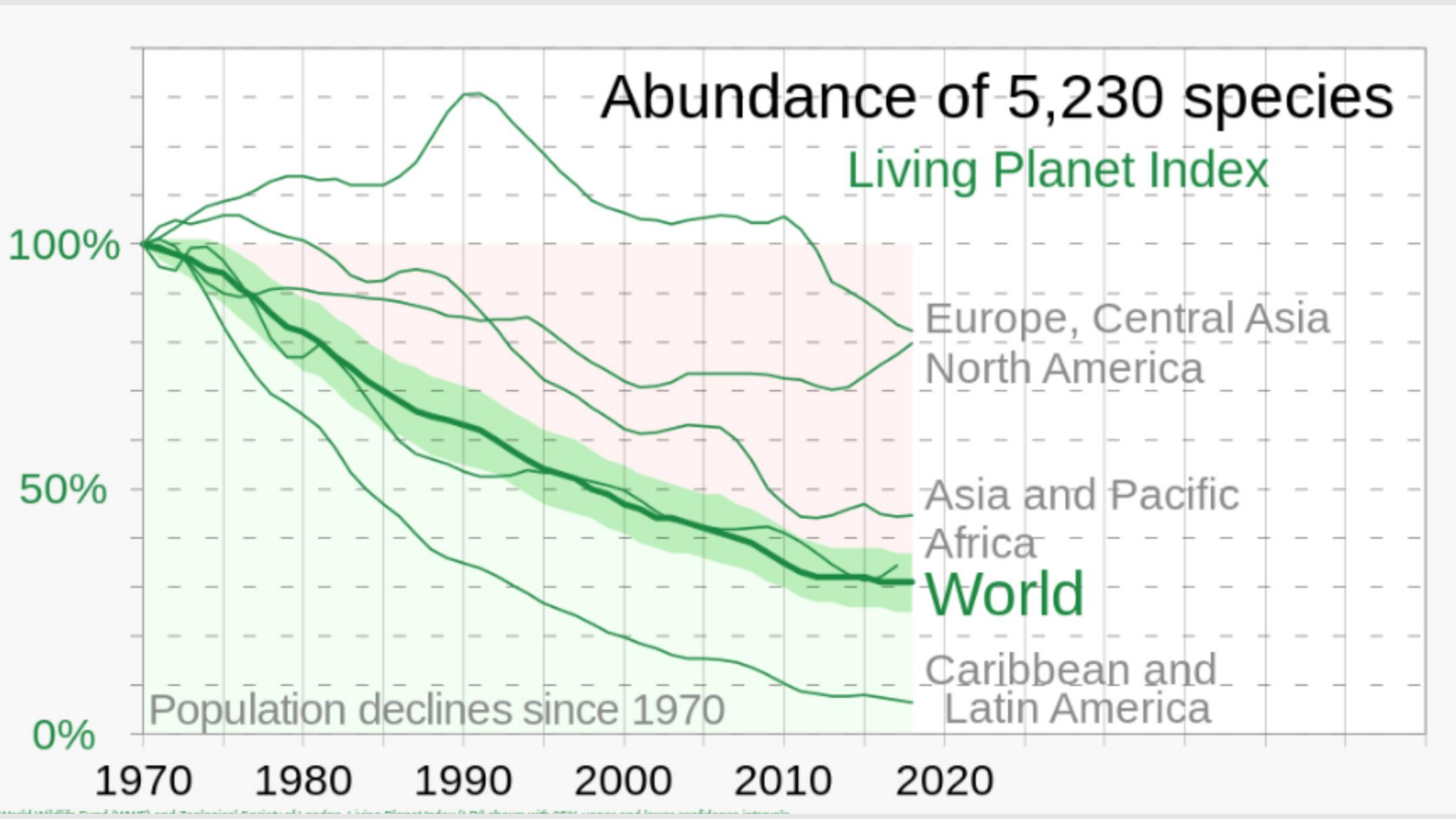
images: stock.Adobe.com, Wikipedia

Ecosystem Services Concept



- Costanza, R. et al. **The value of the world's ecosystem services and natural capital.** *Nature 1997*, 387, 253–260.
- Millennium Ecosystem Assessment (**MA)** (2005)
- The Economic Of Ecosystems and Biodiversity (**TEEB**).
- Common International Classification of Ecosystem Services (**CICES**). Available online: https://cices.eu/
- International Panel for Biodiversity and Ecosystem Services (**IPBES**)

Source: stock.Adobe.com


Abundance of 5,230 species
Living Planet Index
100%
50%
0%
Europe, Central Asia
North America
Asia and Pacific
Africa
World
Caribbean and
Latin America
Population declines since 1970
1970
1980
1990
2000
2010
2020

Species level	2+ years of data
Known location	Standardised method

Data we can use

Vertebrate species:

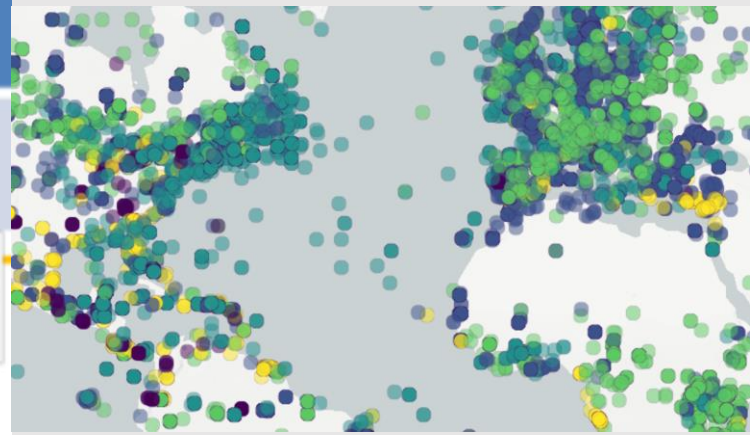
- Full population counts
- Estimates (e.g. population size estimated from measured parameters)
- Densities (including converted camera trap data)
- Indices
- Proxies (e.g. breeding pairs, nests, tracks)
- Measures per unit effort (e.g. fish caught per net per hour)
- Biomass (e.g. spawning stock biomass)
- Samples (e.g. where a proportion of the population is regularly monitored)

Data we may use in future

- Occupancy data

Data we can't use

- Data from experimental observations
- Survival rates
- Recruitment data e.g. number of eggs or young
- Catch or hunting data with no measure of effort
- Data where method has changed (unless corrected for)
- Opportunistic sighting data

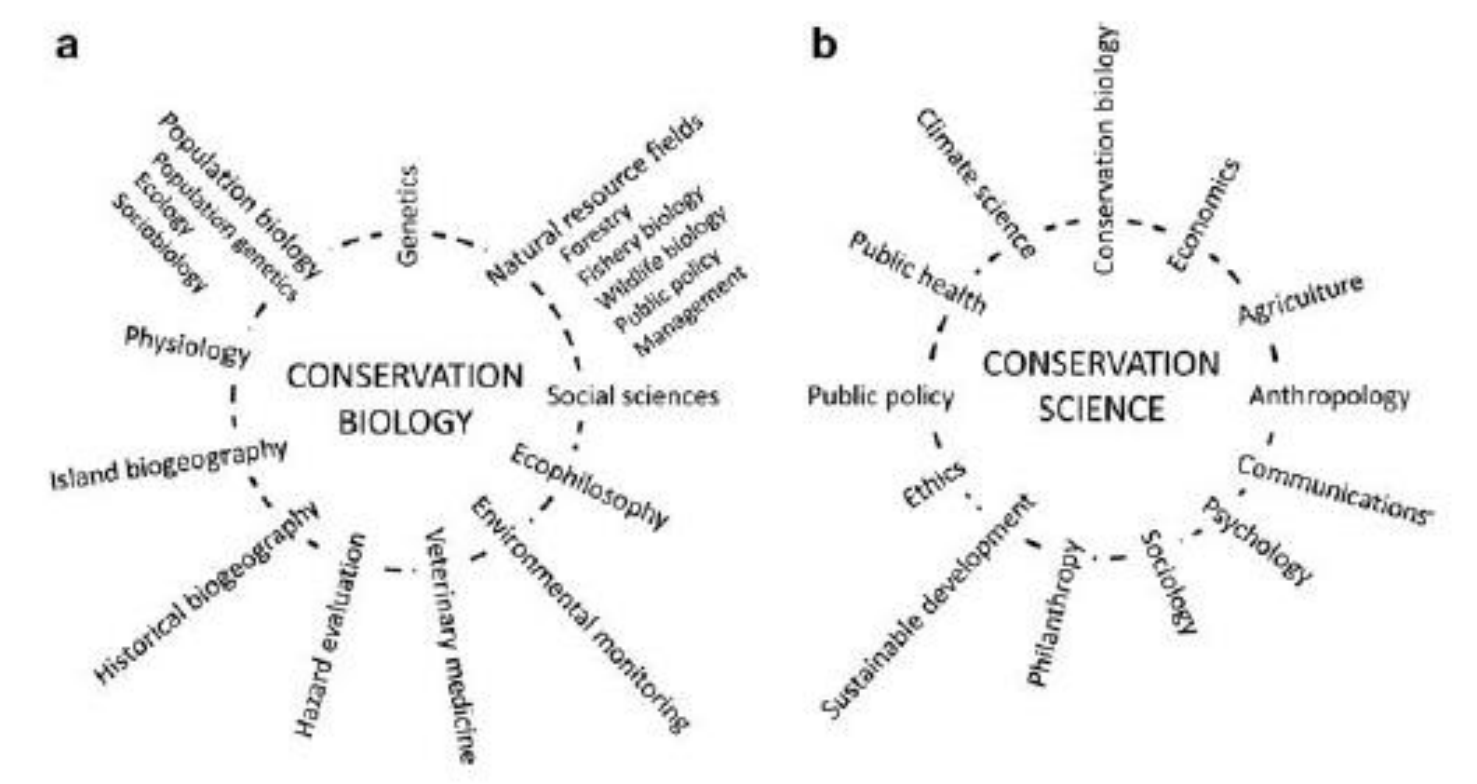


We can keep data confidential!

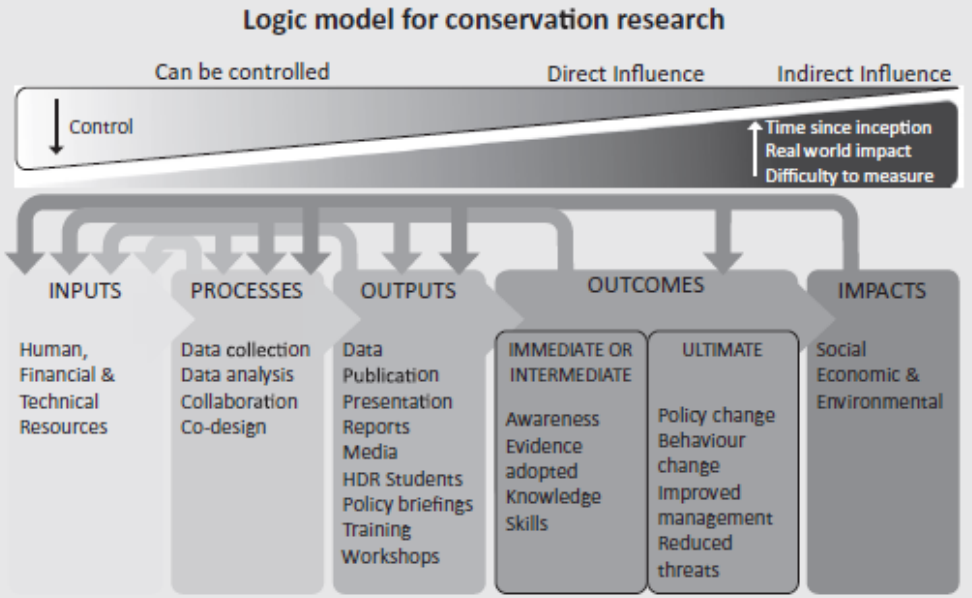
Sensitive/unpublished data are not publicly available, but used to estimate trends

Scientific background for nature conservation

Soule 1985: What is conservation biology

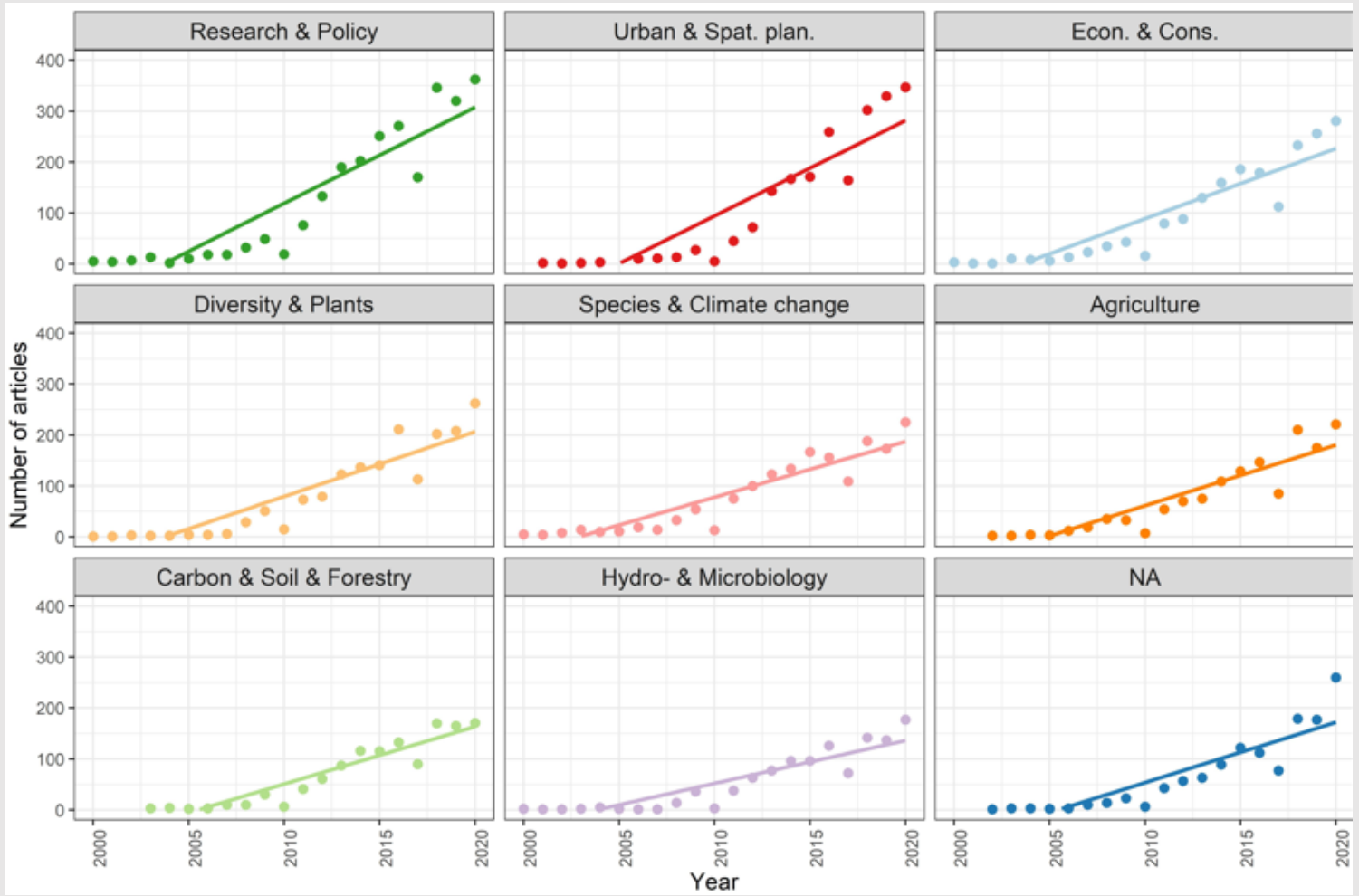


Kareiva, P., & Marvier, M. (2012)



Lavery et al. 2021

Biodiversity and Ecosystem services



Source: Takacs, V., & O'Brien, C. D. (2023). *Ambio*, *52*(1), 81-94.

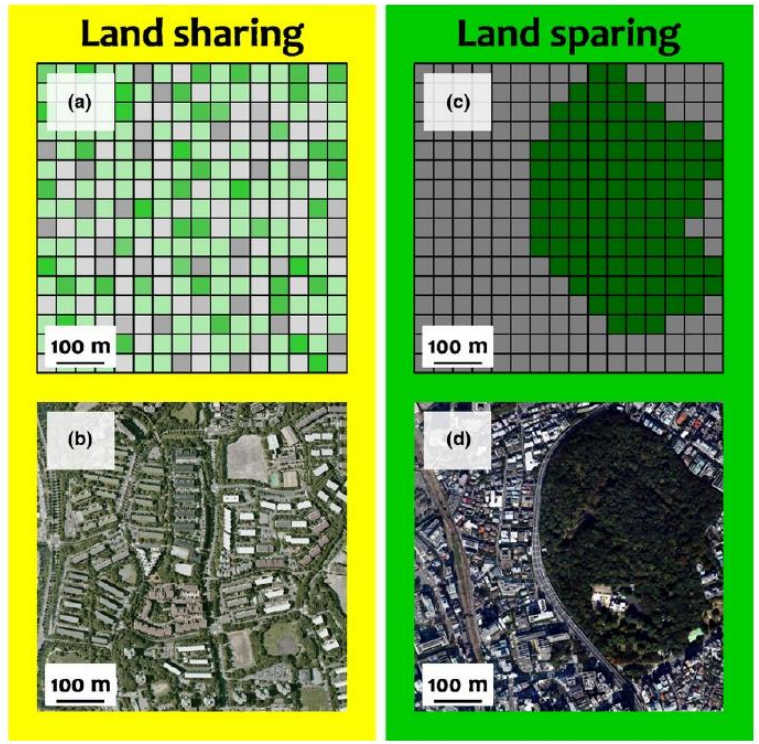
Boundaries of scientific understanding, can we generalize our knowledge?

3 examples

Source: National Geographic

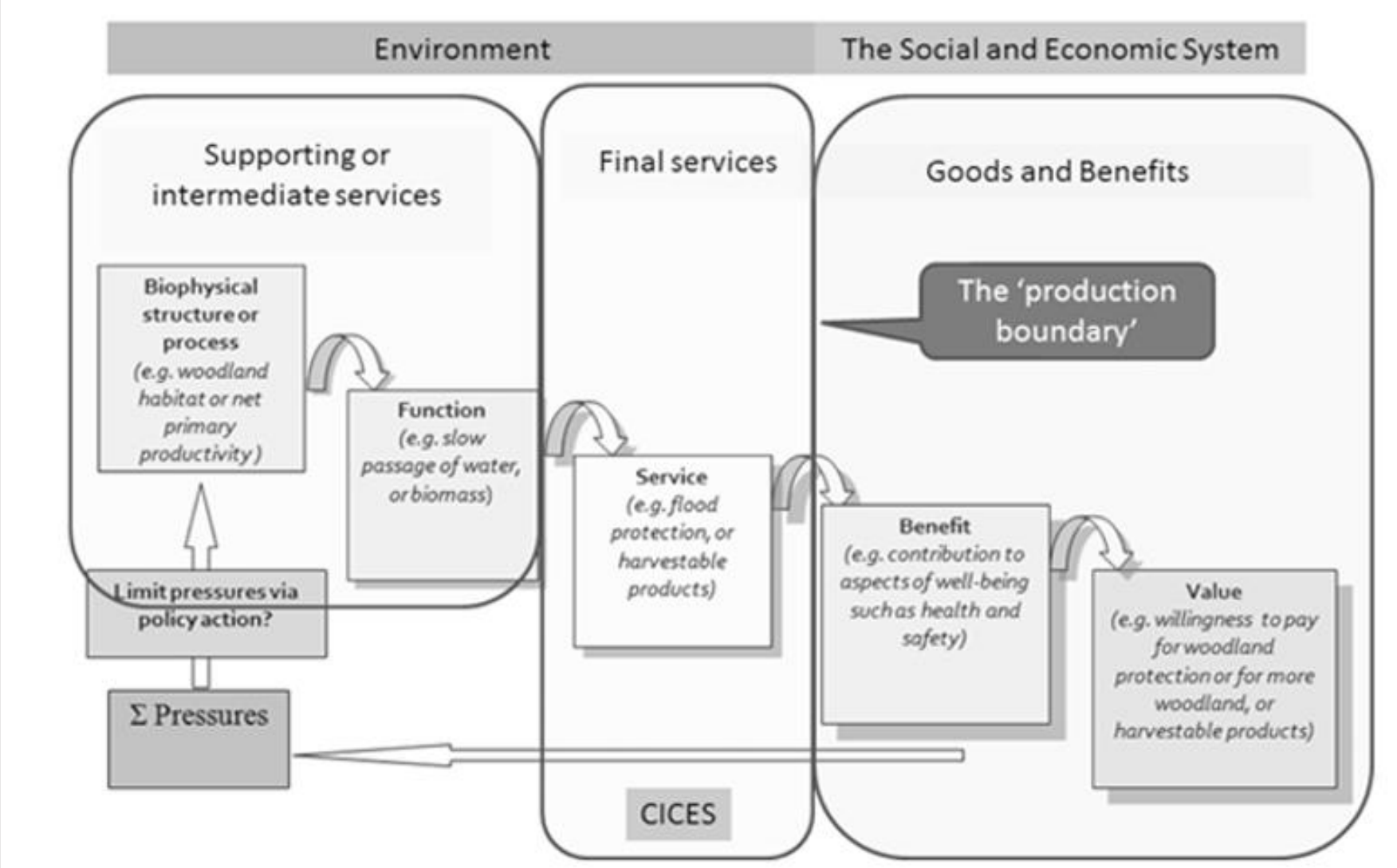
Example 1. Land sharing and land sparing dilemma

Managing the Food System's Main Asset: Land - Food Planet Prize



Soga i in. 2014, J. Applied Ecology

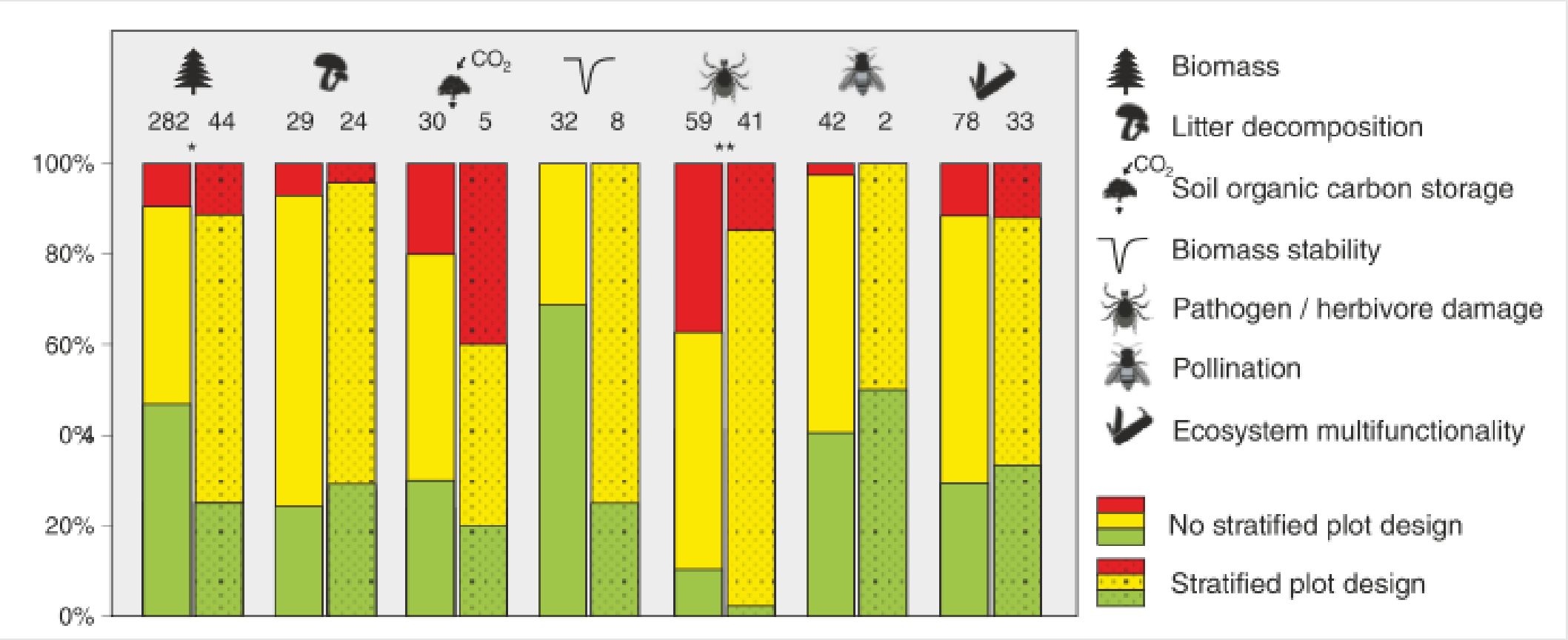
Example 2. Does high biodiversity bolster ecosystem services provision?



Potschin, M. B., & Haines-Young, R. H. (2011).

Example 2. cd…

The proportion of positive (green), negative (red) and neutral (yellow) biodiversity- ecosystem functioning relations (meta-analysis to 2019)



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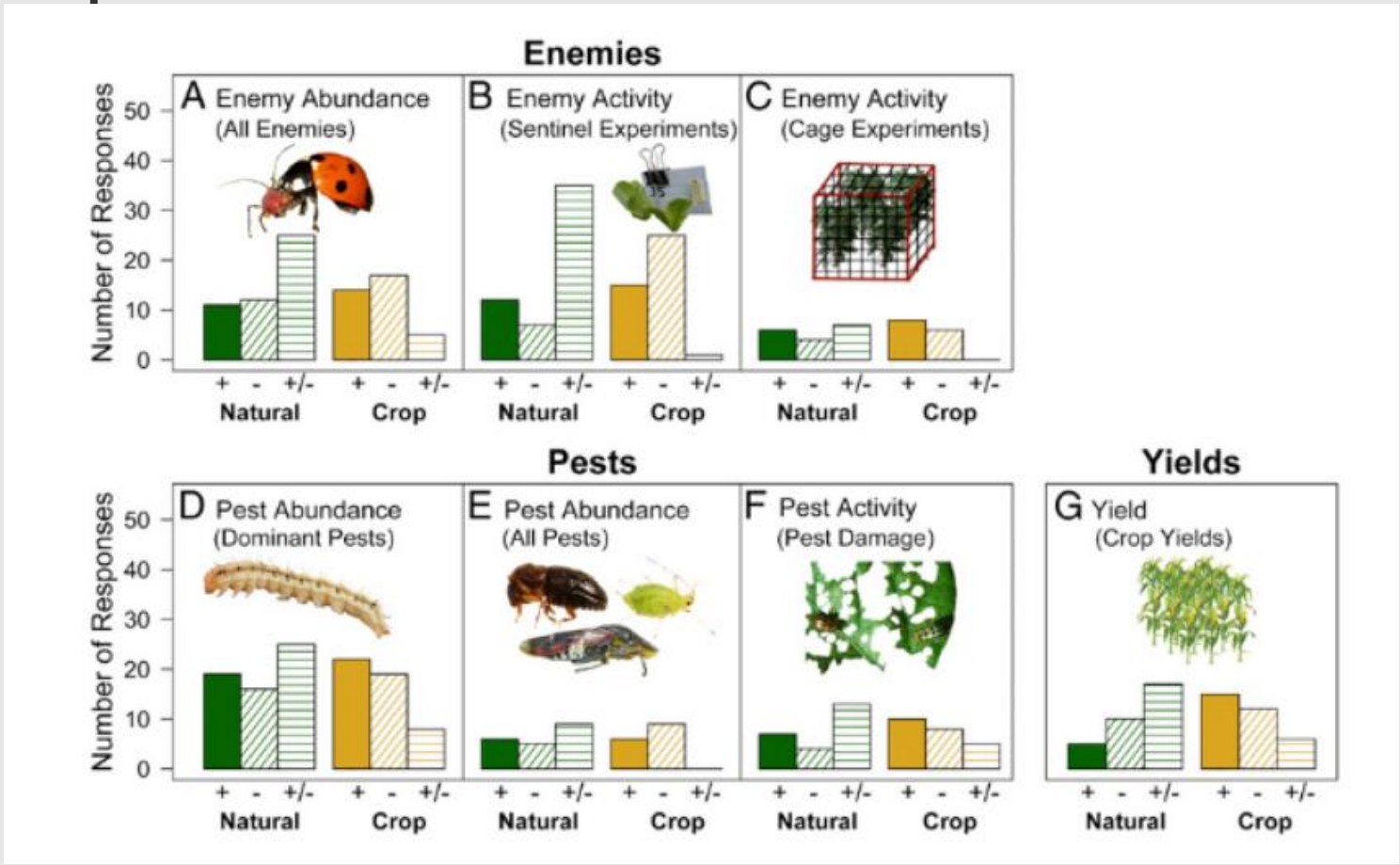
van der Plas, F. (2019). *Biological Reviews*, *94*(4), 1220-1245.

Example 3. The importance of landscape heterogeneity for pest control services

N=132 studies
n=6759 sites
n= 359 pest control responses



Karp, D. et al.(2018). Crop pests and predators exhibit inconsistent responses to surrounding landscape composition. *PNAS*, *115*(33)

IBPES assessment (how to group the scientific evidence)

- **Well established:** comprehensive meta-analysis or other synthesis or multiple independent studies that agree.
- **Established but incomplete:** general agreement although only a limited number of studies exist; no comprehensive synthesis and/or the studies that exist address the question imprecisely.
- **Unresolved:** multiple independent studies exist but conclusions do not agree.
- **Inconclusive:** limited evidence, recognizing major knowledge gaps.

Comment

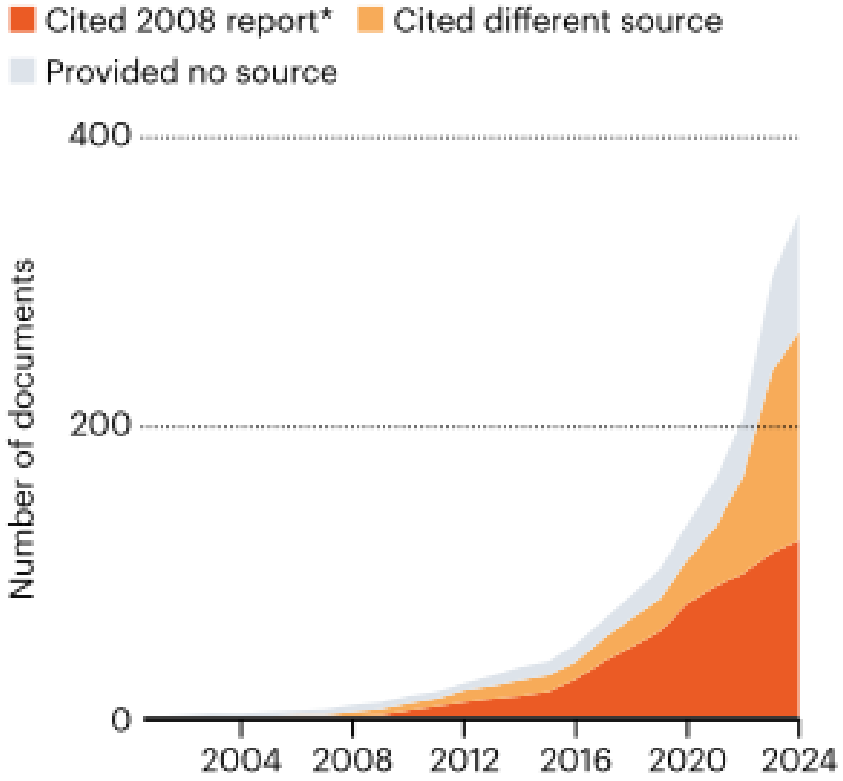
Tsimane' people in the Bolivian Amazon weave palm leaves together to thatch dwellings.

A baseless statistic could harm the Indigenous Peoples it is meant to support

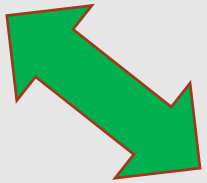
Álvaro Fernández-Llamazares, Julia E. Fa, Dan Brockington, Eduardo S. Brondizio, Joji Cariño, Esteve Corbera, Maurizio Farhan Ferrari, Daniel Kobei, Pernilla Malmer, Guadalupe Yesenia H. Márquez, Zsolt Molnár, Helen Tugendhat & Stephen T. Garnett

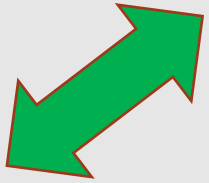
POOR FACT-CHECKING

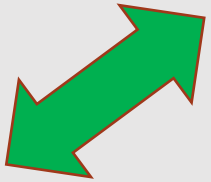
The number of documents in the scientific literature stating that 80% of the world's biodiversity is found in the territories of Indigenous Peoples has skyrocketed in the past ten years.

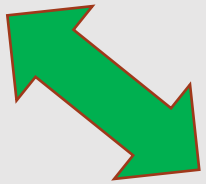


*Sobrevila, C. *The Role of Indigenous Peoples in Biodiversity Conservation: The Natural But Often Forgotten Partners* (World Bank, 2008). For a list of documents citing the 80% figure, see Supplementary information (go.nature.com/3xkcwom).



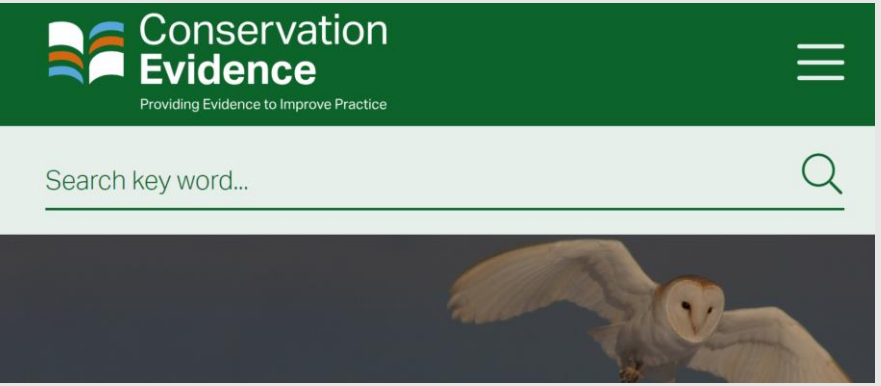






Source: istock.com

Practitioners – academy gap; Evidence based nature conservation initiative



Research evidence for conservation practitioners and

Sutherland, W. J., Pullin, A. S., Dolman, P. M., & Knight, T. M. (2004). The need for evidence-based conservation. *Trends in ecology & evolution*, *19*(6), 305-308.,

Policy engagement

Cardou, F., & Vellend, M. (2023).

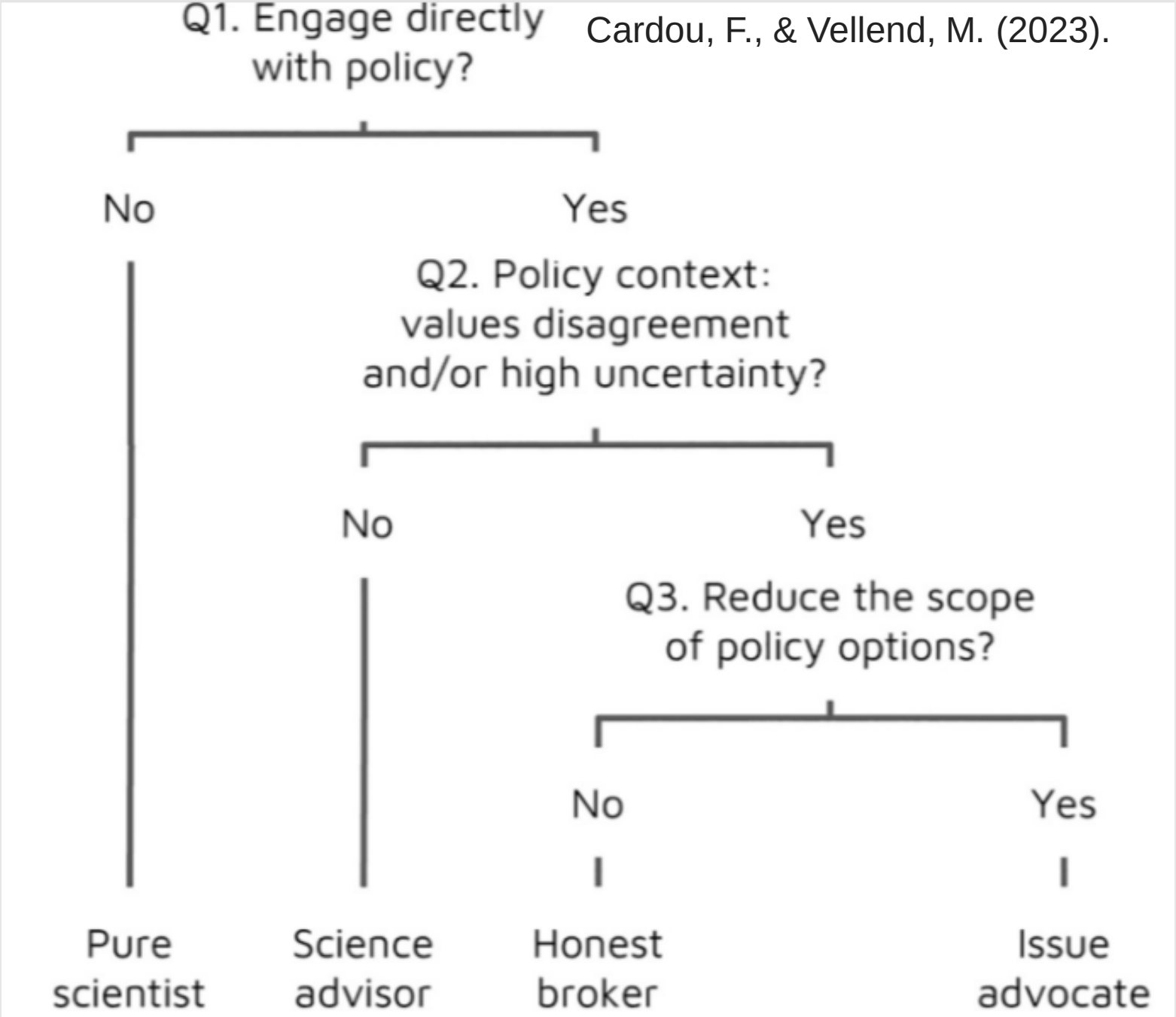


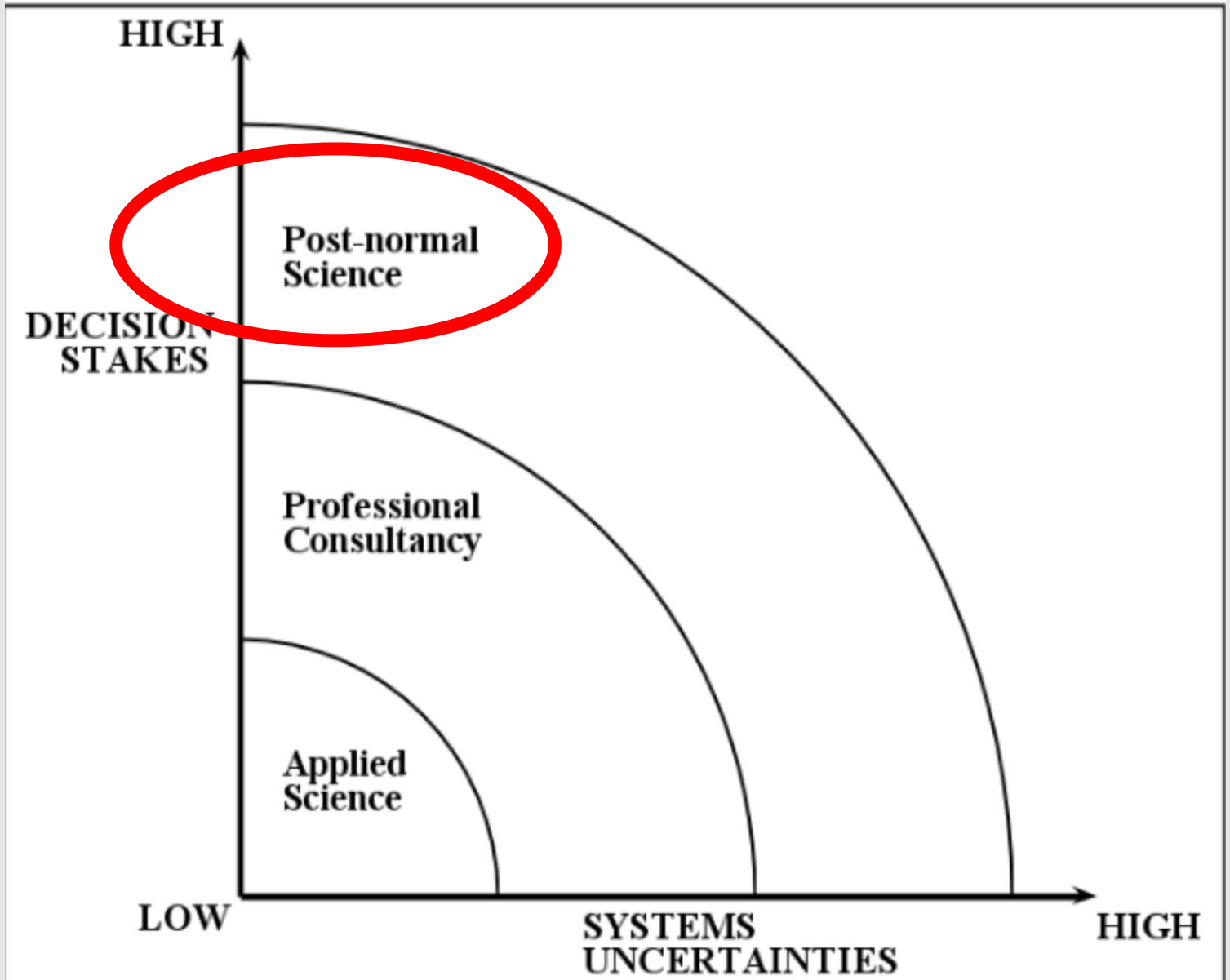
Fig. 1. Four roles that scientists can play in real-world environmental policy

Engaged research

„Engaged Research= strategic research approach, that involves meaningful interactions between diverse societal stakeholders”

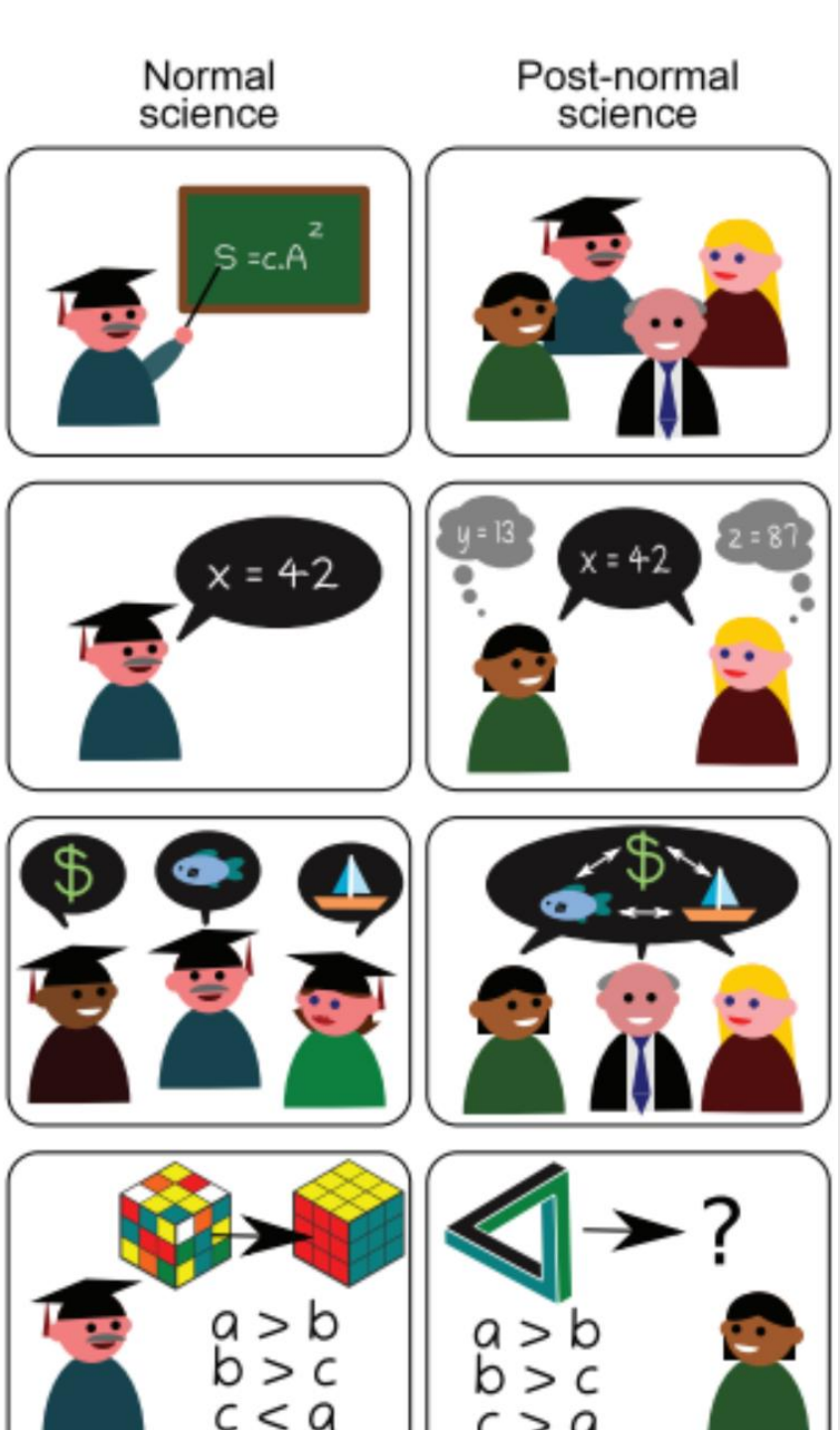
Source: AI

Post normal science concept; uncertainity in decision making process



Funtowicz, S., & Ravetz, J. (2018), Post-normal science. In *Companion to environmental studies* (pp. 443-447).

Funtowicz, Silvio O.; Ravetz, Jerome R. (September 1993). "Science for the post-normal age". *Futures*. 25 (7)



Buschke, et.al. (2019). *Conservation Science and Practice*, *1*(8), e73.

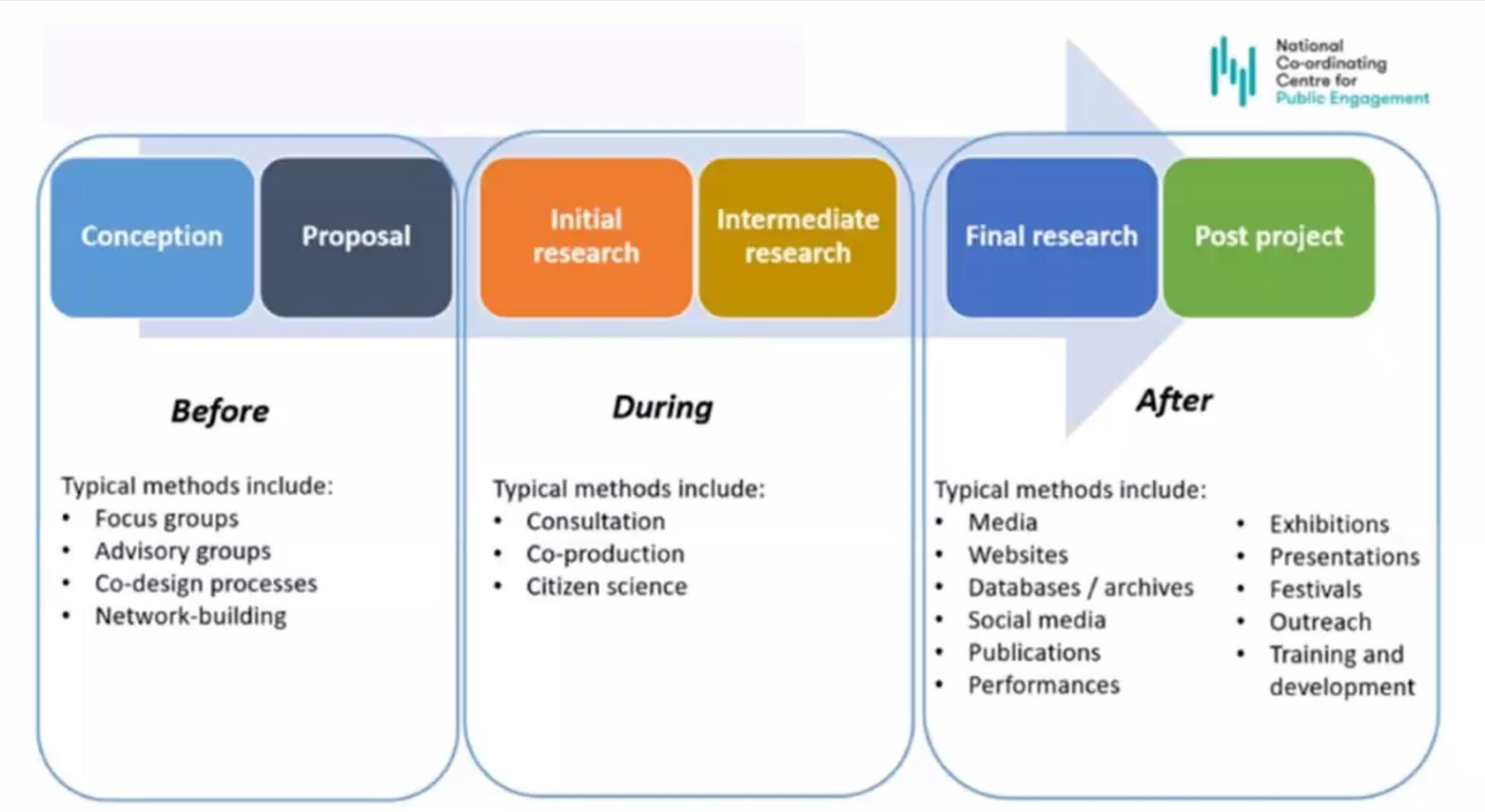
Experts & *stakeholders particioners*

Explicit facts supplemented with experience & *practical knowledge*

Blurs the boundaries between disciplines, transdisciplinary approach

The tackled problems might be *complex, without simple solutions*

Engagement possibilities during the research



Source: spring school ACCEU presentation

Engaged research in conservation science

- Collaborative projects are more successful in nature conservation (LeFlore at al. 2021)
- Engaged research can be win-win
- Life sciences – only 32 % researchers deal with engaged research (European Comission 2021)

Conservation efforts risk getting snared in a tangle of aims.

A call for inclusive conservation

Heather Tallis, Jane Lubchenco and 238 co-signatories petition for an end to the infighting that is stalling progress in protecting the planet.

Tallis, H., & Lubchenco, J. (2014)

Challenges of engaged research

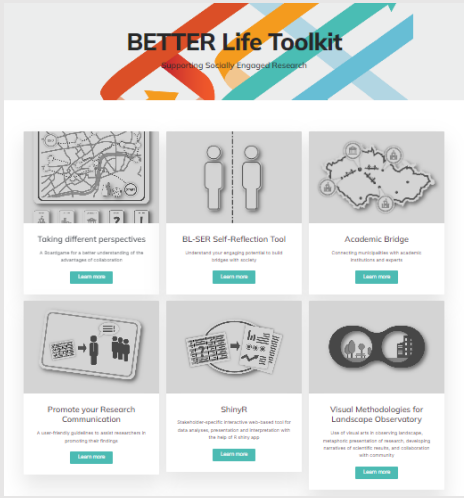
- Lack of interactions
- Lack of forums
- Lack or authorities
- Lack of knowledge, best practices, mentors

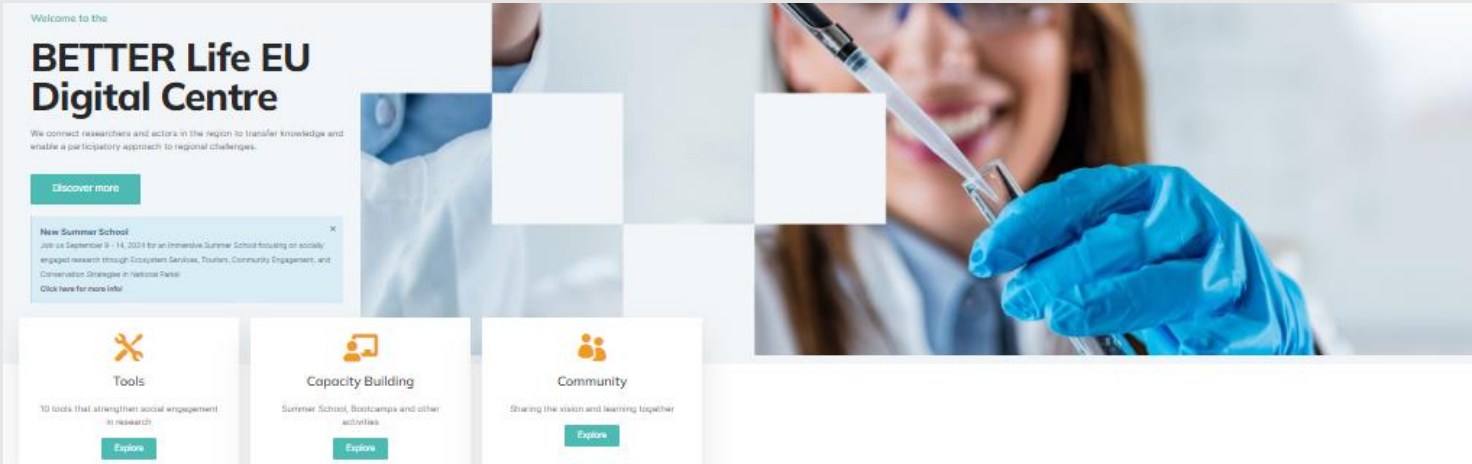
- Lack of common language
- Different interests
- Different scale

Source: AI

Engaged research for early carrier researchers!

- Basic skills and practice
- Institutional background
- Best practice
- https://betterlifehorizon.eu/, https://www.better-life-digital.eu/



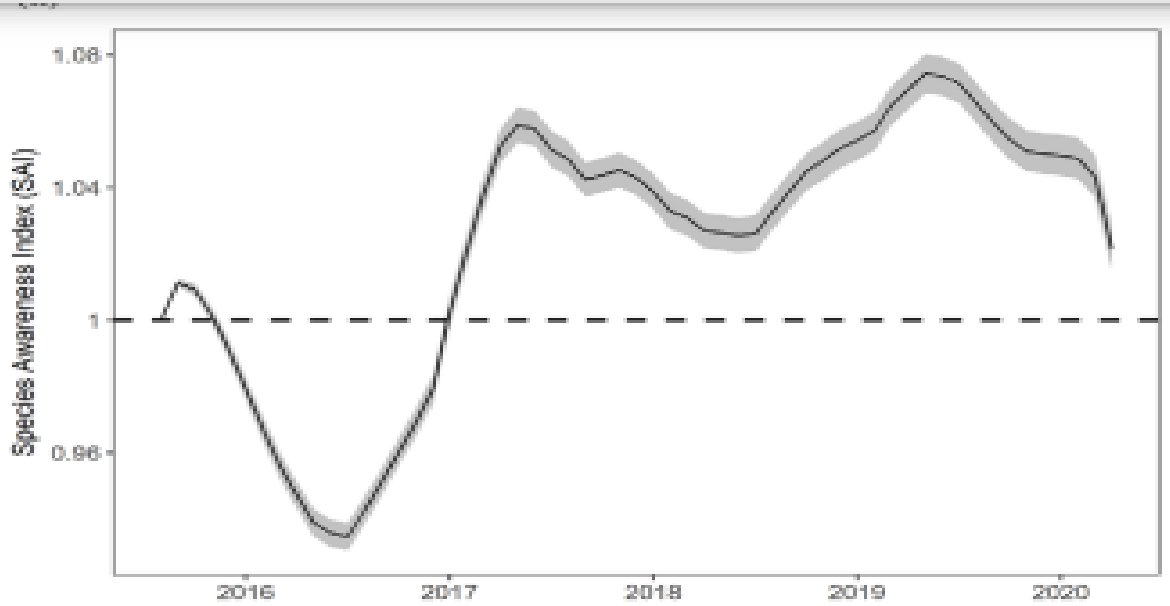


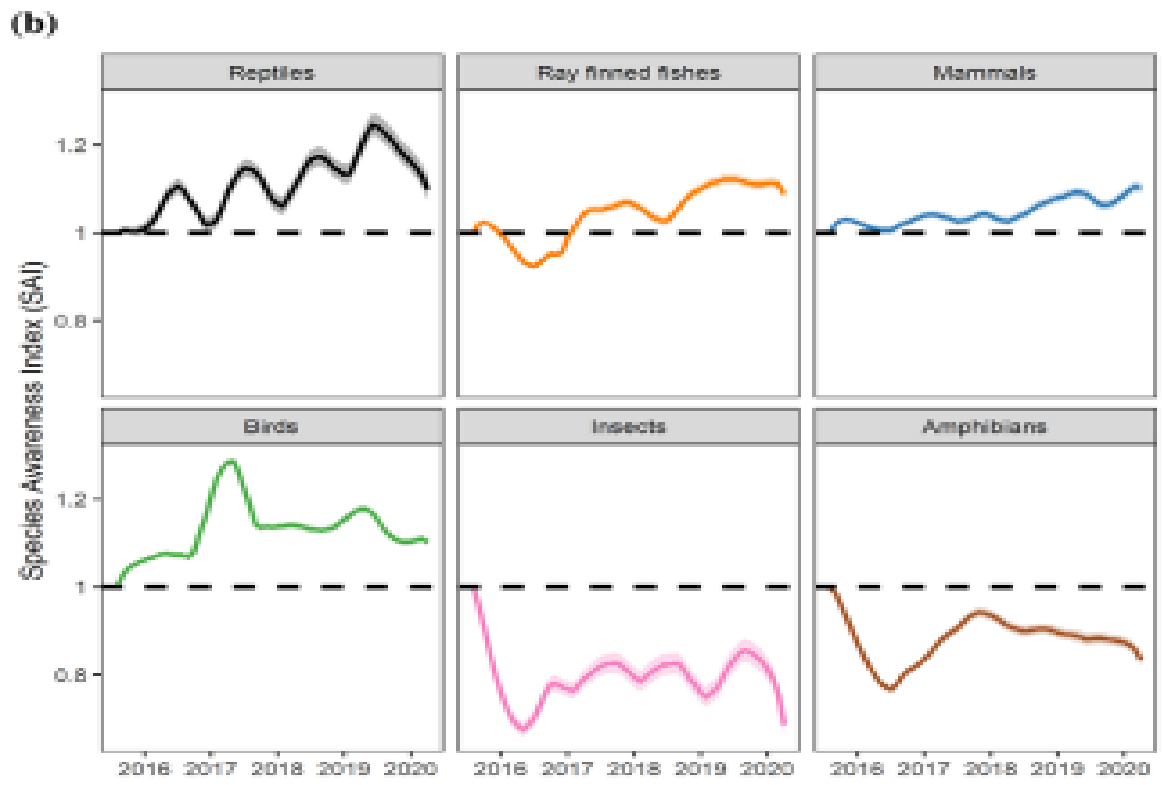
Conclusions

- Nature conservation science often deals with complex problems with high level of uncertainty
- Nature conservation needs engaged research
- Engaged research is one of the solutions how to overcome difficulties
- Need for skill development (early carrier researchers)

Biodiversity; do we know the species?

The species awareness index (SAI) for reptiles, ray-finned fishes, mammals, birds, insects, and amphibians on the Wikipedia languages Arabic, Chinese, English, German, Italian, Japanese, Portuguese, Russian, and Spanish for July 2015–March 2020





illard, et al. (2021). *Conservation Biology*, *35*(2), 472-
32.

Thank you for your attention!

Literature

Cardou, F., & Vellend, M. (2023). Stealth advocacy in ecology and conservation biology. *Biological Conservation*, *280*, 109968.

European Commission. (2021). MORE4: Support data collection and analysis concerning mobility patterns and career paths of researchers: survey on researchers in European higher education institutions. https://op.europa.eu/en/publication-detail/-/publication/487036ad-bdd1-11eb-8aca-01aa75ed71a1/language-en

Funtowicz, S., & Ravetz, J. (2018), Post-normal science. In *Companion to environmental studies* (pp. 443-447).

Kareiva, P., & Marvier, M. (2012). What is conservation science?. *BioScience*, *62*(11), 962-969.

Karp, D. et al.(2018). Crop pests and predators exhibit inconsistent responses to surrounding landscape composition. *PNAS*, *115*(33)

Lavery, T. H., Morgain, R., Fitzsimons, J. A., Fluin, J., Macgregor, N. A., Robinson, N. M., ... & Lindenmayer, D. B. (2021). Impact indicators for biodiversity conservation research: Measuring influence within and beyond academia. *Bioscience*, *71*(4), 383-39

LeFlore, M., Bunn, D., Sebastian, P., & Gaydos, J. K. (2022). Improving the probability that small-scale science will benefit conservation. *Conservation Science and Practice*, *4*(1), e571.

Millard, J. W., Gregory, R. D., Jones, K. E., & Freeman, R. (2021). The species awareness index as a conservation culturomics metric for public biodiversity awareness. *Conservation Biology*, *35*(2), 472-482.

van der Plas, F. (2019). Biodiversity and ecosystem functioning in naturally assembled communities. *Biological Reviews*, *94*(4), 1220-1245.

Potschin, M. B., & Haines-Young, R. H. (2011). Ecosystem services: Exploring a geographical perspective. *Progress in physical geography*, *35*(5), 575-594.

Sutherland, W. J., Pullin, A. S., Dolman, P. M., & Knight, T. M. (2004). The need for evidence-based conservation. *Trends in ecology & evolution*, *19*(6), 305-308.

Takacs, V., & O'Brien, C. D. (2023). Trends and gaps in biodiversity and ecosystem services research: A text mining approach. *Ambio*, *52*(1), 81-94.