



proteus

# Mapping global hotspots of natural capital depletion

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30 June 2021

# Welcome

## Objectives of the Proteus Data Forum sessions

- A venue for direct communication between data users and technical experts
- Increase familiarity with Proteus resources
- Identifying common challenges & finding solutions

## Logistics

- *Frequency*      quarterly
- *Scheduling*    AM & PM sessions
- *Rules*            Chatham House discussion, but presentations recorded
- *Topics*          Your suggestions are welcome!

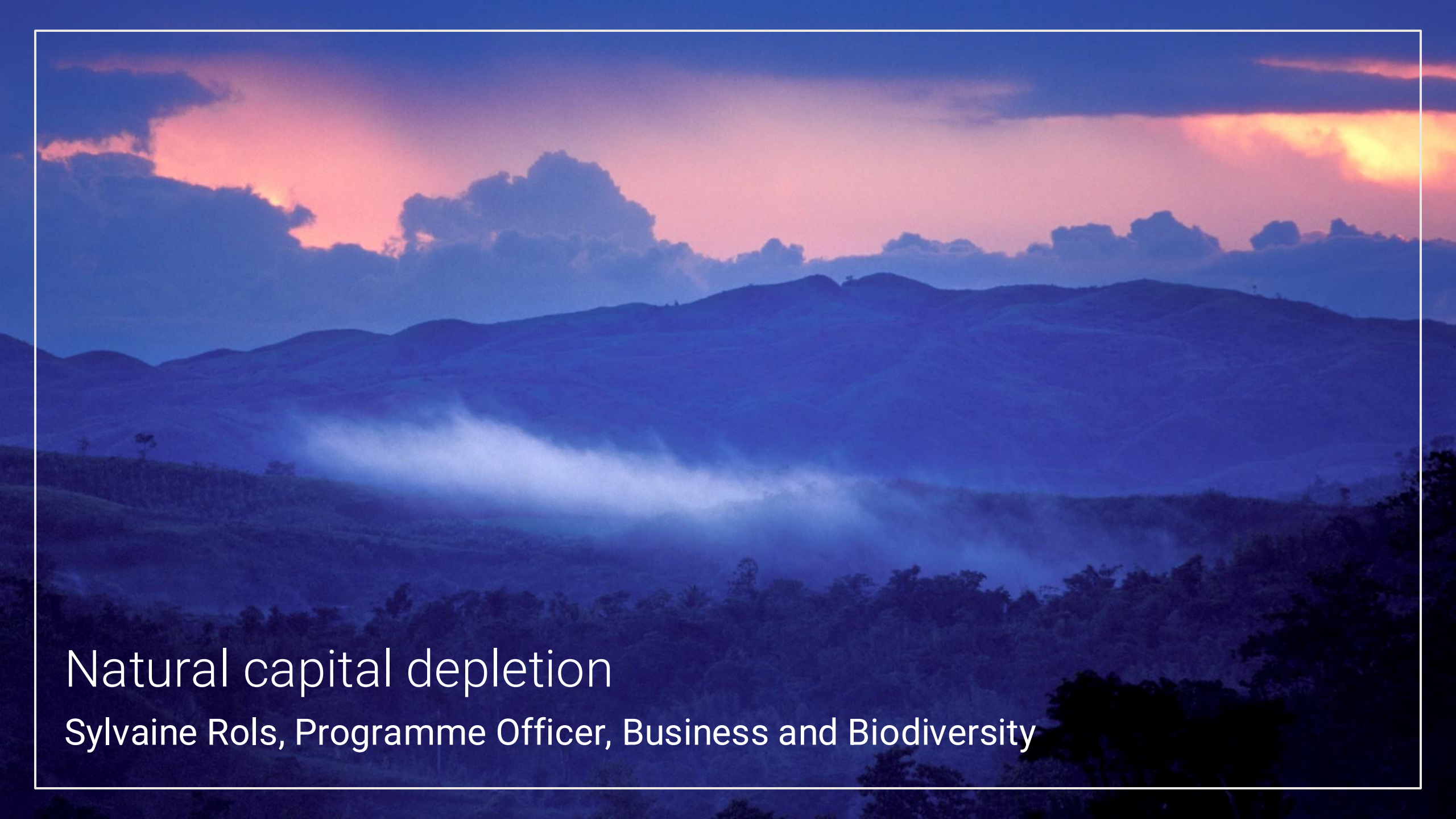
# Today

## Presentation: Mapping global hotspots of natural capital depletion

- The rationale for developing the hotspots of depletion layers
- Methodology used to create the layers
- Intended use of the layer and relevance to Proteus Partners
- Layer caveats, limitations and availability

## Peer-to-peer discussion

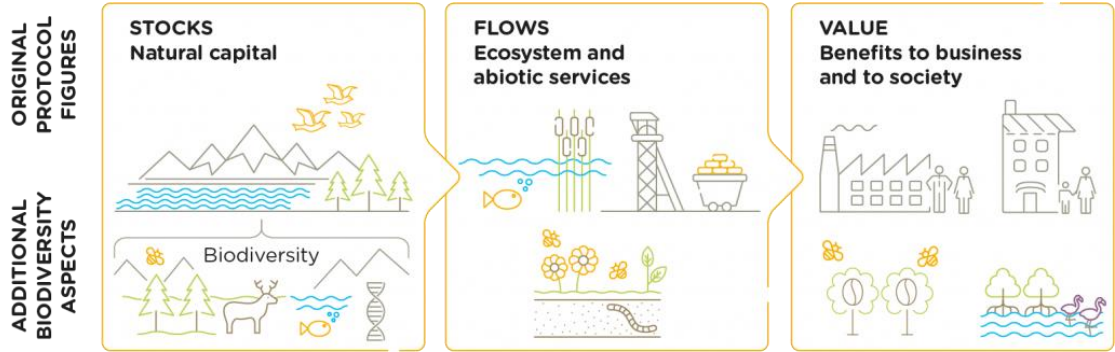
- Q&A
- Feedback from Partners
- Menti.com – 8547 6798



# Natural capital depletion

Sylvaine Rols, Programme Officer, Business and Biodiversity

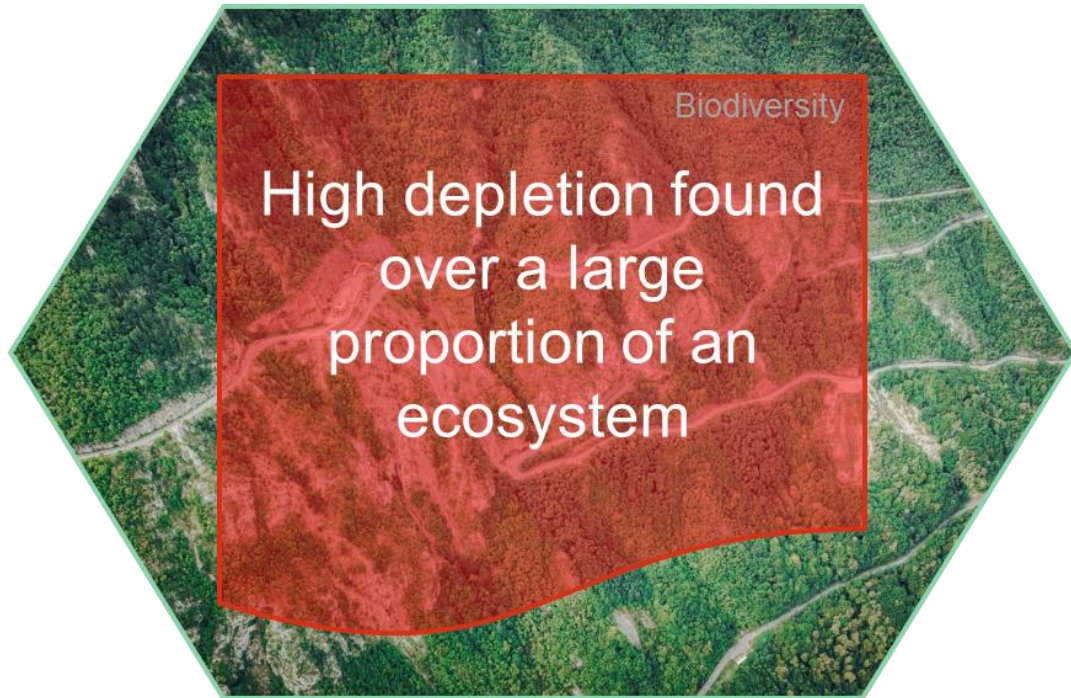
# NATURAL CAPITAL DEPLETION PUTS ECOSYSTEM SERVICES AND THE ECONOMY AT RISK



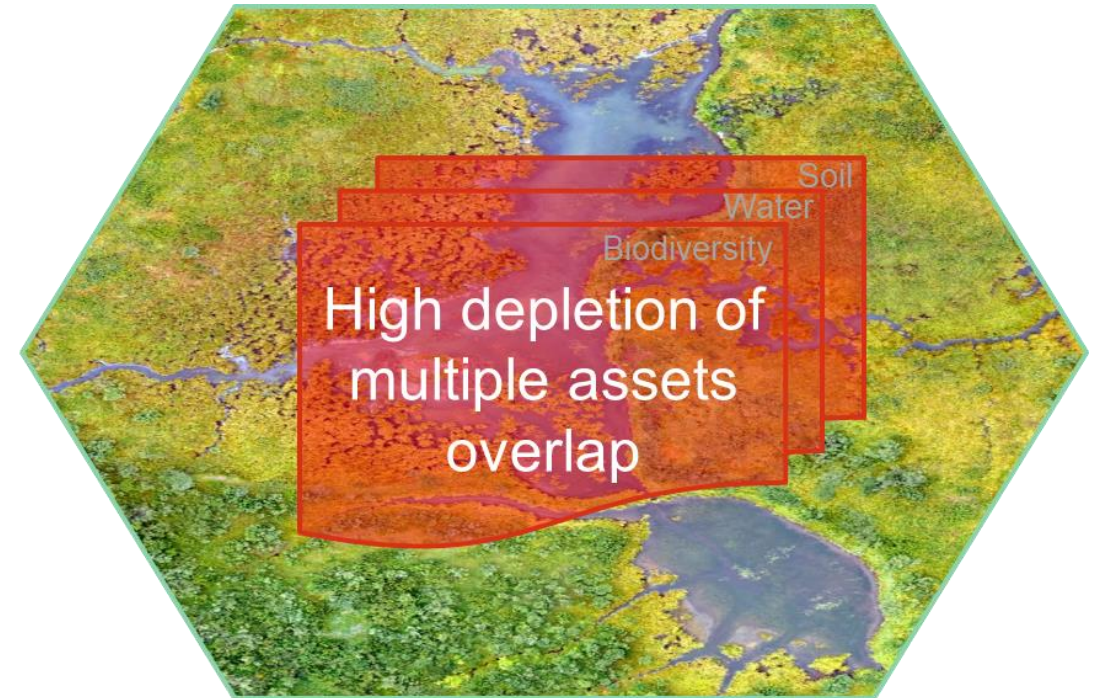
**Natural Capital stocks, flows, and values.**  
 Source: Capitals Coalition and Cambridge Conservation Initiative (2020)

**Percentage of direct and supply chain gross value added with high, medium and low nature dependency, by industry.** Source: PwC, in WEF (2020) Nature Risk Rising

# HIGHER RISKS EXIST WHERE...



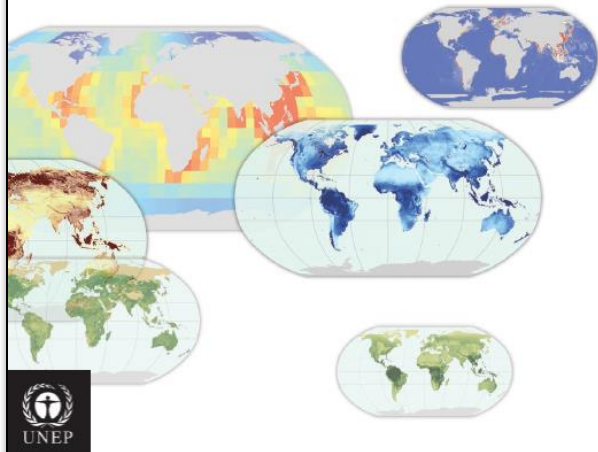
Ecosystem



Ecosystem

# PAST EFFORTS TO MAP NATURAL CAPITAL

## Towards a global map of natural capital: key ecosystem assets



Map 10: Composite map of global ecosystem assets

The composite map of global ecosystem assets illustrates a high concentration of terrestrial ecosystem assets in the equatorial regions, particularly in the Brazilian Amazon and the Congo Basin as well as in the boreal forests of Canada and Russia. Marine ecosystem assets are concentrated in Southeast Asia and along coastlines, especially on the west coasts of South America, Northern Africa and Europe.

A low value relative to the global distribution of ecosystem assets does not mean that a given area is not nationally or locally important for well-being or economic activity. Instead, it may be the result of the fairly coarse resolution of the map. In addition, the map does not capture all valuable ecosystem assets, with ecosystem functions such

as coastal protection and aesthetic value being omitted entirely from this first version.

The question of value to whom is an important one for assessing natural capital. The ecosystem assets mapped differ with regard to the scope of their beneficiaries. While fresh water resources and soil quality are significant for economic use in national and local contexts, carbon and biodiversity values are likely to extend beyond a single country or region. Fish stocks are often captured by fleets hailing from countries far from the fishing grounds.

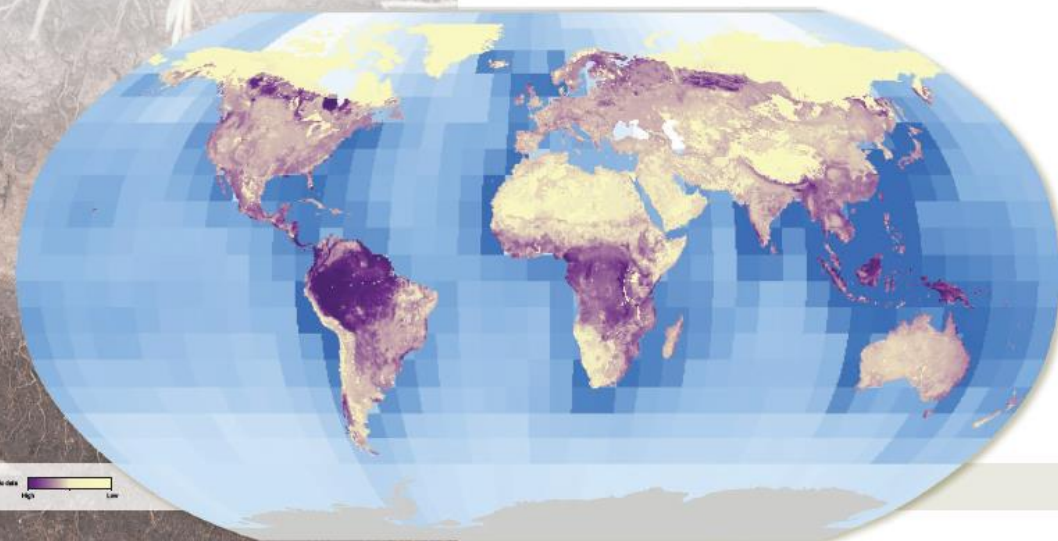
Whilst the global map displays potential values of ecosystem assets, not all these assets are being realized. This implies that there may be trade-offs between these potential values and that all of them may not be able to exist simultaneously. For

example, realizing a forest's soil quality value by crop cultivation could risk losing carbon stocks, if cultivation entailed clearing forest for agriculture.

The global map displays an equal weighting given to underlying ecosystem asset layers. Alternative approaches to weighting might employ valuation, where higher weight would be given to those assets with higher monetary value. A further approach for weighting could be to solicit expert or public opinion on the relative importance of different ecosystem assets via a survey or a panel. Moving from physical to monetary assessment is nevertheless likely to be difficult.

Finally, Antarctica is shown as a no-data area in the global map. Whilst some relevant data does exist for the continent, it tends to be absent from global datasets. Integrating Antarctic data into the analysis is a clear area for improvement.

5.3. Composite map



Source: Dickson *et al* (2014) Towards a global map of natural capital: Key ecosystem assets. UNEP, Nairobi, Kenya

A vertical photograph on the left side of the slide shows a sunset over a body of water. The sky is a gradient of orange and yellow, with the sun low on the horizon. In the foreground, a line of trees is silhouetted against the bright sky, and their reflection is visible in the calm water below.

# MAPPING NATURAL CAPITAL DEPLETION

Focus on natural capital stocks needed because:

- Measures of ecosystem services' flow may fail to capture the status of underlying stocks
- Ecosystem services rely on multiple natural capital assets in combination

A photograph of a dense tropical forest. The scene is filled with various types of trees and plants. In the foreground and midground, there are several large trees with thick, gnarled trunks and branches. Some of these trees have large, fan-shaped palm-like leaves. The background is a thick canopy of green foliage, with sunlight filtering through in some places, creating a dappled light effect. The overall atmosphere is lush and vibrant.

# Methodology

Alex Ross, Programme Officer, Business and Biodiversity

# CLASSIFYING NATURAL CAPITAL ASSETS

Adopted the common framework of natural capital assets for use in public and private sector decision making (Leach *et al.* 2019)

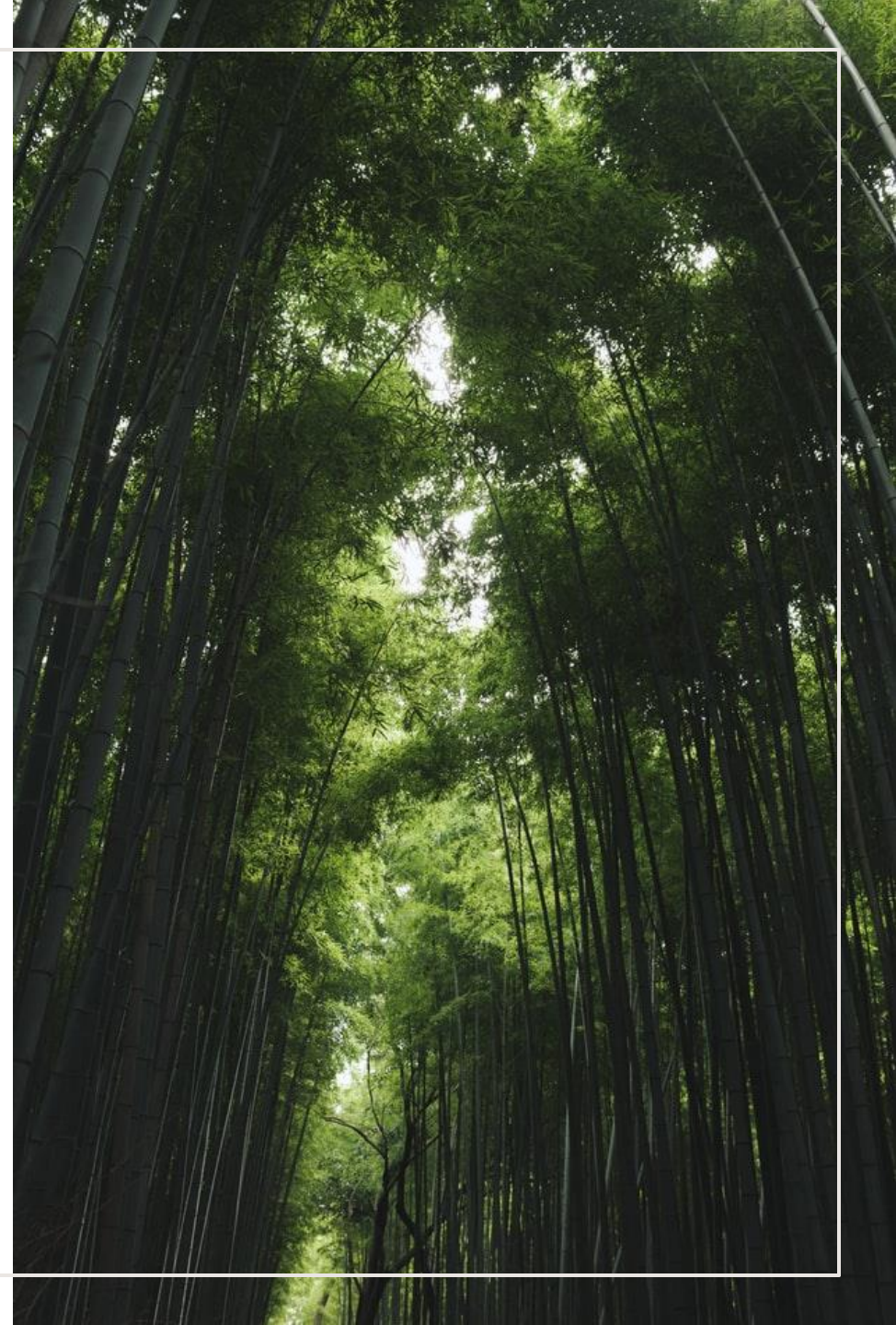
## Levels 1-3\* of the hierarchical classification of natural capital assets from Leach *et al.* (2019)

Level 1	Level 2	Level 3	Retained in analysis
Abiotic	Functional	<b>Atmosphere</b>	<b>Yes</b>
		<b>Water</b>	<b>Yes</b>
	Non-renewable	Energy	No
		Minerals	No
		<b>Soils and sediments</b>	<b>Yes</b>
		Physical	
	Physical	Land geomorphology	No
		Ocean geomorphology	No
Biotic	Biodiversity	<b>Habitats</b>	<b>Yes</b>
		<b>Species</b>	<b>Yes</b>

\*Note: The hierarchy contains four levels in total

# DEFINING DEPLETION OF NATURAL CAPITAL ASSETS

- Decrease in the quantity of the stock
- Decrease in its capacity to deliver ecosystem services



# INDICATORS OF DEPLETION

Natural capital asset	Definition of depletion	Indicators of depletion
Atmosphere	Emission of pollutants	<ul style="list-style-type: none"><li>• Temperature anomalies</li><li>• Non-GHG emissions</li></ul>
Water	Decrease in the quantity of quality of water resources	<ul style="list-style-type: none"><li>• Baseline water stress</li><li>• Lack of sanitation</li><li>• Coastal eutrophication</li></ul>
Soils and sediments	Decrease in the quantity and quality of soil, including carbon stocks	<ul style="list-style-type: none"><li>• Soil erosion</li><li>• Soil salinity increase</li><li>• Loss of soil carbon</li></ul>
Biodiversity	Decrease in species and habitat intactness	<ul style="list-style-type: none"><li>• Decline in biodiversity intactness</li></ul>





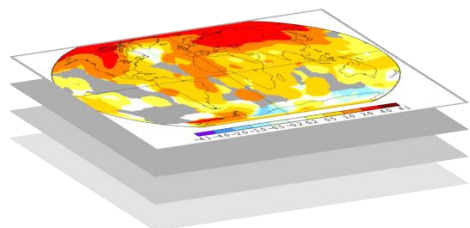
# REQUIREMENTS FOR INPUT DATASETS

- Reflects indicators of depletion
- Shows recent ongoing changes
- Global coverage
- Publicly available and licensed for use by commercial entities

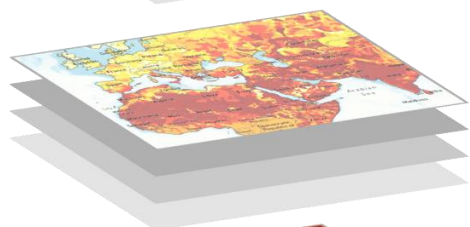
# INPUT DATASETS

Natural capital asset	Definition of depletion	Indicators of depletion	Input datasets
Atmosphere	Emission of pollutants	<ul style="list-style-type: none"><li>• Temperature anomalies</li><li>• Non-GHG emissions</li></ul>	<ul style="list-style-type: none"><li>• GISTEMP v4</li><li>• EDGAR v5.0</li></ul>
Water	Decrease in the quantity of quality of water resources	<ul style="list-style-type: none"><li>• Baseline water stress</li><li>• Lack of sanitation</li><li>• Coastal eutrophication</li></ul>	<ul style="list-style-type: none"><li>• WRI Aqueduct 3.0 database</li></ul>
Soils and sediments	Decrease in the quantity and quality of soil, including carbon stocks	<ul style="list-style-type: none"><li>• Soil erosion</li><li>• Soil salinity increase</li><li>• Loss of soil carbon</li></ul>	<ul style="list-style-type: none"><li>• Borrelli <i>et al.</i> 2017</li><li>• Ivuskin <i>et al.</i> 2019</li><li>• Soils Revealed</li></ul>
Biodiversity	Decrease in species and habitat intactness	<ul style="list-style-type: none"><li>• Decline in biodiversity intactness</li></ul>	<ul style="list-style-type: none"><li>• Biodiversity Intactness Index</li></ul>

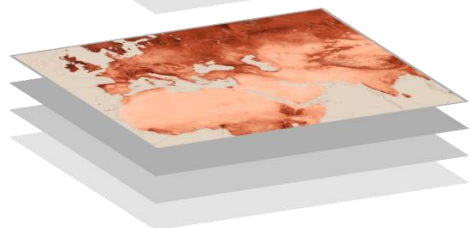
# DATA PROCESSING



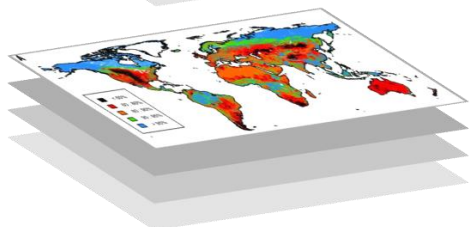
Atmosphere depletion hotspots



Water depletion hotspots

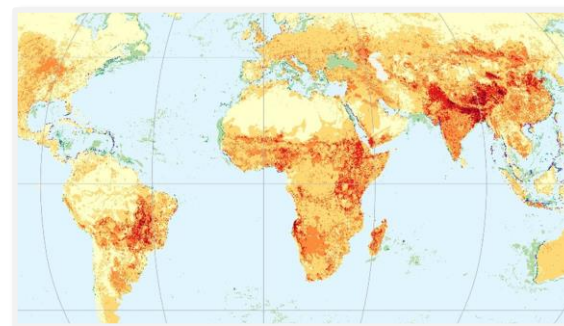


Soil and sediments depletion hotspots



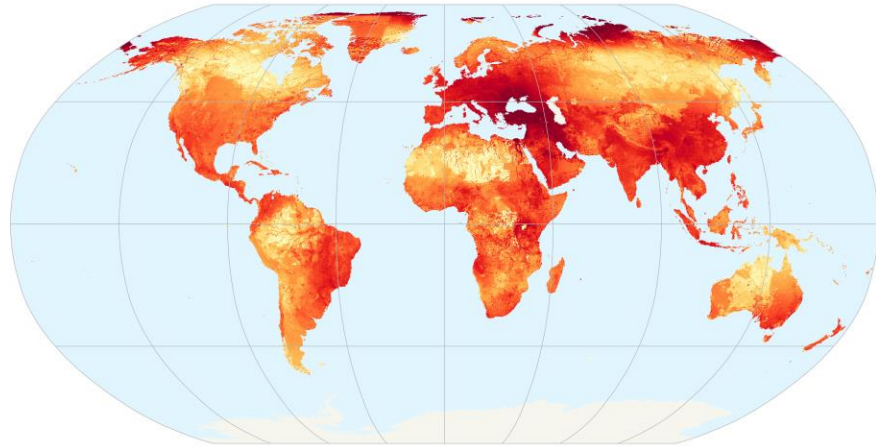
Biodiversity depletion hotspots

**Hotspot:** top 20% of relative depletion values

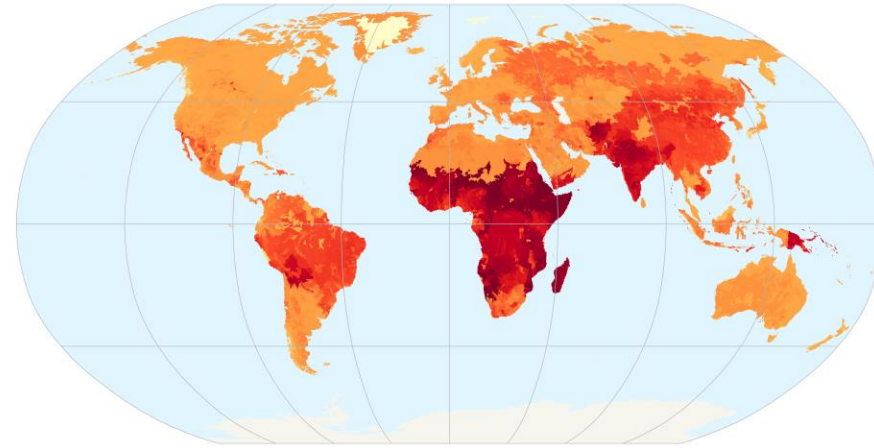


Combined hotspots of depletion of terrestrial natural capital

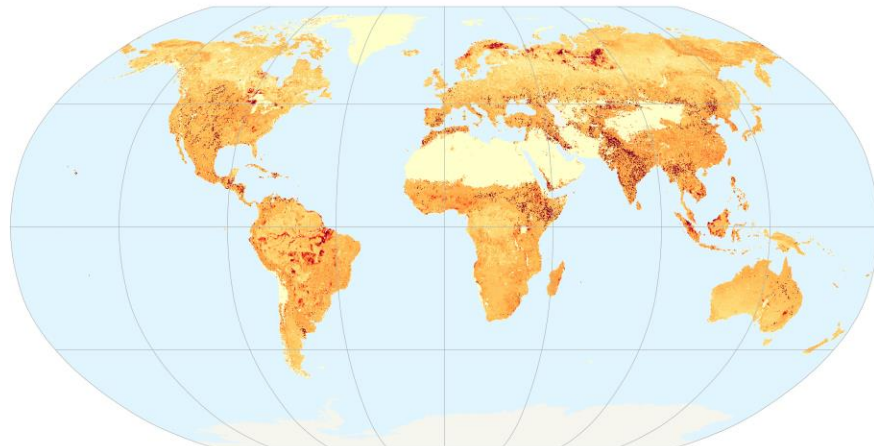
# SINGLE ASSET LAYERS



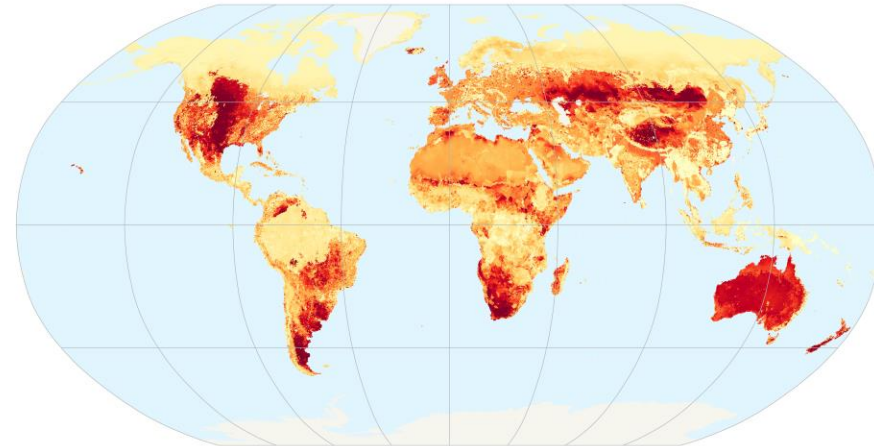
Atmosphere



Water

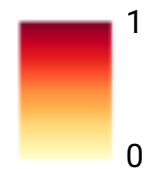


Soils and sediments



Biodiversity

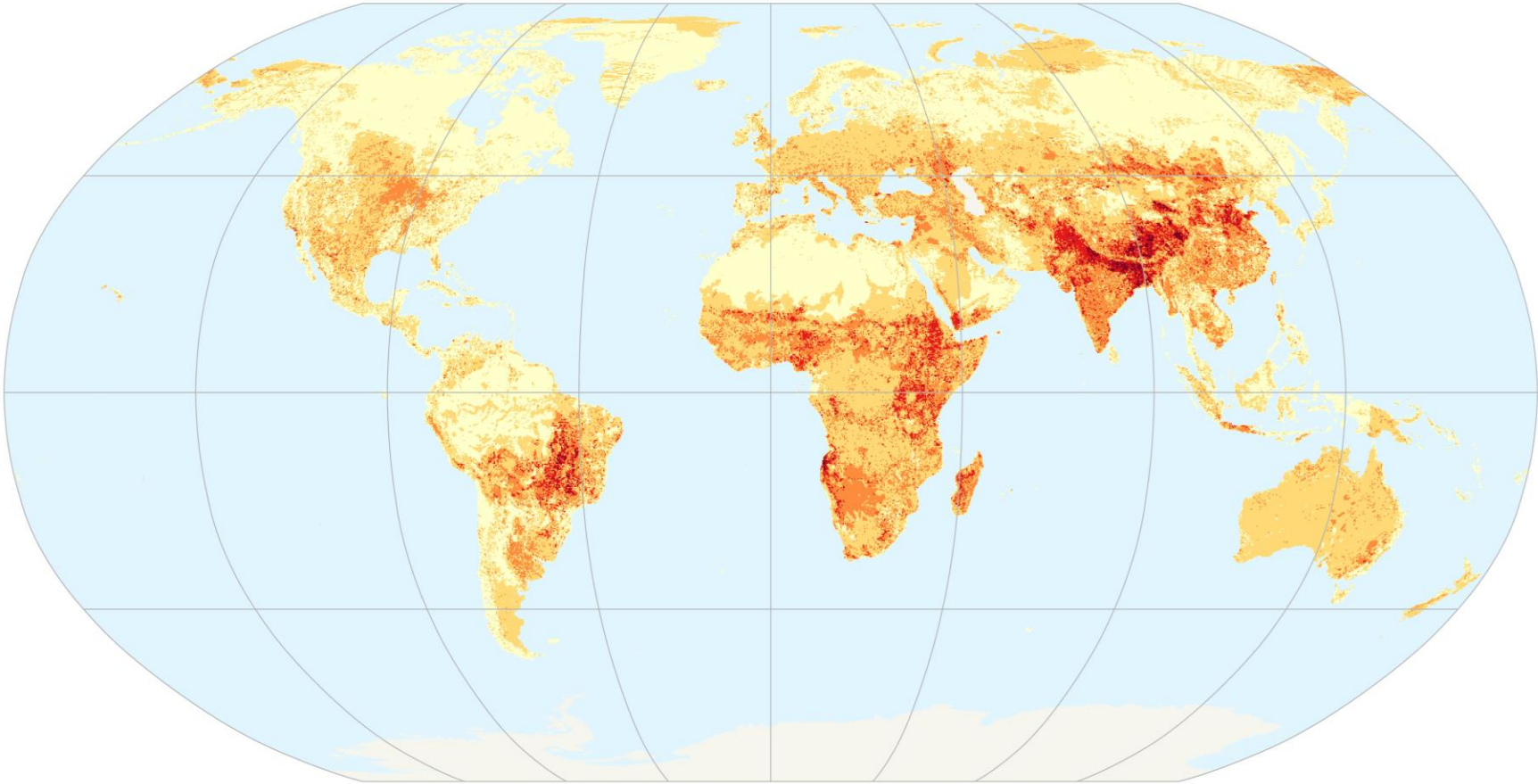
Relative depletion



Projection Robinson,  
Central Meridian 0

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# COMBINED HOTSPOTS OF NATURAL CAPITAL DEPLETION



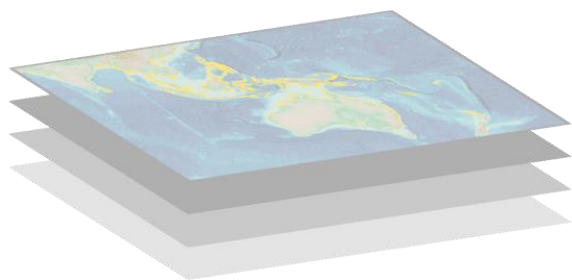
Number of overlapping hotspots of depletion



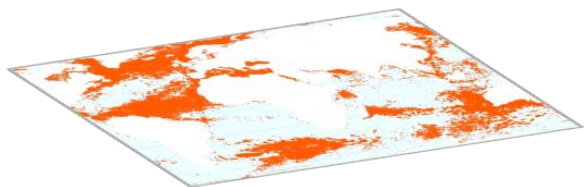
Projection Robinson,  
Central Meridian 0

Combined terrestrial layer

# MARINE LAYER



Natural capital stocks of biodiversity (6 habitat types) and carbon

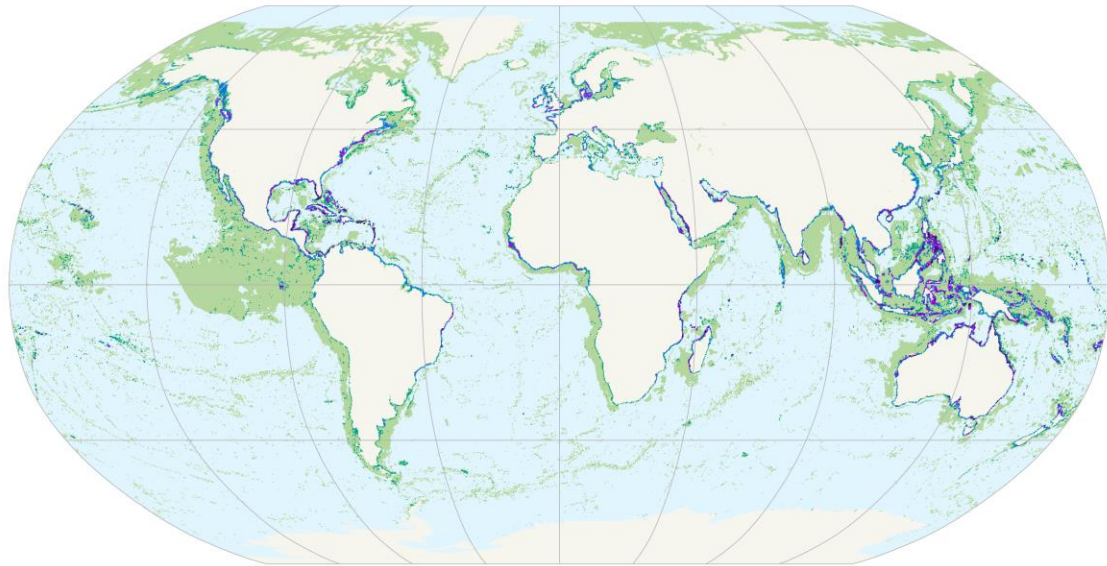


Hotspots of cumulative human pressures

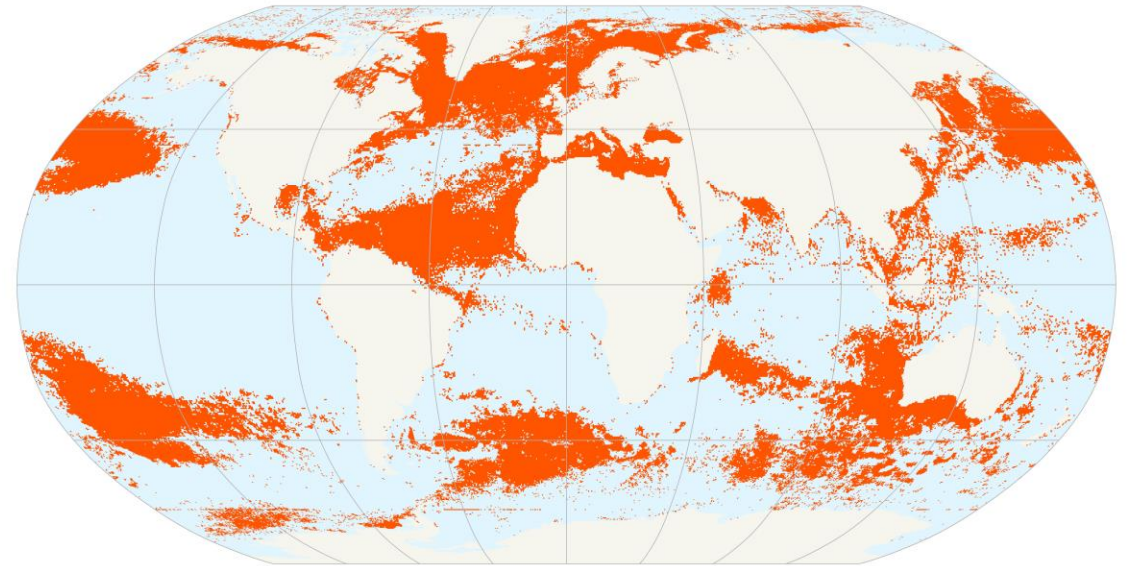


Potential hotspots of depletion of marine natural capital

# INPUT LAYERS



Marine natural capital



Marine human pressures

Number of overlapping marine assets

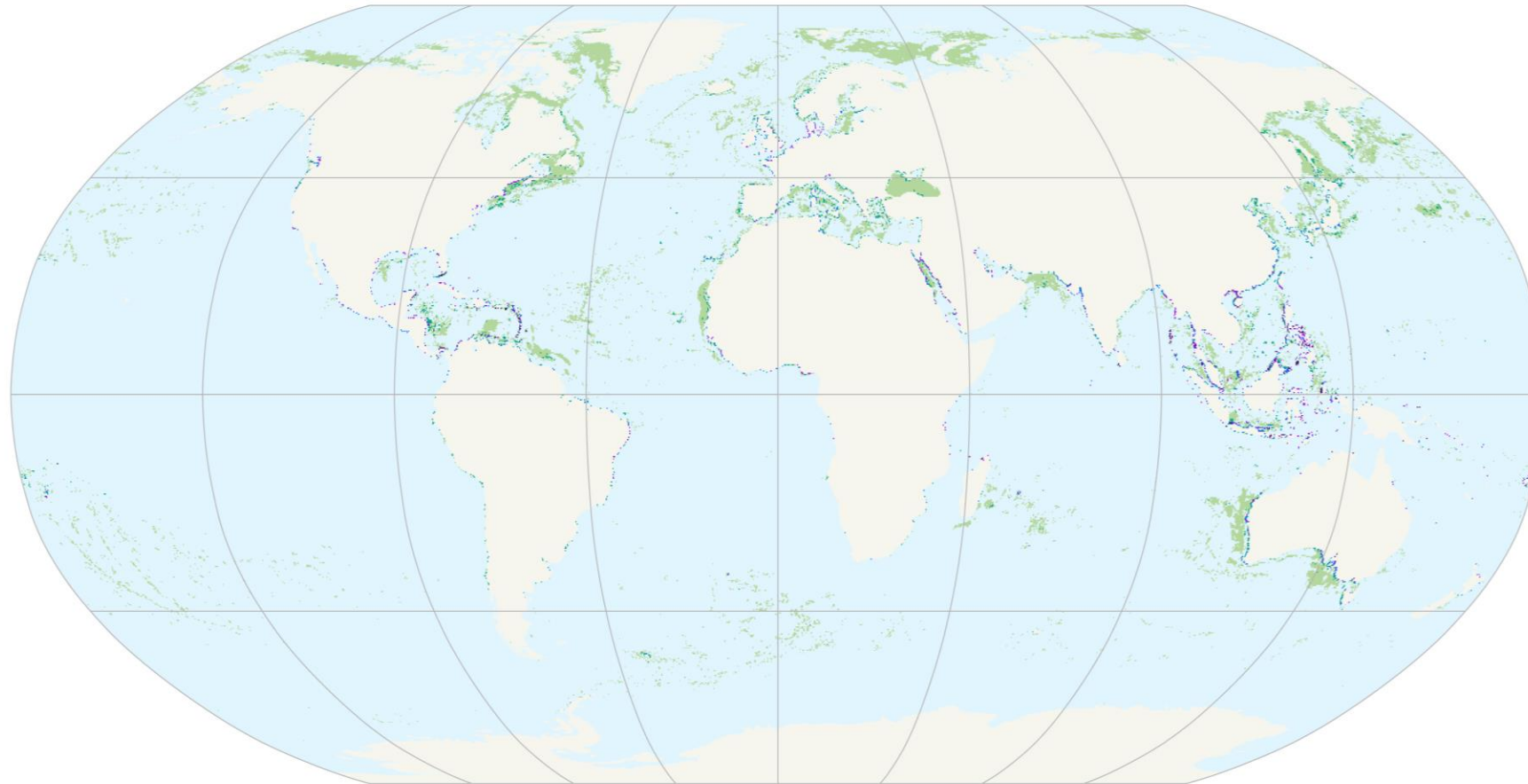


Marine pressure hotspots

Projection Robinson,  
Central Meridian 0

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# HOTSPOTS OF POTENTIAL DEPLETION OF MARINE NATURAL CAPITAL



Number of overlapping  
**potential** hotspots of  
depletion



Projection Robinson,  
Central Meridian 0

Combined marine layer

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Dataset use

Sylvaine Rols, Programme Officer, Business and Biodiversity

# TEST CASE FOR INVESTORS

- Identification of impacts and dependencies through the ENCORE tool
- Identification of high risk geographies and sectors linked to hotspots of depletion
- Refining engagement strategies through direct engagement with investees and collaborative engagement with investor coalitions

The image shows the cover page of a report. At the top left is the PRi logo (Principles for Responsible Investment) and at the top right is the UN WCMC logo (World Conservation Monitoring Centre). The title of the report is 'IDENTIFYING NATURAL CAPITAL RISKS AND OPPORTUNITIES AS PART OF DESIGNING AN INVESTOR ENGAGEMENT STRATEGY'. Below the title is a summary box with a blue border containing text about the test case and a link to read more. Underneath are two columns: 'User profile' (Asset manager) and 'Primary market' (Global portfolio of listed equity). The main body of text describes AMC, an asset management company, and its use of the ENCORE tool to identify natural capital risks in its food consumer goods portfolio. It lists four steps taken to understand these risks. At the bottom, there is a footnote defining natural capital and logos for the PRI Association, UNEP Initiative, and United Nations Global Compact.

**PRi** Principles for Responsible Investment

**UN WCMC** environment programme

## IDENTIFYING NATURAL CAPITAL RISKS AND OPPORTUNITIES AS PART OF DESIGNING AN INVESTOR ENGAGEMENT STRATEGY

*This test case provides an example how investors can use the ENCORE tool to identify potential exposures in their portfolios to natural capital depletion. This is a hypothetical test case based on fictitious companies. Investors may follow different steps, or in a different order, based on their processes and objectives. For example, their interest may be driven by risks associated with a specific region rather than a company or production process.*

Read more about the tool [here](#).

**User profile**  
■ Asset manager

**Primary market**  
■ Global portfolio of listed equity

AMC, an asset management company, was considering expanding its investments in food consumer goods companies. It held food retailers, food manufacturers and agricultural (in particular soy) traders in its portfolio. AMC was committed to responsible investment and had been looking to incorporate environmental, social and governance (ESG) risks into its corporate engagement and investment analysis. Through its exposure to the food sector, AMC was concerned about the potential dependencies and impacts of arable crops, such as soy, and their role in corporate supply chains. AMC wanted to better understand the natural capital risks associated with soy production and sourcing locations, and to identify potential opportunities to reduce its risk exposures and impacts on ecosystem services.<sup>1</sup>

To understand its exposures to natural capital risks associated with soy, AMC took the following steps:

1. Using the [ENCORE](#) tool, it identified key soy dependencies and impact drivers on natural capital assets and ecosystems.
2. Via the Transparency for Sustainable Economies tool ([TISE](#)), ESG data providers, and engagement with investees, it identified soy sourcing locations for companies in its portfolio.
3. Through [ENCORE](#), it identified where natural capital depletion might be occurring.
4. It compared company sourcing location data with a map of natural capital depletion.

Using this information, AMC designed an engagement strategy for investees, through which it aimed to understand and discuss their practices and performance, to reduce risks associated with dependency and impact on natural capital and ecosystem services. It reinforced the strategy with indirect engagement, through collaboration with existing financial sector initiatives, to support policies that help businesses manage natural capital.

<sup>1</sup>Natural capital is defined as the "stock of renewable and non-renewable resources that combine to yield a flow of benefits to people" by the [Natural Capital Protocol](#).

**PRI Association**  
Registered office: 10th Floor, 25 Cabot Square, London, UK, E14 4QJ. Company No. 10297947  
T: +44 (0) 20 3714 3300 W: [www.unpri.org](http://www.unpri.org) E: [info@unpri.org](mailto:info@unpri.org)

**UNEP INITIATIVE**  
An investor initiative in partnership with IASG Finance Initiative and UN Global Compact

**United Nations**  
Global Compact

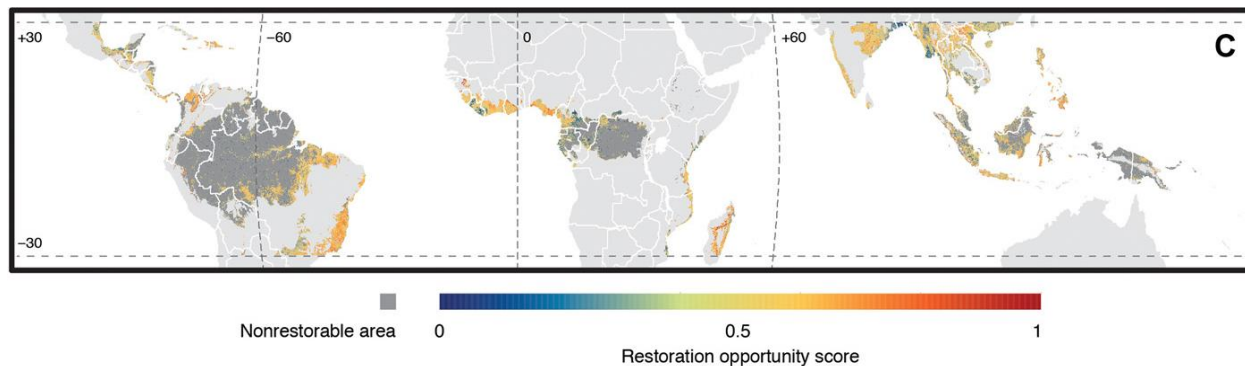


# APPLICATIONS FOR PROTEUS PARTNERS

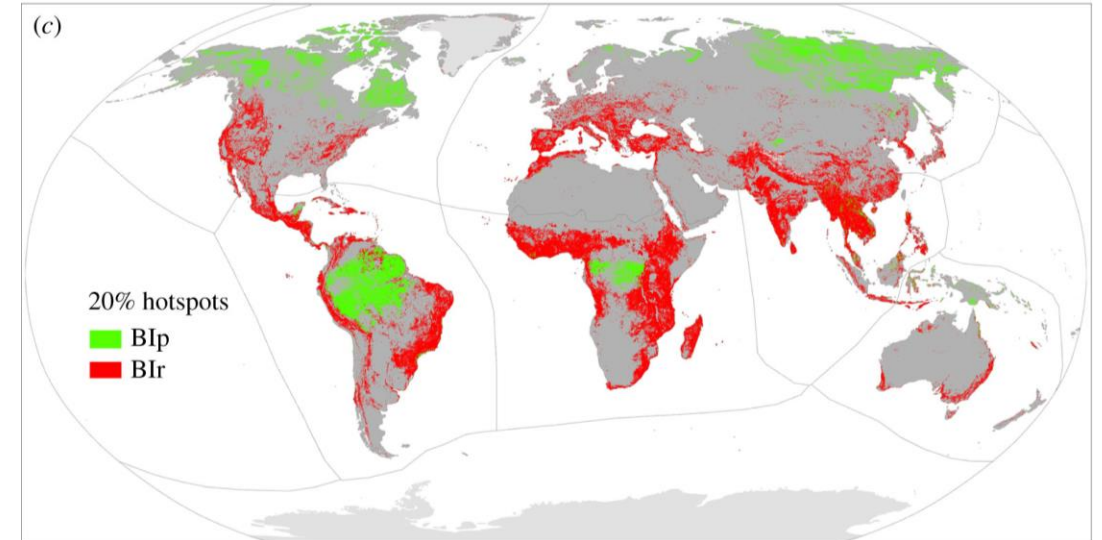
- Understanding and identifying high risk geographies where ecosystem services could be disrupted due to hotspots of natural capital depletion
- Ensuring a common language with potential investors, and adopting a proactive approach towards natural capital depletion risks

# REVERSING NATURAL CAPITAL DEPLETION

- The UN Decade on Ecosystem Restoration (2021-2030) frames efforts to restore ecosystems and their services
- Hotspots of natural capital depletion can be combined with other analyses to prioritise and focus restoration activities



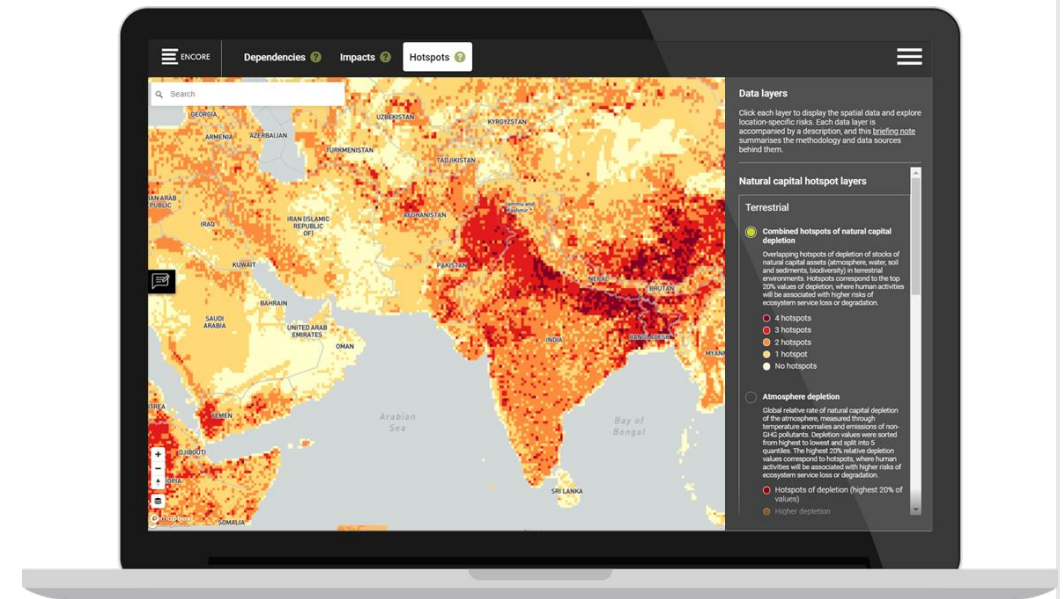
Restoration opportunity score for tropical rainforest landscapes in lowlands, with benefits combined with feasibility. Source: Brancalion *et al* (2019)



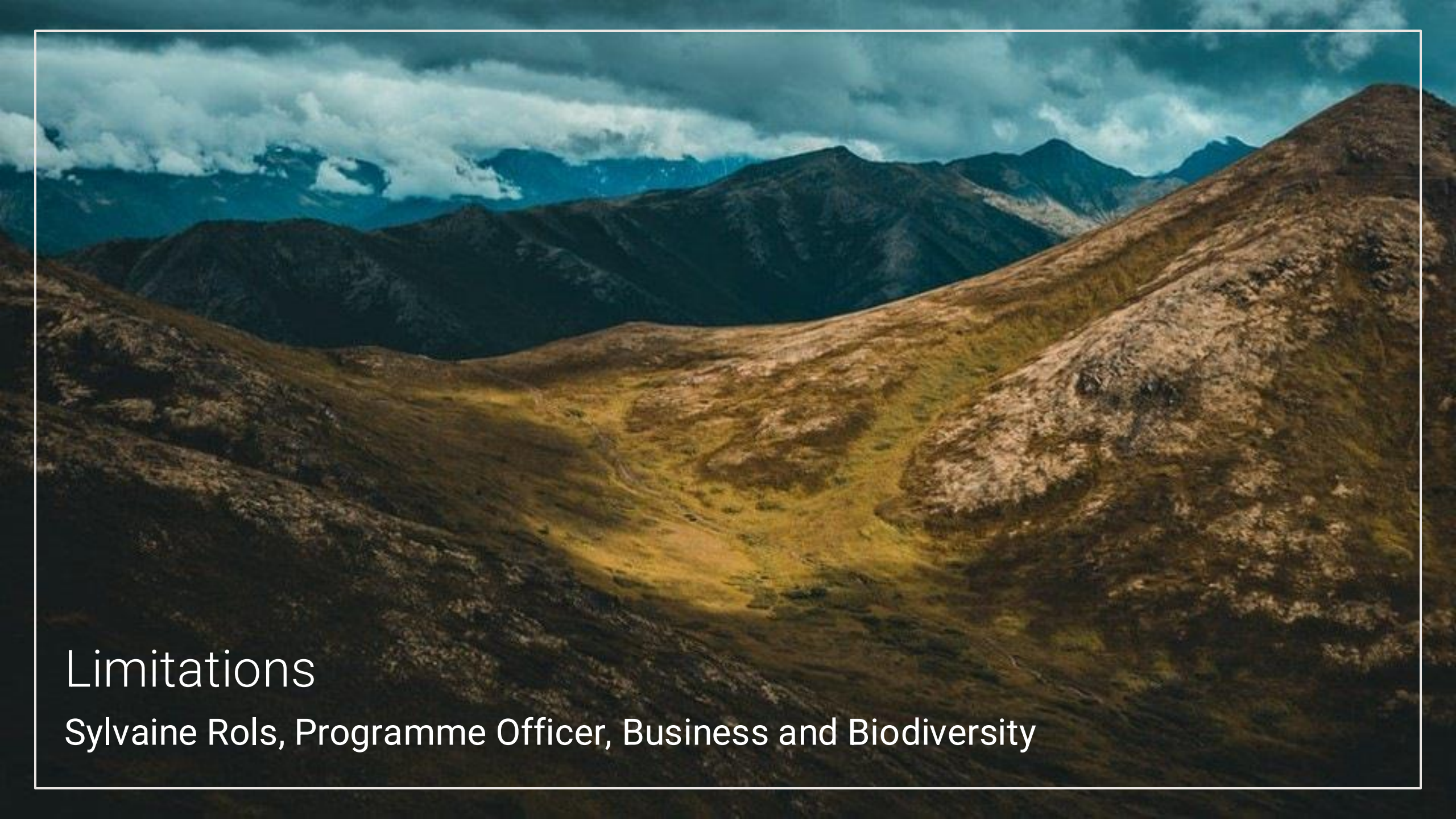
Priority areas for proactive (B1p) and reactive (B1r) conservation actions for carbon storage and biodiversity. Source: Soto-Navarro *et al* (2020)

# ACCESSING AND USING THE DATA LAYERS

- The maps can be visualised on the ENCORE tool
- The data layers can also be downloaded by Proteus partners: [here](#)
- Licence: CC-BY-SA 4.0



Go to: <https://encore.naturalcapitalfinancealliance.org/map?view=hotspots>



# Limitations

Sylvaine Rols, Programme Officer, Business and Biodiversity

# DATA AVAILABILITY AND RESOLUTION

Lack of suitable global datasets for all indicators of depletion:

- Use lower resolution datasets
- Rely on proxies
- Identify potential depletion for the marine realm, based on overlap with human pressures



# DEPLETION TIMEFRAMES

- Targeting depletion over 30-year period, with 1990 to 2020 being optimal
- Each dataset reflected a different time-period
- The Biodiversity Intactness Index values model change in comparison to fully intact natural habitats - datasets on declines compared to fixed points in time are in development

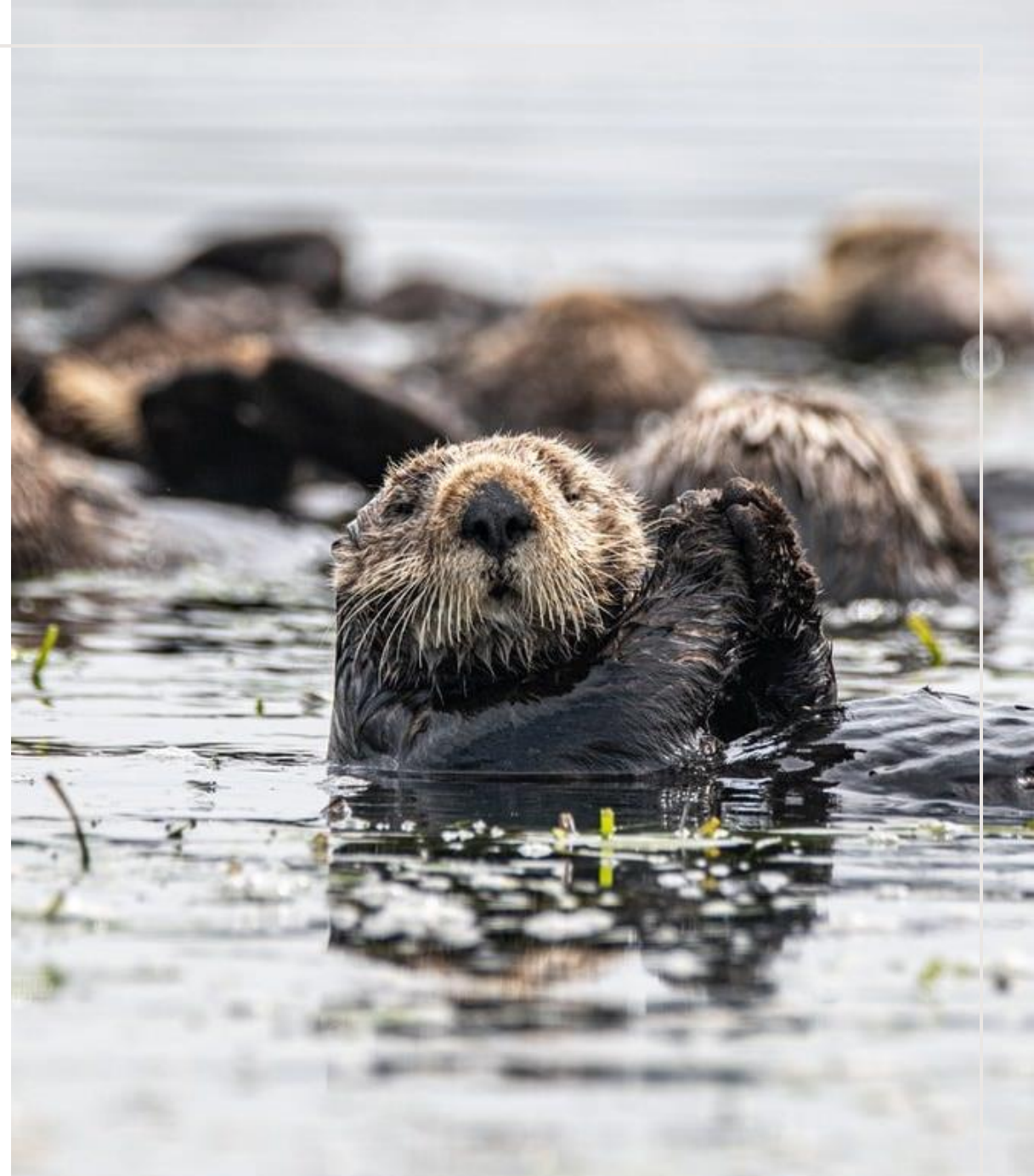


# CONSIDERATIONS FOR DATA USE

- Current version more suited to regional prioritisation rather than site-level management
  - Methodology could be re-applied to specific locations or countries.
- Unable to monitor change in rate of depletion
  - Time-series data would be useful to track rates of depletion in specific locations

# GOING FORWARD

- Scientific paper in draft
- User testing with PRI members
- Ensuring longevity and updates of the maps
- Promoting availability of global corporate-level data, to complement the maps



# ACKNOWLEDGEMENTS

- Funded by the Principles for Responsible Investment
- UNEP-WCMC project team: Sylvaine Rols, Alex Ross, Jake Bedford, Joe Turner, and Katie Leach
- This work was possible thanks to all the **data providers**





Thank you

# Proteus Data Forum

## Mapping global hotspots of natural capital depletion

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**WCMC**

**proteus**



**UN**   
**environment  
programme**

**WCMC**