Projected impacts of climate change and land-based mitigation on mammal abundance and extinction risk

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Biodiversity is declining

Approximately 25% of the world flora and fauna species are threatened with extinction, and the situation has worsened over the last decades.
Short-term biodiversity projections

Trends projected to 2020 predict further declines in biodiversity and ecosystem services, despite stepped-up conservation response.
What would be the effect of mitigation policies on biodiversity?
Scenarios of land-based mitigation

MAgPIE
Alternative pathways to achieve RCP 2.6

GLOBIO/IMAGE
Alternative pathways to achieve multiple objectives (2°C, SDG)
Effect of land-based mitigation on habitat and extinction risk of large mammals globally

Species' response to climate

Adapt locally  
Track climate  
Local extinction

Habitat

Global extinction risk

Visconti et al. 2015 Conservation Letters

Consumption change  
Business as usual
Consumption change vs. Business as usual pathways

Business as usual
- no new policies
- expanding agriculture, fisheries, aquaculture
- increased use of fossil energy, water, wood products
- climate scenario A1b

Consumption change
- achieves sustainable development goals
- meat consumption reduced to 25% of current level in the Americas, Europe, and parts of Asia
- food waste halved
- reduced impact logging
- climate scenario B1
Effect of land-based mitigation on the habitat of European mammals

In Europe, a change in lifestyle and consumption patterns may halt the loss of habitat for large mammals.

A lifestyle change not so dramatic, as *per capita* meat consumption in the simulation is still twice the amount recommended for a healthy diet.
The same effect of land-based mitigation can be achieved at very different costs for biodiversity. Based on MAgPIE scenarios, climate mitigation through bioenergy with carbon capture and storage would slightly increase the already negative human impacts on mammals. Achieving the same through afforestation would generate a win-win solution for biodiversity too.
In conclusion...

Halting the current trend of biodiversity loss AND strong land-based mitigation are compatible

The current trends demonstrate that longer we wait to take action, the less room for recovery there will be

Some, BUT NOT ALL land-based mitigation strategies can fulfil multiple objectives and achieve climate targets as well as Sustainable Development Goals