

# TRENDS IN PROTECTED AREA REPRESENTATION OF BIODIVERSITY AND ECOSYSTEM SERVICES IN FIVE TROPICAL COUNTRIES

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**ACES DECEMBER 2018**

**CONSERVATION  
INTERNATIONAL**



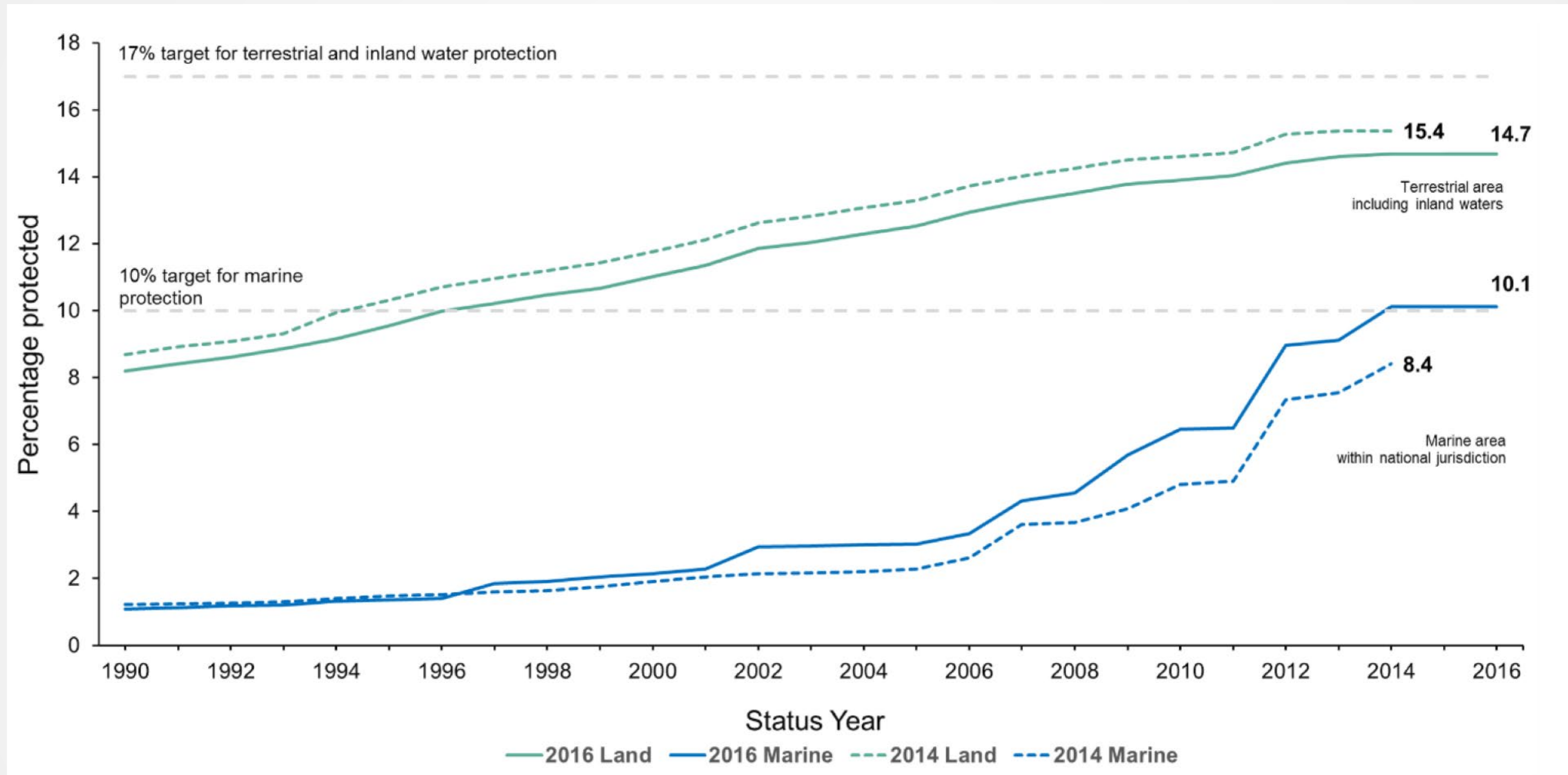
# CONVENTION ON BIOLOGICAL DIVERSITY

## AICHI TARGET 11

By 2020, at least 17 percent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, **especially areas of particular importance for biodiversity and ecosystem services**, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.



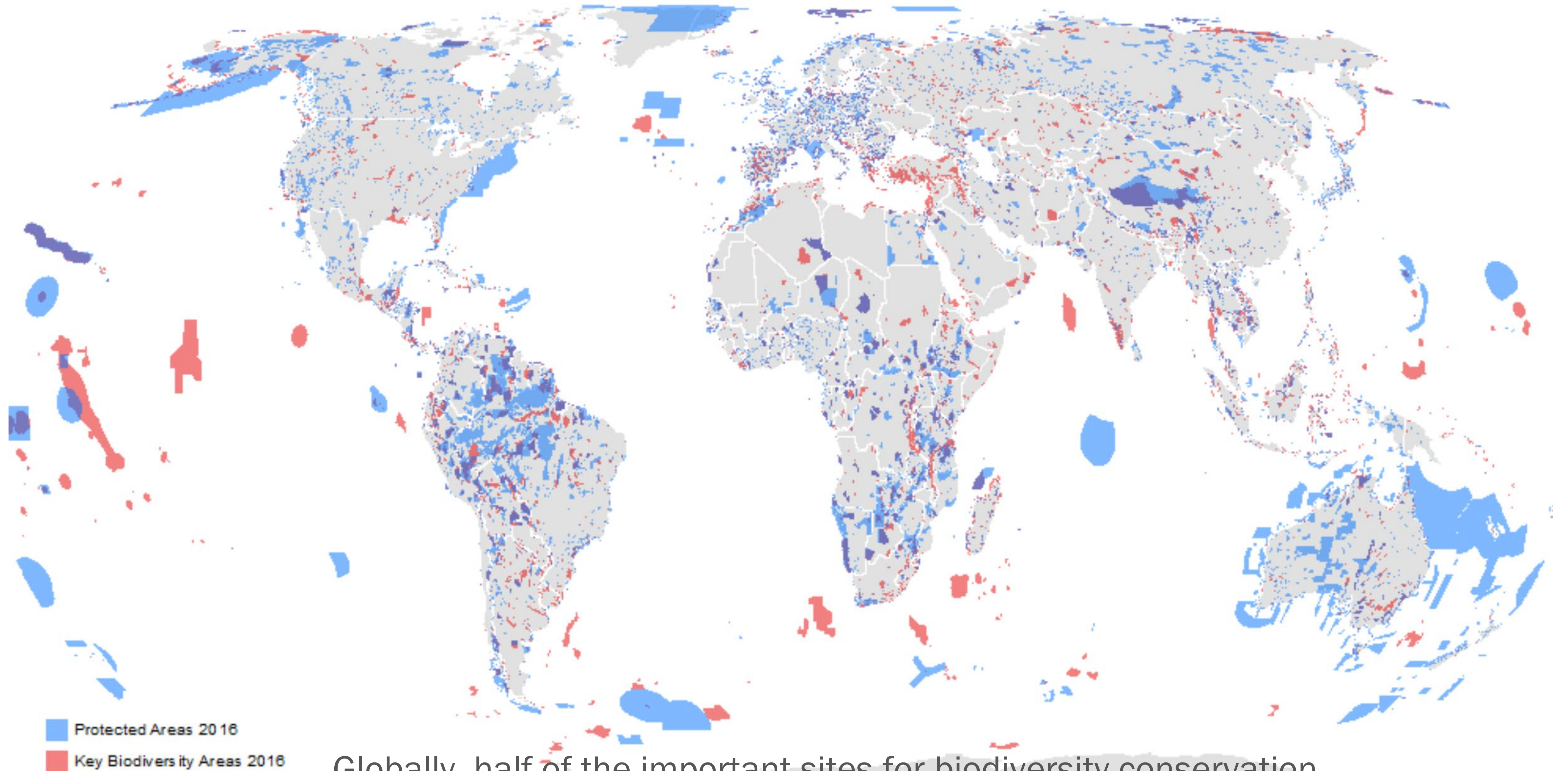
# GROWTH IN GLOBAL PROTECTED AREAS



Globally, protected areas covered 8.5% of land and inland waters in 2004 and 14.7% in 2015 (Lewis et al. 2017)



# ARE THEY IN THE RIGHT PLACES?



Globally, half of the important sites for biodiversity conservation remain unprotected (Butchart et al. 2012)

# ARE THEY IN THE RIGHT PLACES?



# FIVE TROPICAL COUNTRIES



GUYANA &  
SURINAME

LIBERIA

MADAGASCAR

CAMBODIA

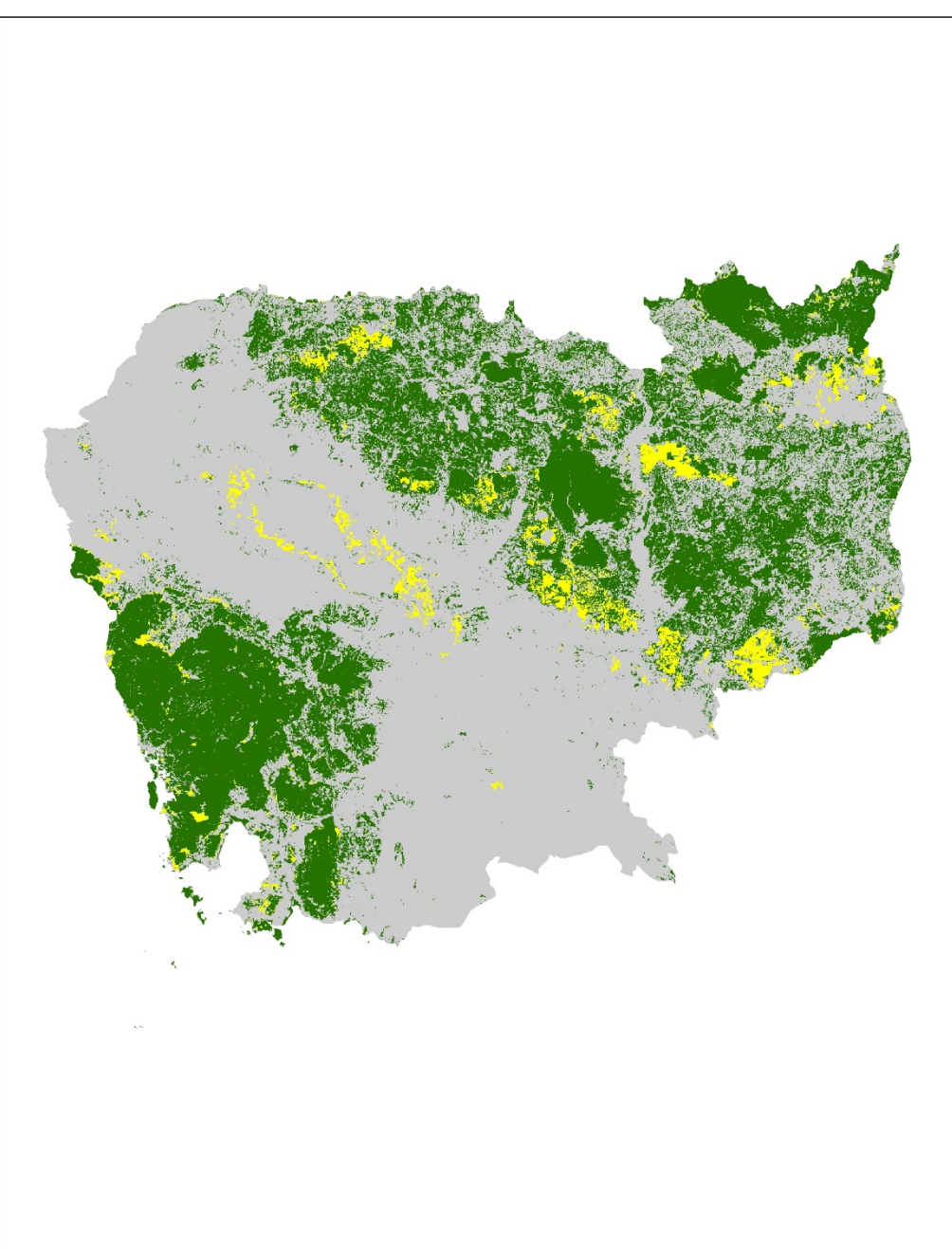
# QUESTIONS

1. Has spatial representation\* of biodiversity priority areas and ecosystem services (ES) within protected areas (PAs) improved over time?
2. Could biodiversity and ES be better represented, if the PA network had targeted these areas?

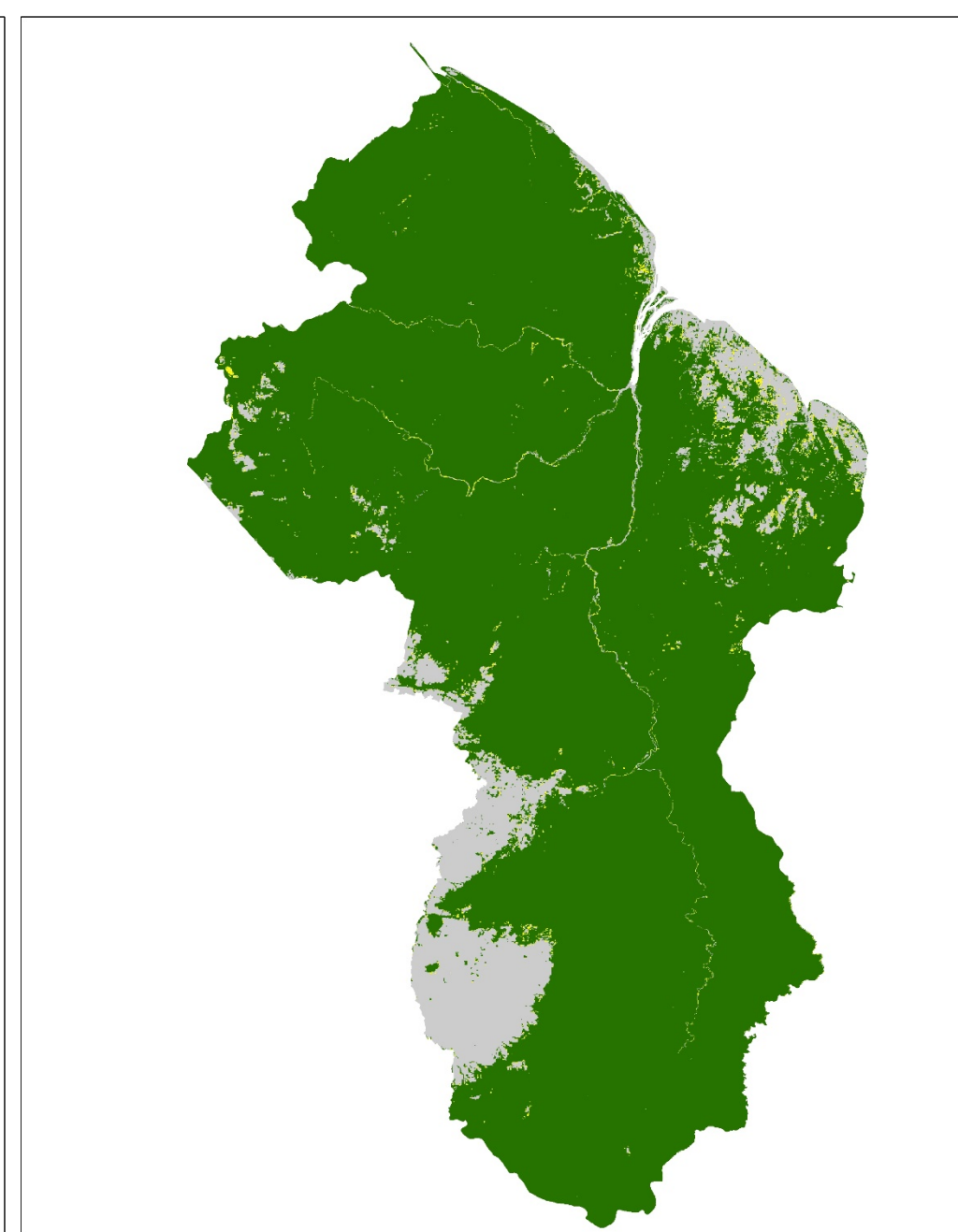
\*Spatial representation  $\neq$  effective protection



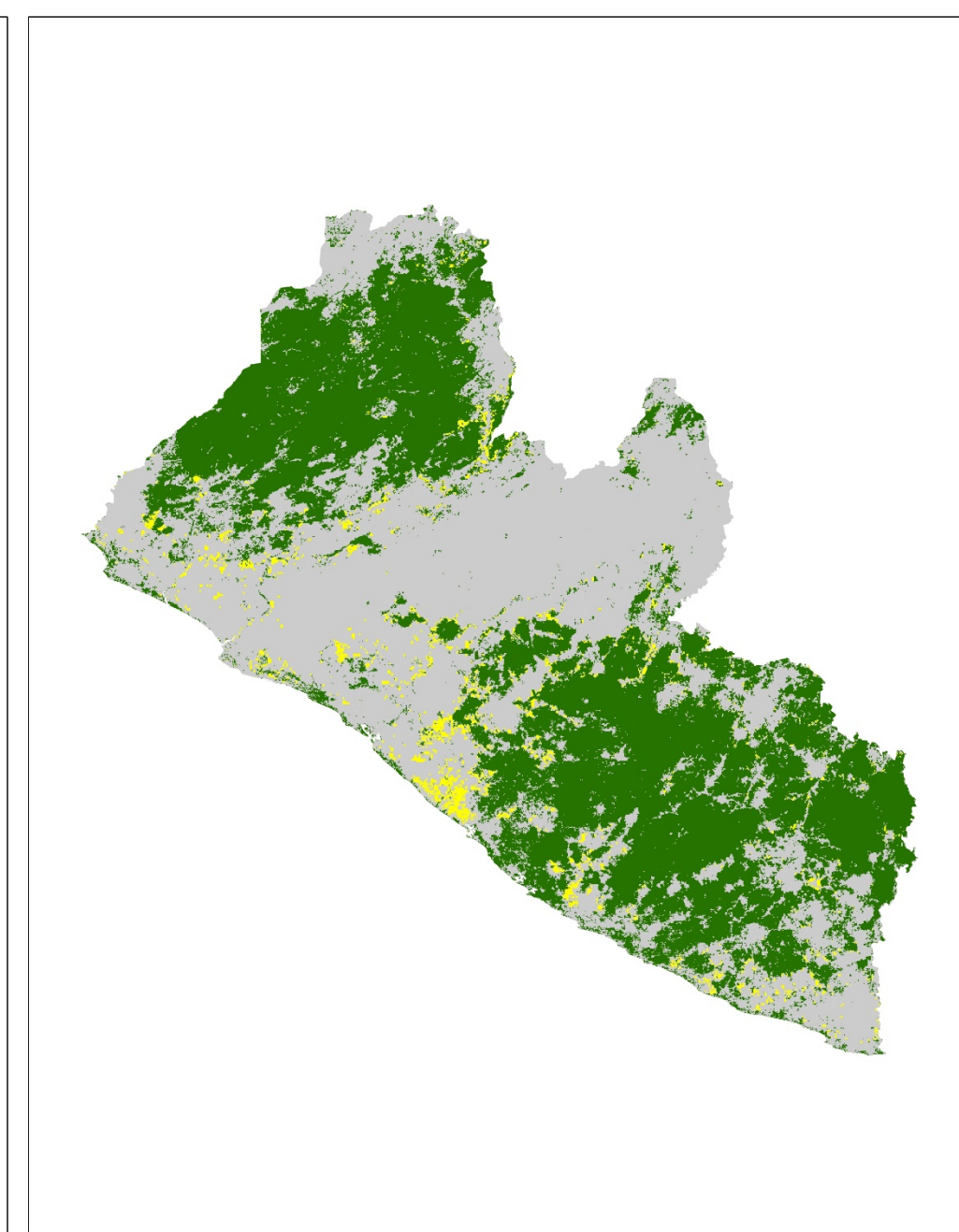
# FIVE TROPICAL COUNTRIES



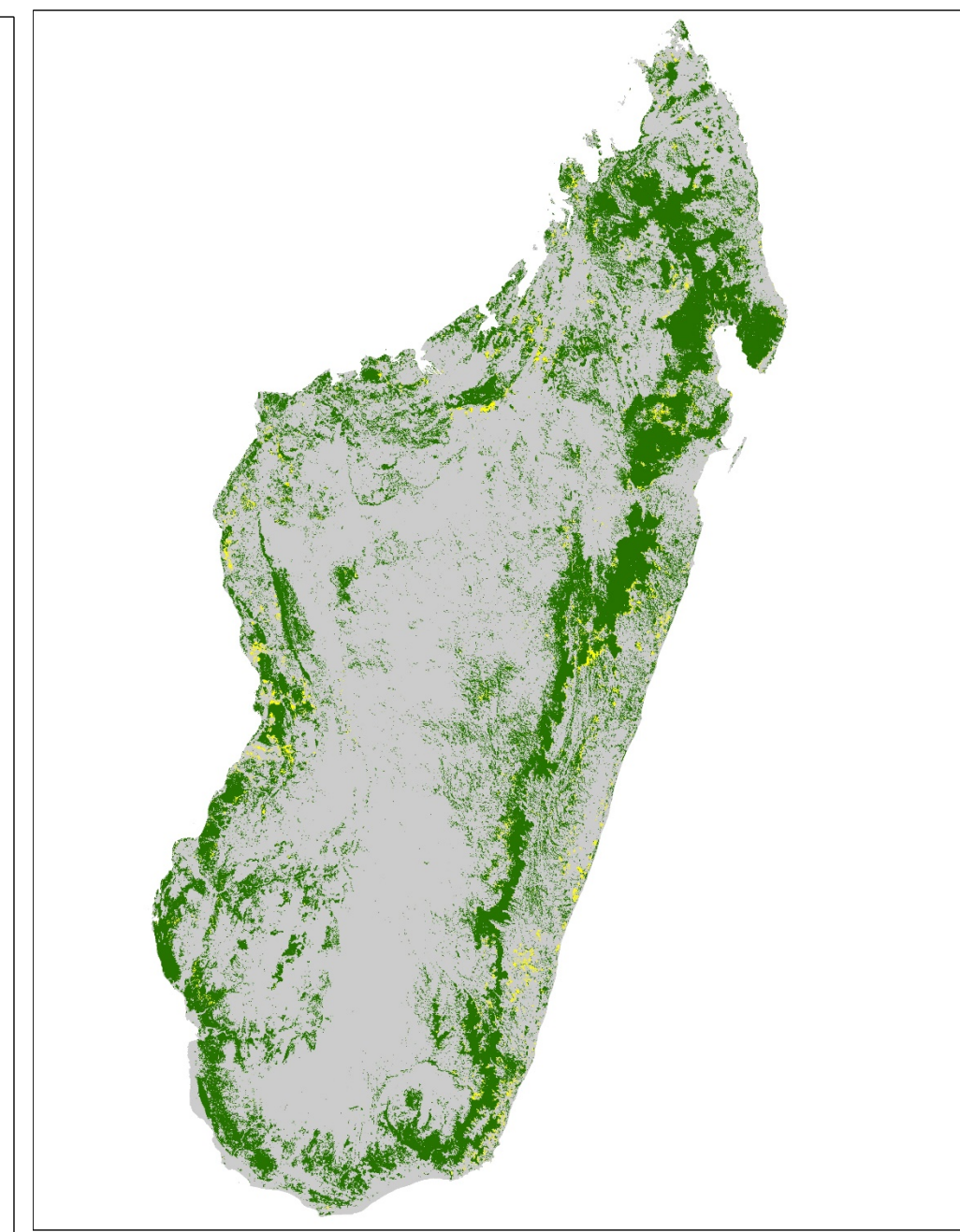
CAMBODIA



GUYANA



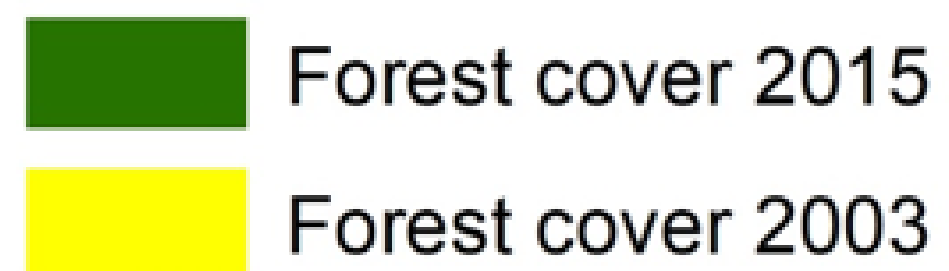
LIBERIA



MADAGASCAR



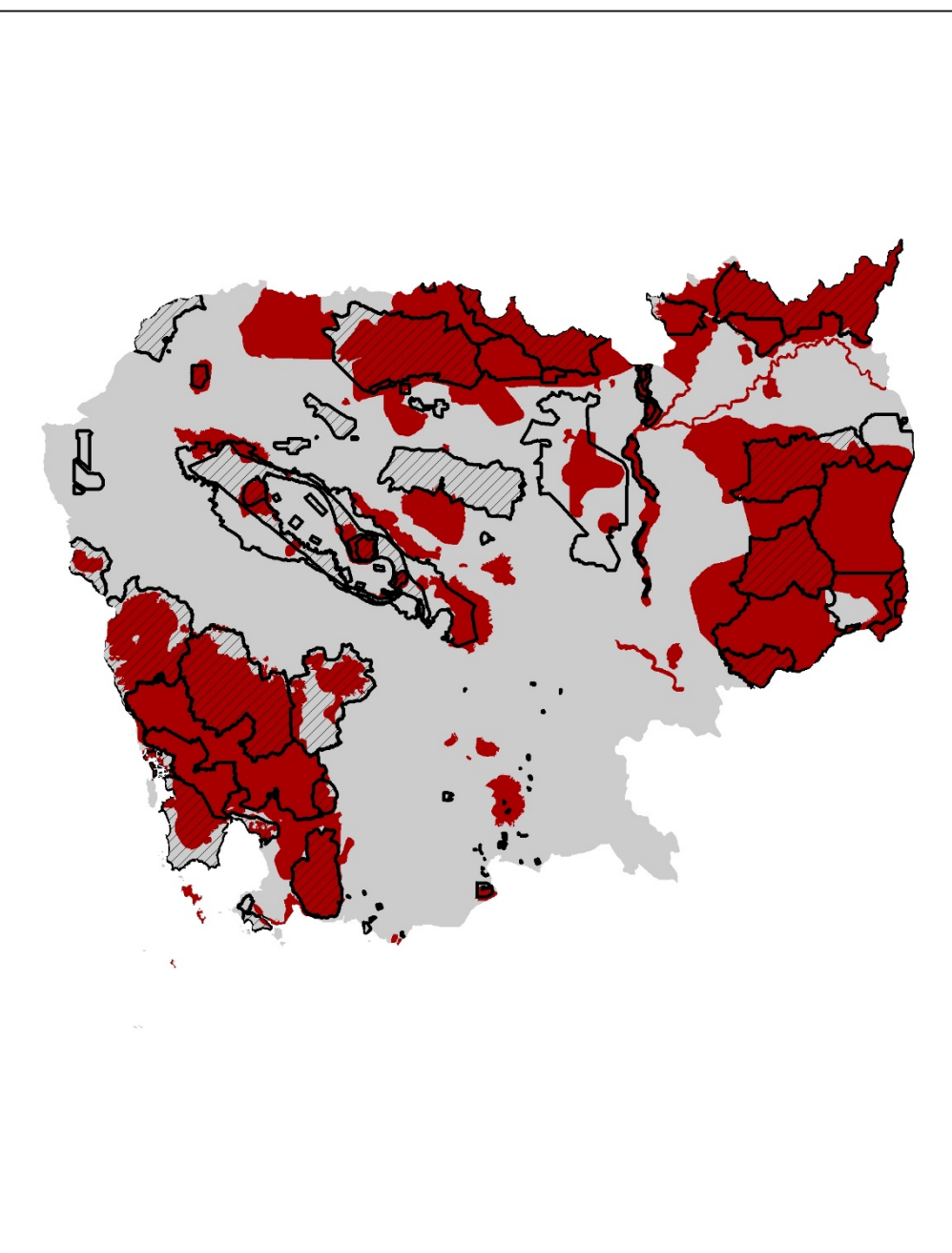
SURINAME



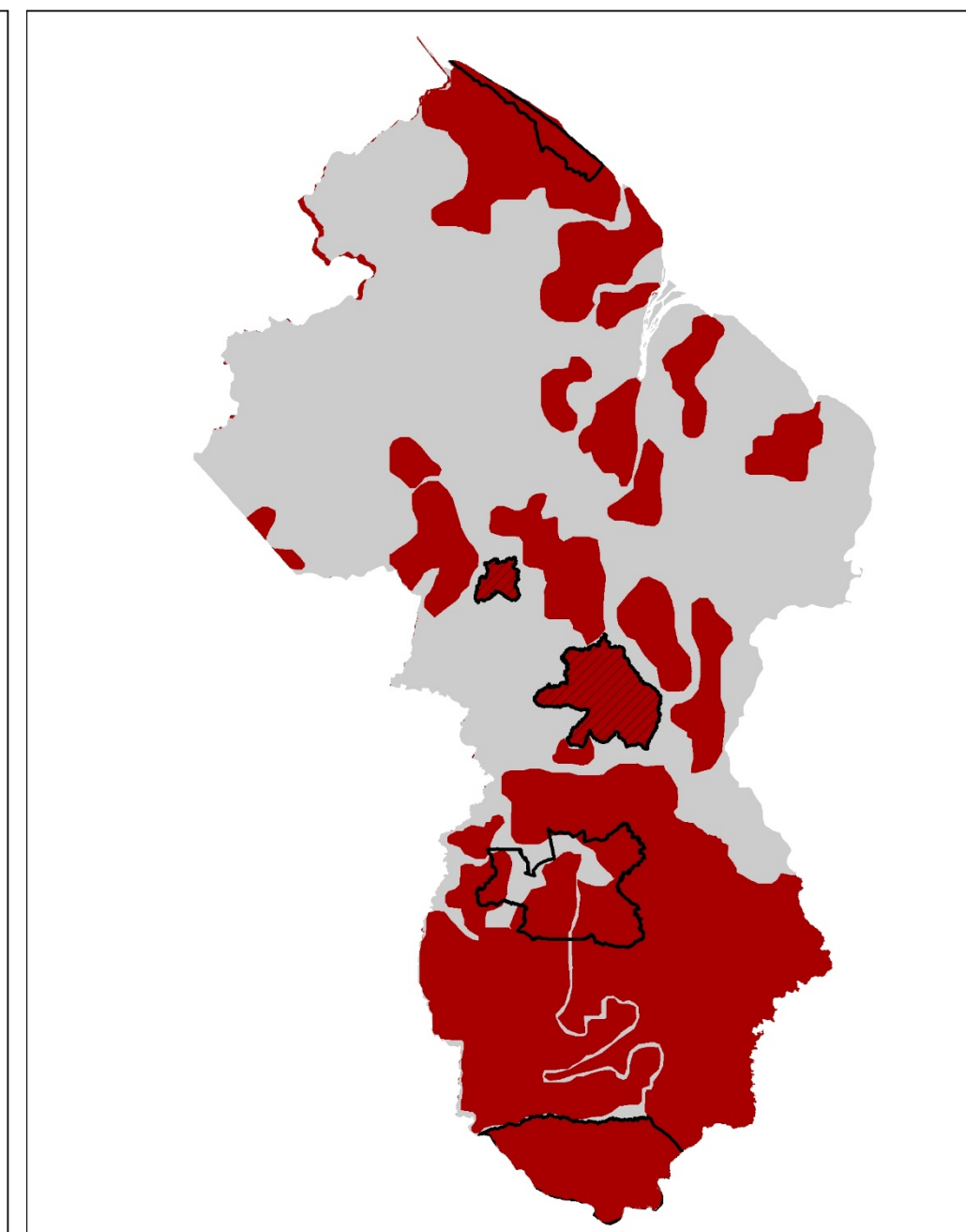


# RESULTS: BIODIVERSITY PRIORITY AREAS

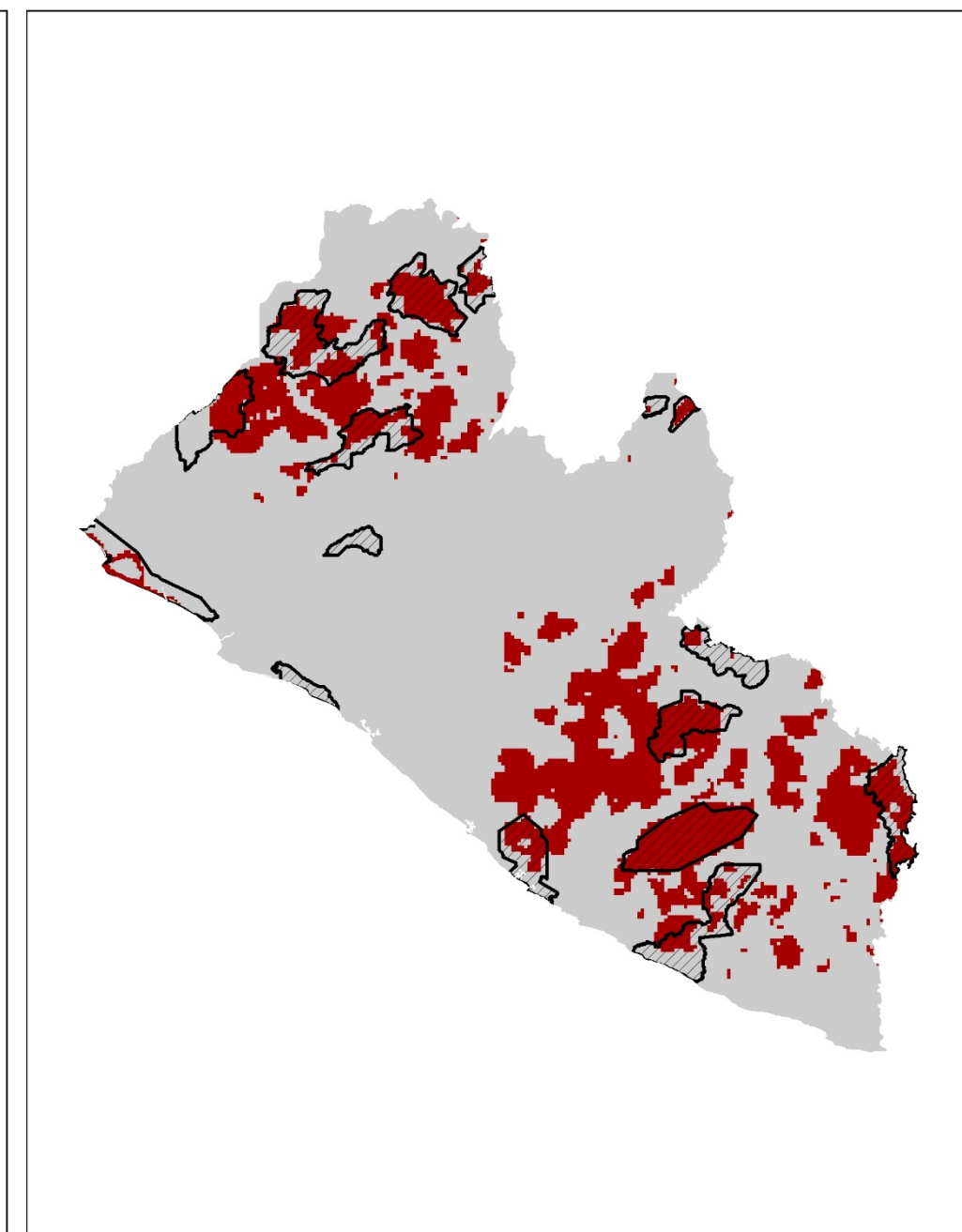
- PAs **over-represent** biodiversity priority areas (better than you'd expect, given their size)
- & representation has improved over time
- If PAs were targeted, could increase representation of BPAs, with same total area protected



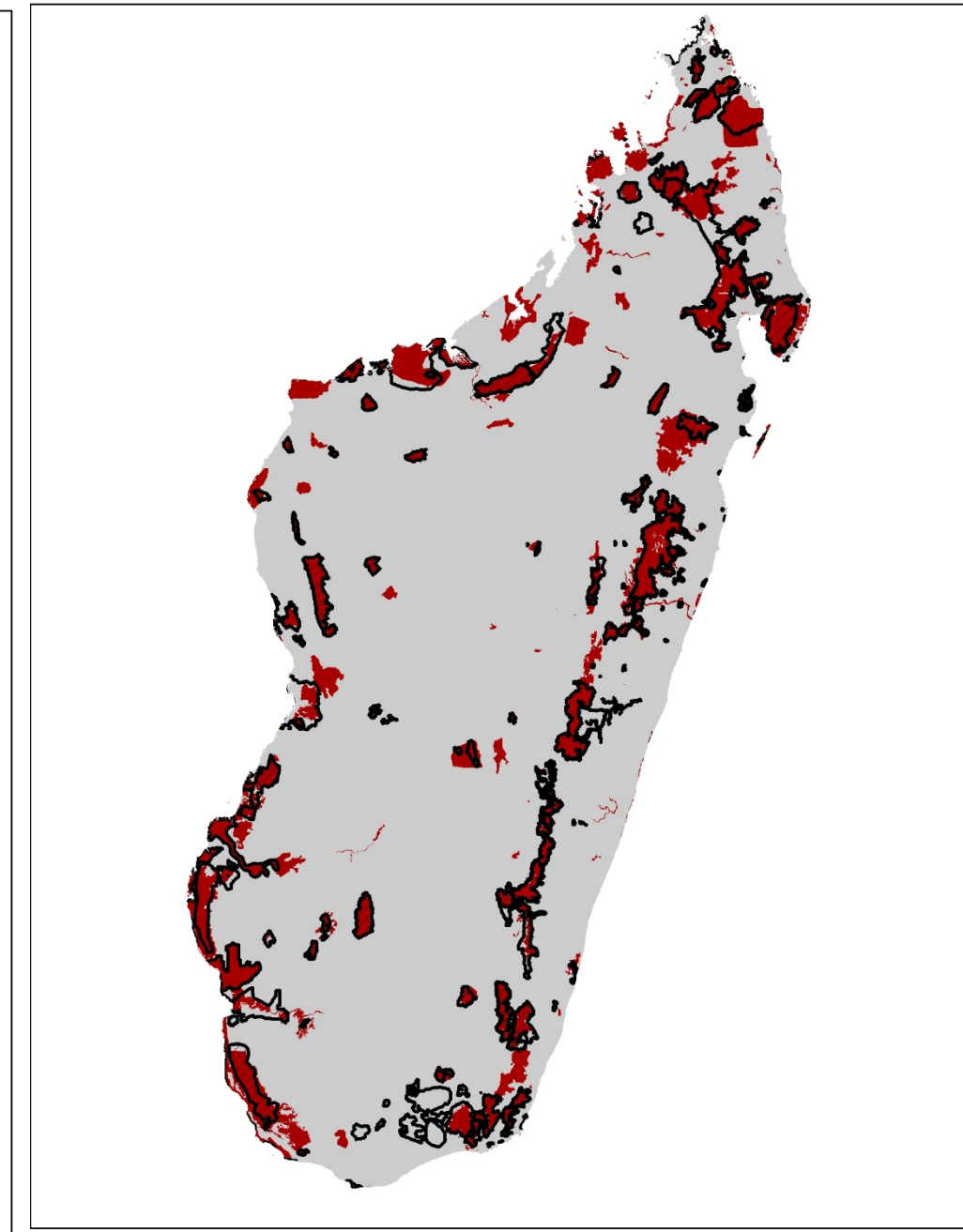
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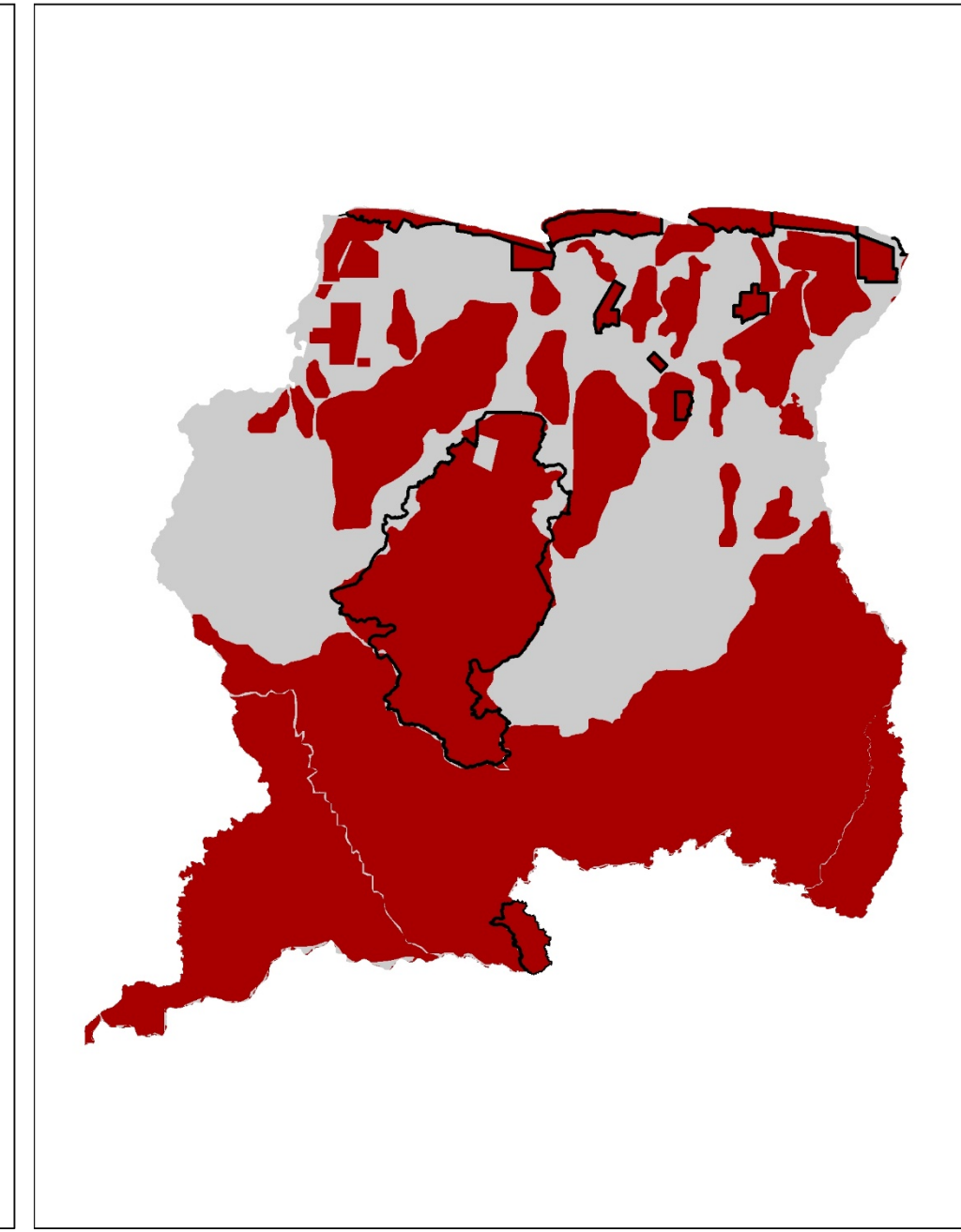
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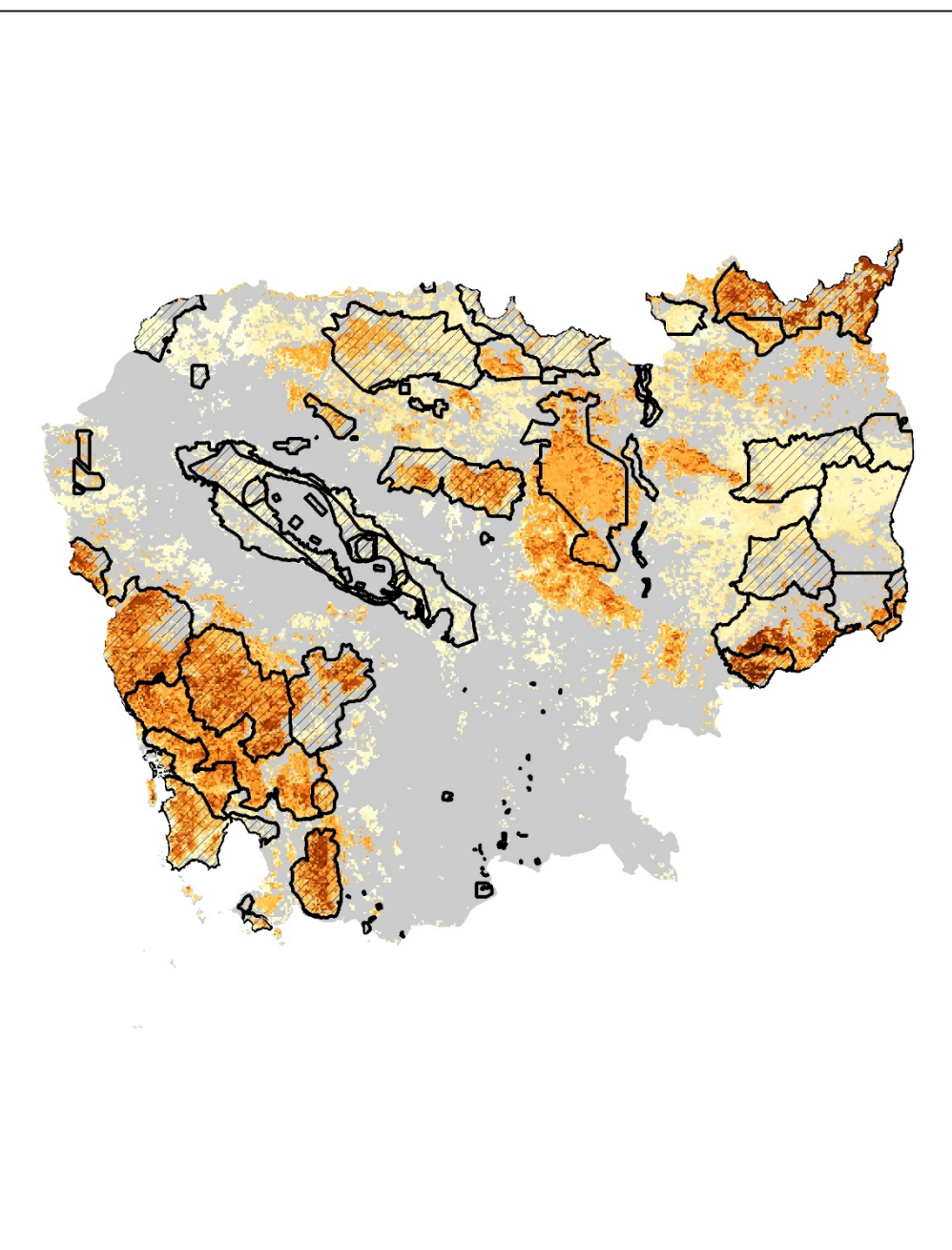


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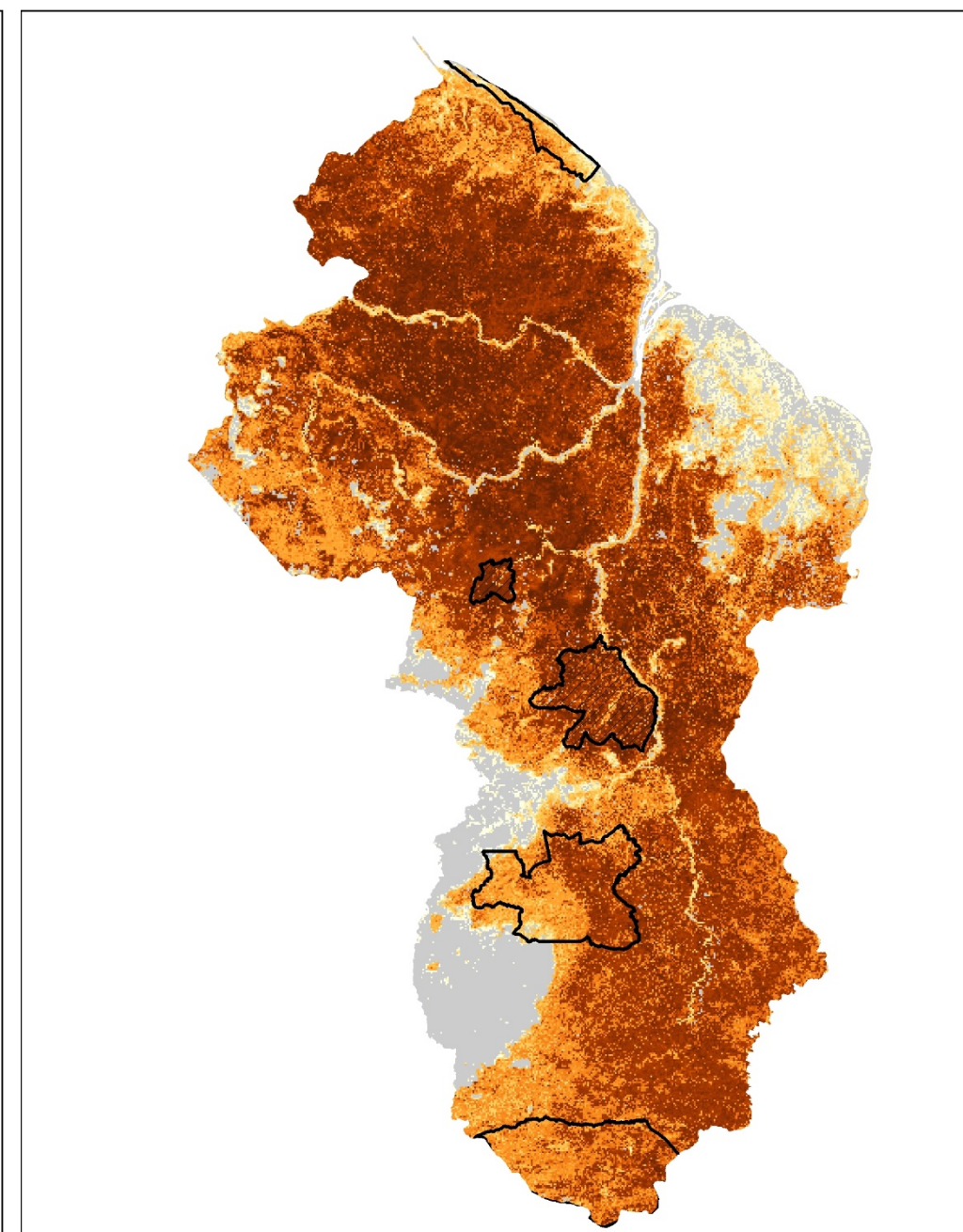


# FORESTS & FOREST CARBON STOCKS

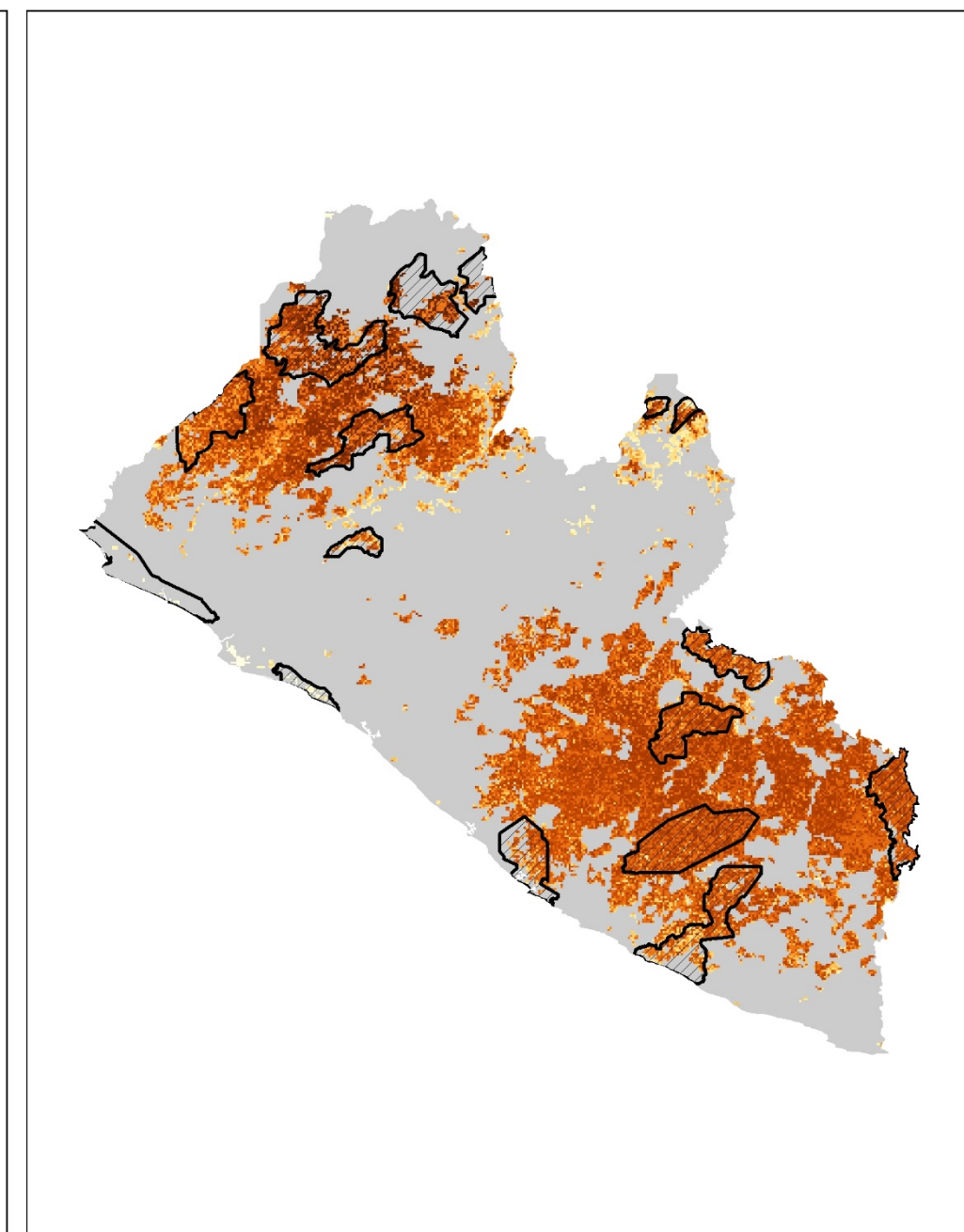
- Cambodia, Liberia, Madagascar: PAs **over-represented** forests & forest carbon stocks; could do even better
- Guyana, Suriname: PAs **represented** forests & carbon as well as expected; no gains possible without PA expansion



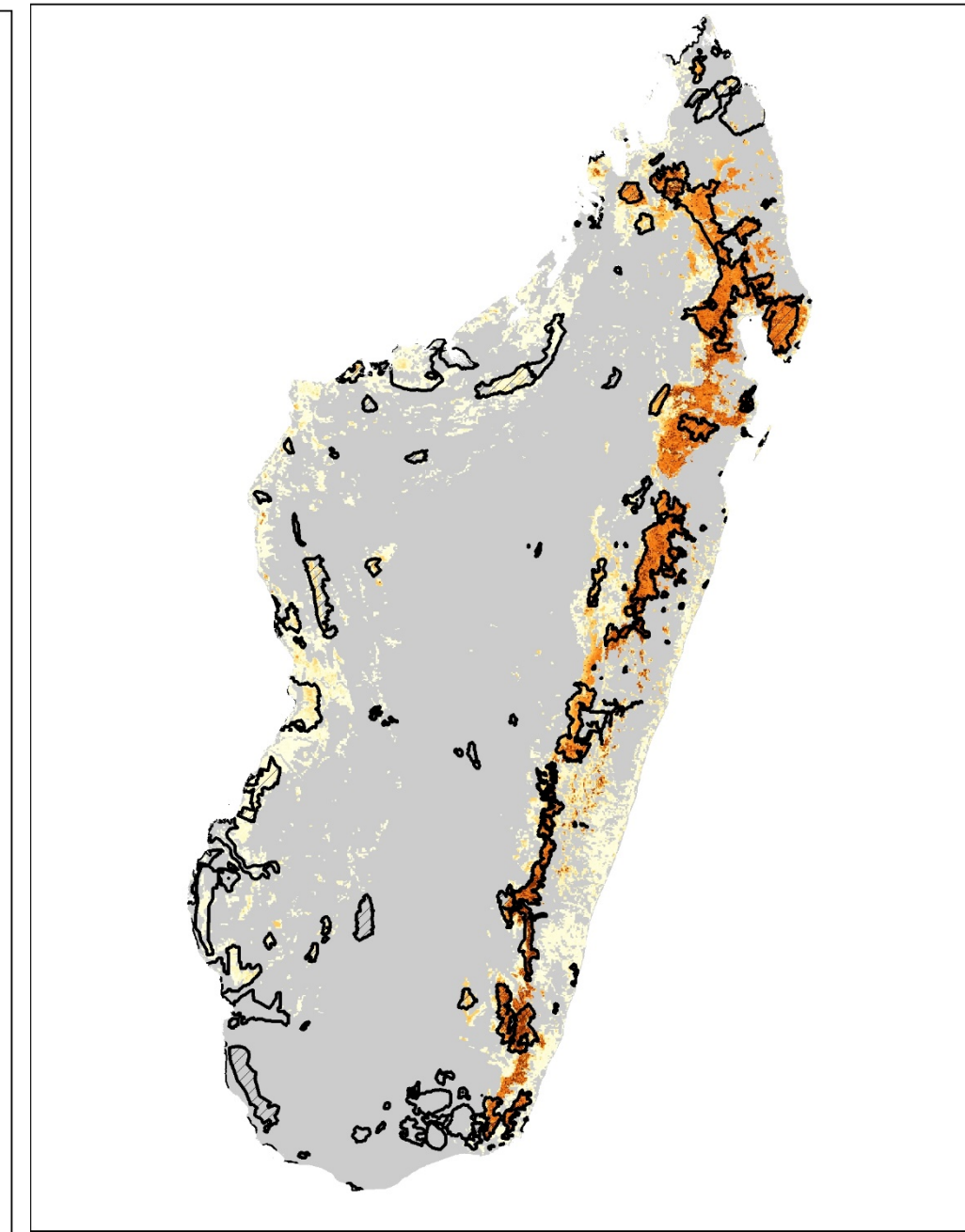
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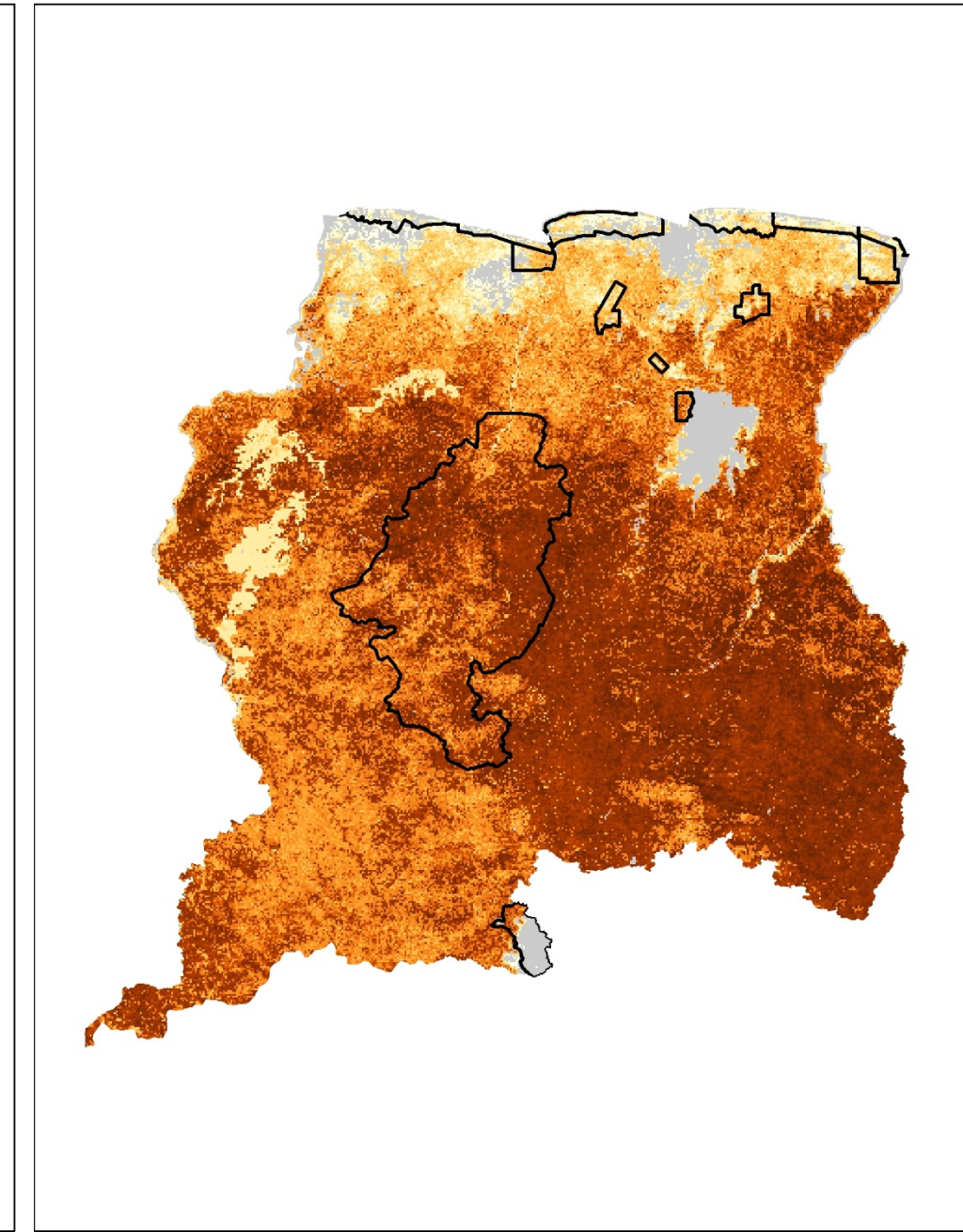
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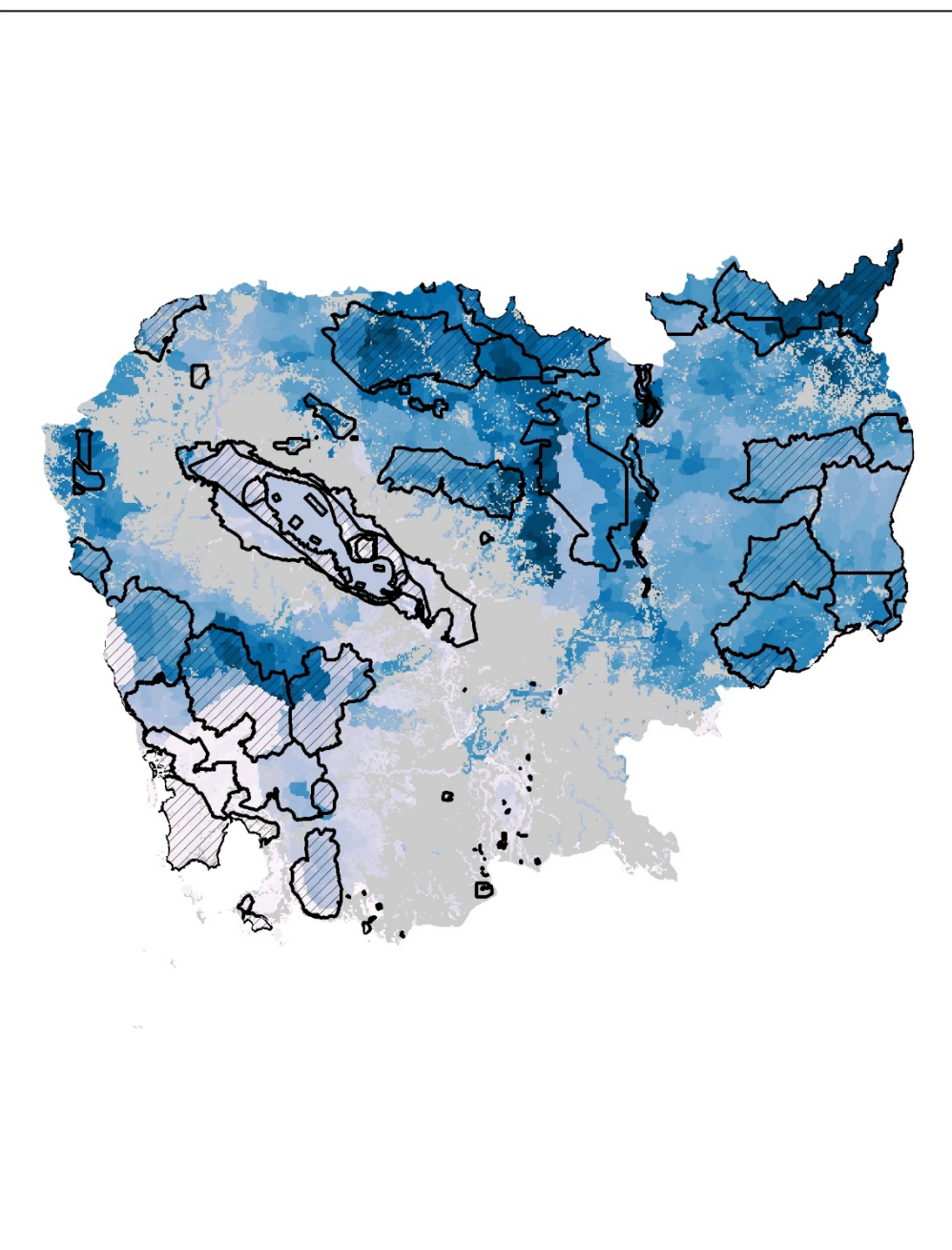


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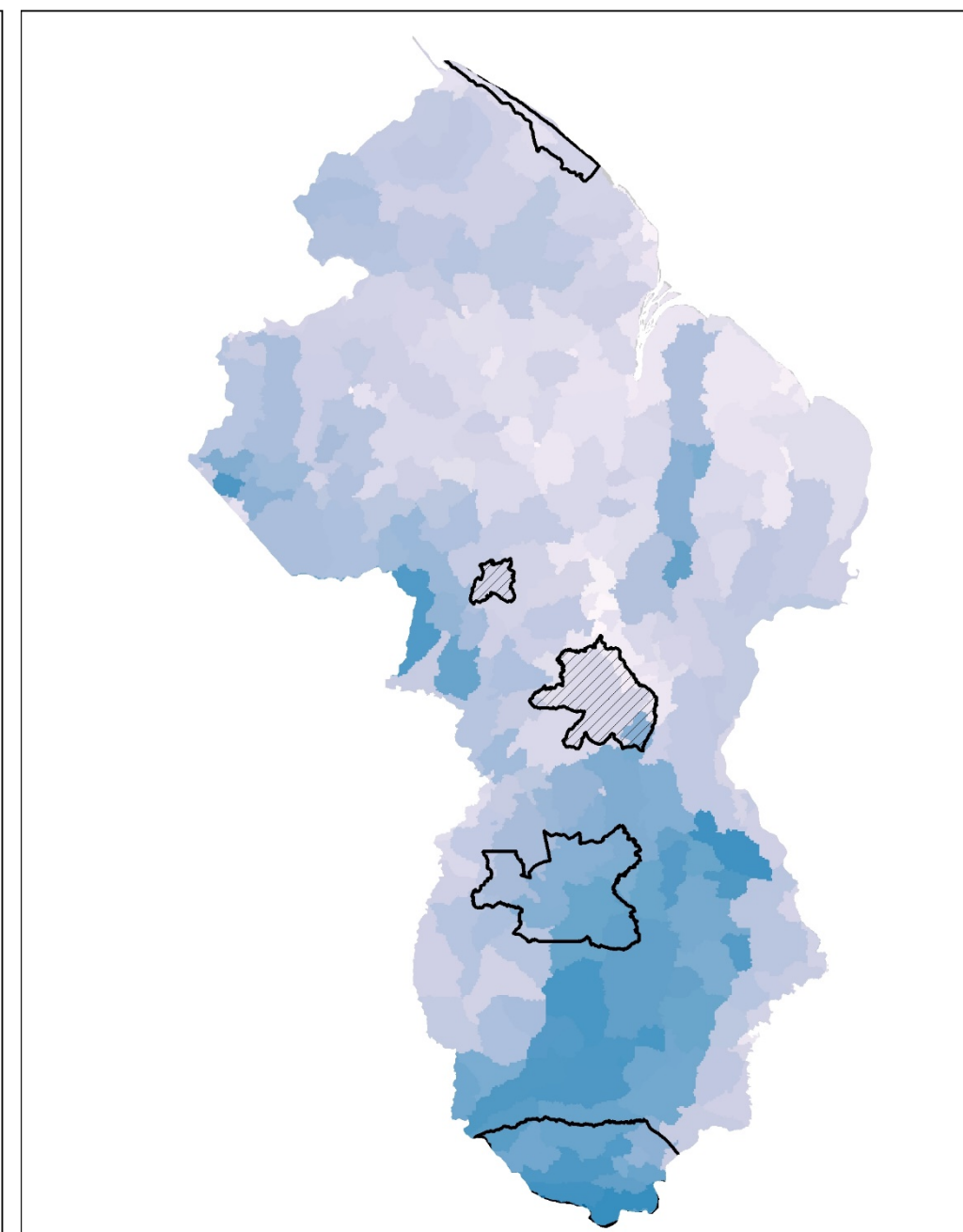


# FRESHWATER ECOSYSTEM SERVICES

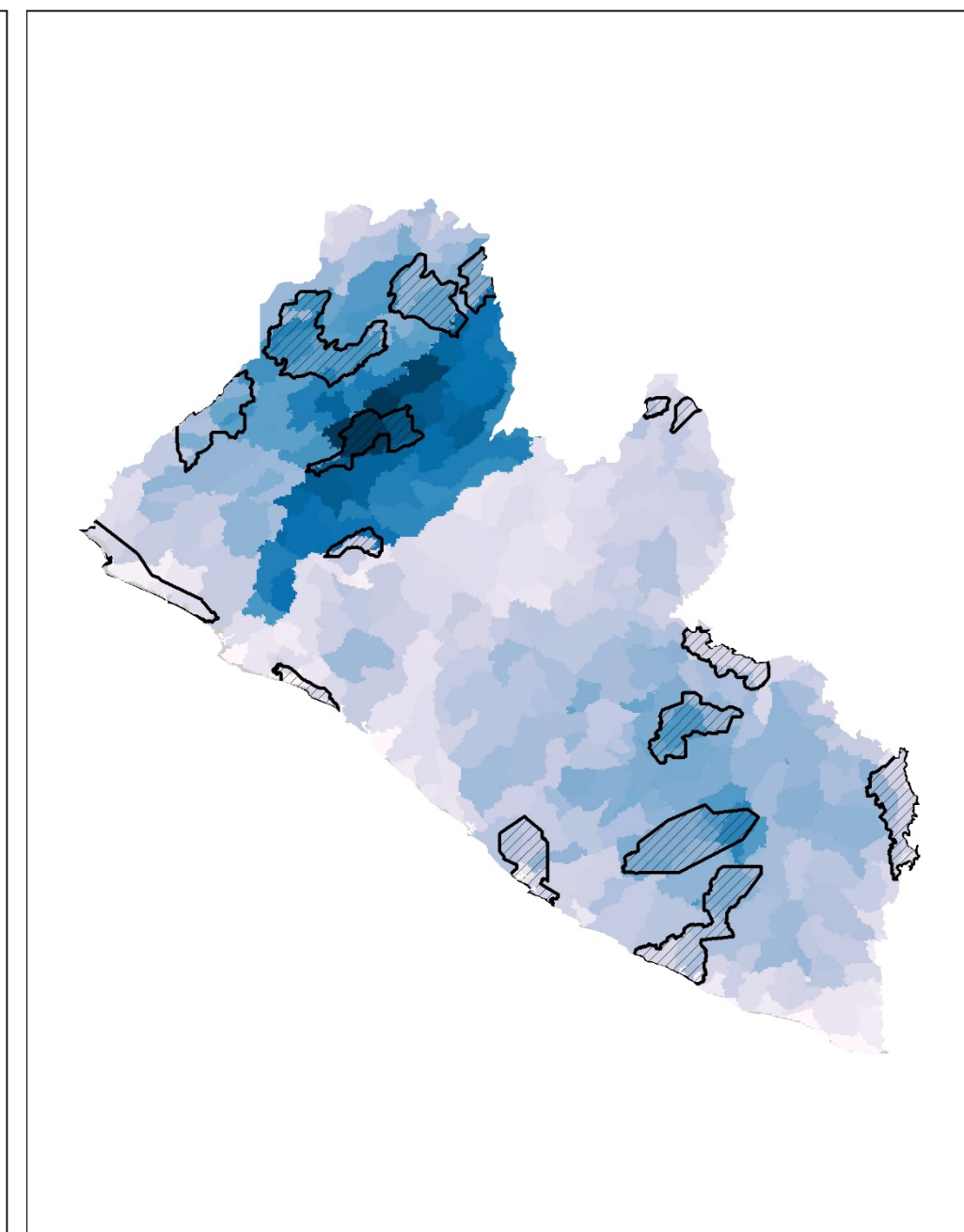
- Cambodia: PAs over-represented freshwater ES & increased over time
- Other countries: no better than would be expected based on their size



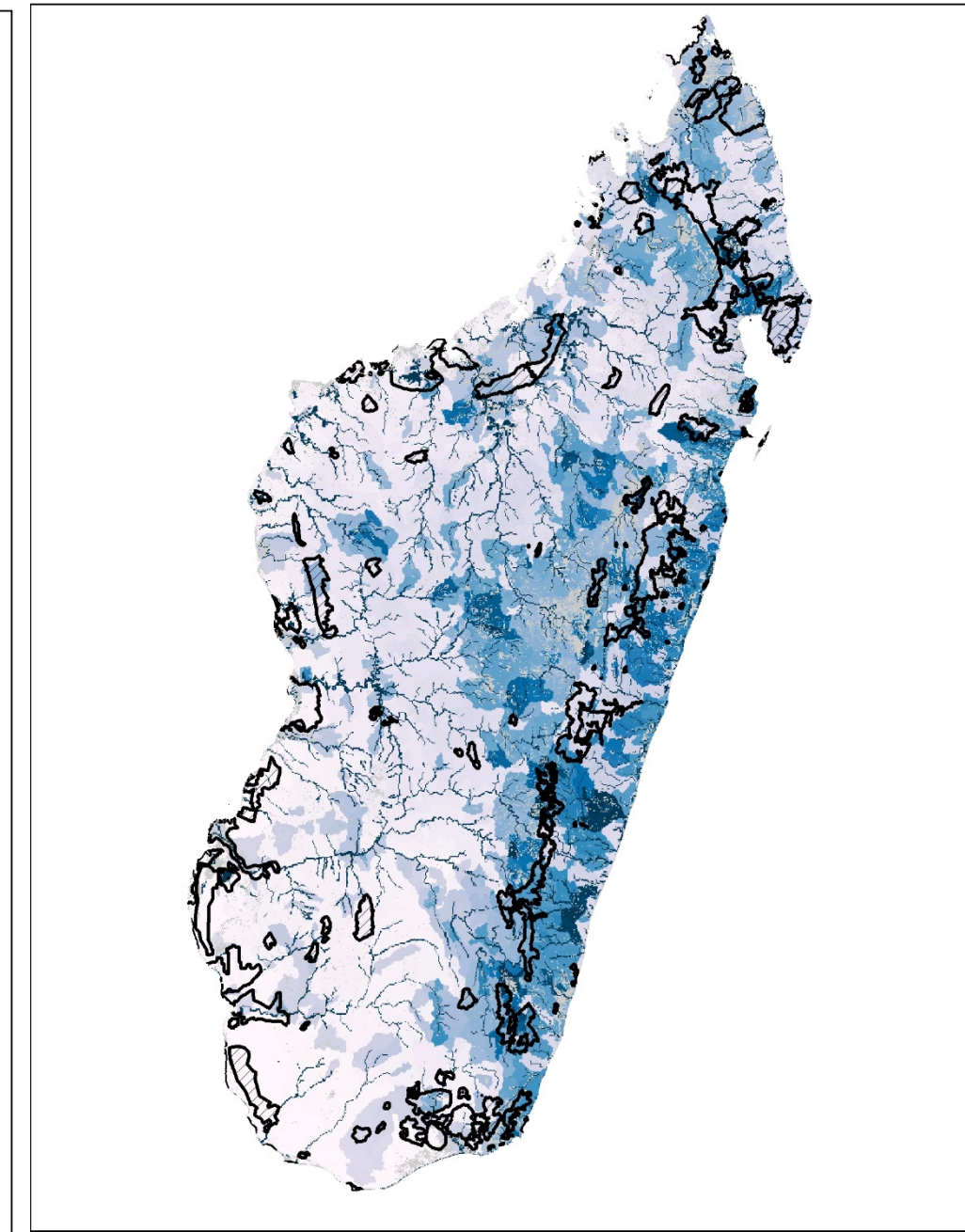
CAMBODIA



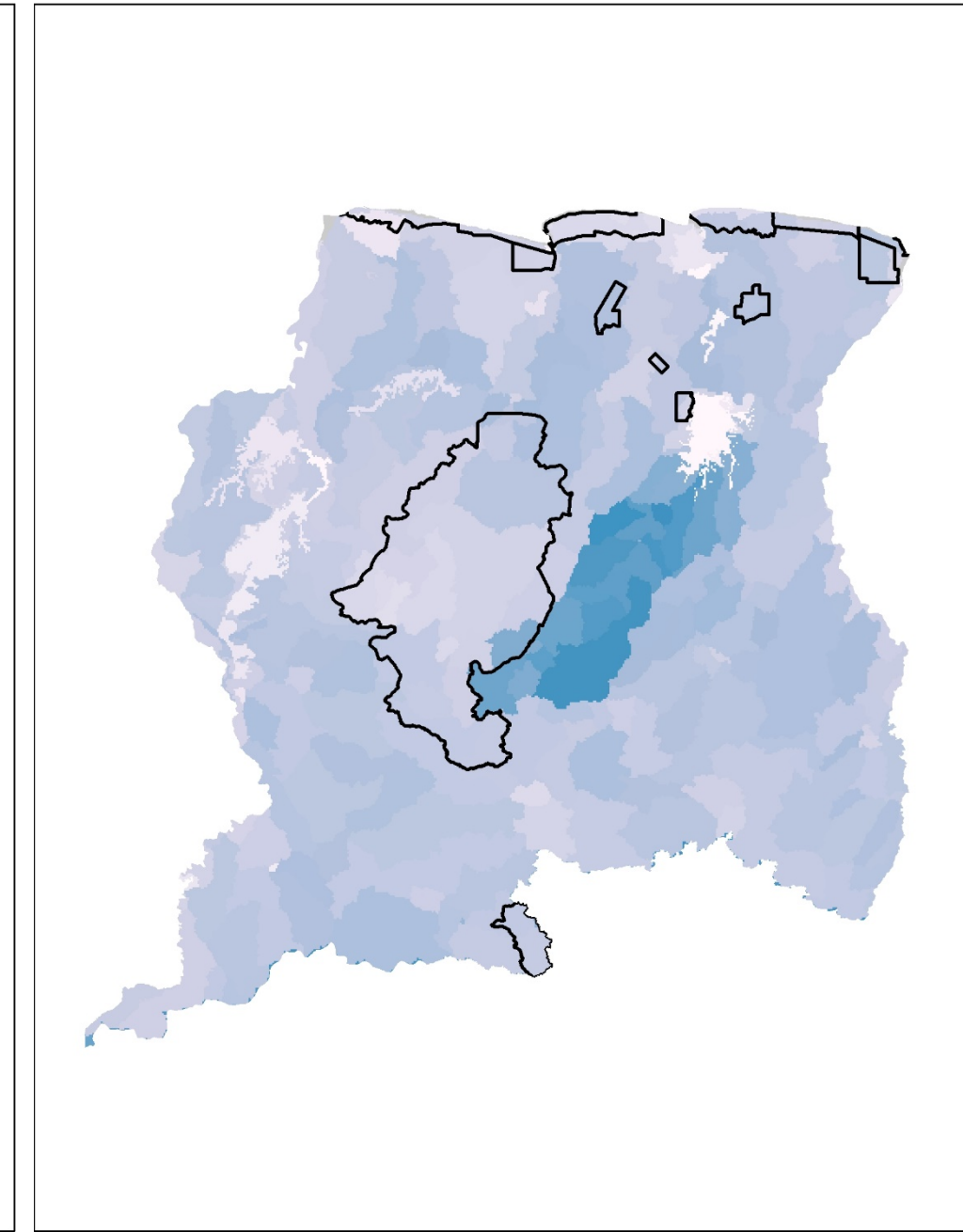
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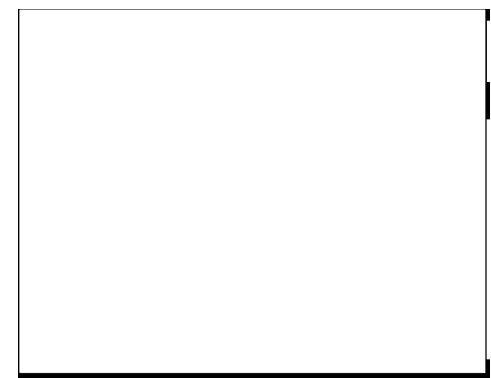
LIBERIA



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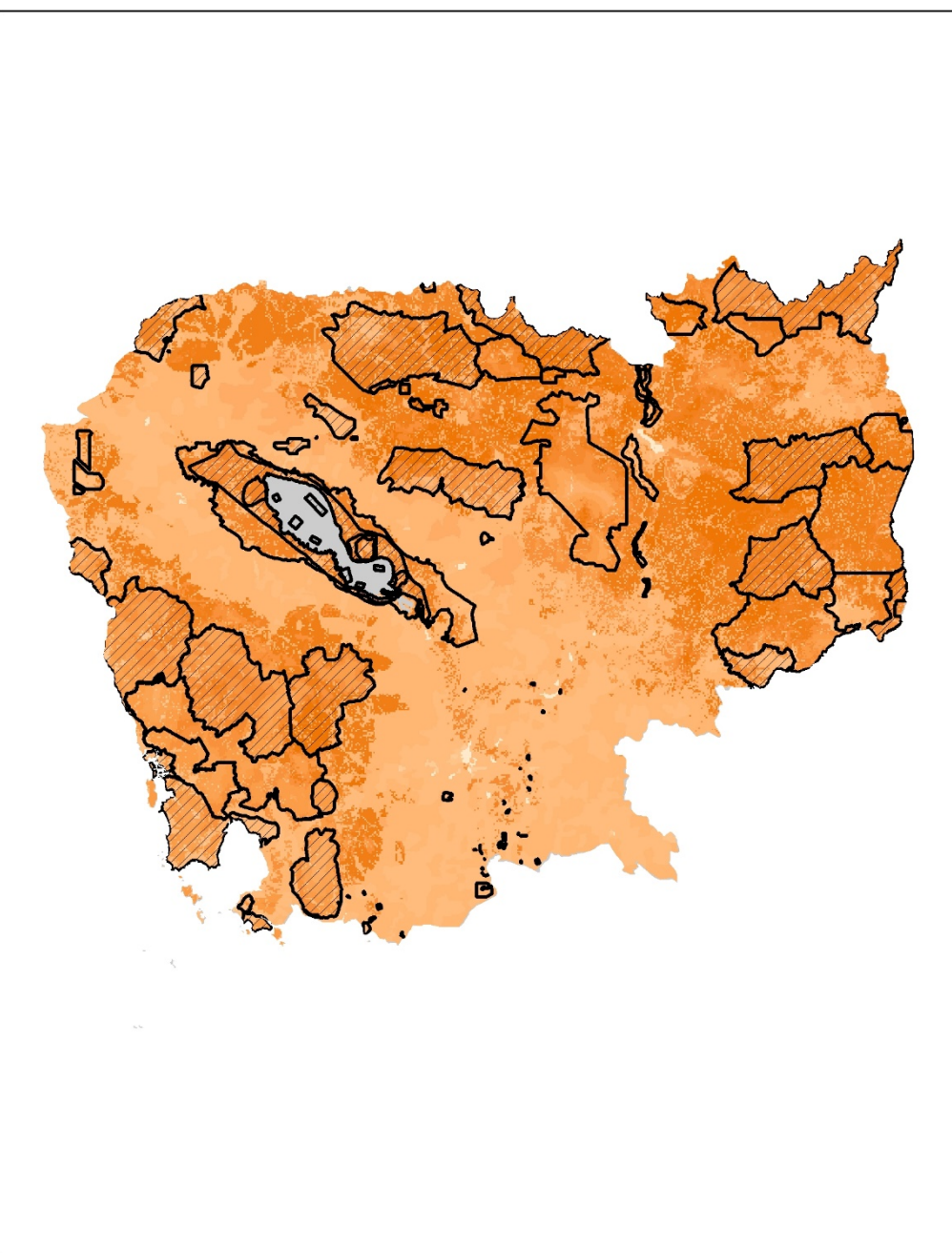


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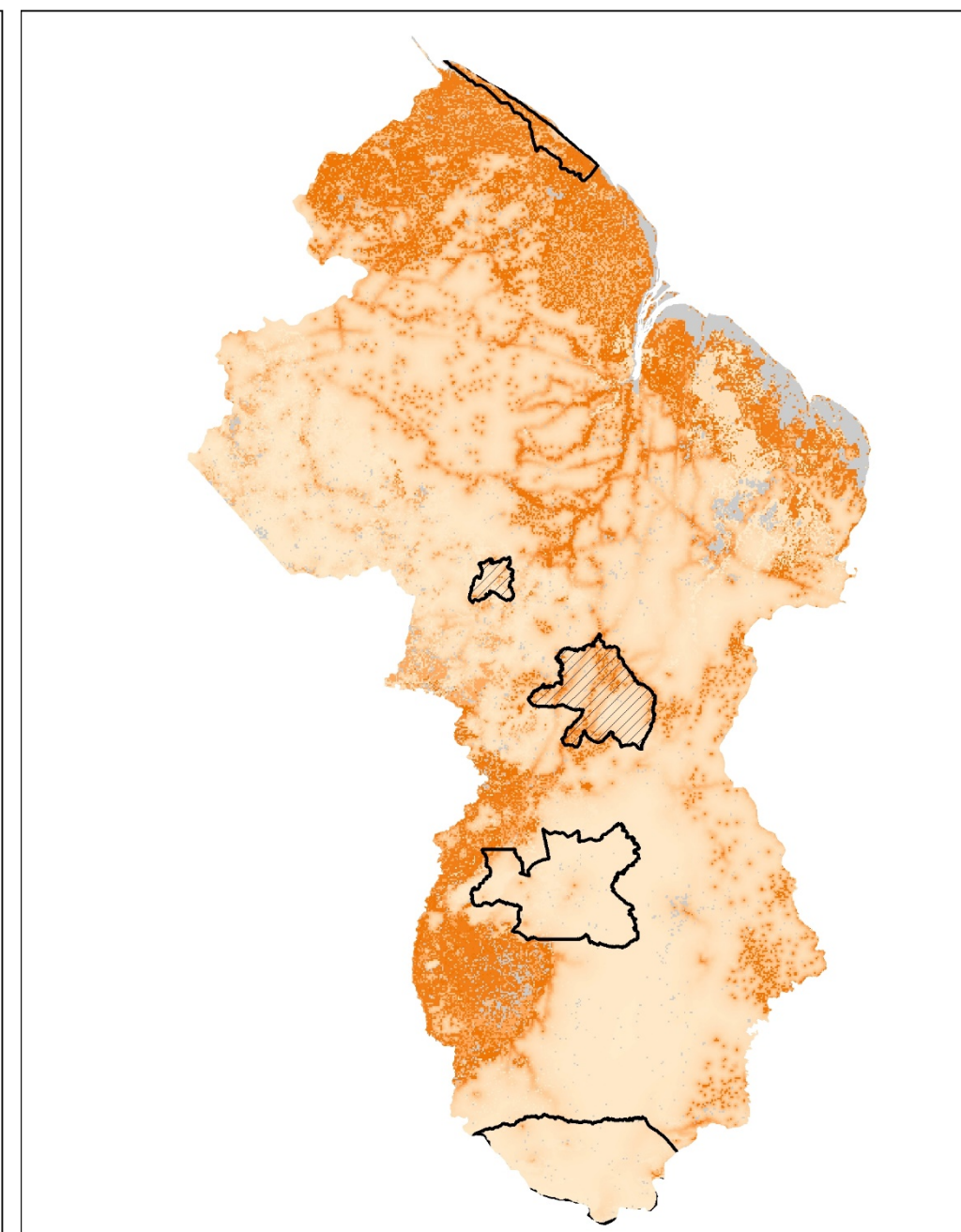


# NON-TIMBER FOREST PRODUCTS

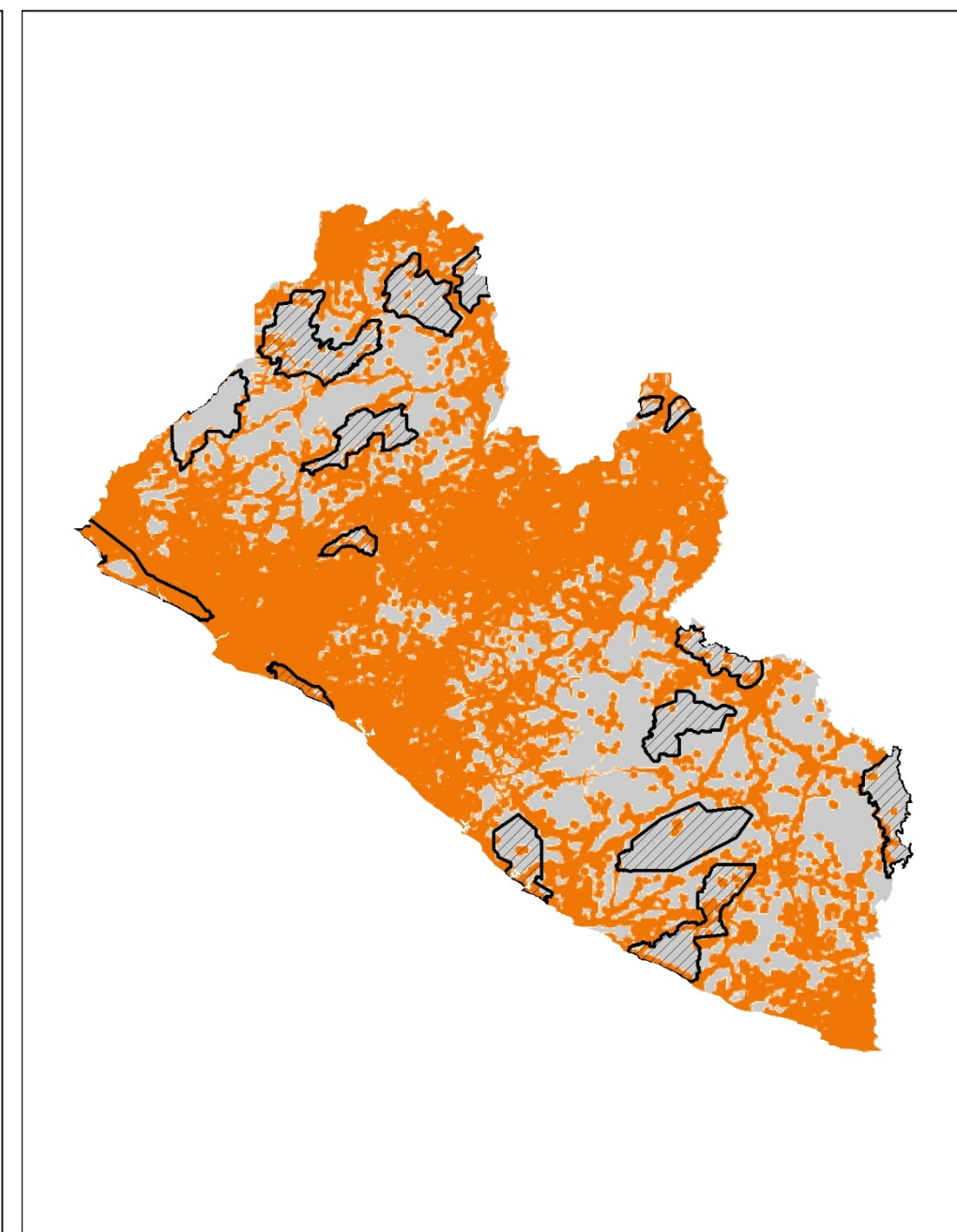
- PAs represented important areas for NTFPs no better (and in some cases worse) than would be expected based on their size



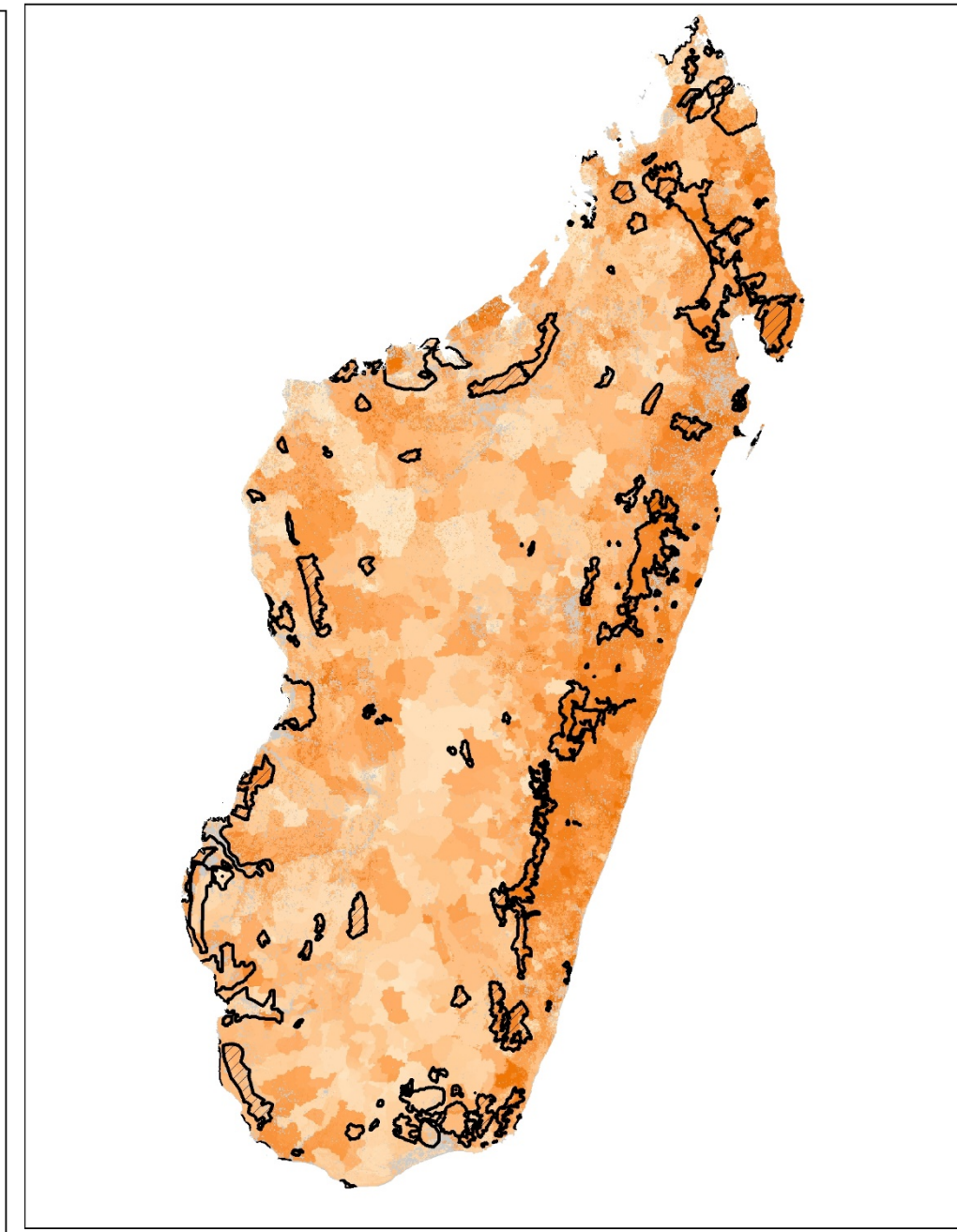
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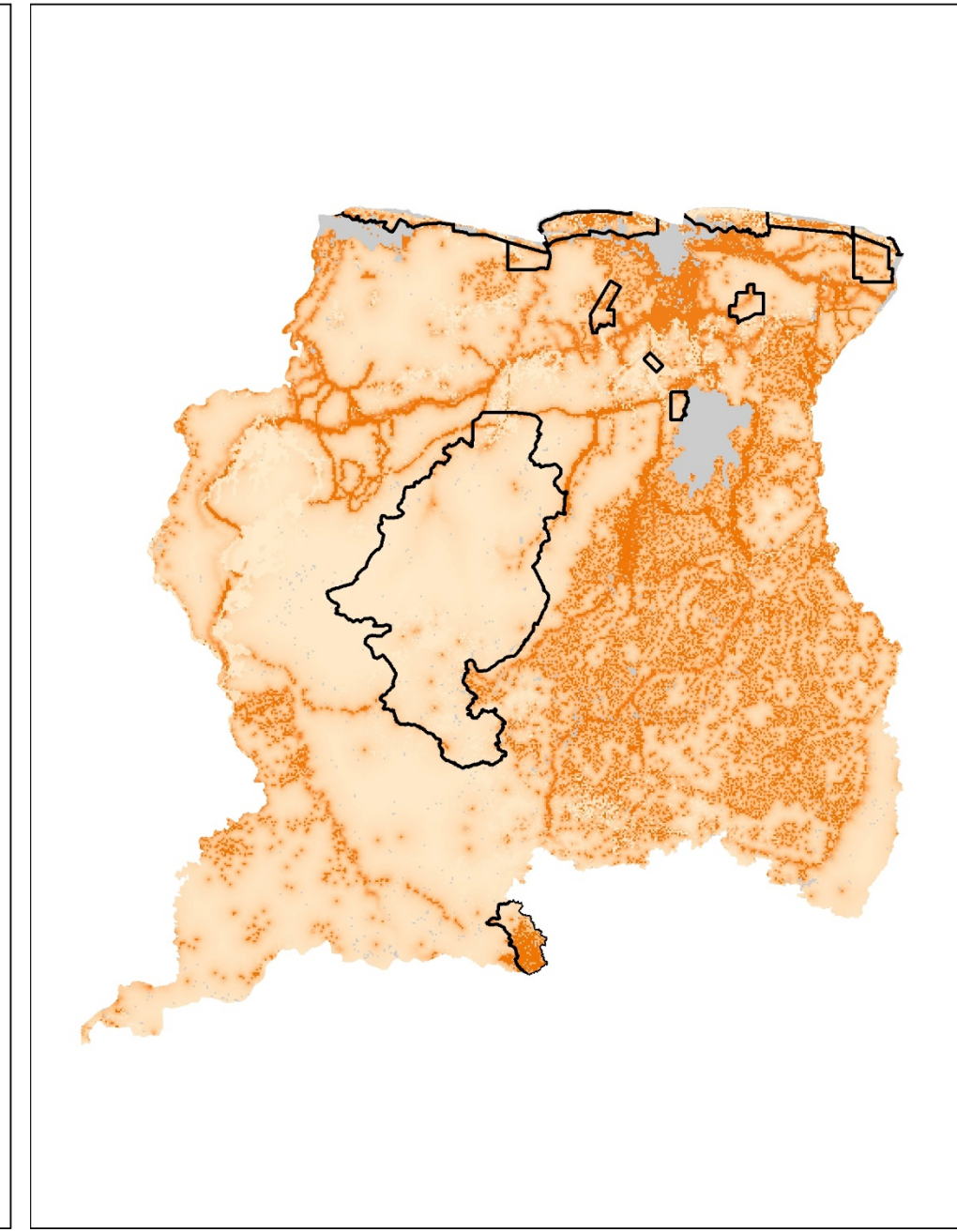
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LIBERIA



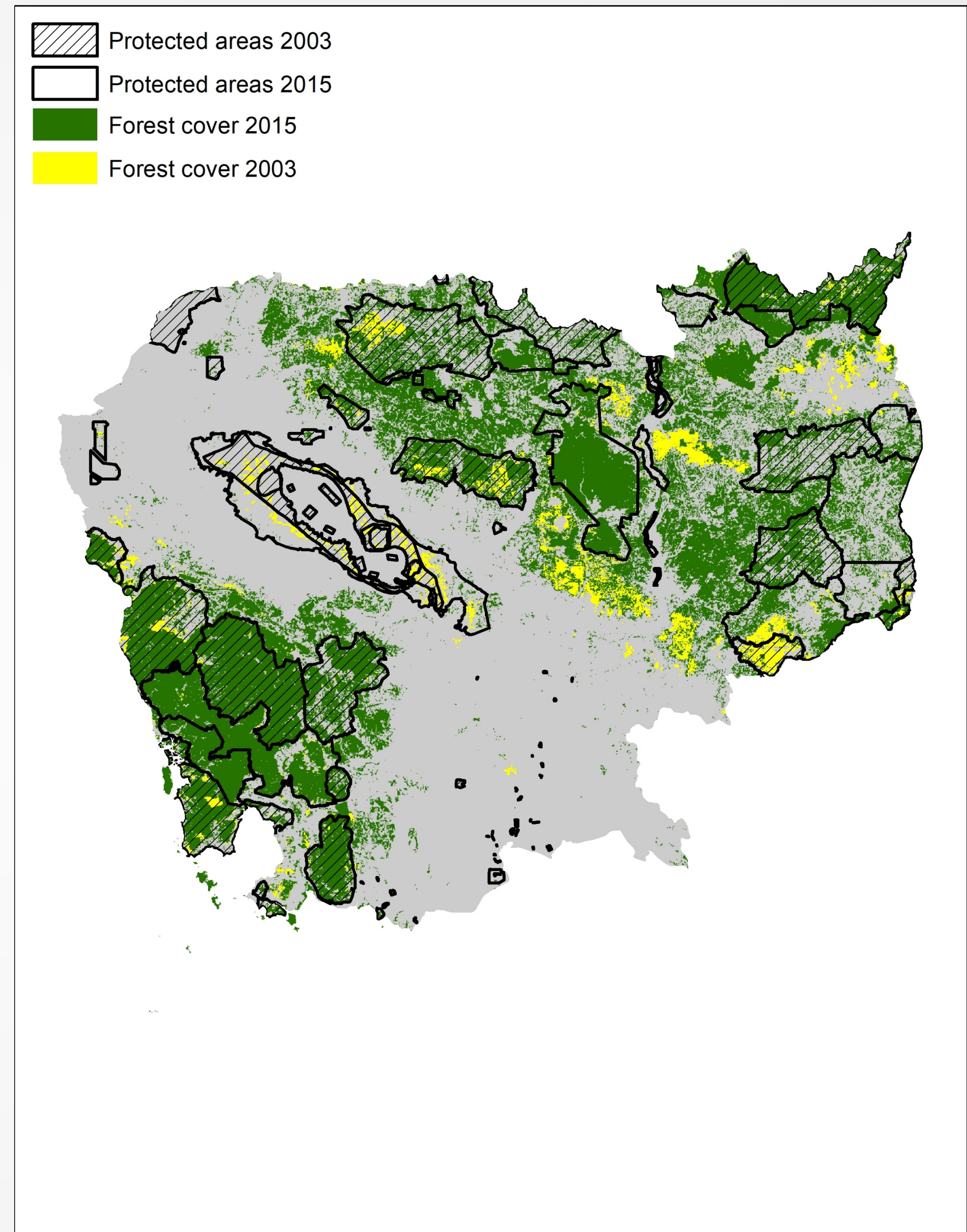
MADAGASCAR



SURINAME

# KEY MESSAGES

- Countries appear to be targeting biodiversity priority areas & forests for protection
  - Also, ongoing forest cover loss in some countries
- Increased representation of biodiversity & ES possible, if PAs targeted these values
  - Exception: forest/carbon in high forest cover countries
- PAs not optimally located for freshwater ES, NTFPs
  - Governments don't have ES information to guide PA design
  - PAs not necessarily the best mechanism for maintaining ES



# LIMITATIONS

- Spatial representation  $\neq$  PA effectiveness
- Sample size = 5 countries
- Missing marine ES, cultural ES
- ES data for only a single time period



# IMPLICATIONS

- Spatial data on biodiversity and ES can inform PA network design
- If targeted, PAs could represent more important areas for biodiversity and ES
- Biodiversity and ES don't necessarily overlap, so PAs that represent some values (biodiversity, carbon) may not represent others (water, NTFPs)
- Other mechanisms might be necessary (community-based conservation, incentives, eco-certification) to maintain flows of ES outside PAs



# THANK YOU

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Kevin Moull, Madeleine McKinnon, David Hole, Natalia Acero Martinez, Luciano Andriamaro, Curtis Bernard, Curan Bonham, Carlos Andres Cano, Paula Ceotto, Tracy Farrell, Matthew Gibb, Miroslav Honzak, Thais Kasecker, Kellee Koenig, Trond Larsen, Juan Carlos Ledezma, Mark Mulligan, Annette Olsson, Zo Lalaina Rakotobe, Andriambolantsoa Rasolohery, Leonardo Saenz, Marc Steininger, Timothy Max Wright, Will Turner

Funding for this work was provided by the Gordon and Betty Moore Foundation, the Lui-Walton Innovators Fellowship, a generous gift from Gordon and Betty Moore, and the Critical Ecosystem Partnership Fund

