



# Correlating Management Effectiveness and Biodiversity Outcomes

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Worlds Parks Congress



Danmarks  
Grundforskningsfond  
Danish National  
Research Foundation

CENTER FOR MACROECOLOGY  
EVOLUTION AND CLIMATE  
UNIVERSITY OF COPENHAGEN

# Collaborative project

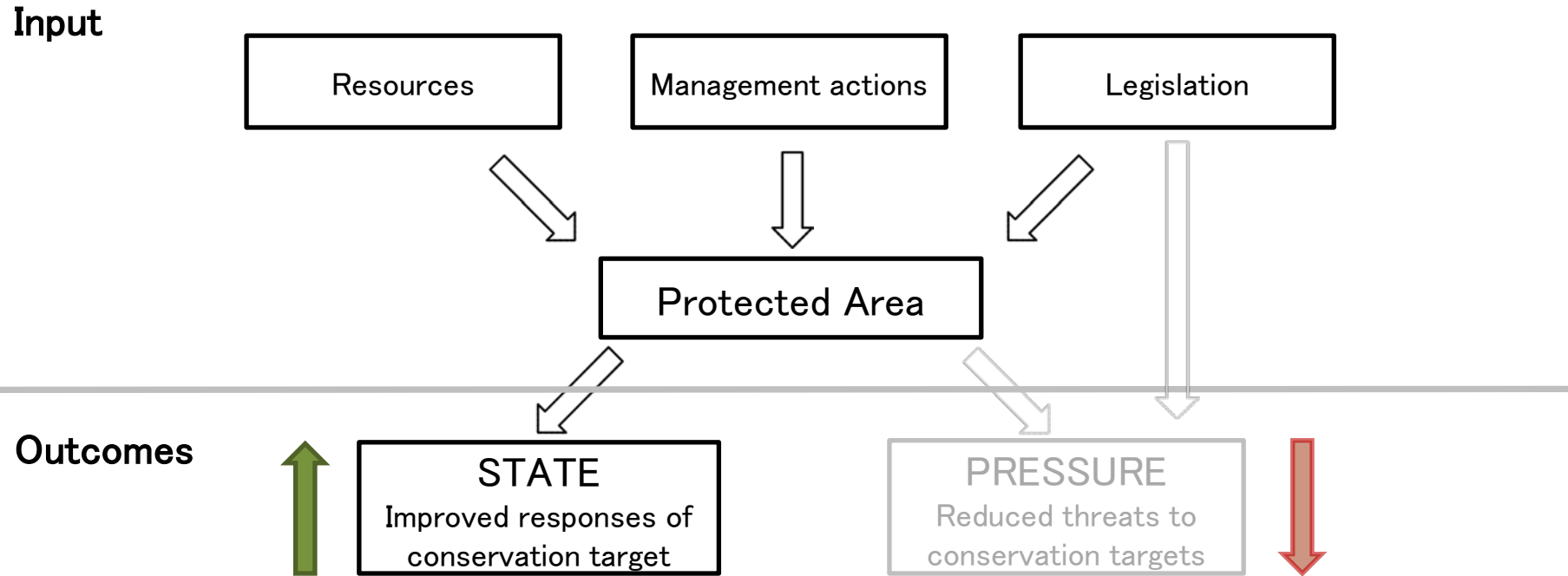
Lauren Coad, Ian Craigie, Megan Barnes, Stephen Woodley, Luke Harrison, Neil Burgess, Marc Hockings, Fiona Leverington, Tom Brooks, Ben Collen, Louise McRae

All the people doing METT assessments and collecting time-series data



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# Protected area performance



- What evidence exists?
  - Systematic review of existing literature
- Do we have the data to answer this beyond case-studies?
  - Global study using animal population trends and management effectiveness data

Systematic review

## Effectiveness of terrestrial protected areas in reducing habitat loss and population declines

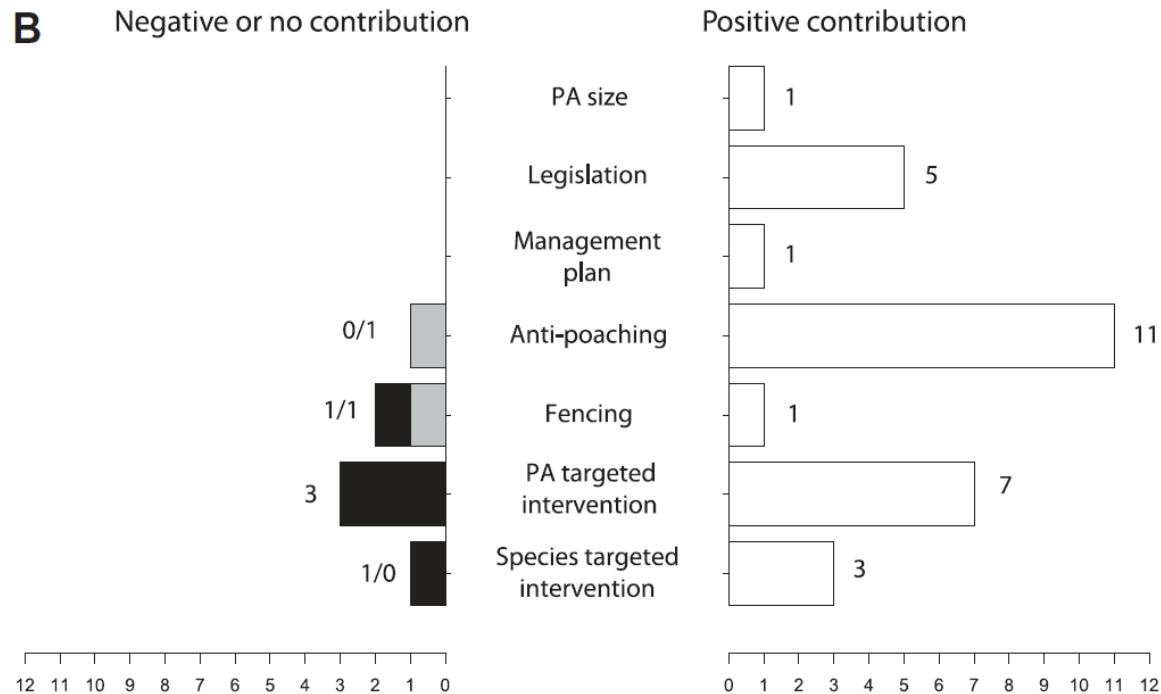


Jonas Geldmann<sup>a,\*</sup>, Megan Barnes<sup>b,c</sup>, Lauren Coad<sup>d</sup>, Ian D. Craigie<sup>e</sup>, Marc Hockings<sup>b</sup>, Neil D. Burgess<sup>a,f</sup>

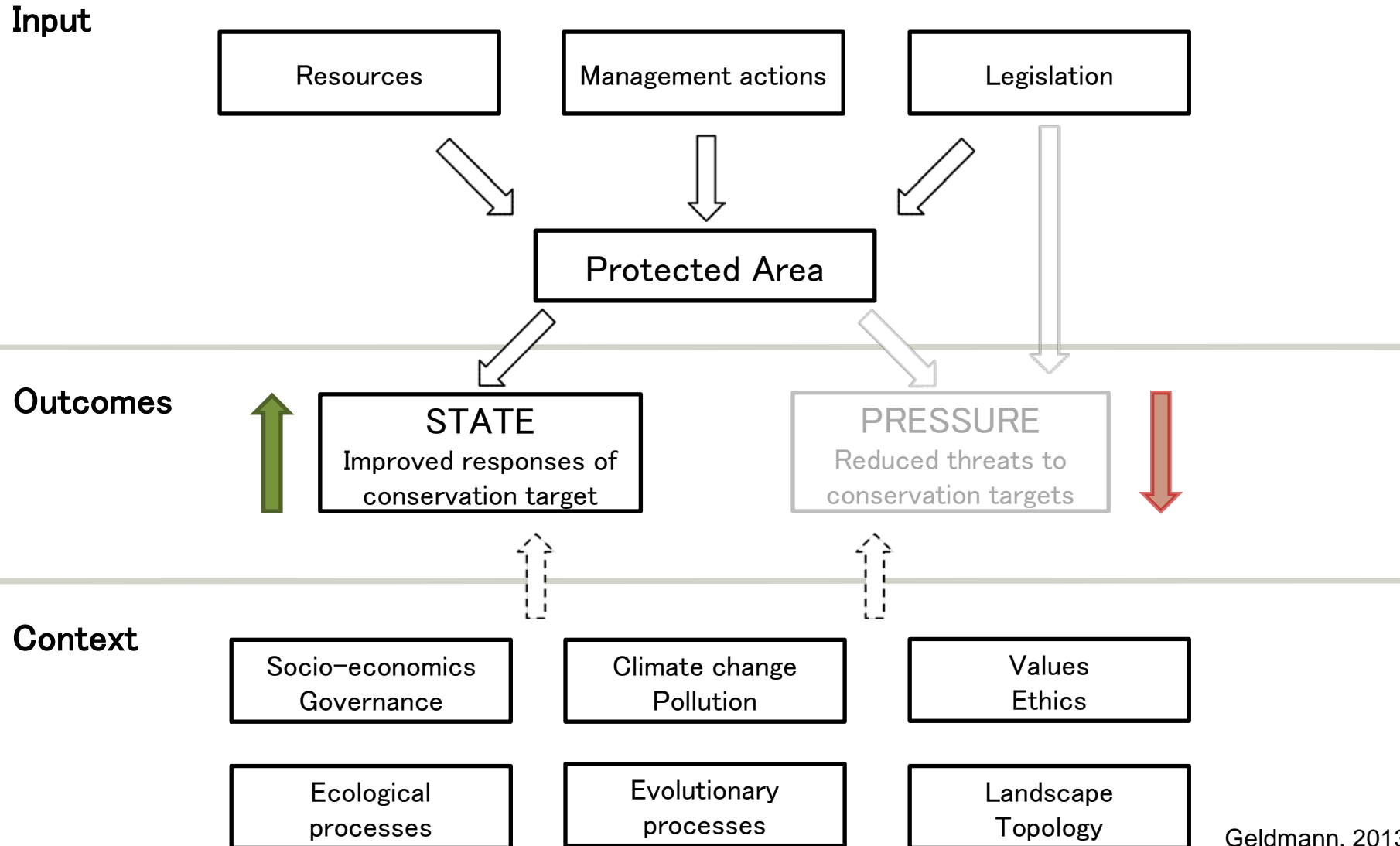
- Systematic review of 2,599 papers
- Only studies causally linking *input* → *outcomes*
- Where described we recorded management interventions
- 35 population change papers (42 studies)

# Existing evidence

- Majority of studies found positive a positive correlation
- However evidence remains equivocal
- Tropical and mammal bias



# Protected area performance



# Protected area performance

## Input

Management Effectiveness Tacking Tool (METT)

1,634 sites with 4,136 assessments

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## Outcomes

Living Planet Database

2,103 sites with 9,298 populations

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## Context

Slope and elevation

Human Footprint, MODIS landcover, GRoads, Human population density

Malnutrition, and Infant mortality rate


# The METT

A score card evaluation of context, inputs, and process in a protected area

Conducted by GEF, UNDP, WWF as well as multiple other organizations and countries

Collects information on threat, objectives, staffing, budget, designations AND

30 specific questions

- 
 0 = There are no regulations  
 1 = Regulations with major weaknesses  
 2 = Regulations with some weaknesses or gaps  
 3 = Regulations provide an excellent basis for management

Reporting Progress at Protected Area Sites: Data Sheet

|  |  |                                      |
|--|--|--------------------------------------|
| Name of protected area   | Boumba Bek (BB) National Park (proposed)   |                                      |
| Location of protected area (country, ecoregion, and if possible map reference)                 | Cameroon, Western Congo Basin Moist Forest Eco-region<br>2° 58 and 2° 24'N and 14° 40 and 15° 18'E   |                                      |
| Date of establishment (distinguish between agreed and gazetted*)                               | Agreed<br>1996   | Gazettement<br>pending               |
| Ownership details (i.e. owner, tenure rights etc)  | State owned land and managed under the permanent estate regime   |                                      |
| Management Authority   | Government Wildlife and Protected Areas Authority  |                                      |
| Size of protected area (ha)  | 238,260  |                                      |
| Number of staff  | Permanent<br>2 (Gov't) and 6 (WWF staff)   | Temporary<br>8 temporary game guards |
| Annual budget (US\$)   | 120,000  |                                      |
| Designations (IUCN category, World Heritage, Ramsar etc)                                       | Category 6 being proposed  |                                      |
| Reasons for designation  | Extremely rich in wildlife, timber and other NTFPs. Local communities include indigenous forest people, Baka pygmies   |                                      |
| Brief details of World Bank funded project or projects in PA                                   | Boumba Bek between 1997 and 2001 benefited from GEF funds amounting to about US\$500,000 targeting basic research  |                                      |
| Brief details of WWF funded project or projects in PA  | WWF has been involved in the region since 1987 but had a management role since 1997 with management of GEF funds and also invested more than US\$600,000 over the past 5 years to establish management infrastructure, monitoring programme etc  |                                      |
| Brief details of other relevant projects in PA   | Capacity building of local communities in management of community hunting zones and also establishment of consultative forums between stakeholders notably sport and logging companies. Boumba Bek proposed NP forms a continuous forest block with Nki proposed NP. Nki is part of a trans-boundary conservation initiative comprising PAs in Cameroon (Dja biosphere reserve), Congo-Brazzaville (Odzala NP) and Minkebe in Gabon. WWF is also working with various logging companies operating in the region on SFM-C |                                      |
| List the two primary protected area objectives   |  |                                      |
| Objective 1  | Ecological integrity of the forest is maintained by enhancing sustainable natural resource exploitation and management   |                                      |
| Objective 2  | Local communities directly benefit in a participatory management process by regulated access to resources and accrued benefits from commercial exploitation of surrounding multiple used zones   |                                      |
| List the top two most important threats to the PA (and indicate reasons why these were chosen) |  |                                      |
| Threat 1   | Unsustainable timber exploitation activities   |                                      |
| Threat 2   | Poaching   |                                      |
| List top two critical management activities  |  |                                      |
| Activity 1   | Working with local communities and other stakeholders to establish sustainable exploitation and management practices   |                                      |
| Activity 2   | Law enforcement and control  |                                      |



# The 30 questions

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## Question

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1 Legal status

2 Protected area regulations

3 Law enforcement

4 Protected area objectives

5 Protected area design

6 Protected area boundary

7 Management plan

8 Regular work plan

9 Resource inventory

10 Research

11 Resource management

12 Staff numbers

13 Personal management

14 Staff training

15 Current budget

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## Question

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16 Security of budget

17 Management of budget

18 Equipment

19 Maintenance of equipment

20 Education program

21 State and comm. Neighbors

22 Indigenous people

23 Local communities

24 Visitor facilities

25 Commercial tourism

26 Fees

27 Condition assessment

28 Access assessment

29 Economic benefit assessment

**30 Monitoring and evaluation**

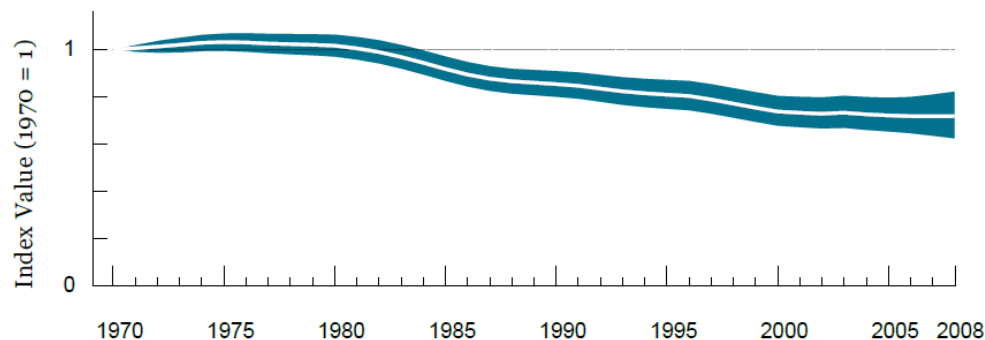
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# The living Planet database (LPD)

More than 20 years of work collating existing monitoring of vertebrate populations

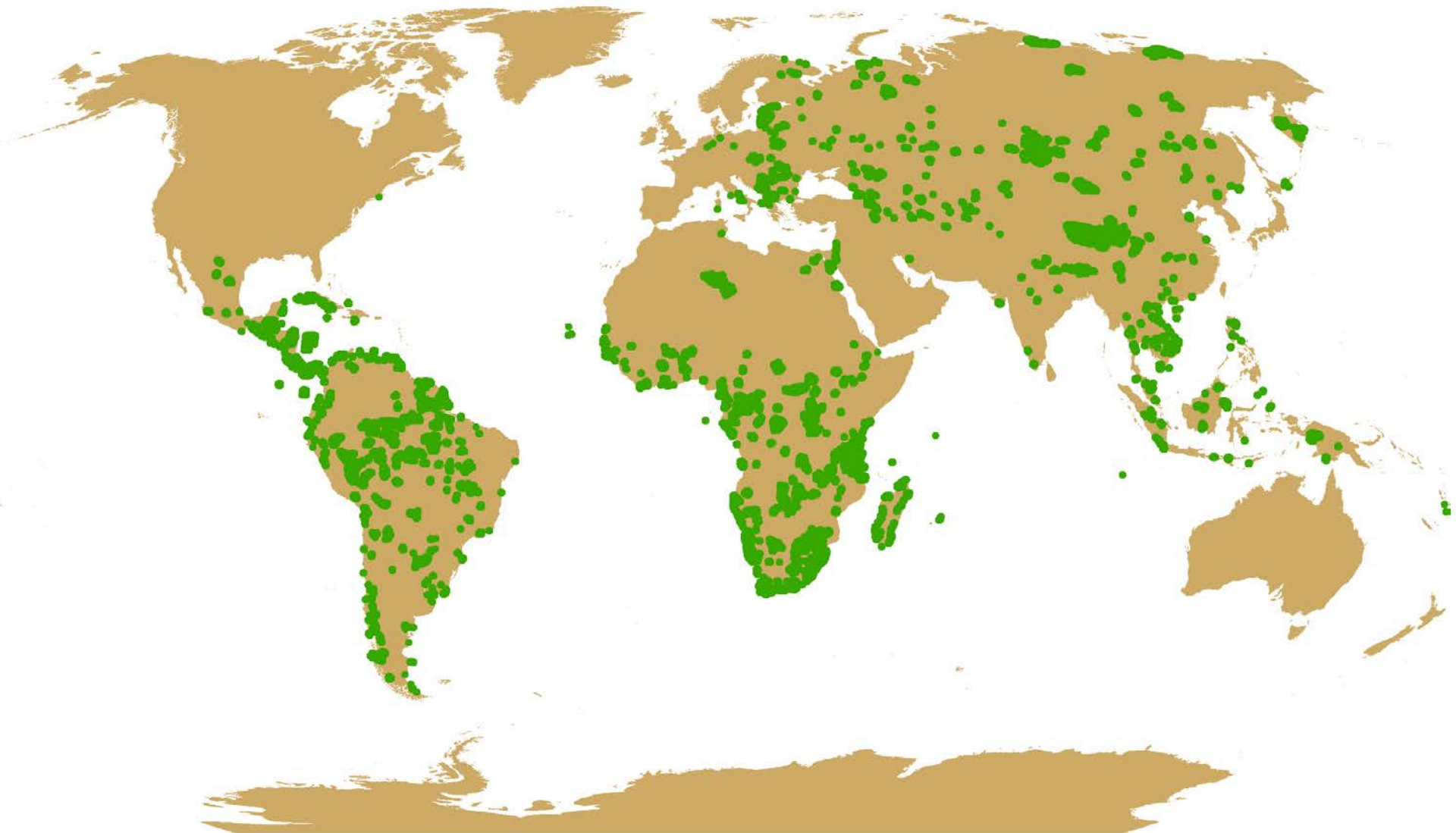
We considered all time-series which had at least 3 data point over 5+ years from 1990 →

For each population we calculated a slope as the dependent variable specific to the protected areas

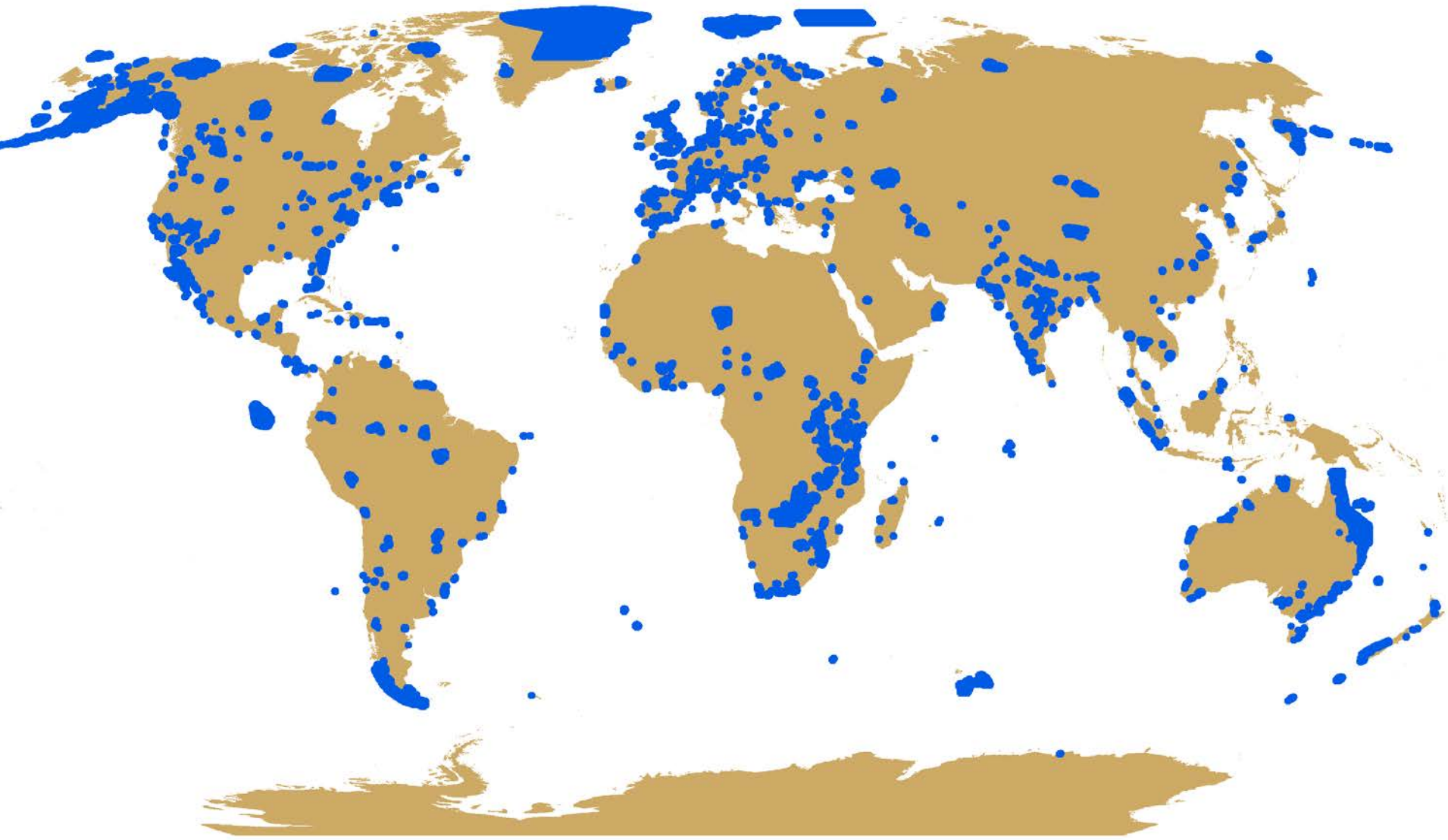




# METT sites



# LPD sites



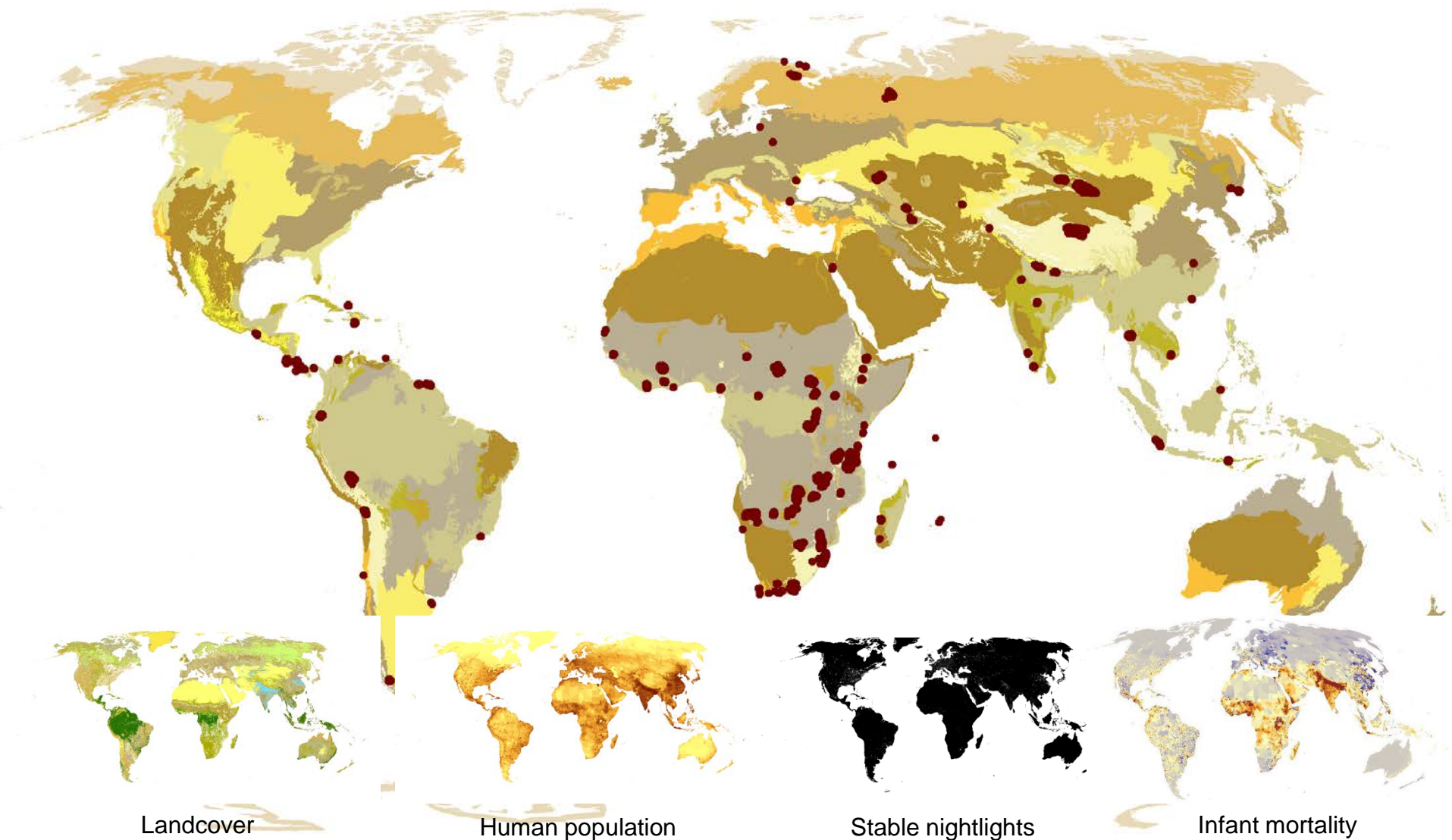
# Overlap (n= 111 with 465 populations)







# Overlap with context

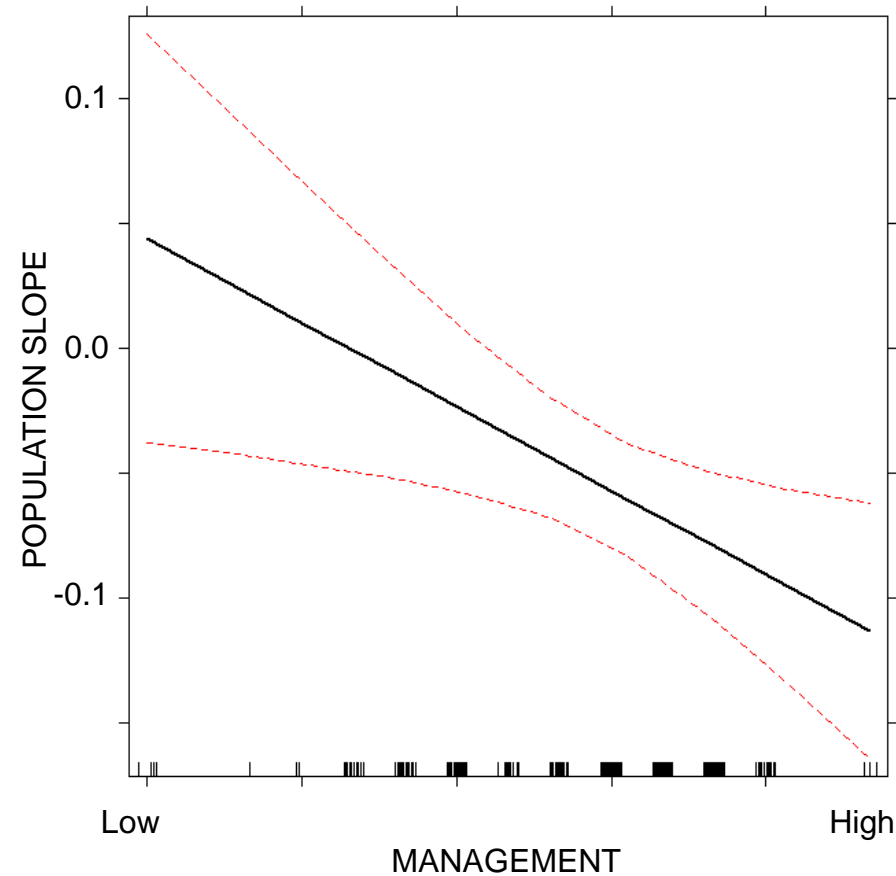


# (**very**) Preliminary results

Model selected based on AIC, testing 512 different models

| Parameter   | Estimate | <i>p</i> -value |
|-------------|----------|-----------------|
| Management  | -0.001   | 0.014 *         |
| Perimeter   | -0.232   | 0.030 *         |
| Slope of PA | -0.002   | 0.286           |

When taking management out, the socio-economic factors comes out as significant



# Summary

- Literature evidence is not very strong – though more positive cases than negative
- Global overlap between METT and LPD is small
- Very preliminary results suggest management is important, but could be a reaction more than a treatment
- There is still a **STRONG** need to get more data to better test the relationship between inputs and outcomes in a BACI setting
- Management effectiveness tools is a simple approach to getting at this their interpretation is far from straight forward