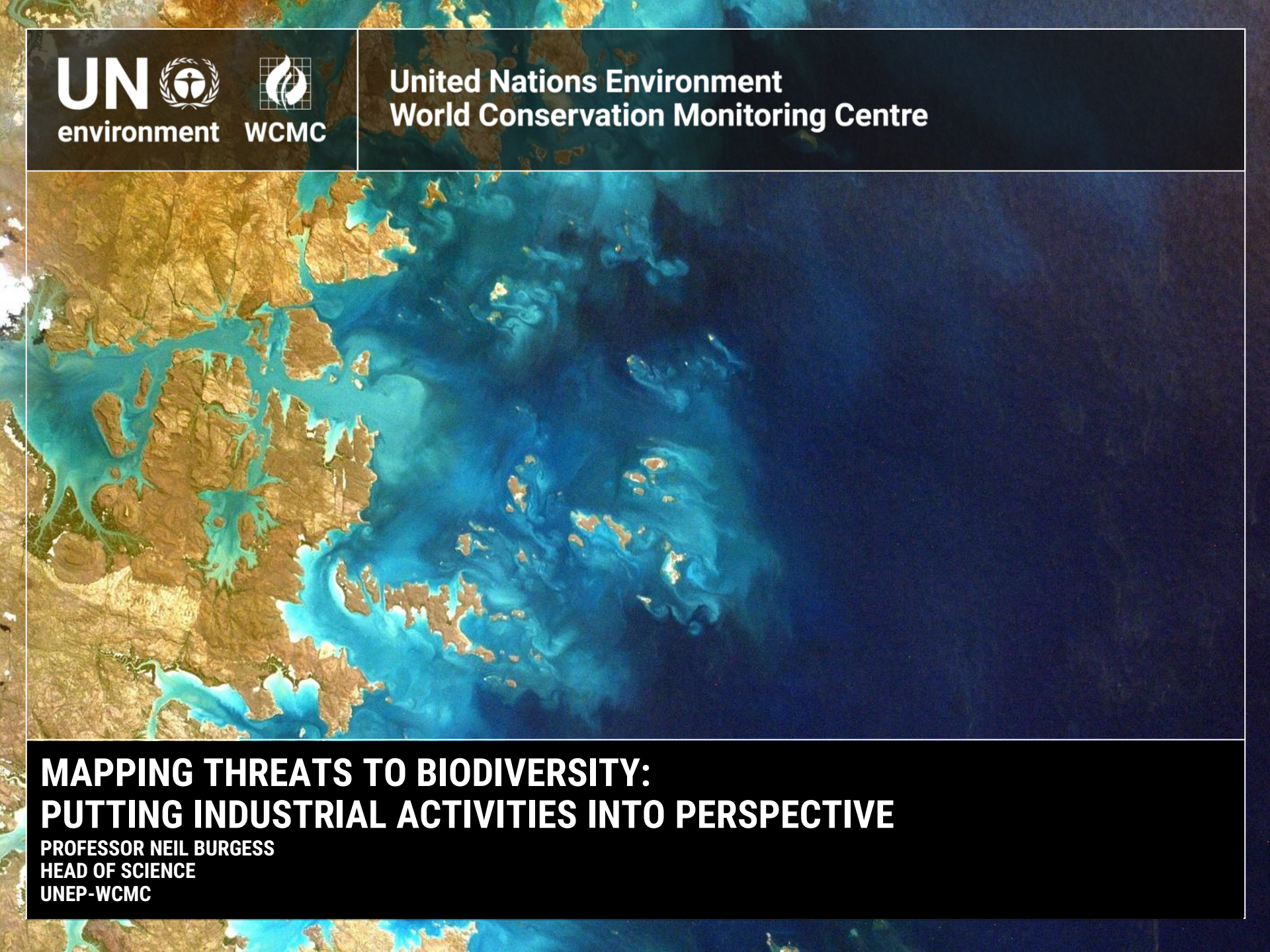


UN environment WCMC

United Nations Environment
World Conservation Monitoring Centre

MAPPING THREATS TO BIODIVERSITY: PUTTING INDUSTRIAL ACTIVITIES INTO PERSPECTIVE

PROFESSOR NEIL BURGESS
HEAD OF SCIENCE
UNEP-WCMC

Focal areas

What is threat mapping trying to achieve?

What is the relative threat posed by industrial activities?

How to map and measure multiple threats?

Current research on linking trade to biodiversity impacts

Approaches for mitigating threats

WHAT IS THREAT MAPPING TRYING TO ACHIEVE ?

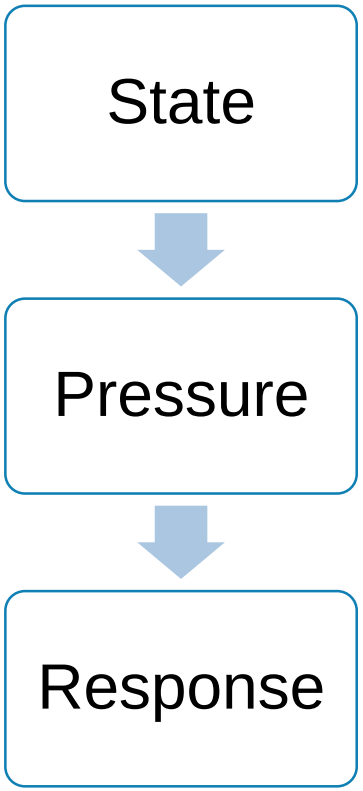
Threat mapping

Mapping

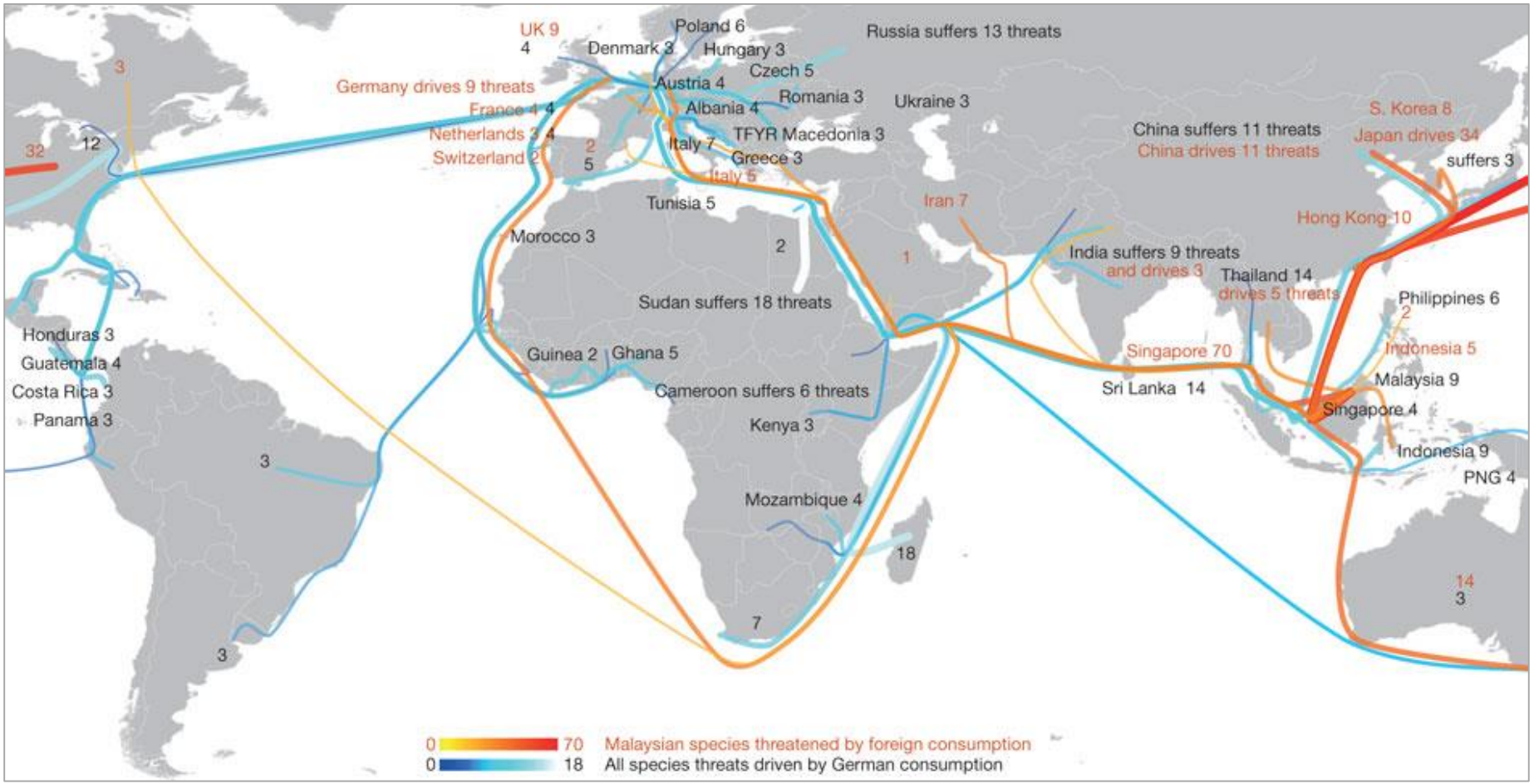
- pressures on habitats and species
- impacts on habitats and species

Linking production and trade to impacts caused

- by commodity
- by industry sector
- by country
- by individual company



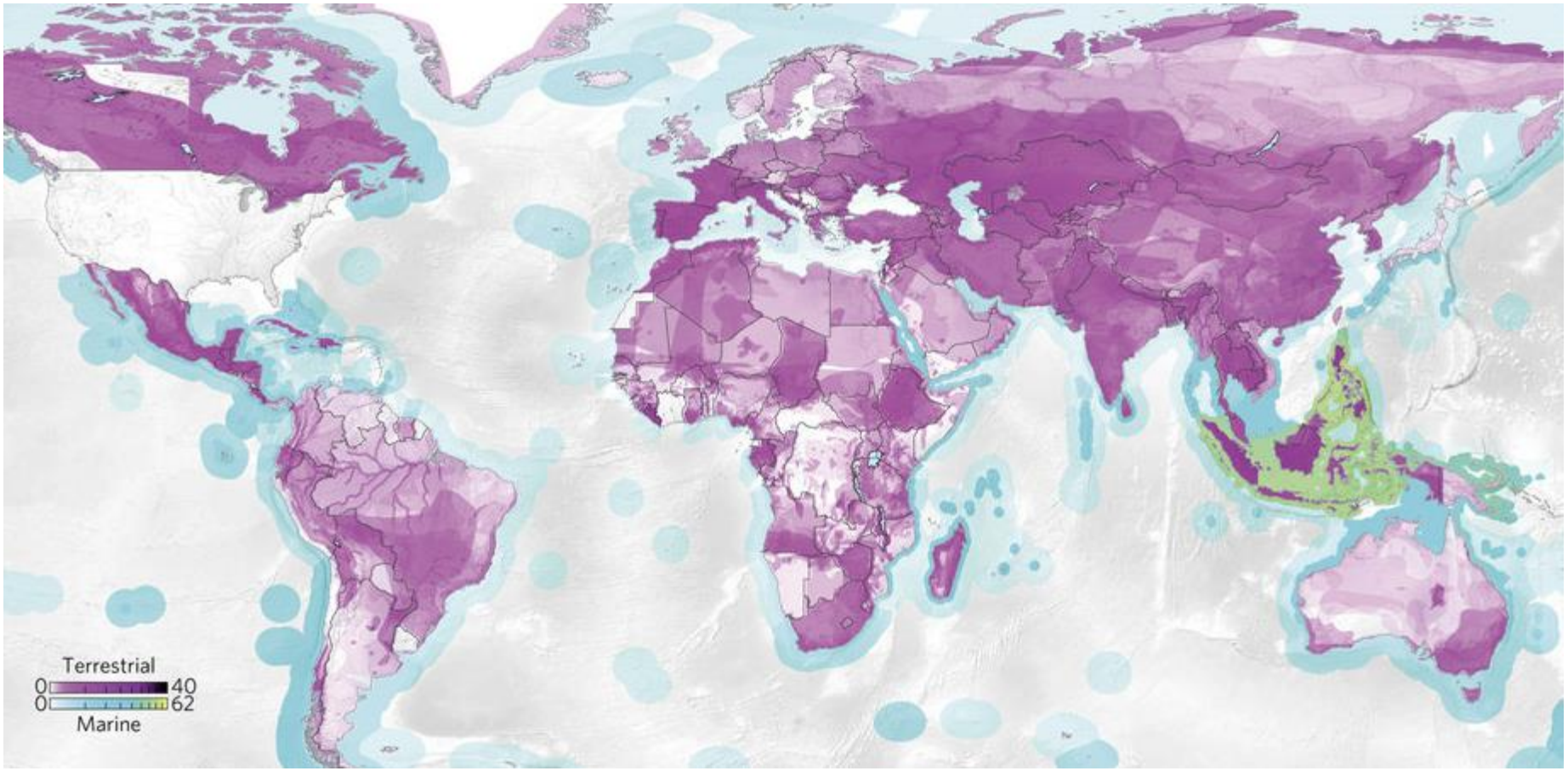
Challenge 1: Tracking international trade chains



Lenzen et al. (2012) *International trade drives biodiversity threat in developing nations*. Nature.

Link to paper

Challenge 2: Identifying threat hotspots from supply chains

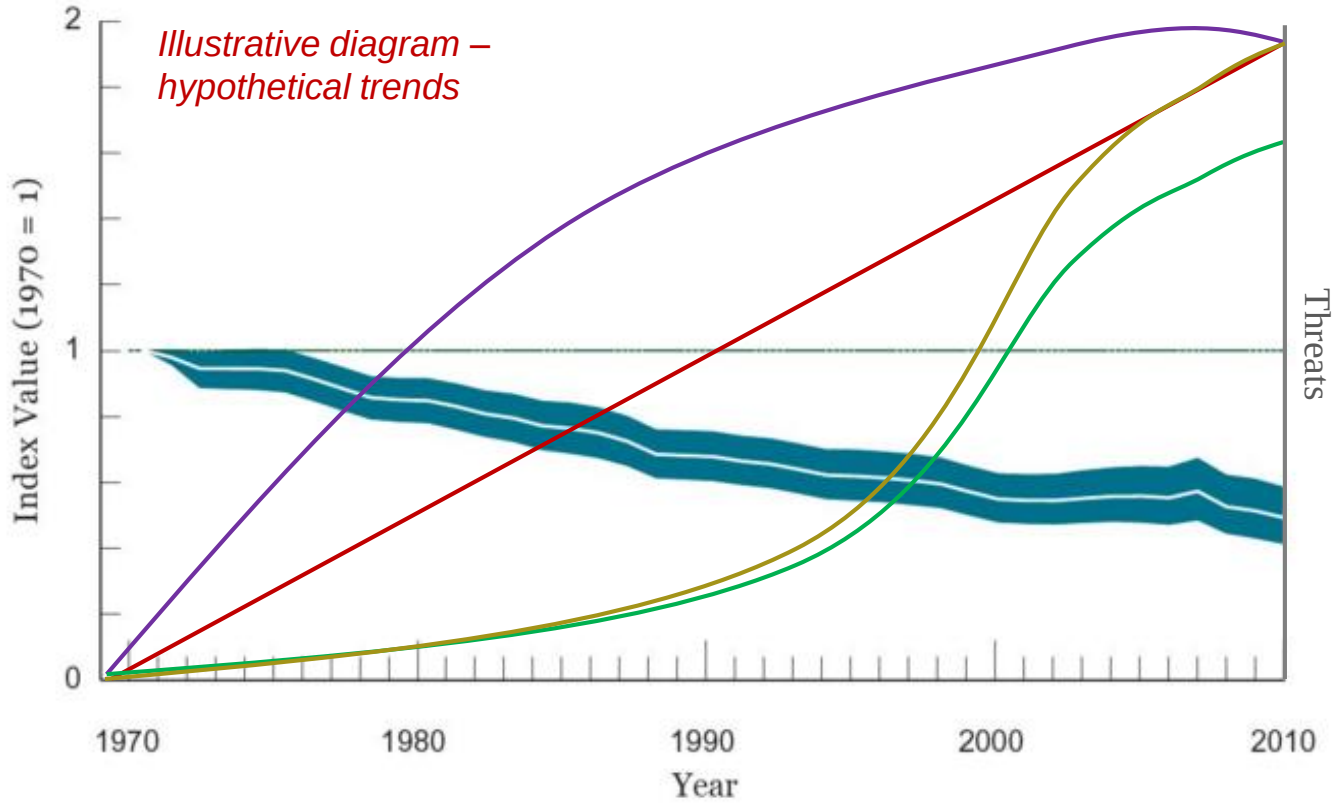


Moran & Kanemoto (2017) *Identifying species threat hotspots from global supply chains*. Nature Ecology & Evol.

Link to paper

Challenge 3: Linking threats to species trends

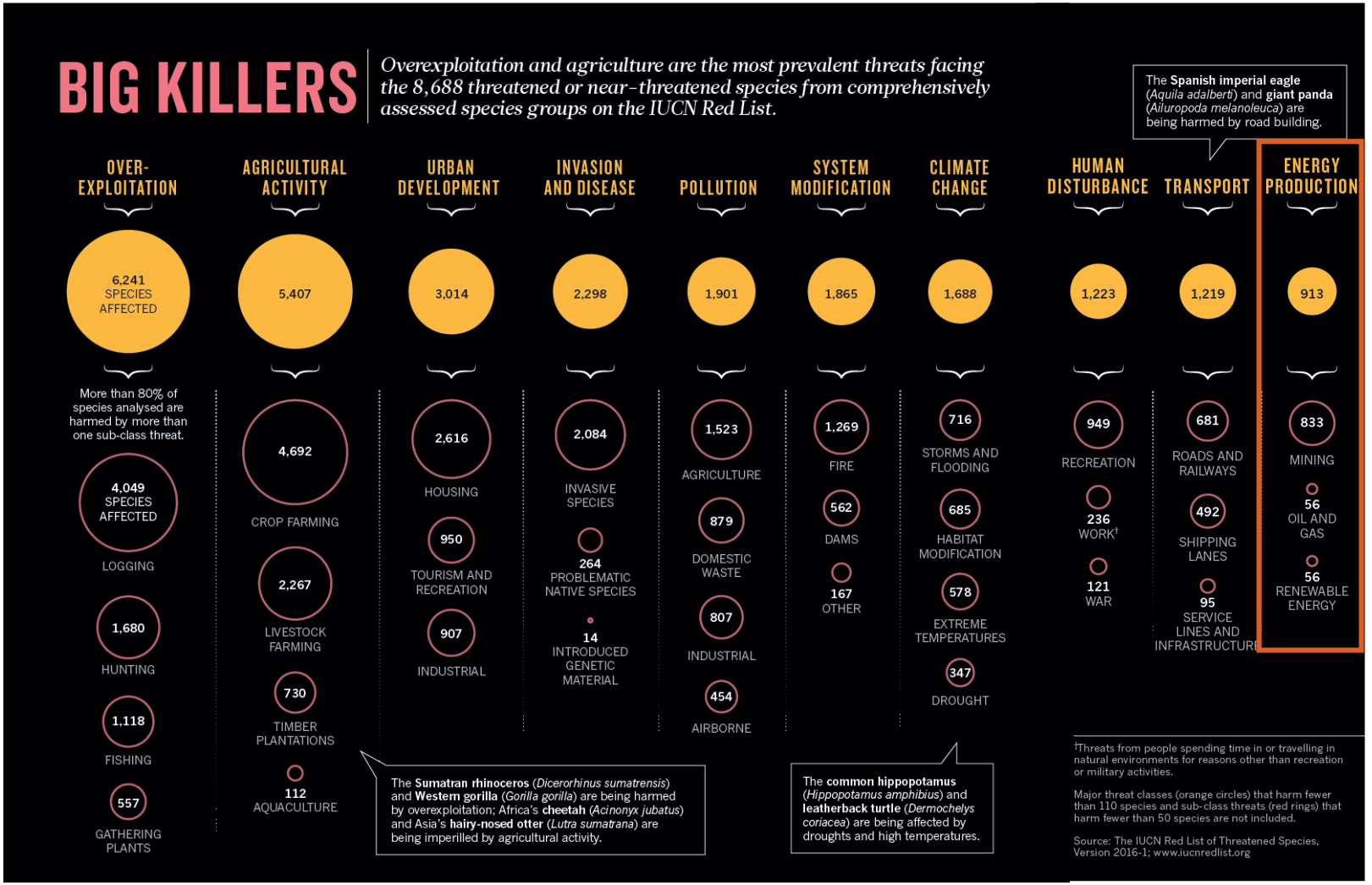
Linking threats to the WWF / ZSL Living Planet Index



Luc Hoffmann Institute

WHAT IS THE THREAT TO SPECIES POSED BY INDUSTRIAL ACTIVITIES ?

Threats to species on the IUCN Red List



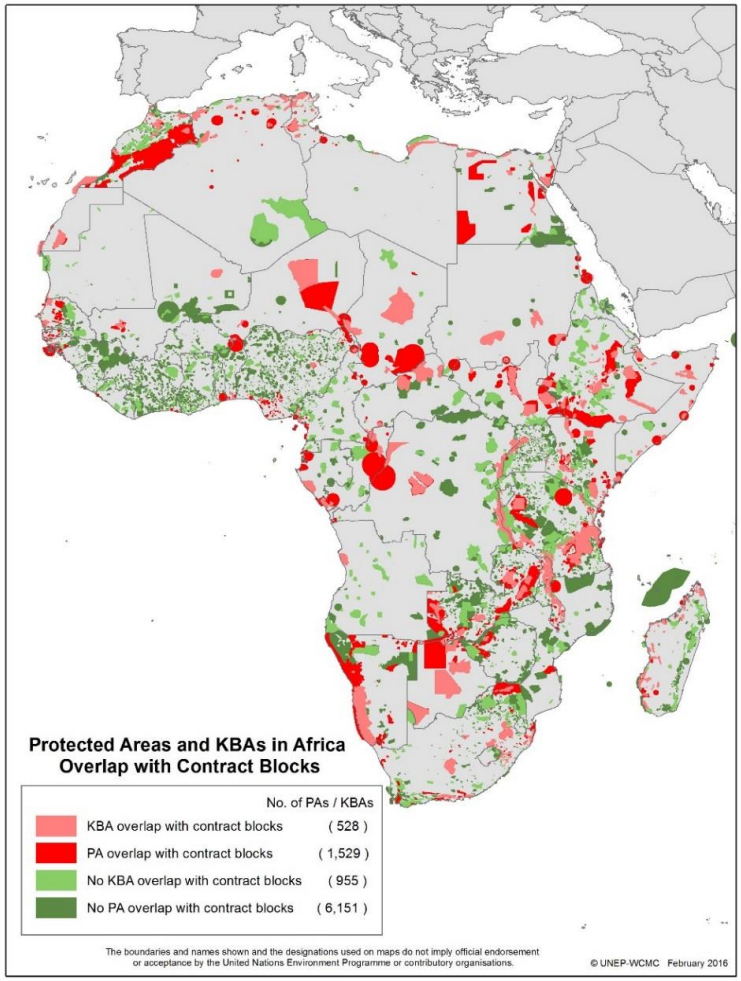
Maxwell et al. (2016) *Biodiversity: The ravages of guns, nets and bulldozers*. Nature Communications.

Link to paper

Oil and gas development relative to biodiversity in Africa

- Risk indicator: Overlap of contract blocks with protected areas

- 20 % of protected areas overlap with contract blocks (over half entirely)
- 36% of KBAs overlap with contract blocks (~half entirely)
- Countries with significant overlap include Malawi, Mozambique, Somalia and Djibouti



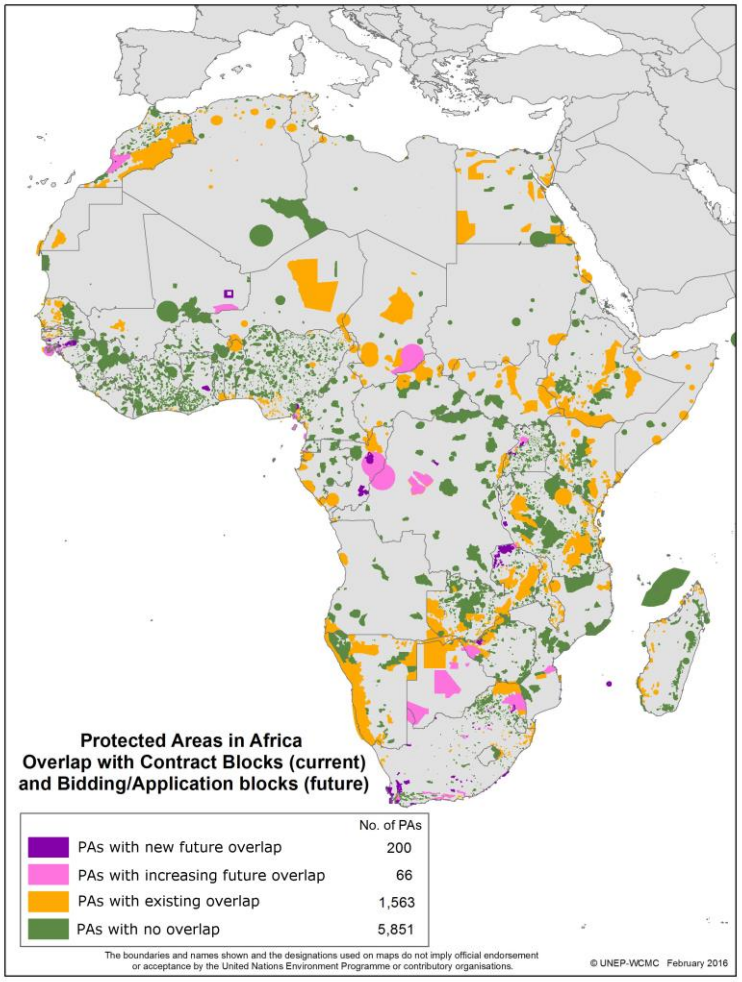
Leach et al (2016) *Potential threat to areas of biodiversity importance from current and emerging oil and gas activities in Africa*.

Link to UNEP-WCMC publication

Future potential oil and gas development in Africa

- Risk indicator: Overlap of bidding blocks with protected areas

- 66 protected areas potentially facing increasing threat, 12 internationally recognised
- 200 protected areas potentially facing new threat
- Priority countries include Zambia, South Africa, Guinea-Bissau, and Uganda



Leach et al (2016) *Potential threat to areas of biodiversity importance from current and emerging oil and gas activities in Africa*.

Link to UNEP-WCMC publication

From threat to impact

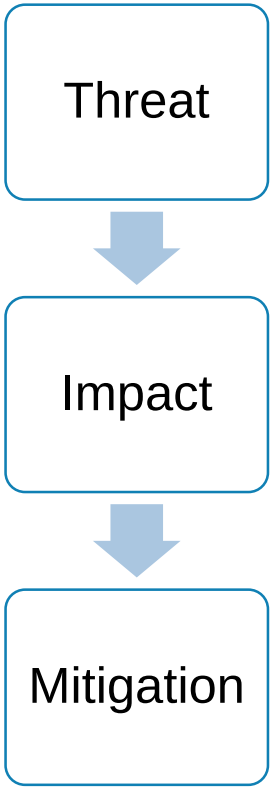


Table 1 Potential and actual impacts and opportunities arising from project activities

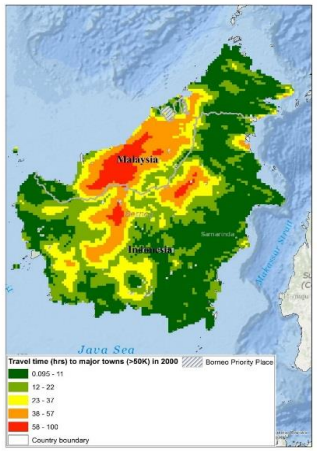
IMPACT TYPE	EXPLANATION	EXAMPLE
Direct (primary)	Direct impacts of project activity.	Road construction (clearing) removes or fragments habitat.
Indirect (higher order)	'Knock-on' effects of direct impacts.	Clearing vegetation leads to increased river sedimentation, degrading water quality.
Indirect (induced)	Presence of project triggers third-party development and access with its impacts/risks and opportunities.	Road provides access into an area, thus increasing local timber harvesting and habitat loss. Road also provides better access for subsistence hunters, poachers, recreational users and researchers.
Cumulative	Impacts and opportunities resulting from the combined effects of a project plus other activities, conditions and/or developments external to the project.	Habitat fragmentation and potential reduction in species diversity, but also increased access enabling research activities (e.g. wildlife monitoring) and the responsible use of ES.

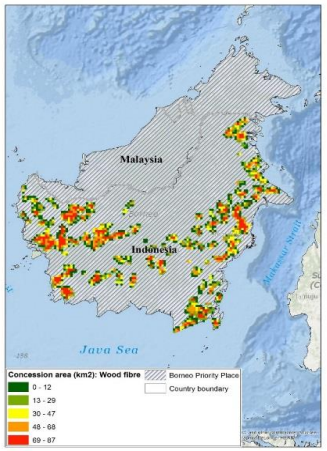
IPIECA (2016) Biodiversity and ecosystem services fundamentals

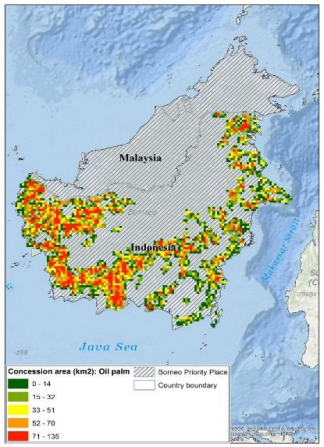
HOW TO MAP AND MEASURE MULTIPLE THREATS ?

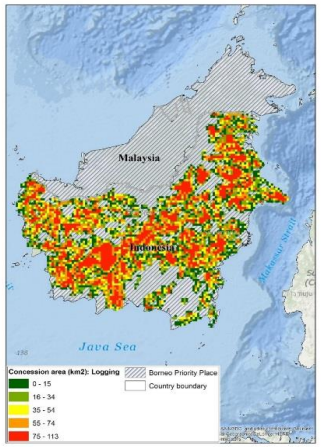
What would threat maps look like?

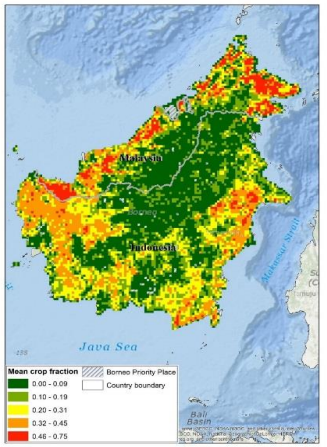
- Examples of standardised threat maps
- Borneo, WWF Priority Place
- Aiming to standardise these kinds of maps globally and provide threat data through GeoPortal system
- Luc Hoffmann Institute and Cambridge Conservation Initiative funding
- Hundreds of maps made for WWF Focal areas











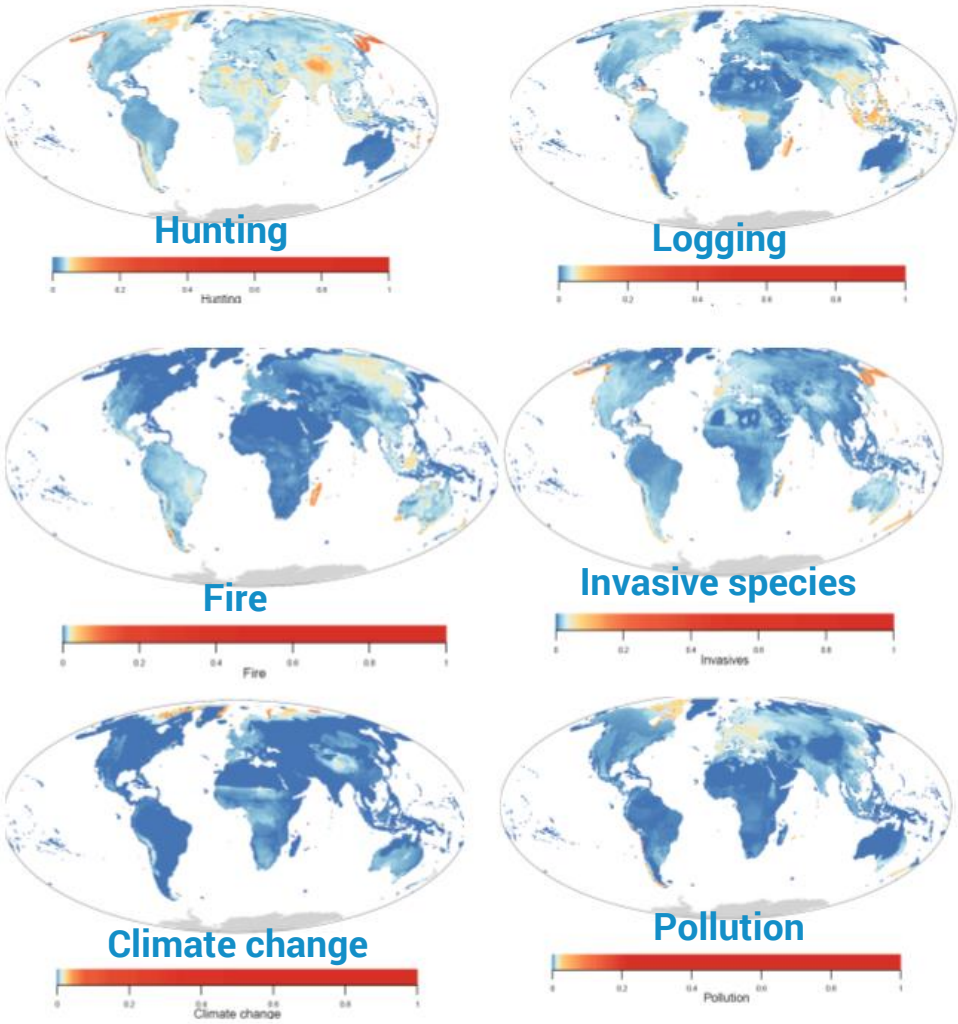
Luc Hoffmann Institute

Mapping threats using data within the IUCN Red List

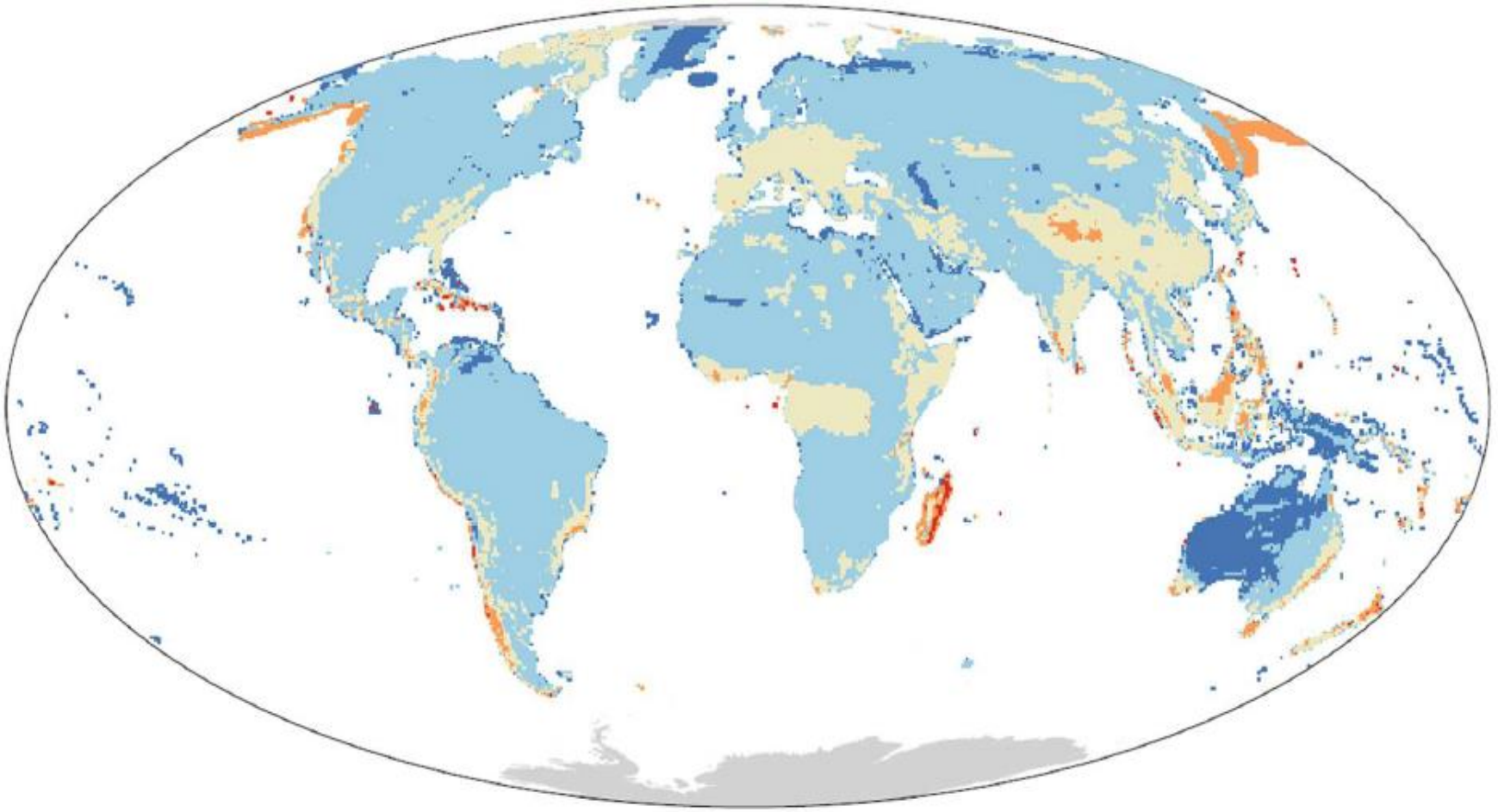
- Applying threats to species to the range polygons and weighting these

  Methodology being tested

- Expanded from UNEP-WCMC Information document for CBD COP 13



Multiple threat hotspots to mammals and amphibians

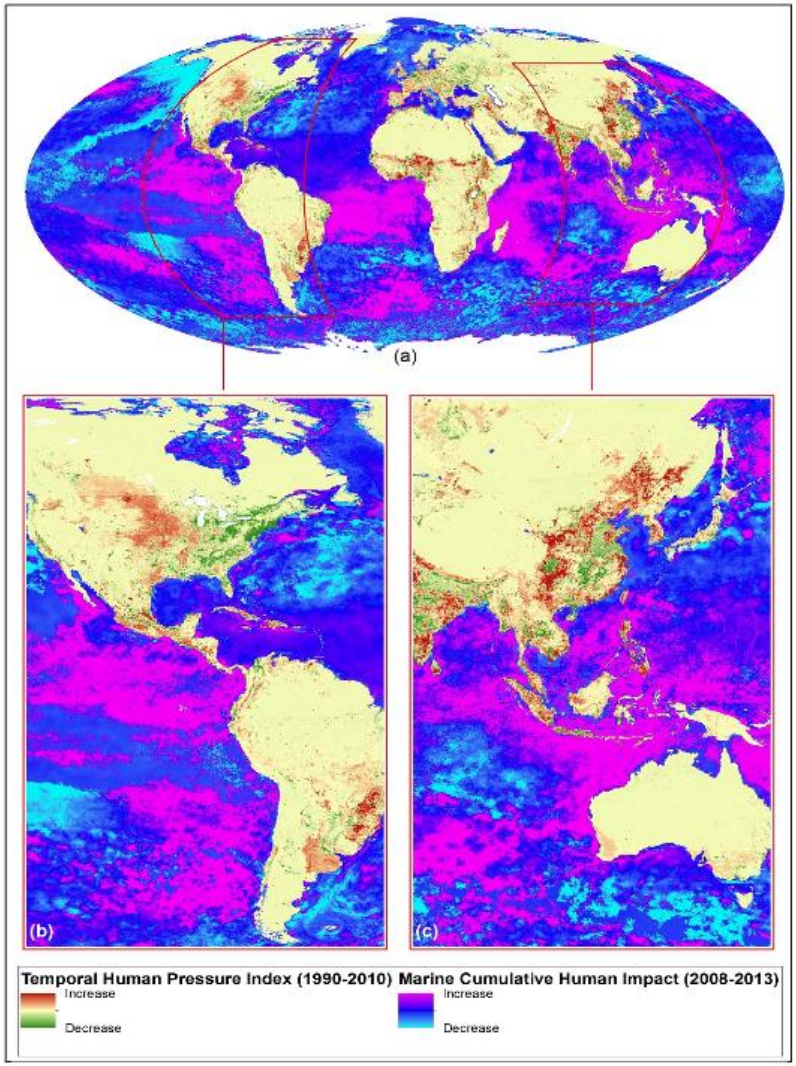


Can we map temporal changes in threats?

Map is combined:

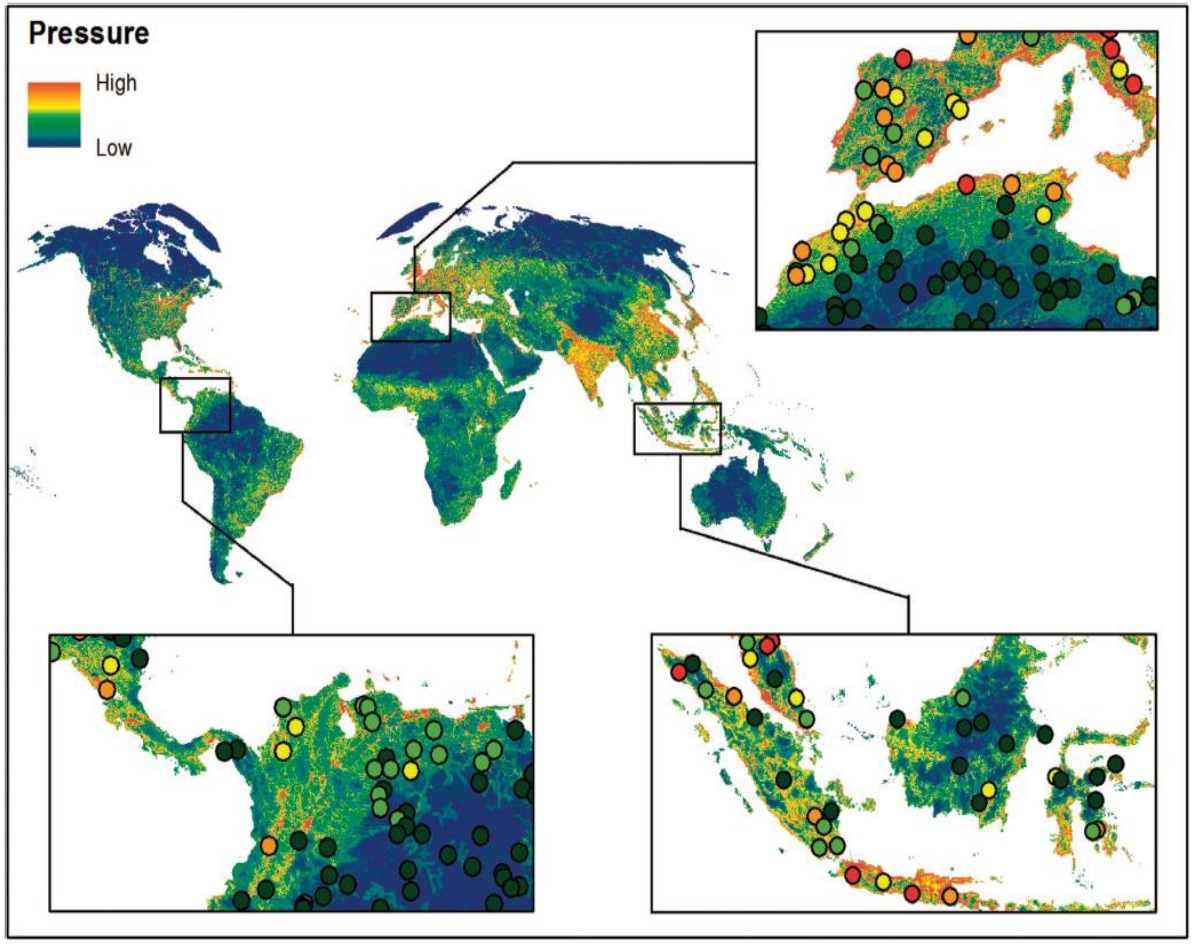
- Terrestrial pressure change 1990-2010 (Geldmann et al. 2014)
- Marine pressure change 2000-2010 (Halpern et al. 2016)

Much harder as very few datasets comparable over time.



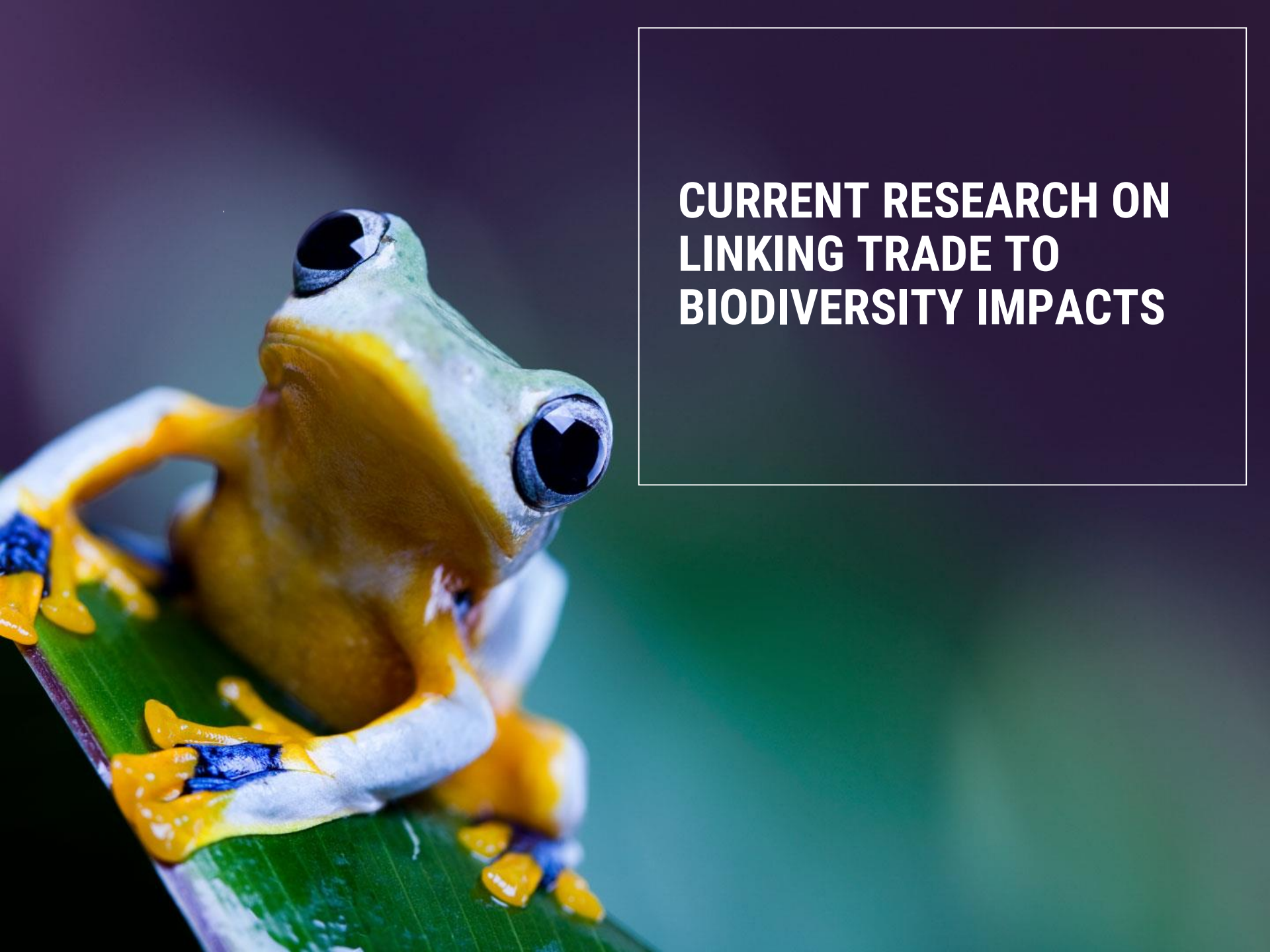
Human Footprint 2009

- 1993 and 2009 as separate maps
- Not possible to make a change product



Venter et al. (2016) *Global terrestrial human footprint maps for 1993 and 2009*. Nature Scientific Data

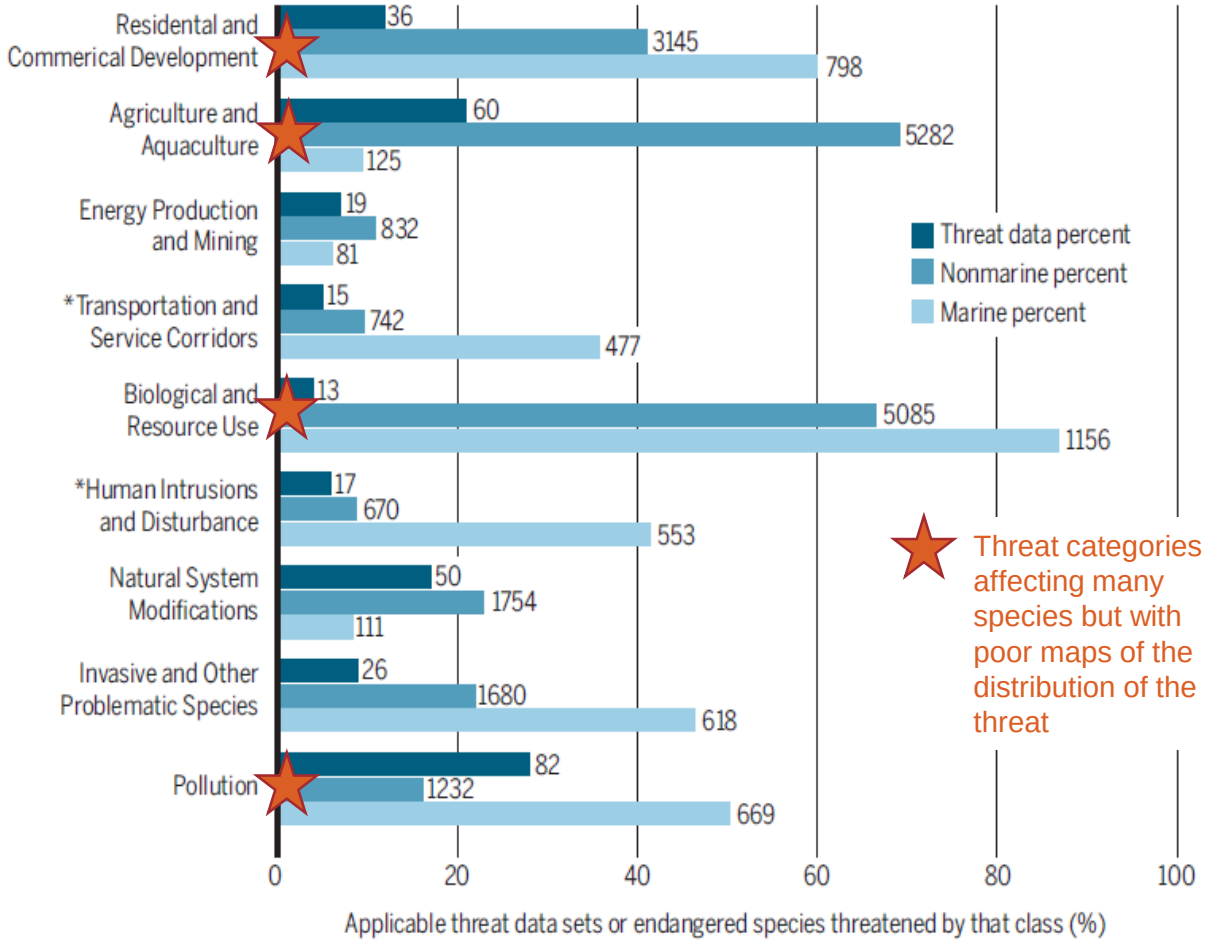
Link to paper



CURRENT RESEARCH ON LINKING TRADE TO BIODIVERSITY IMPACTS

Cataloguing available threat data

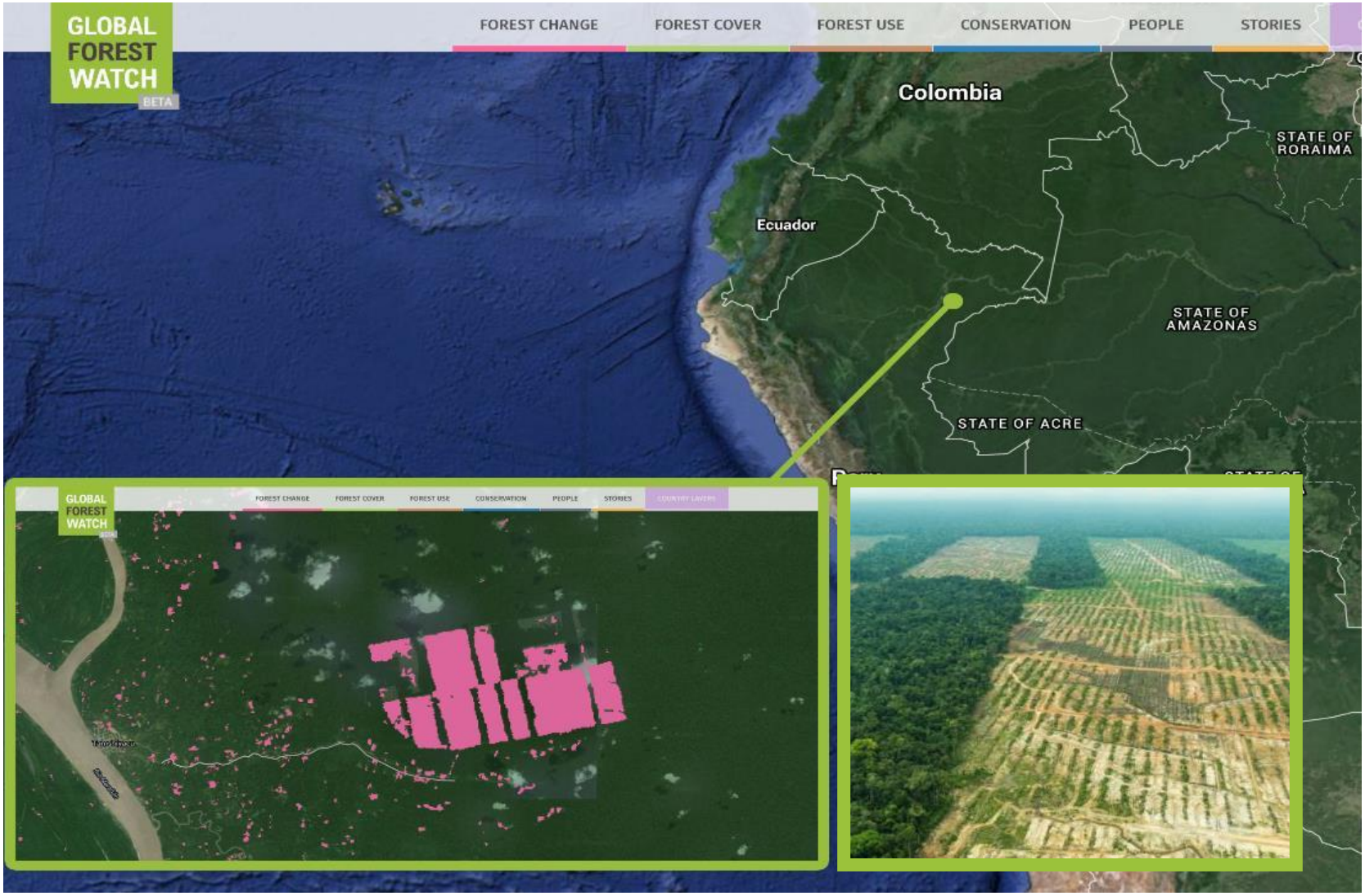
- Some threat classes affecting many species can be mapped using existing data. Others cannot.
- Particular problem in mapping 'biological resource use': logging, hunting, wildlife trade, fishing, etc.



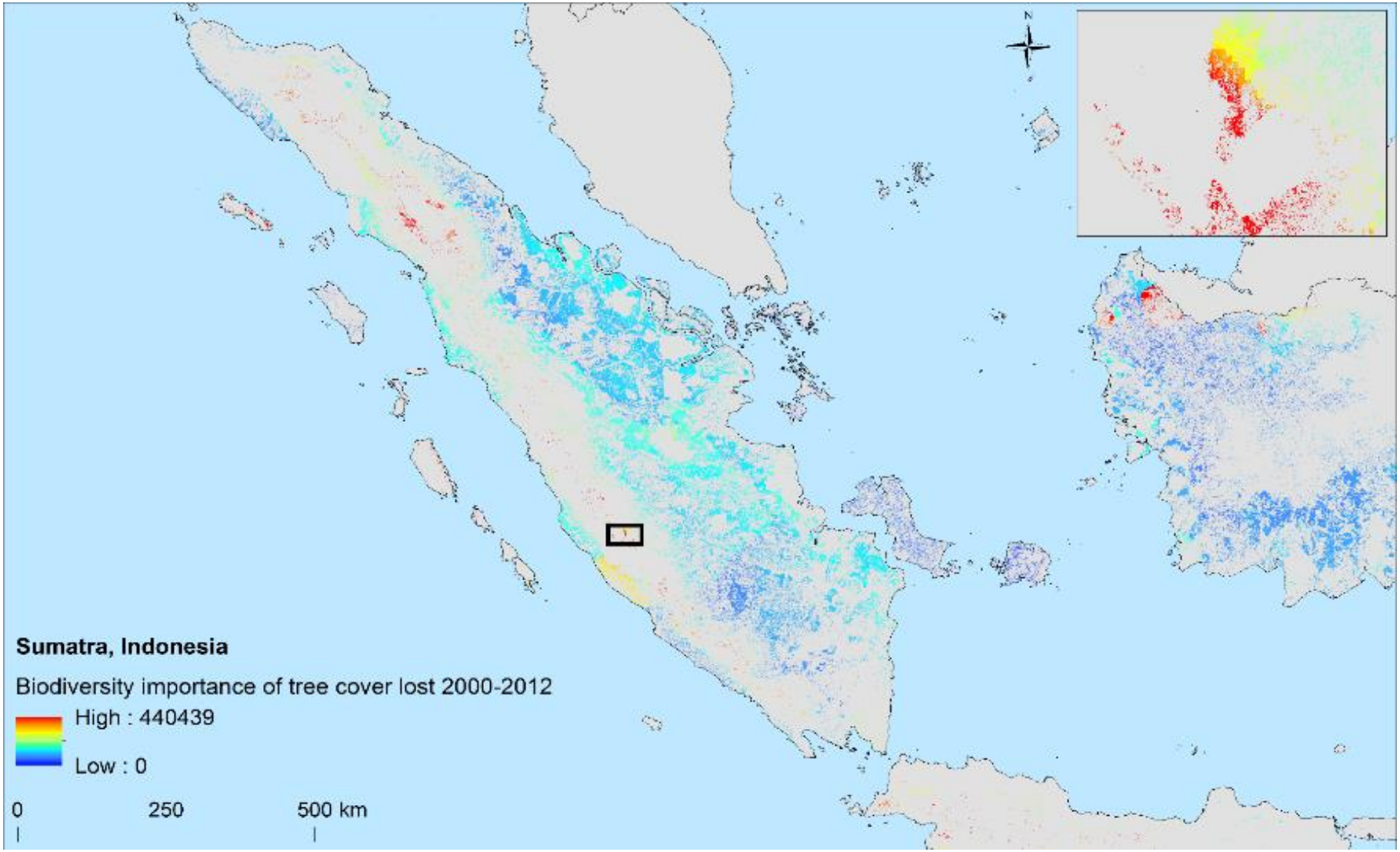
Joppa et al. (2016) *Filling in biodiversity threat gaps*. Science.

Link to paper

Defining the impacts of a single threat on multiple species



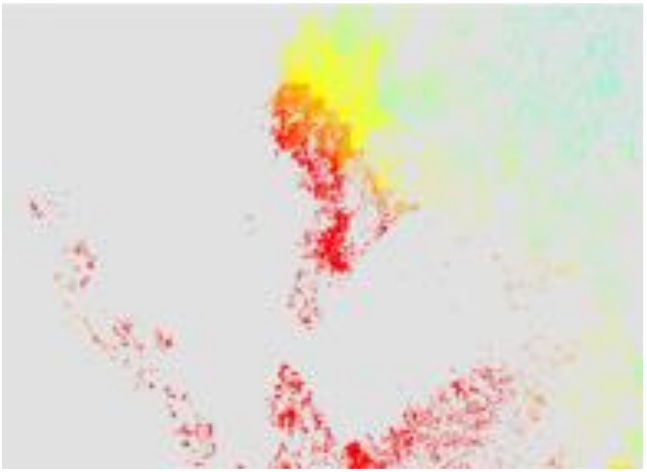
The spatial impact of forest loss on biodiversity



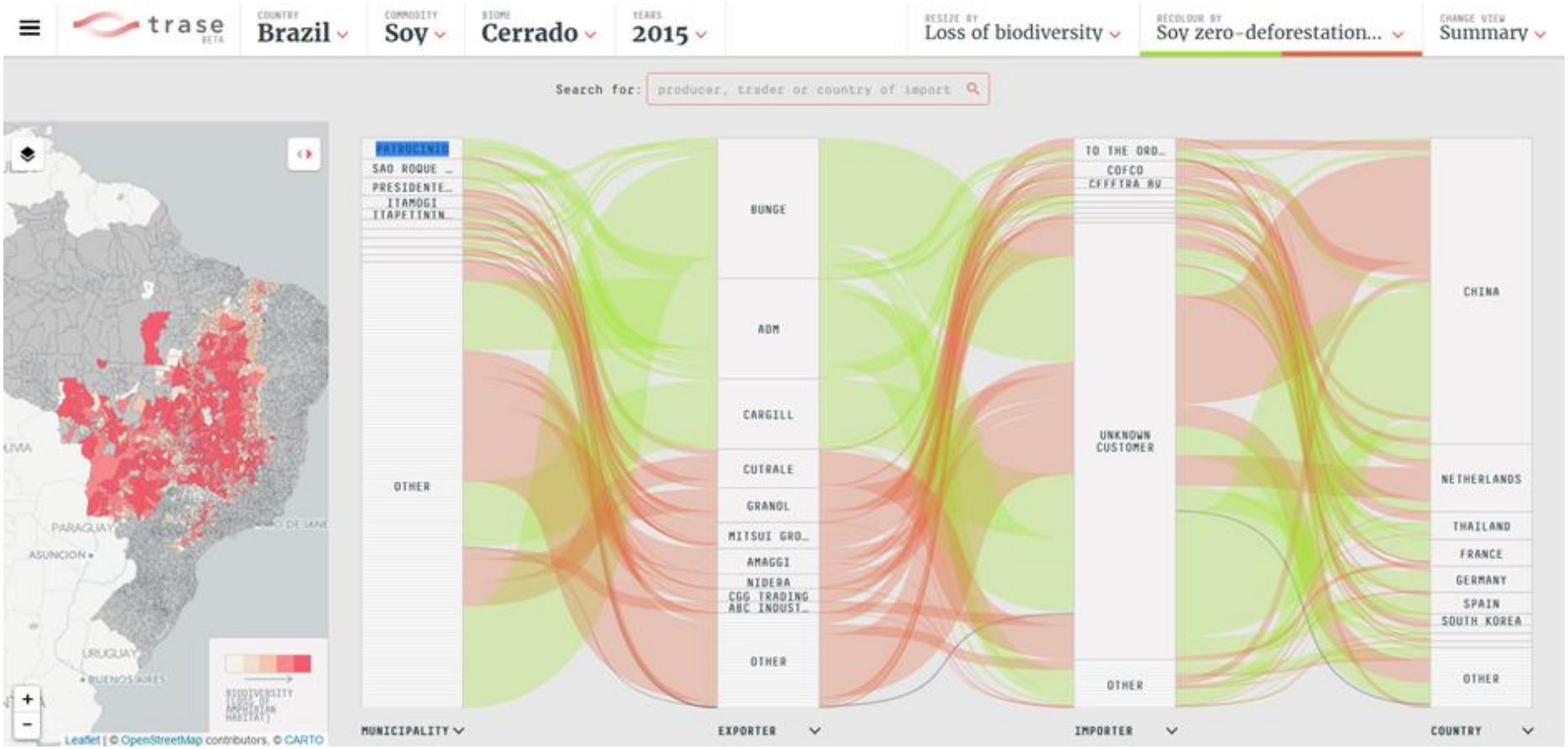
UNEP-WCMC work in progress

Spatial loss of forest biodiversity from oil palm

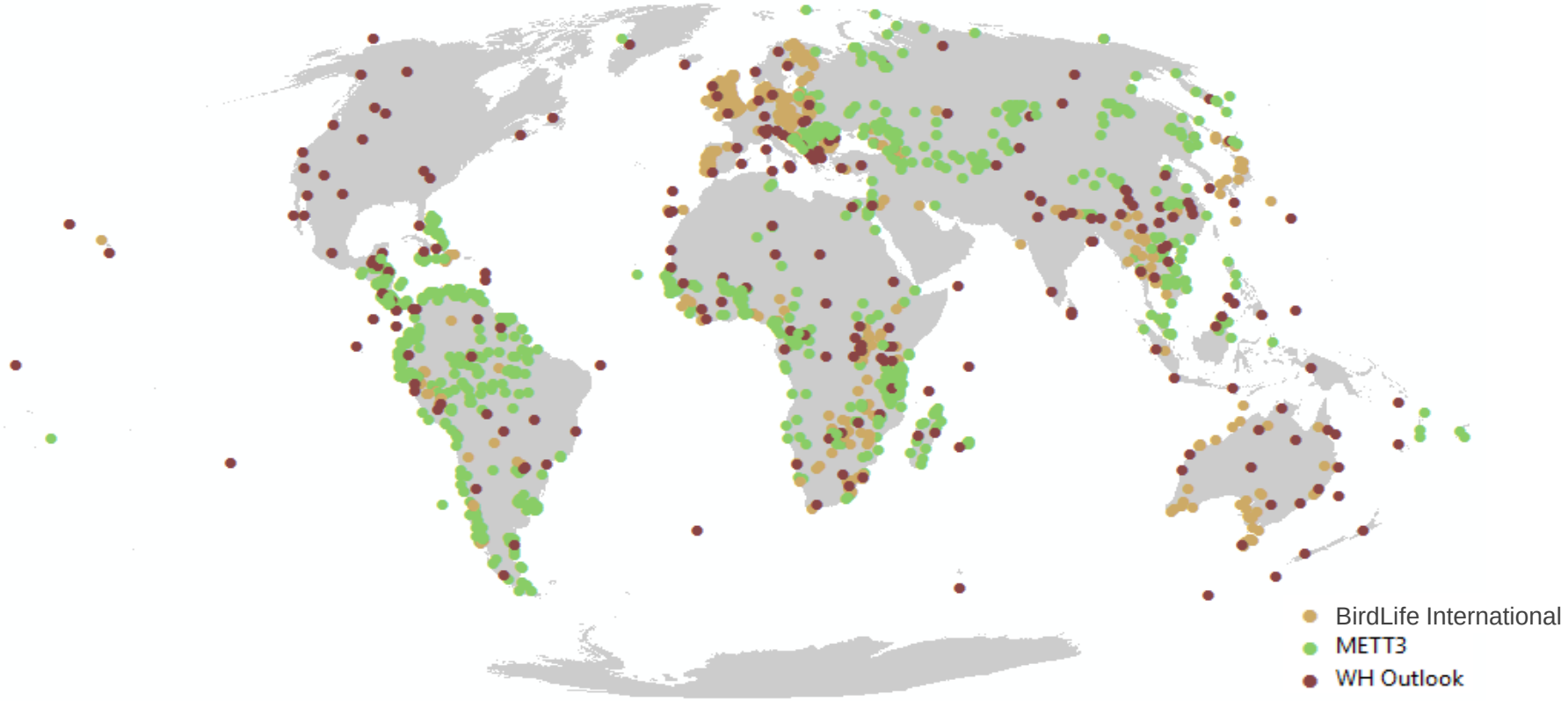
We can trace back to individual oil palm plantations and the species it affects.



Linking global Soy Bean trade to its biodiversity impact in Brazil



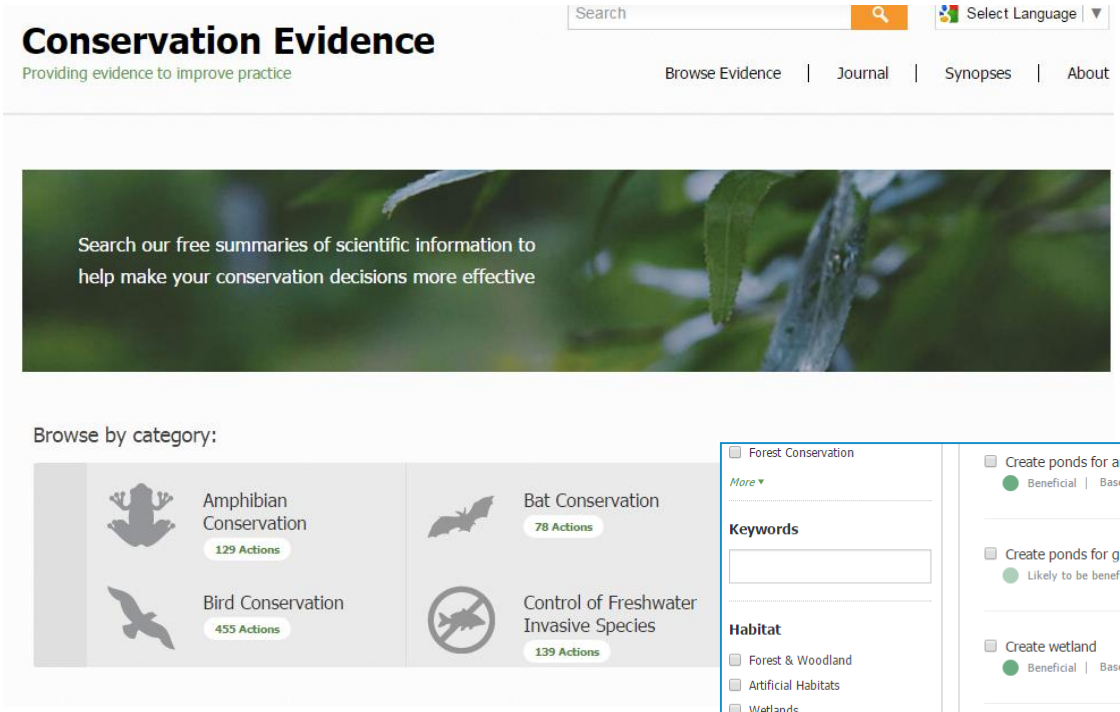
Managing and reducing threats in protected areas



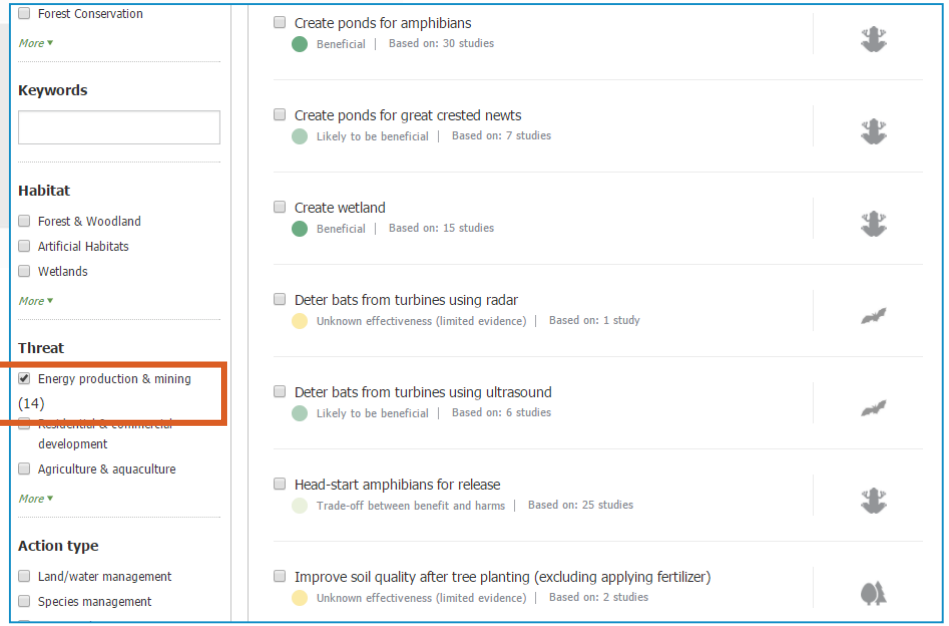
If we know what the key threats to protected areas are – then we can manage the site to reduce those threats

APPROACHES FOR MITIGATING THREATS

Linking threats to solutions (conservation evidence)



Limited entries on effective mitigation measures linked to energy and mining



www.conservationevidence.com

CONCLUDING THOUGHTS…

Summary and key challenges

Different approaches for threat mapping

Relative threat assessment do not take into account indirect / cumulative impact

Many threats to biodiversity can be mapped

- But some key ones cannot (biological resource use and invasive alien species), limiting representativeness of multiple threat maps.
- Rather few of the threats are mapped temporally and at fine scale.

Further information

Webinar recordings and slides will be uploaded to the Proteus website

- www.proteuspartners.org

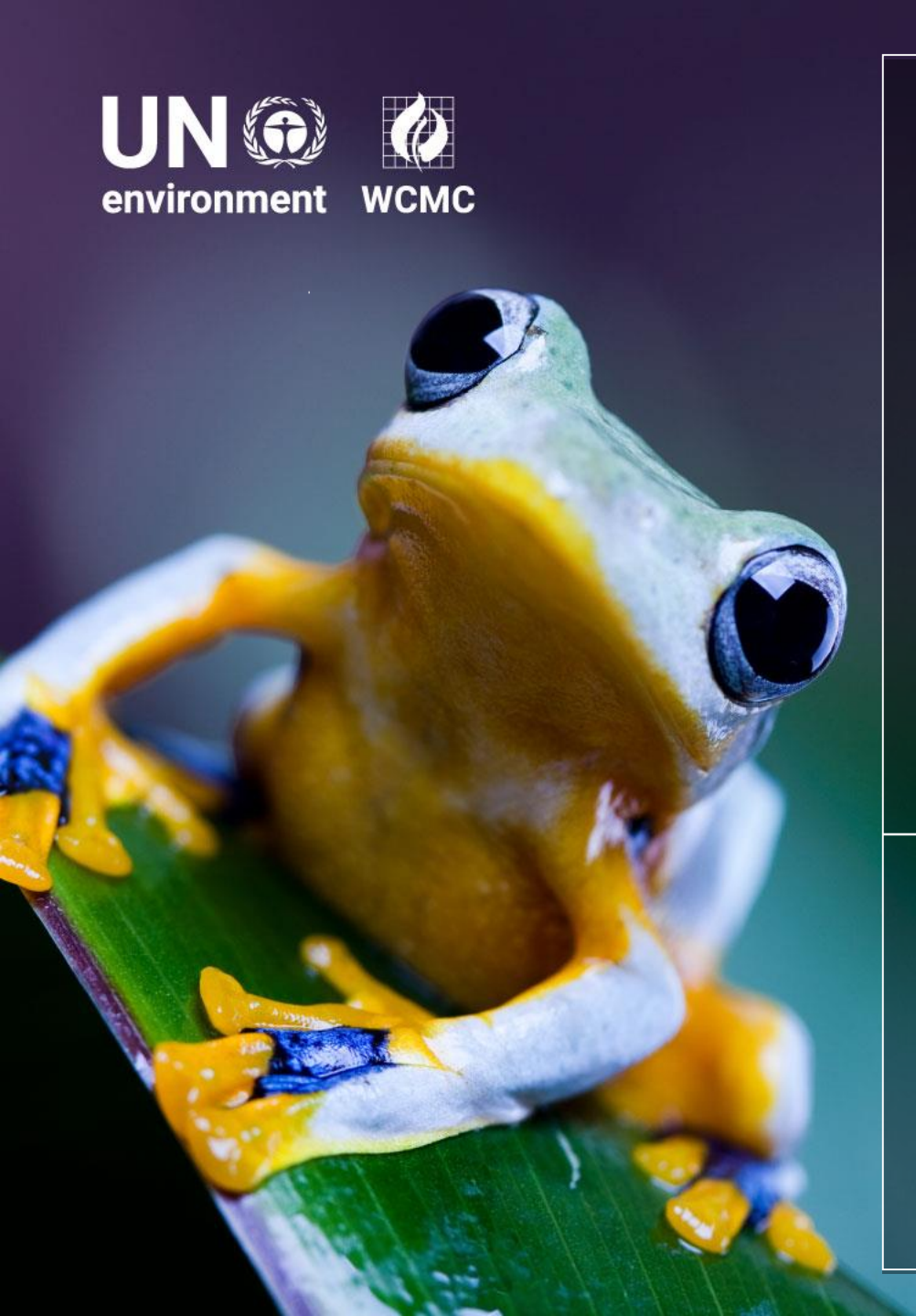
Resources

- IUCN Red List Threats Classification Scheme

  www.iucnredlist.org/technical-documents/classification-schemes/threats-classification-scheme

- Conservation Evidence

  www.conservationevidence.com/



UN environment WCMC

UN Environment
World Conservation Monitoring Centre

www.proteuspartners.org

www.unep-wcmc.org
@unepwcmc

THANK YOU

Speaker: Neil.burgess@unep-wcmc.org

Business & Biodiversity team:

Katie.leach@unep-wcmc.org
Sharon.brooks@unep-wcmc.org
Kerstin.brauneder@unep-wcmc.org

Discussion

Why should threat data be used to inform impact assessment?

- Low existing threat presents a greater risk of increasing indirect threats
- Understanding existing threats at project sites informs cumulative impact assessment
- Opportunities to address existing threats as part of impact mitigation