

Conservation value of protected and logged tropical forests in Cameroon

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Biodiversity loss in tropical forests

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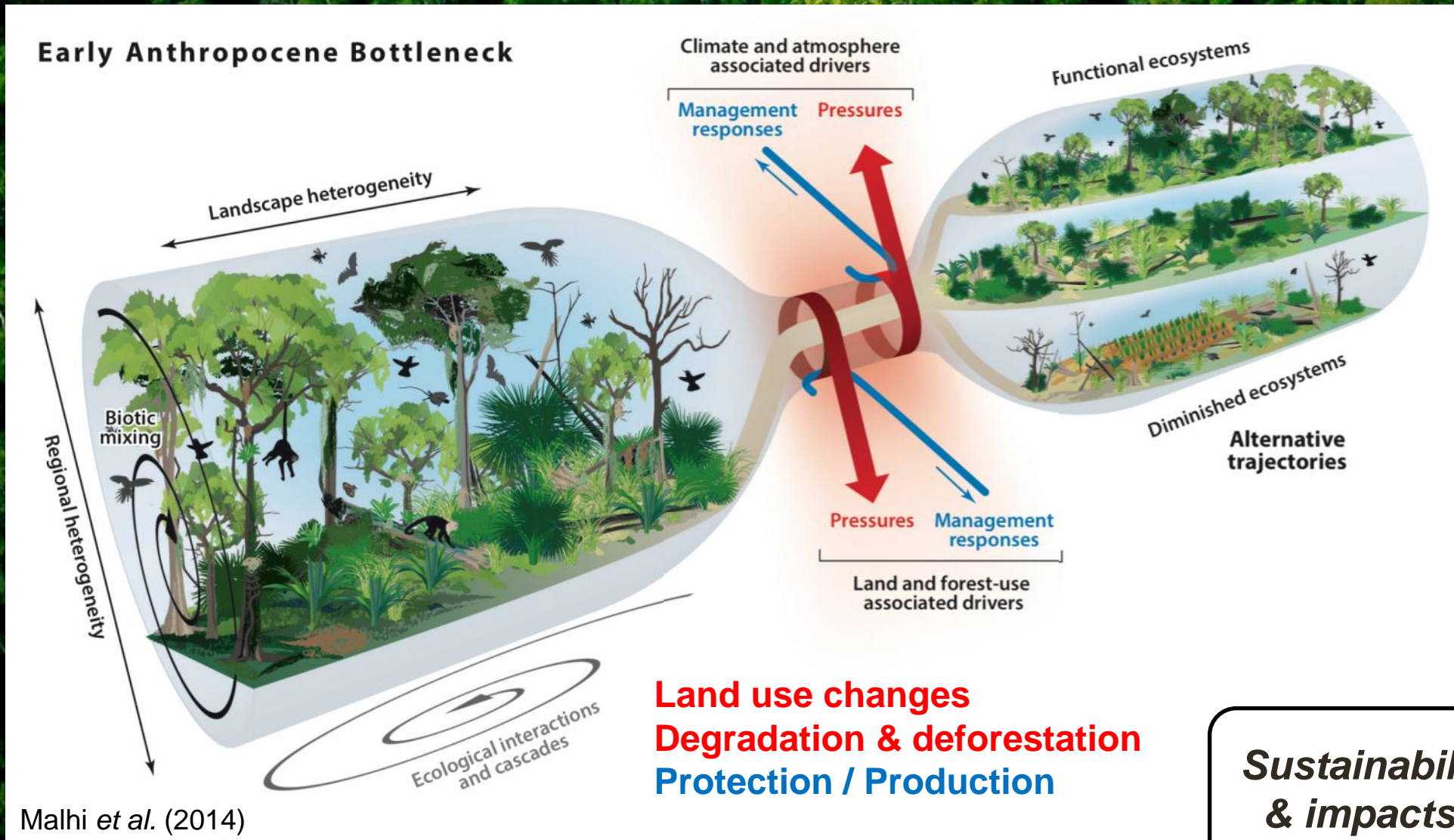


Urgent need for more research on the effect of forest degradation on biodiversity in central Africa (Gibson et al., 2011)

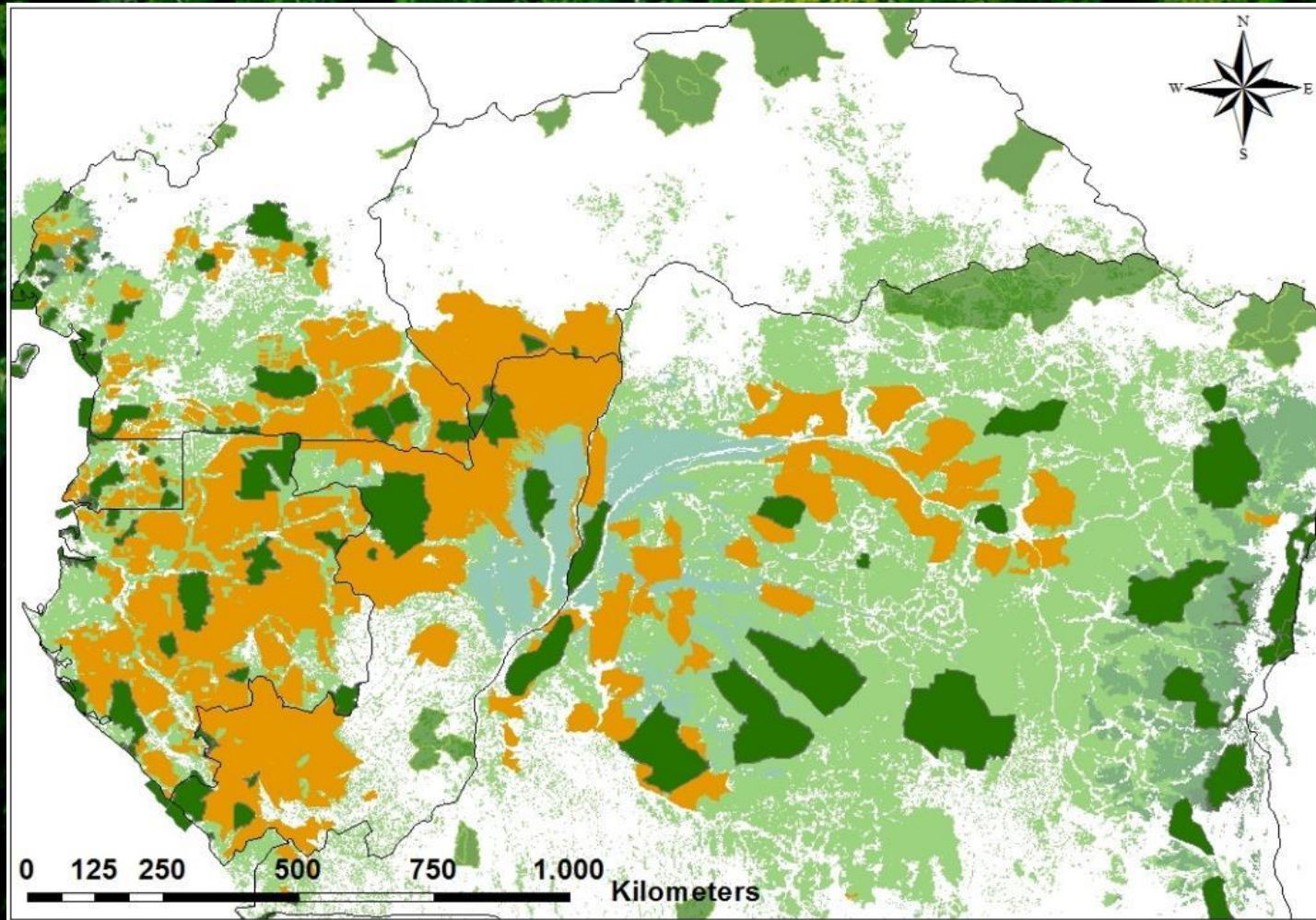


Tropical forests:

>2/3 of Earth's terrestrial biodiversity, but only 6-7% of land surface



+ Other important changes in central Africa:
Population growth, climate change, political instabilities, etc.



Production forests

55 millions hectares
($<10\%$ certified for sustainable
management)



Protected forests

27 millions hectares



Efficient **protected areas**, or paper parks?

Impacts and potential of industrial **logging concessions** in biodiversity conservation?

Remnant biodiversity in degraded **community forests**, or empty forests?



Hypothesis: “Forest biodiversity is shaped by forest land allocation and management”



Mammals

First target of **hunting**

Growing hunting pressure → Local extinctions → Empty forests

Strong detrimental effects on forest ecosystems:

- Trophic webs disruption
- Limitation of seed dispersal and forest regeneration
- Other cascading effects



Dung beetles

Sensitive to small habitat disturbances,
such as **reduced-impact selective logging**

Various ecological processes:

- Nutrient cycling and fertilization
- Plant growth
- Seed dispersal
- Etc.



Biodiversity assessment in three contrasted land allocation types:

- i. A protected area
- ii. A FSC-certified logging concession
- iii. Three community forests

Two indicator taxonomic groups:

- i. Mammals
- ii. Dung beetles



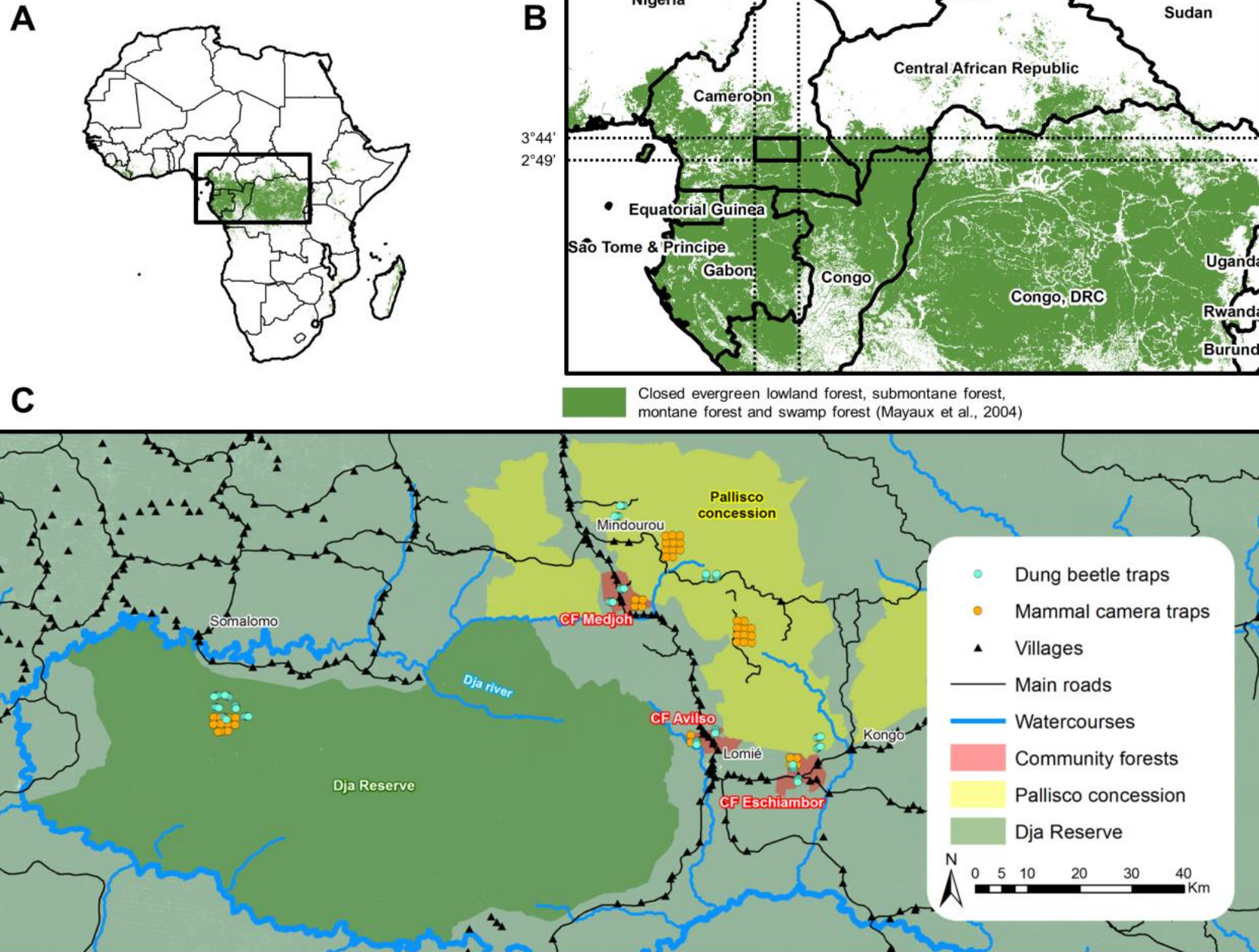
Three different components of diversity (Stirling, 2007):

- i. Variety (species richness)
- ii. Balance (species abundance)
- iii. Disparity (distance between species)

Three different scales:

- i. α -diversity
- ii. β -diversity
- iii. γ -diversity

Study area





44 camera traps
3 months
Density of 1 camera / 2 km²
30-50 cm above ground level
Oriented to animal trails
Herbaceous vegetation cleared



**TEAM
NETWORK**

**TROPICAL ECOLOGY
ASSESSMENT AND MONITORING**



72 baited pitfall traps
18 groups of 4 traps
250 m between traps in each group
48 hours



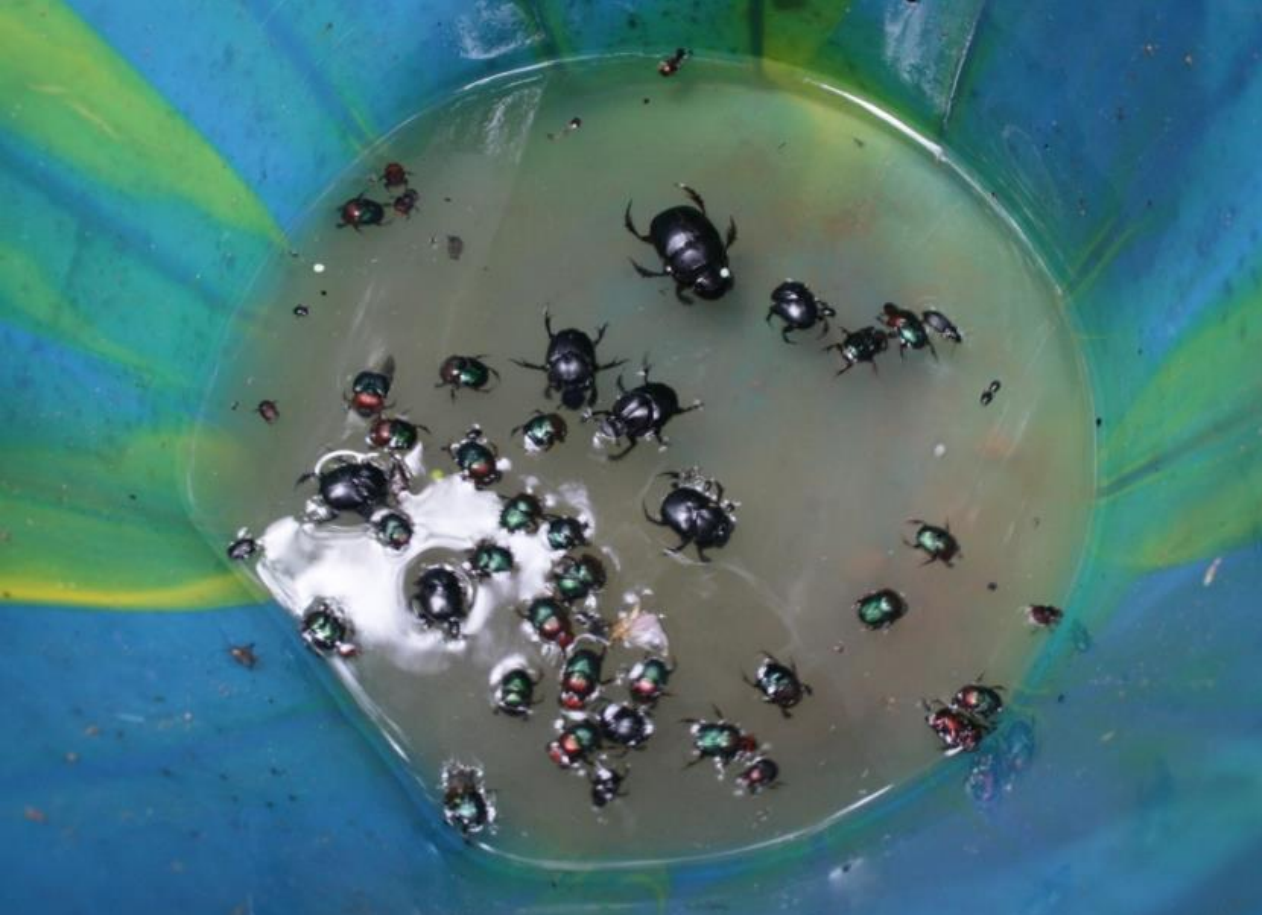
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Dung beetles

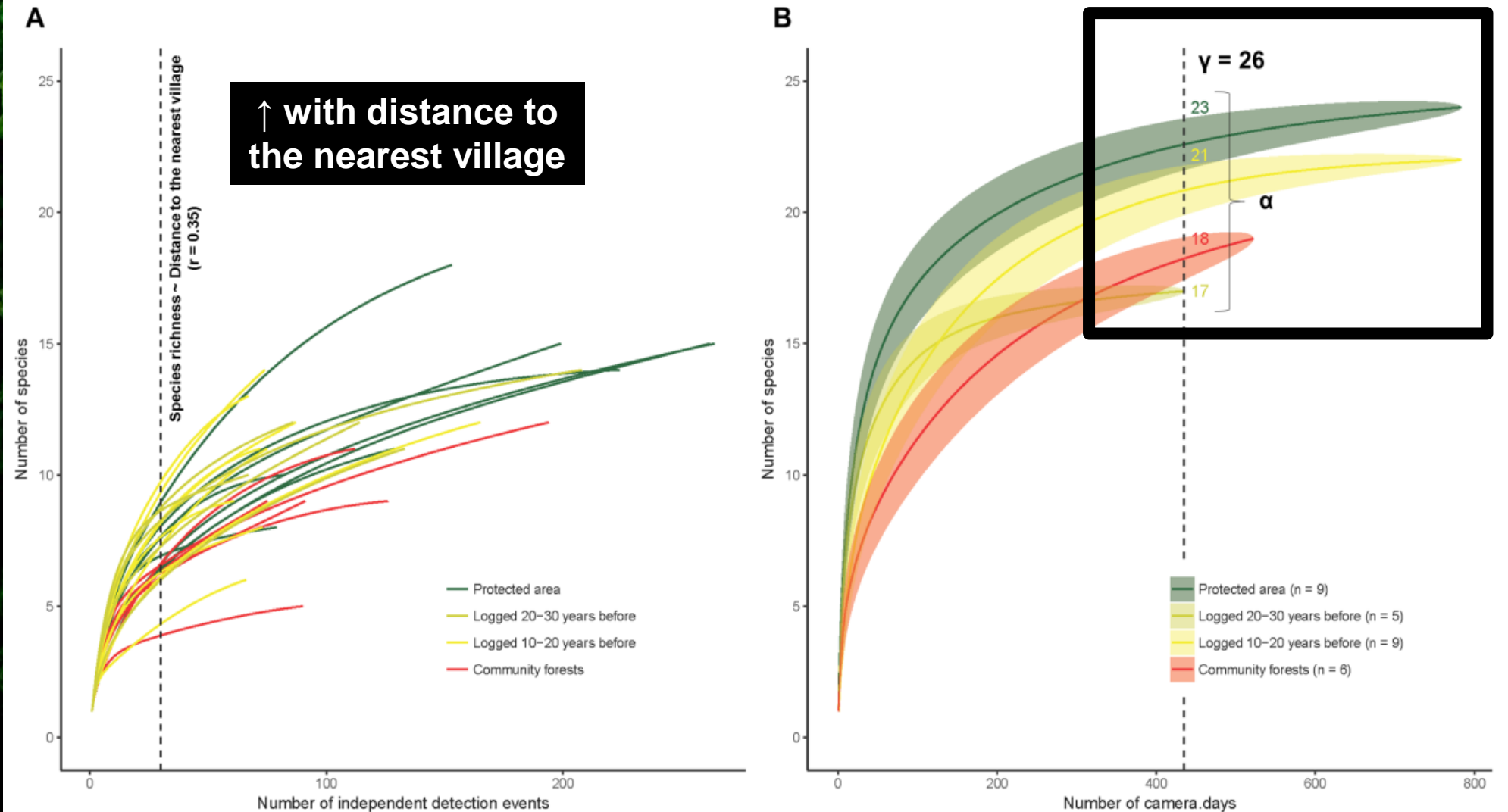
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4475 individuals



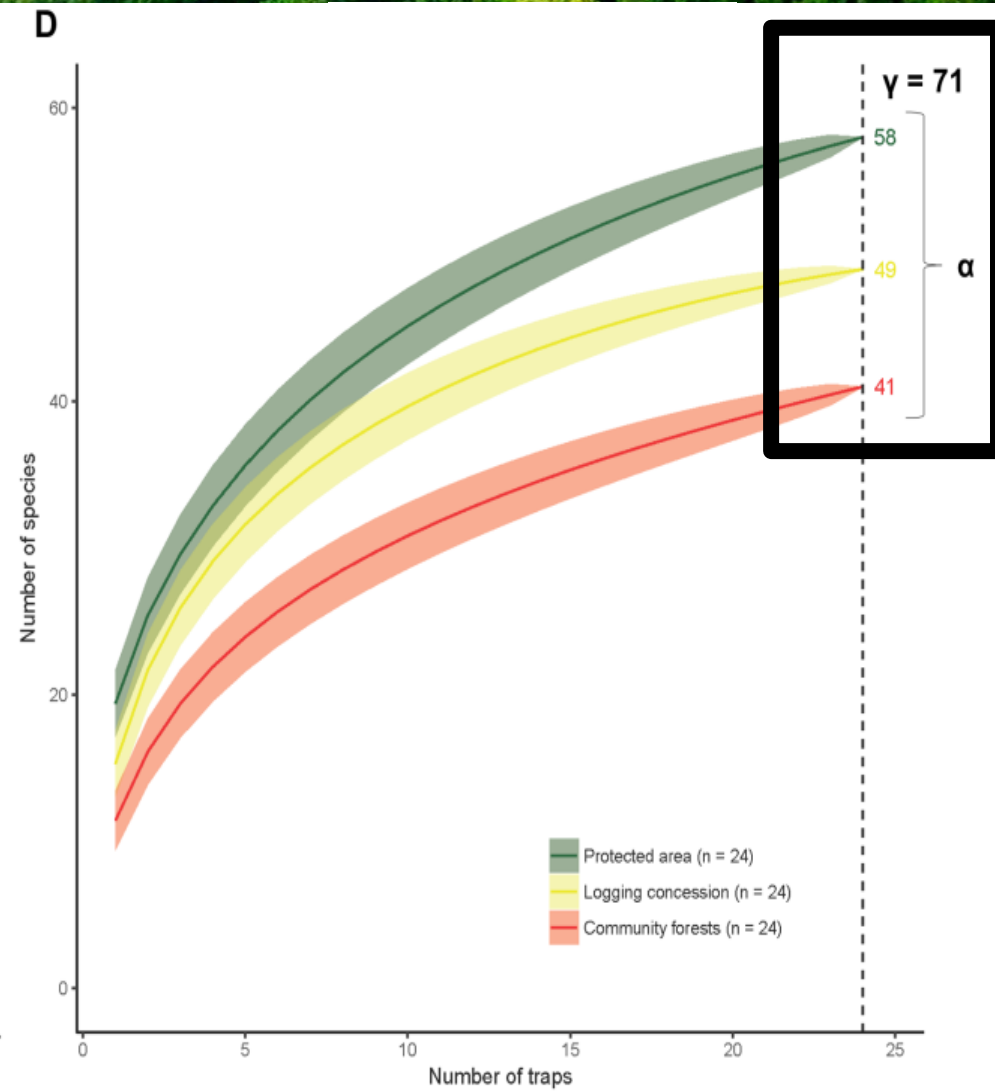
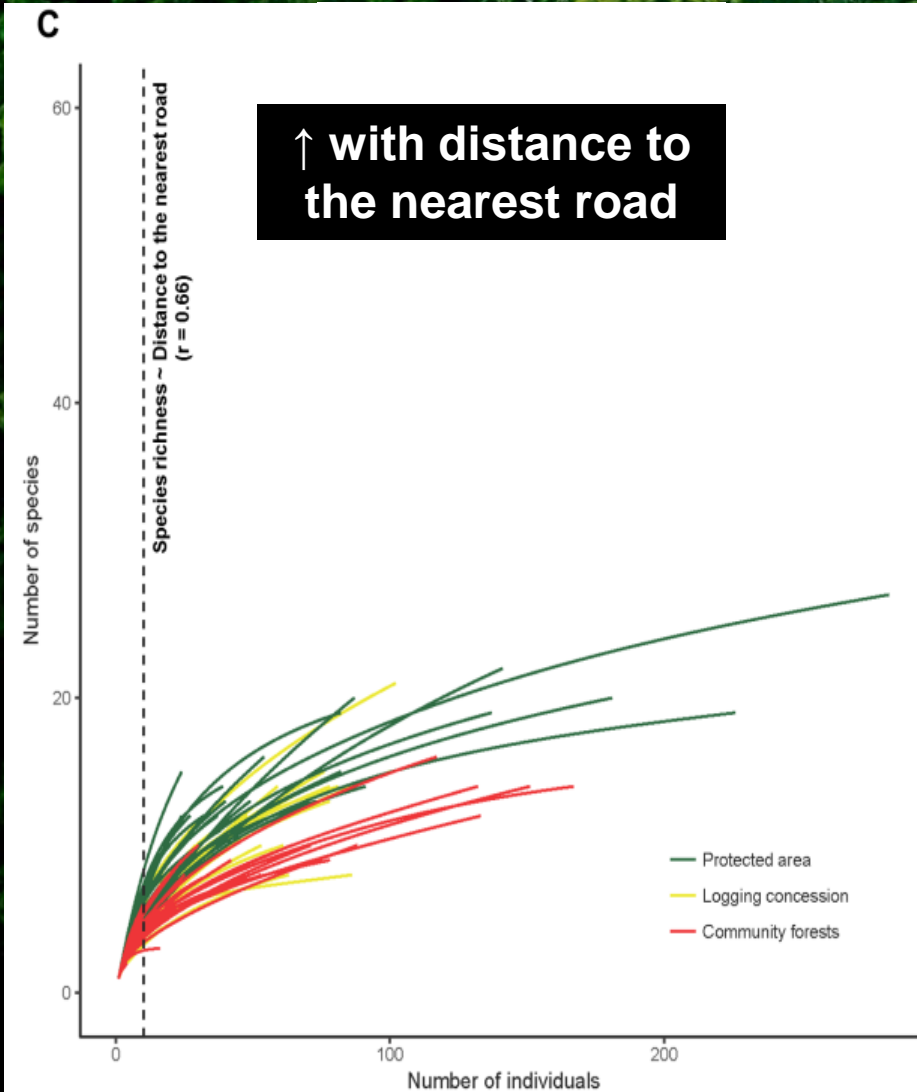
Rarefaction curves (species variety)

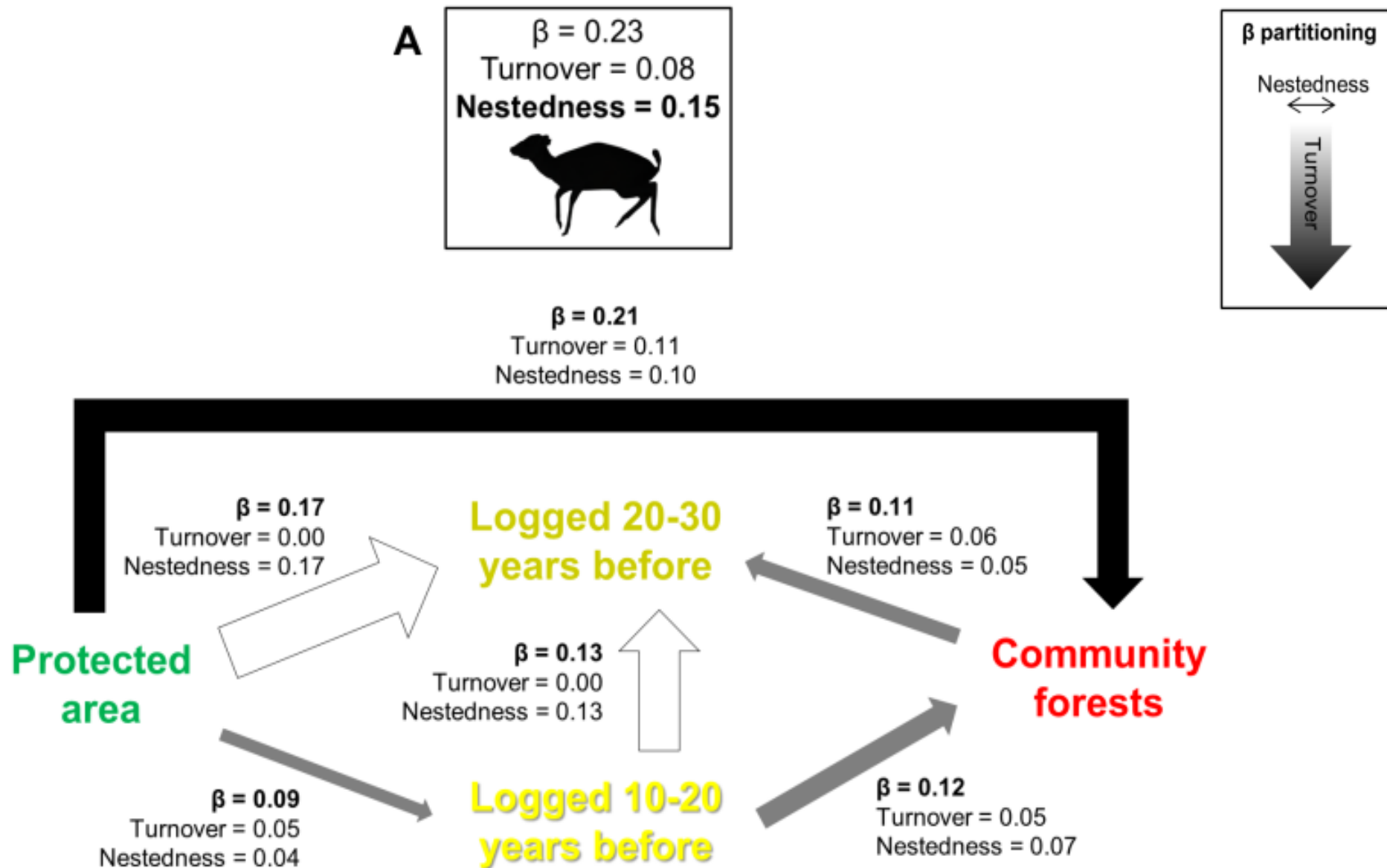
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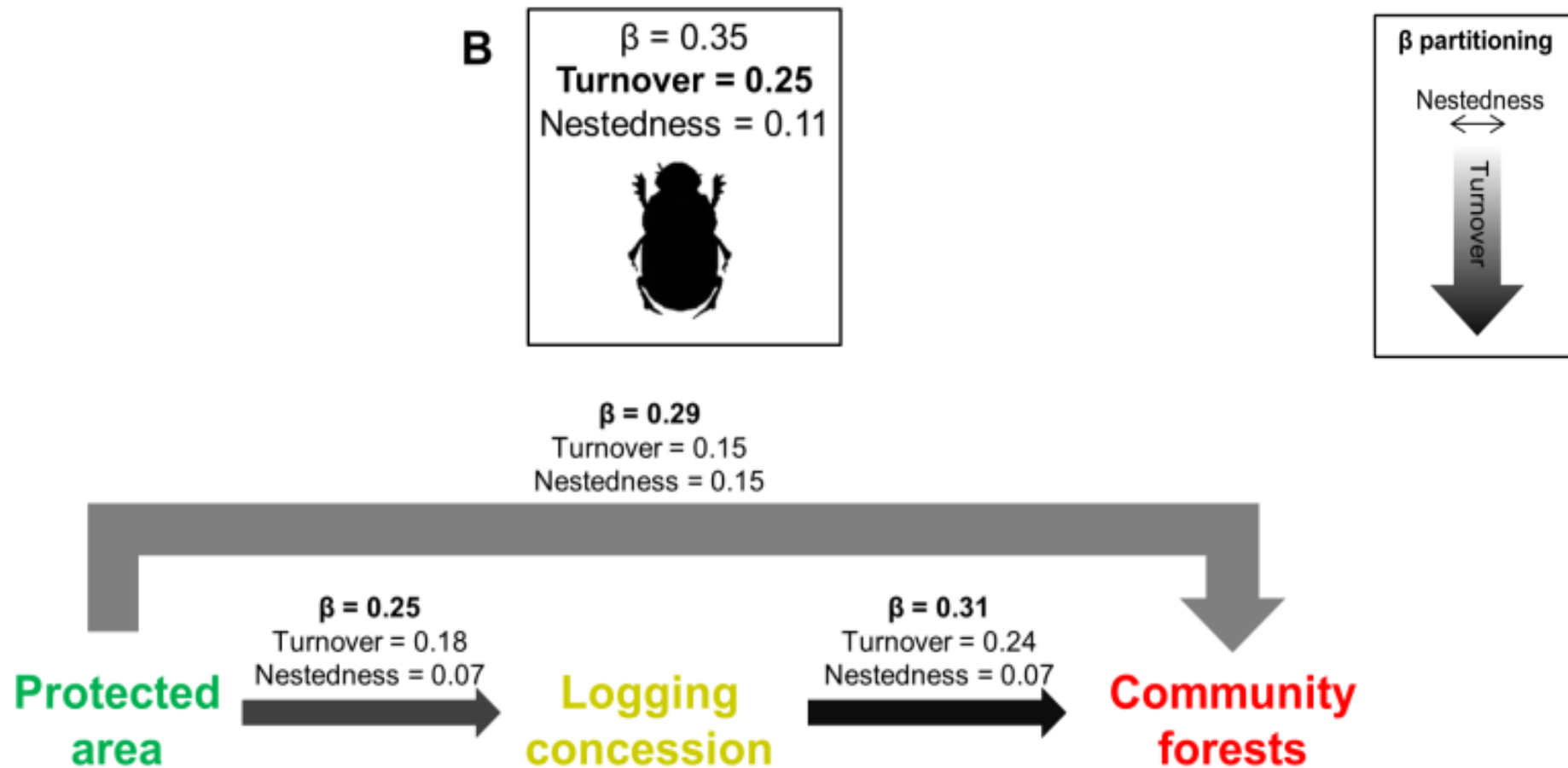


Rarefaction curves (species variety)

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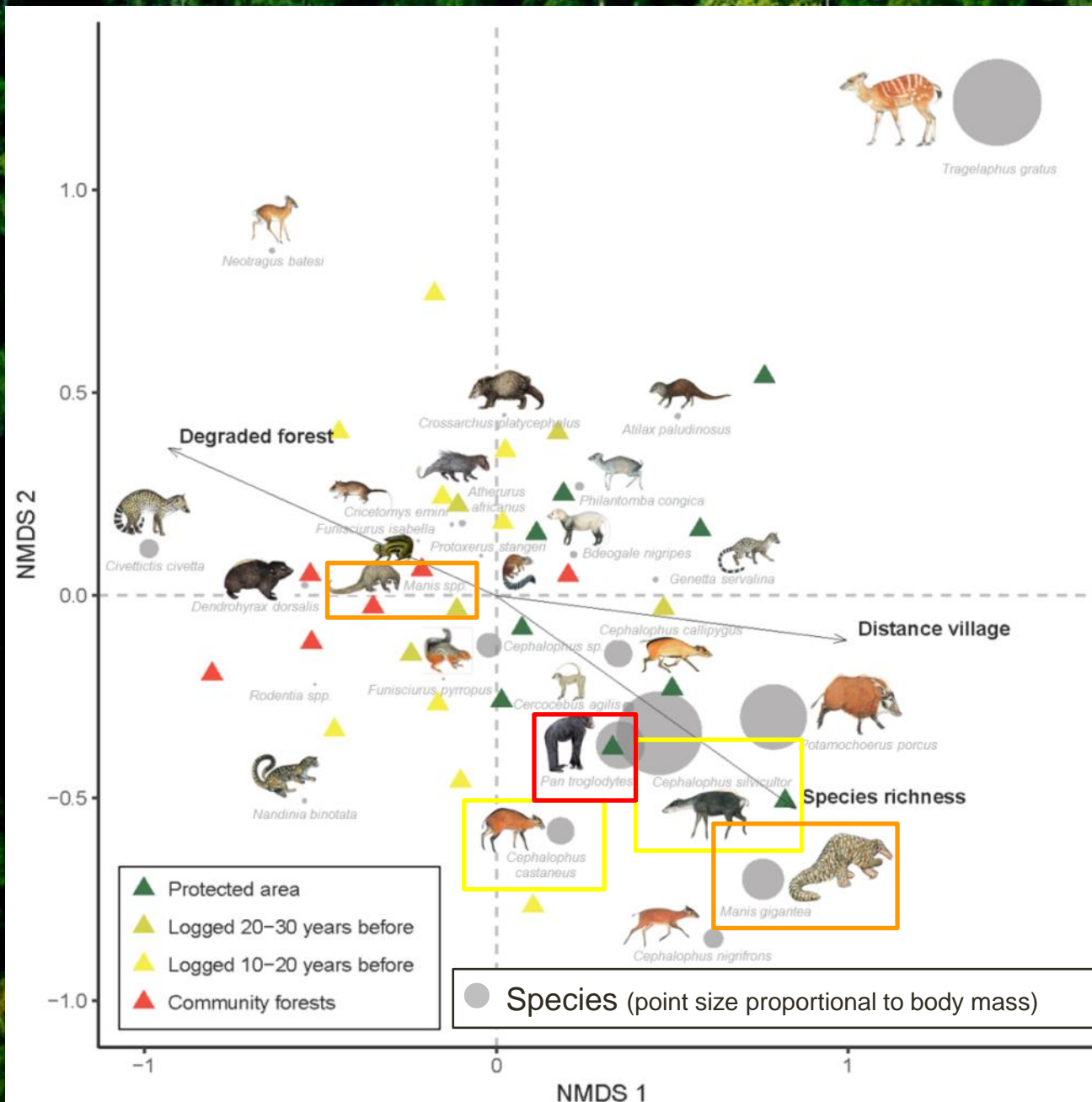






NMDS (species balance and disparity)

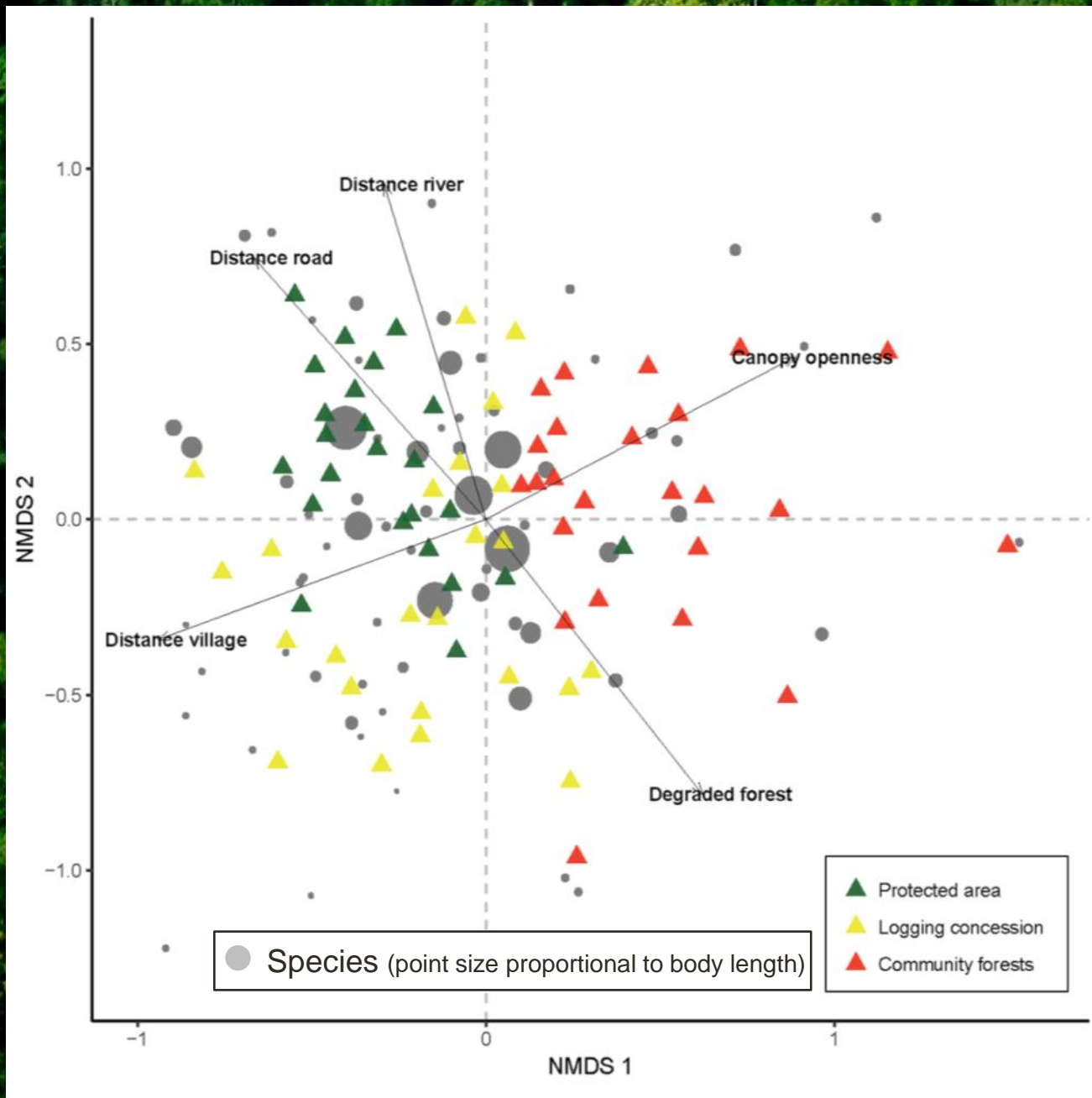
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IUCN status
Least Concern
Near Threatened
Vulnerable
Endangered

NMDS (species balance and disparity)

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Different patterns of biodiversity between the different forest land allocation types

Variety (species richness), for both mammals and dung beetles :

Protected area > FSC-certified logging concession > Community forests

→ But much more variability within the logging concession!

		
α	↑ with distance to the nearest village → Influence of <u>hunting</u>	↑ with distance to the nearest road → Influence of <u>logging & agriculture</u>
β	Nestedness between communities	Turnover between communities
γ	26 species inventoried	71 species inventoried
Balance & disparity	Gradient of body mass + conservation status	Distinct communities + larger species in PA



Negative impact of **hunting** – **distance to human settlements:**

- Species richness ↓ (nestedness)
- Abundance ↓
- Body mass ↓

No or low influence of **logging**: Mammals
are less sensitive than other groups



Negative influence of **logging roads** and **habitat fragmentation**:

- Species richness ↓ (+ turnover)
- Abundance ↓
- Body mass ↓
- Secondary seed dispersal and
overall ecological functions ↓

Gradient of human pressure on forest ecosystems



Protected area

High conservation value
Not a paper park



Logging concession

High potential for
conservation, but high
variability in biodiversity
patterns



Community forests

Degraded forests, but not
empty forests yet



Our results cannot be generalized at the scale
of all Cameroonian / central African protected and logged forests





Controlling hunting practices:

- Anti-poaching patrols
- Alternatives to bushmeat
- Engaging local communities

Integration of managed forests in conservation strategies:

- Tropical forests designated for timber production worldwide = 403 million hectares!
- Selective logging is less detrimental to biodiversity than other large-scale disturbances faces by tropical forests (Bicknell et al., 2015)



Improvement of logging practices:

- Reduced-impact logging (RIL) \gg conventional logging
 - Silvicultural treatments
 - Limit the impacts of logging roads, skid trails and log yards: appropriate planning of the road network (number, size)
- ➔ Minimum volume of timber that would need to be extracted per unit length of logging road in order to justify road construction





Recognition of human-modified landscapes as contiguous land-use mosaics
→ Integration of conservation strategies at the landscape-scale

Consideration of external factors in forest management: surrounding activities?



Improvement of forest governance:

- Enhancing synergies between initiatives to improve national and international forest governance (legality of forest products, ...)
- Market-based initiatives: third-party certification, PES, ...
- Climate change mitigation programs: REDD+, ...
- Devolution of control over forests to empowered local communities

Thanks for your attention!