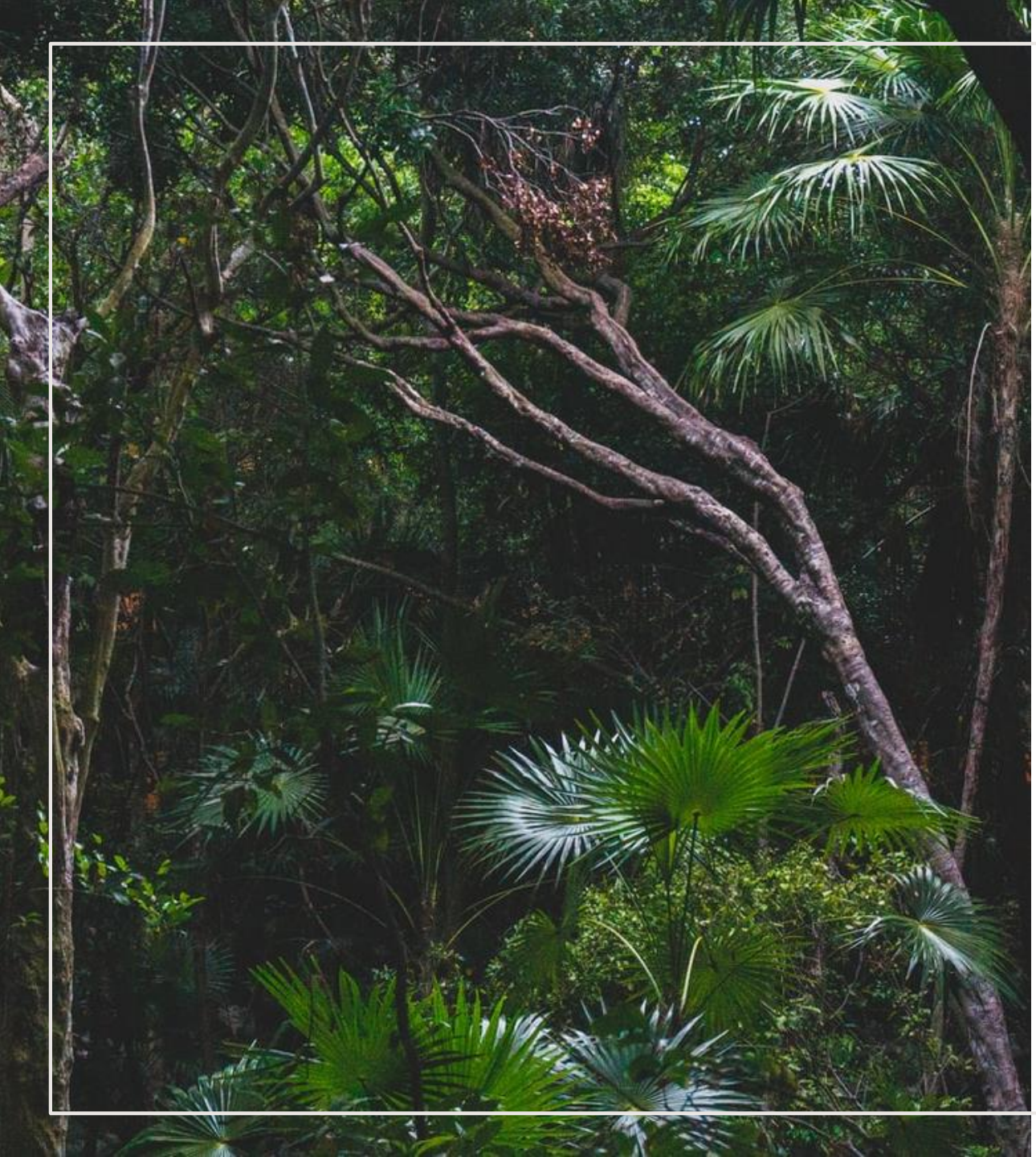


proteus

Ecosystem Integrity Index (EII): updates and next steps

Javier Fajardo, Programme Officer, Science, UNEP-WCMC
Aime Rankin, Associate Programme Officer, UNEP-WCMC

2 NOVEMBER 2022

WELCOME

Objectives of the Proteus Data Forum sessions

- A venue for direct communication between data users and technical experts
- Increase familiarity with Proteus resources
- Peer-to-peer learning between Proteus Partner companies
- Identifying common challenges & finding solutions

Logistics

- ***Frequency*** quarterly
- ***Scheduling*** AM & PM sessions
- ***Rules*** Chatham House discussion, but presentations recorded

TODAY

Presentations: Ecosystem Integrity Index (EII)

- What EII is and what is contained within the EII preprint
- How Proteus Partners can use EII
- The EII methodology paper and next steps

Peer-to-peer discussion

- Q&A with presenters
- Feedback from Partners

WHY MEASURE ECOSYSTEM INTEGRITY?

CBD's of the post-2020 global biodiversity framework

2050 Goal A – The integrity of ecosystems is maintained, restored or enhanced, increasing by at least 5 per cent by 2030 and 15/20 per cent by 2050 of the area, connectivity and integrity of the full range of natural ecosystems…

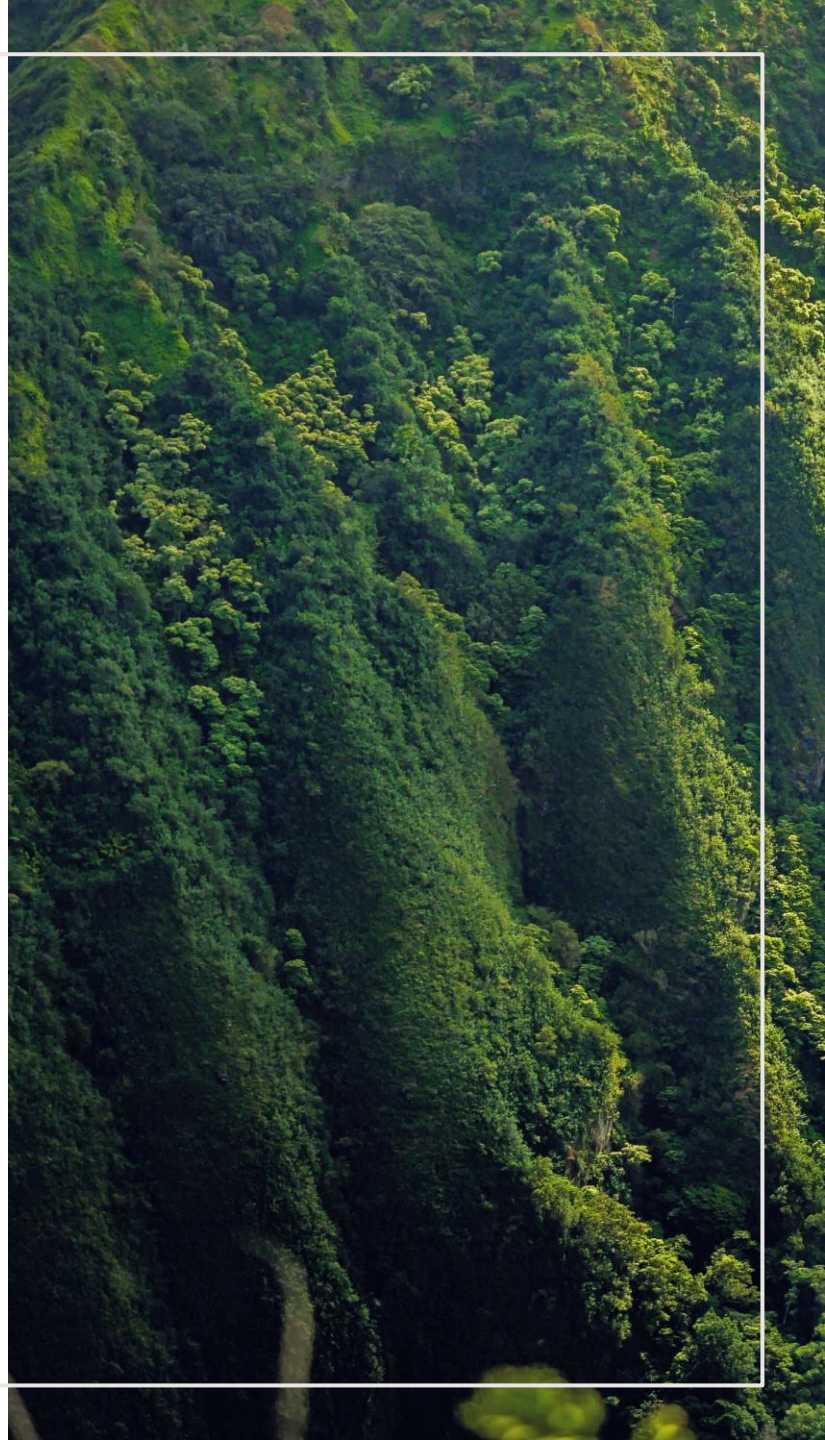
DEVELOPING THE ECOSYSTEM INTEGRITY INDEX

Hill et al., (2022, Preprint), The Ecosystem Integrity Index: a novel measure of terrestrial ecosystem integrity with global coverage. bioRxiv.

ECOSYSTEM INTEGRITY INDEX

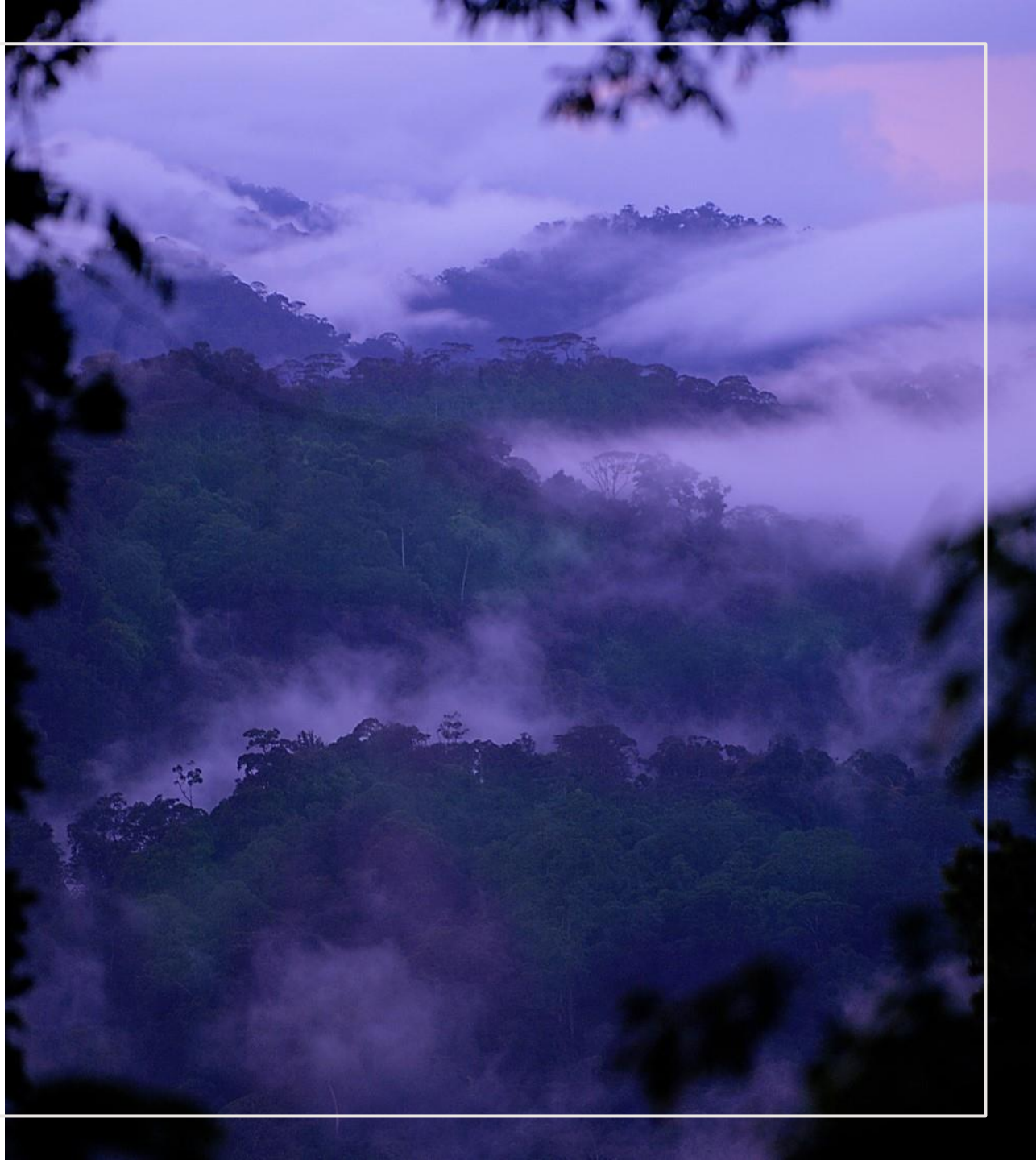
Index requirements:

1. Captures complexity of ecosystem facets with simple solution
2. Readily scalable from local to global
3. Relatable to planetary boundaries
4. Relatable to MEAs, specifically CBD's P2020 GBF
5. Useable as a guide for management decisions
6. Scaled against a measure of naturalness
7. Preferably based upon data that is regularly updated
8. Measurable for all marine, freshwater and terrestrial realms

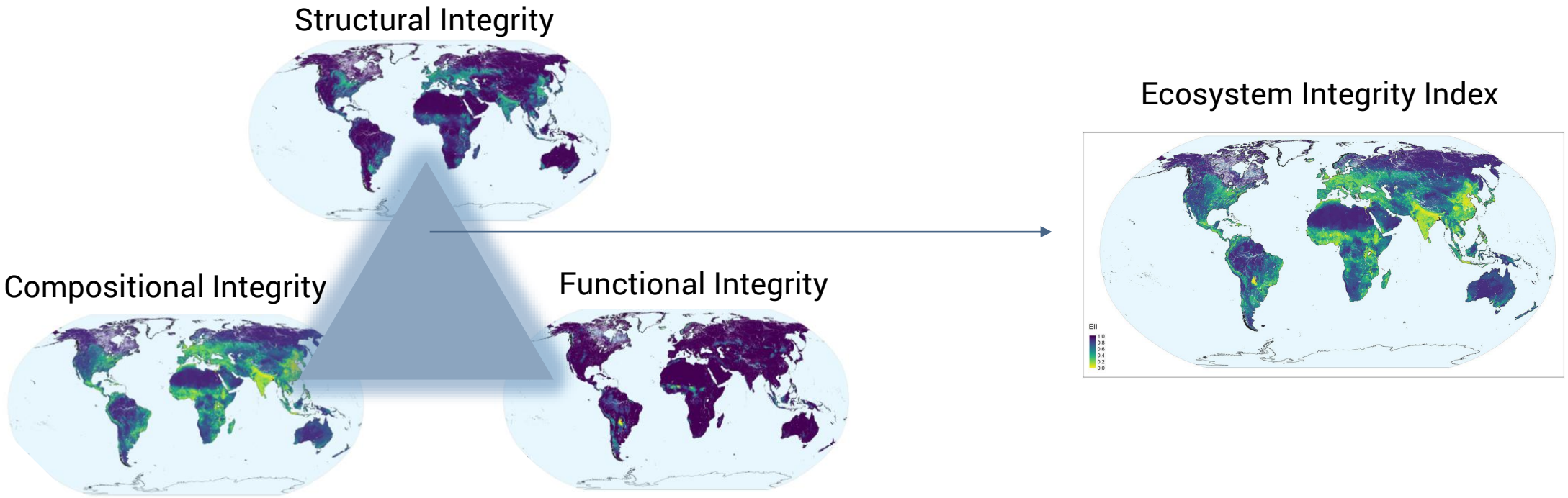


Based on the definition by
Carter et al., (2019)

"The extent to which the **composition**, **structure**, and **function** of an ecosystem fall within their natural range of variation"



Ecosystem integrity: "The extent to which the **composition**, **structure**, and **function** of an ecosystem fall within their natural range of variation" (Carter et al., 2019)



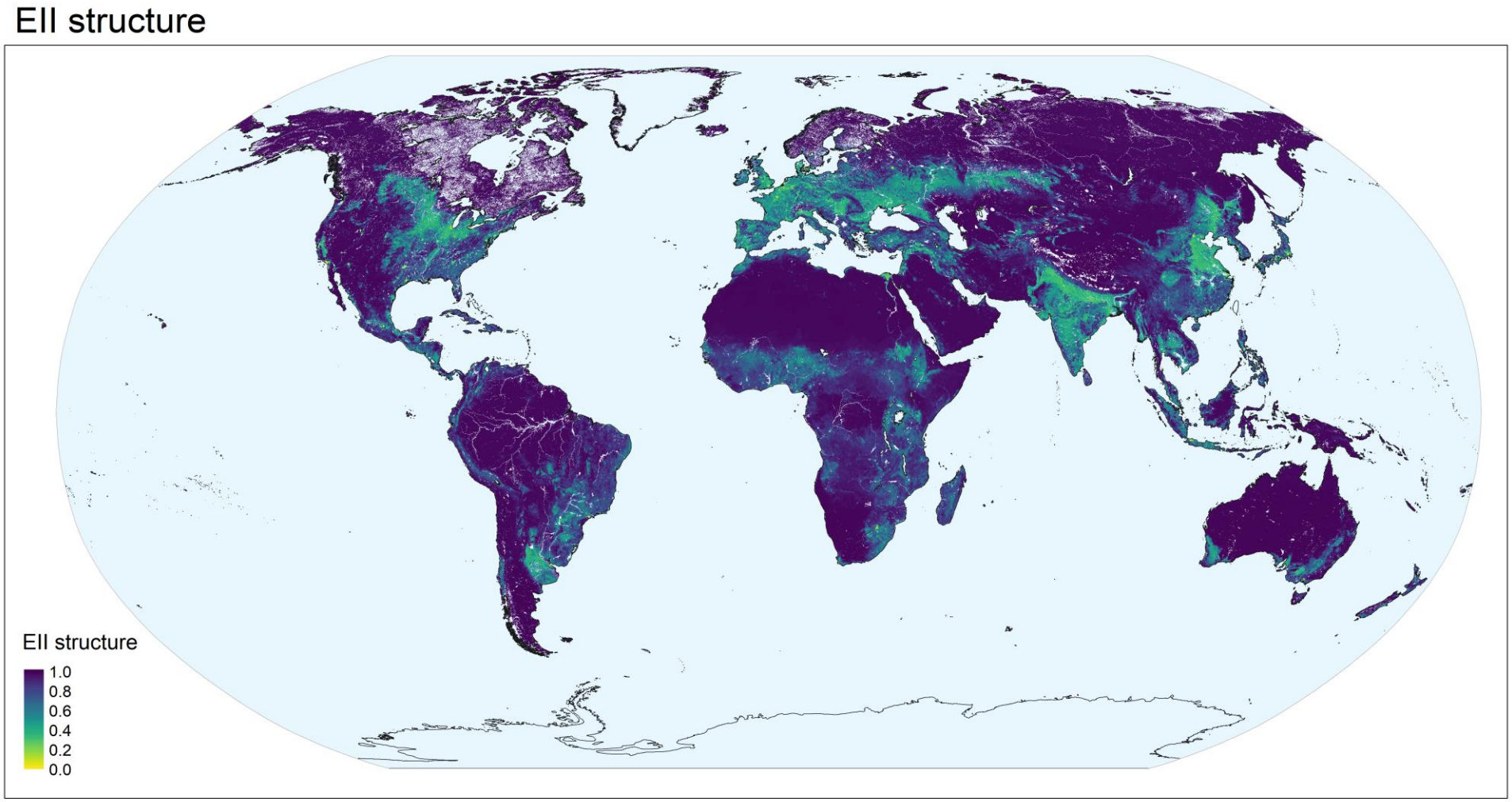
STRUCTURAL INTEGRITY

Structure relates to the physical organisation of the ecosystem and reflects the complexity provided by both abiotic and biotic elements

Examples: habitat structure, climate, soil, fragmentation and connectivity

Based on the Human Modification Index (Kennedy et al. 2019) and the structural integrity method in Beyer et al. (2020)

ECOSYSTEM INTEGRITY INDEX - STRUCTURE



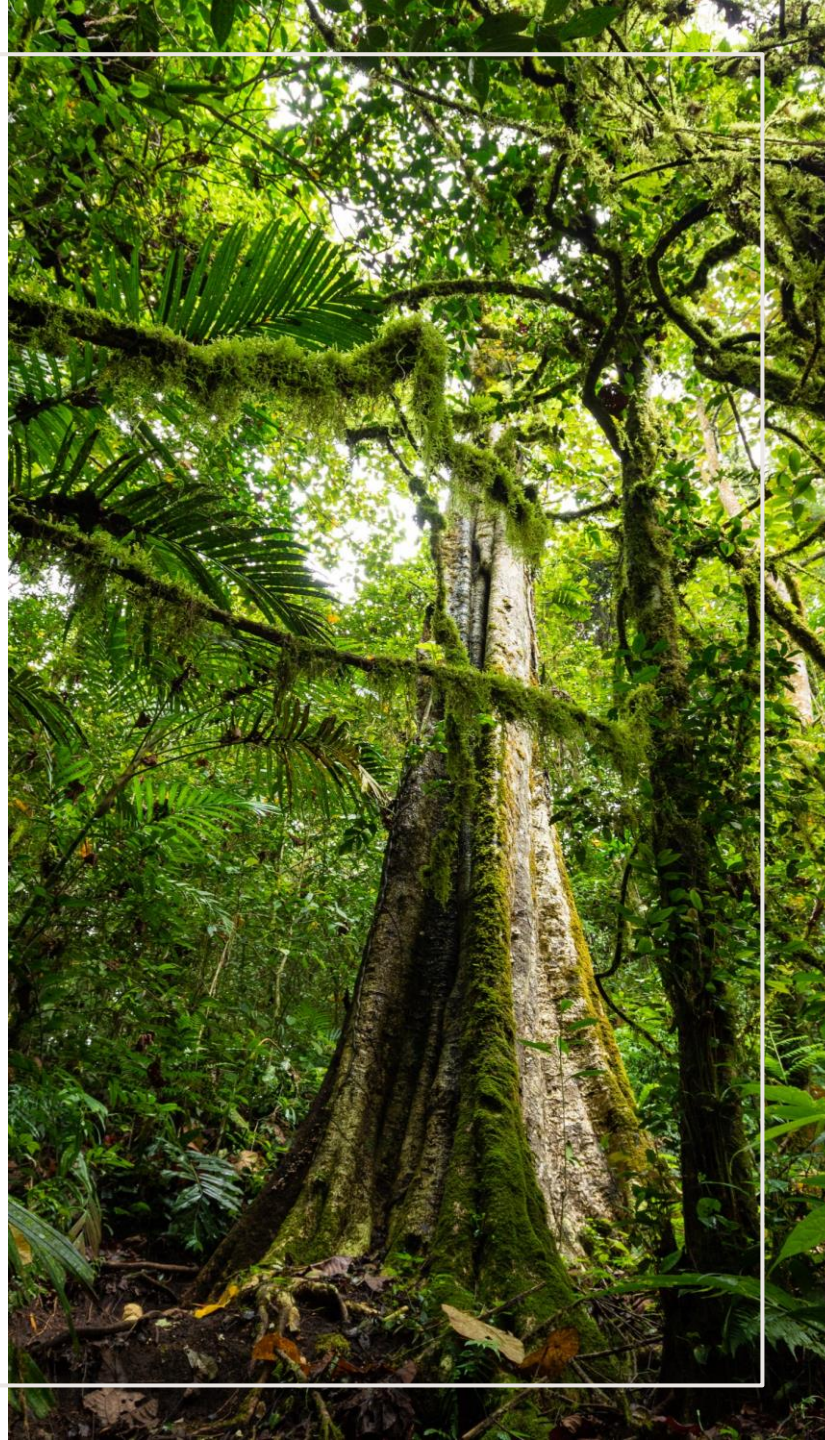
COMPOSITIONAL INTEGRITY

Ecosystem composition refers to the identity and variety of the biota

Examples: taxonomic diversity, population abundance, body mass, allelic diversity.

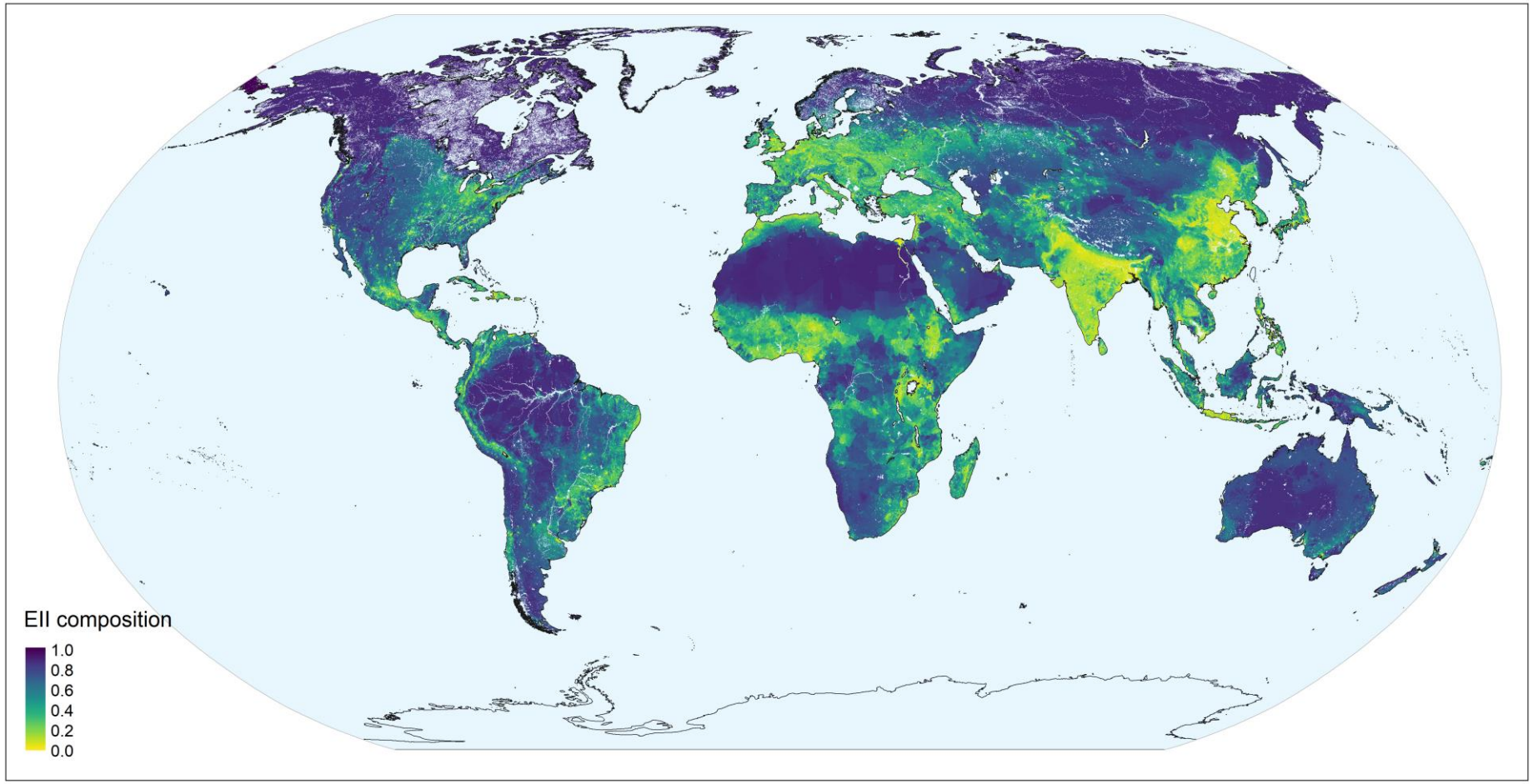
EII compositional integrity based on the Biodiversity Intactness Index (Hill et al. 2018, Newbold et al. 2016)

The Biodiversity Intactness Index estimates the relative change in abundance of species within a community compared to an unimpacted baseline



ECOSYSTEM INTEGRITY INDEX - COMPOSITION

EII composition



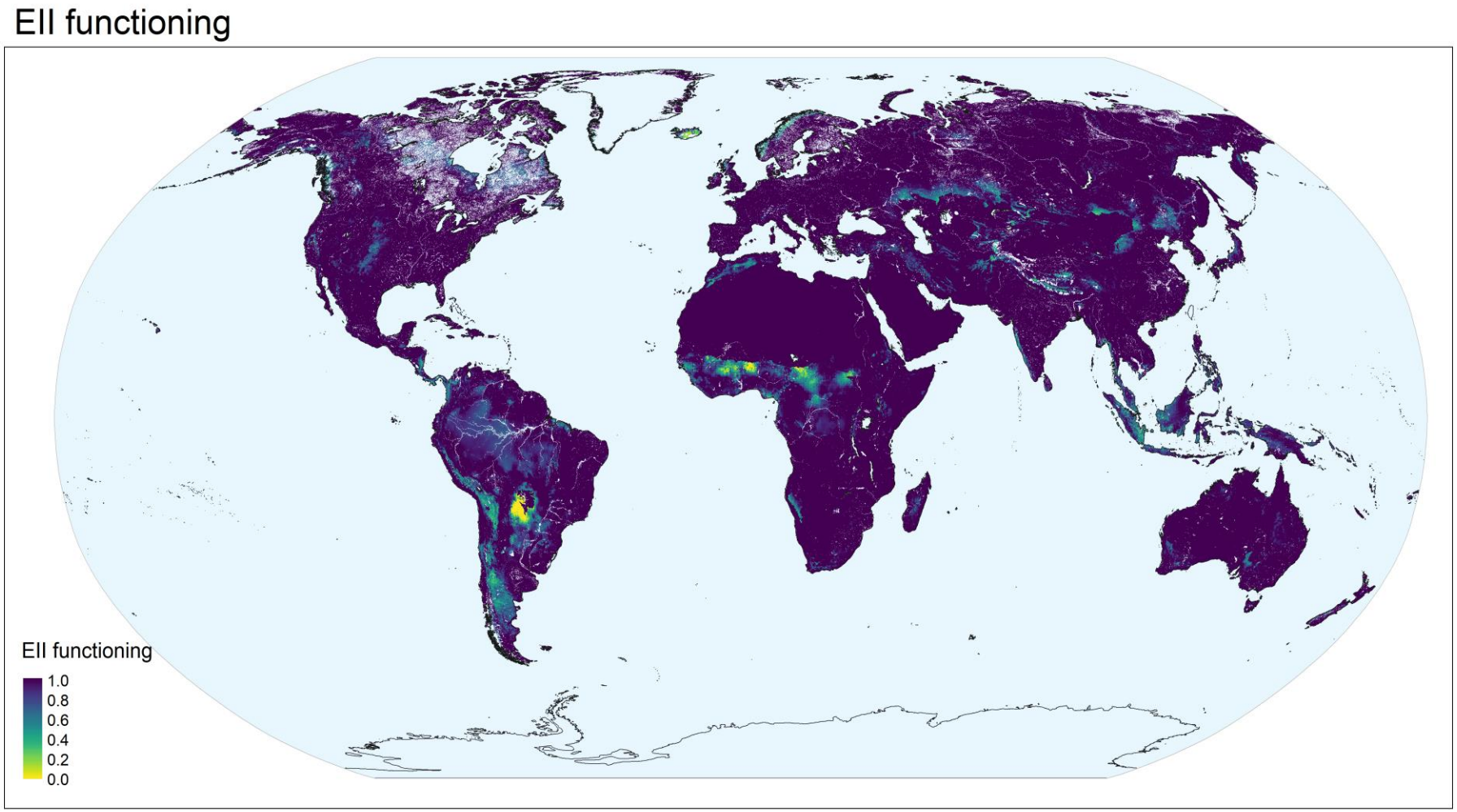
FUNCTIONAL INTEGRITY

Ecosystem function includes the processes that result from the interaction between the abiotic and biotic components

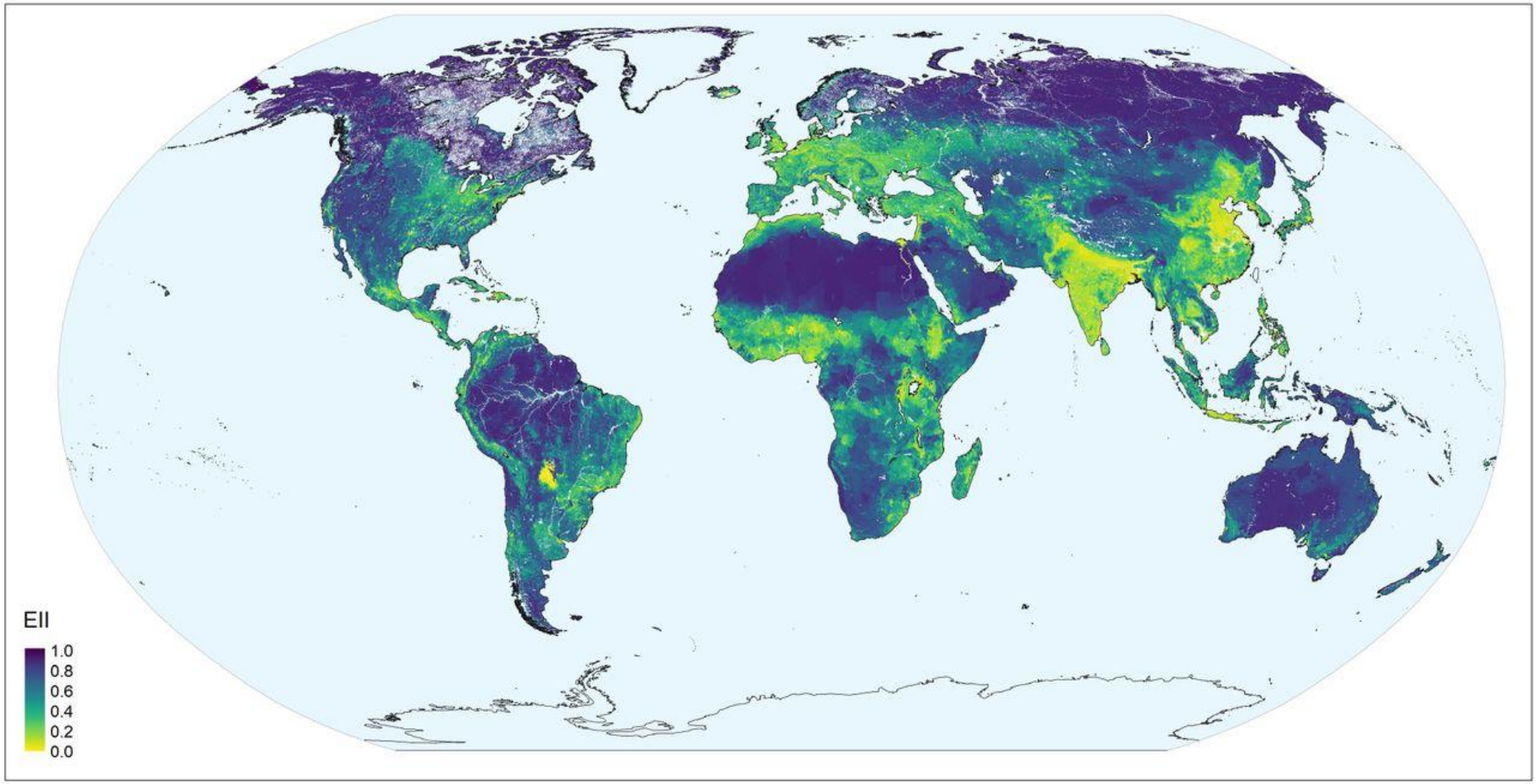
Examples: net primary productivity, nutrient retention, regulating ecosystem services (climate, water etc), functional diversity, fire regimes, nature's contributions to people

Based on contrasting current Net Primary Productivity (MODIS NPP, Zhao & Running 2010) with modelled potential NPP

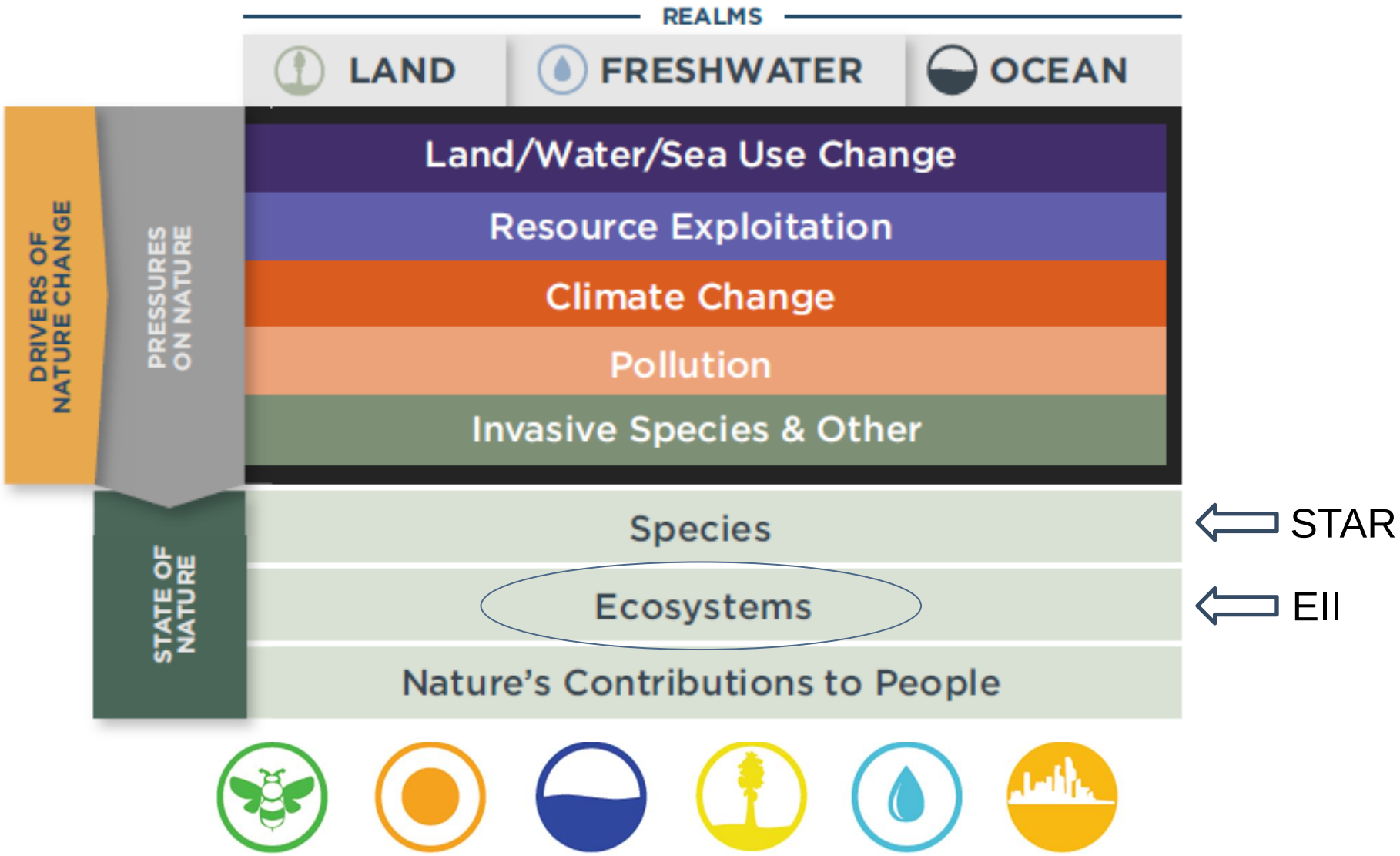
ECOSYSTEM INTEGRITY INDEX - FUNCTION



ECOSYSTEM INTEGRITY INDEX

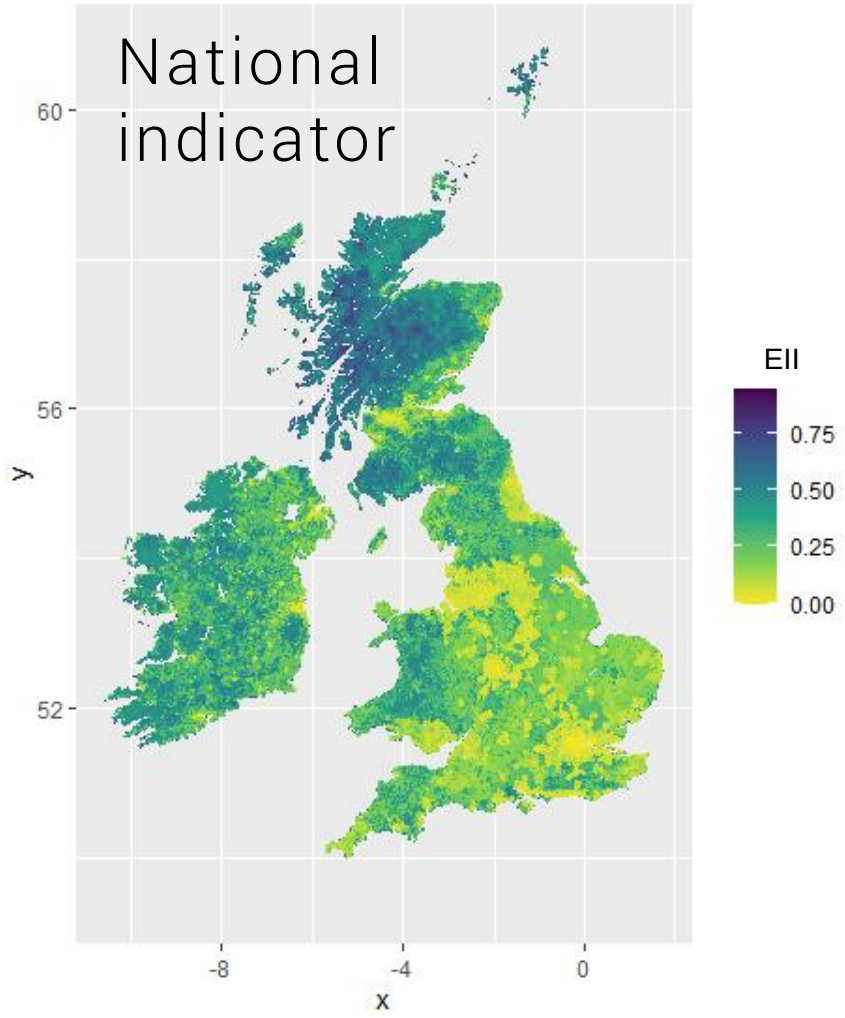


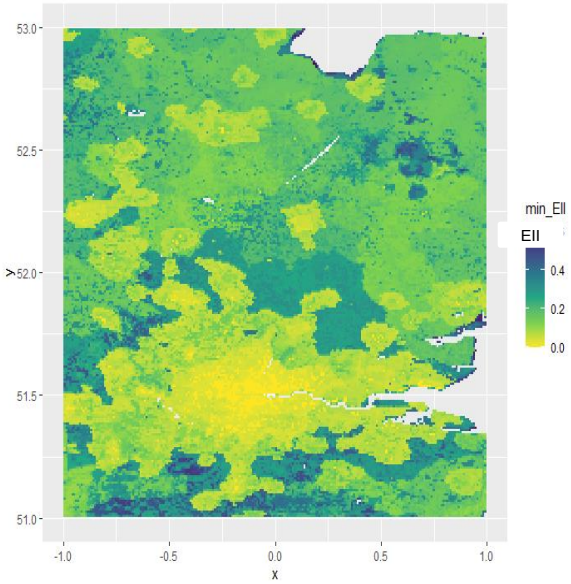
SCIENCE BASED TARGETS NETWORK

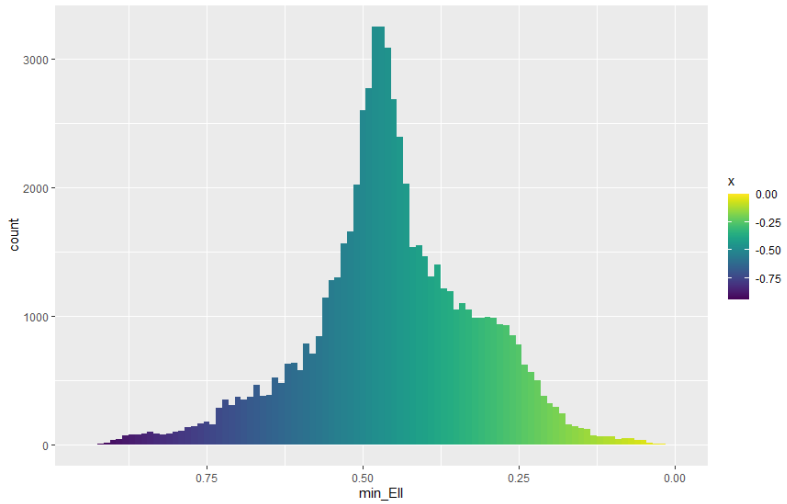


HOW BUSINESSES CAN USE EII

ECOSYSTEM INTEGRITY TARGETS AND THRESHOLDS





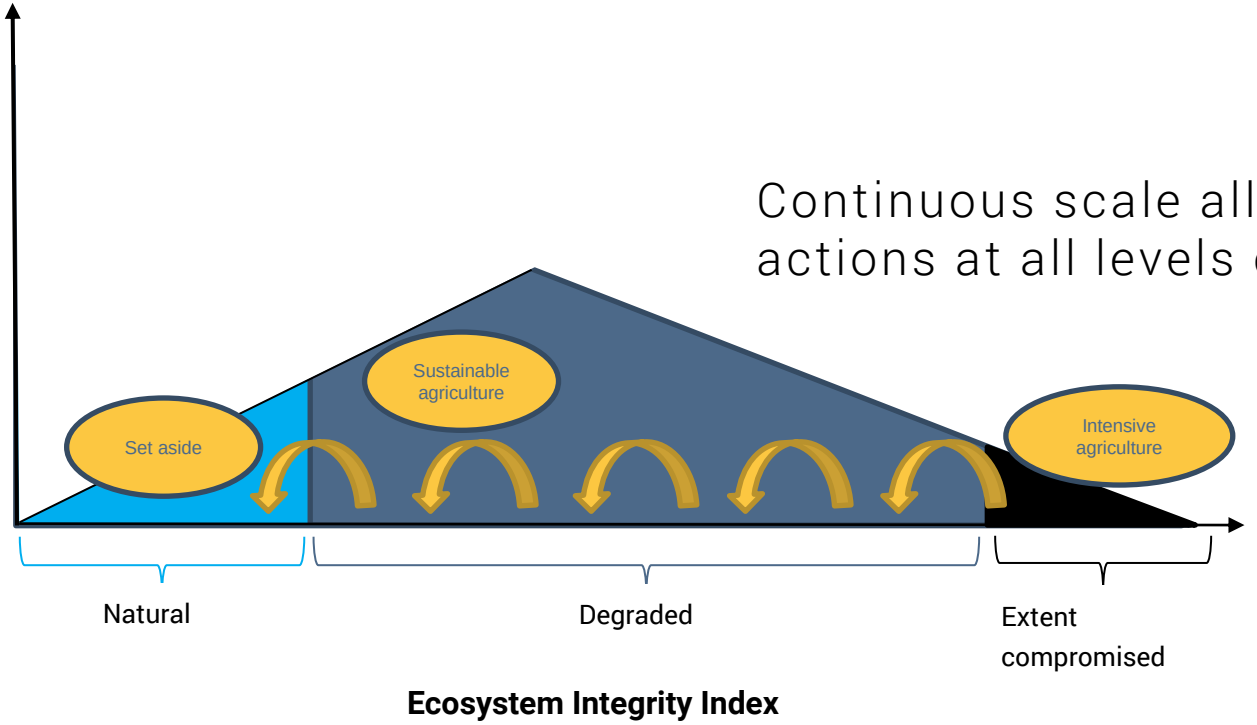


Local planning

ECOSYSTEM INTEGRITY TARGETS AND THRESHOLDS

CBD P2020 GBF Goal A The *integrity* of all ecosystems is enhanced…

Integrity of *natural* ecosystems is increased…



Continuous scale allows targeted actions at all levels of degradation

Net gain in *ecosystem area*

Knowledge of current EII allows spatial planning with *targeted restoration* including knowledge of *connectivity*…

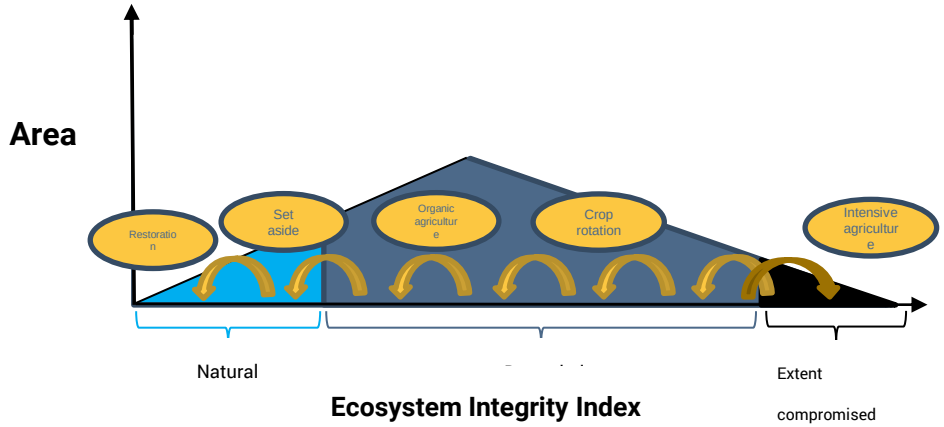
ECOSYSTEM INTEGRITY INDEX
A) TARGET SETTING FRAMEWORK

Summary of target setting framework:

- Screen company's holdings with global EII layer
- Natural vs non-natural assigned to all areas
- Natural: target of increase of EII applied to all natural areas using AVOID or RESTORE actions
- Non-natural: target of net increase of EII applied through:
  - Characterisation of current production archetypes
  - Calculation of expected change in EII through change in production archetype/management action
    - Note: could be increase or decrease
  - Calculation of area expected to be impacted
  - Area impacted x change in EII summed

across all holdings – target of positive result

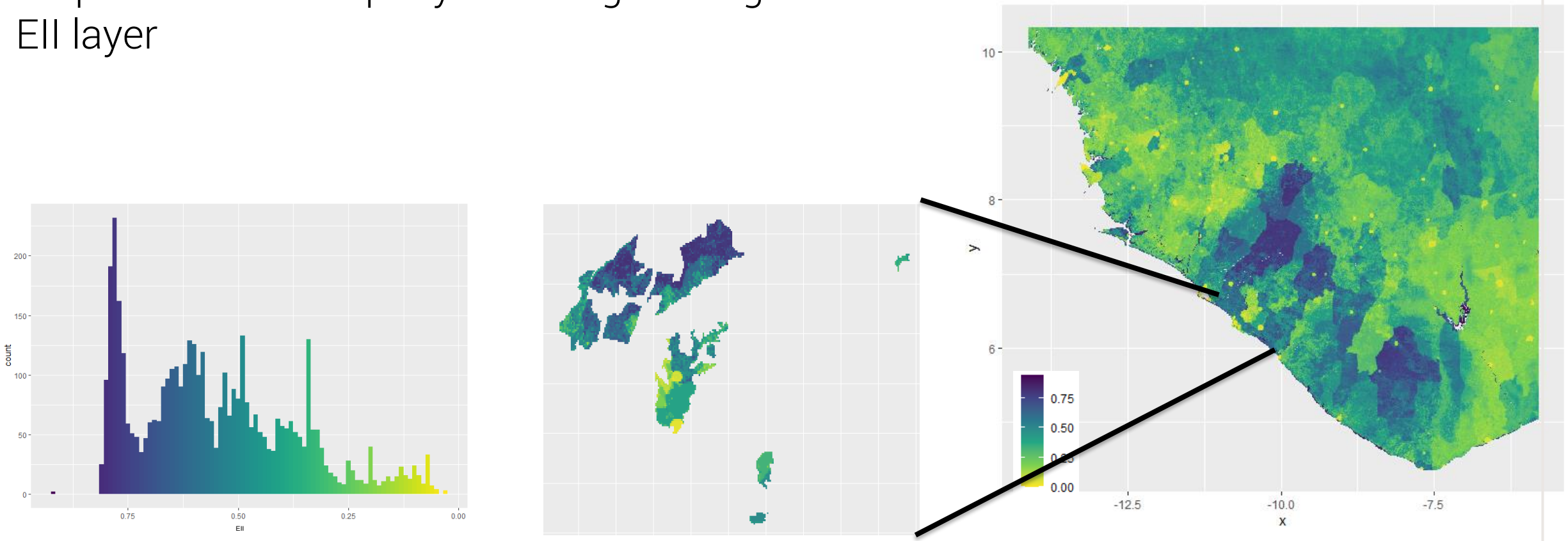
$$\sum_{n=1}^{x} \Delta EII_n \cdot A_n > 0$$



TARGET SETTING WITH SPATIAL DATA

Example: oil palm plantations in Liberia

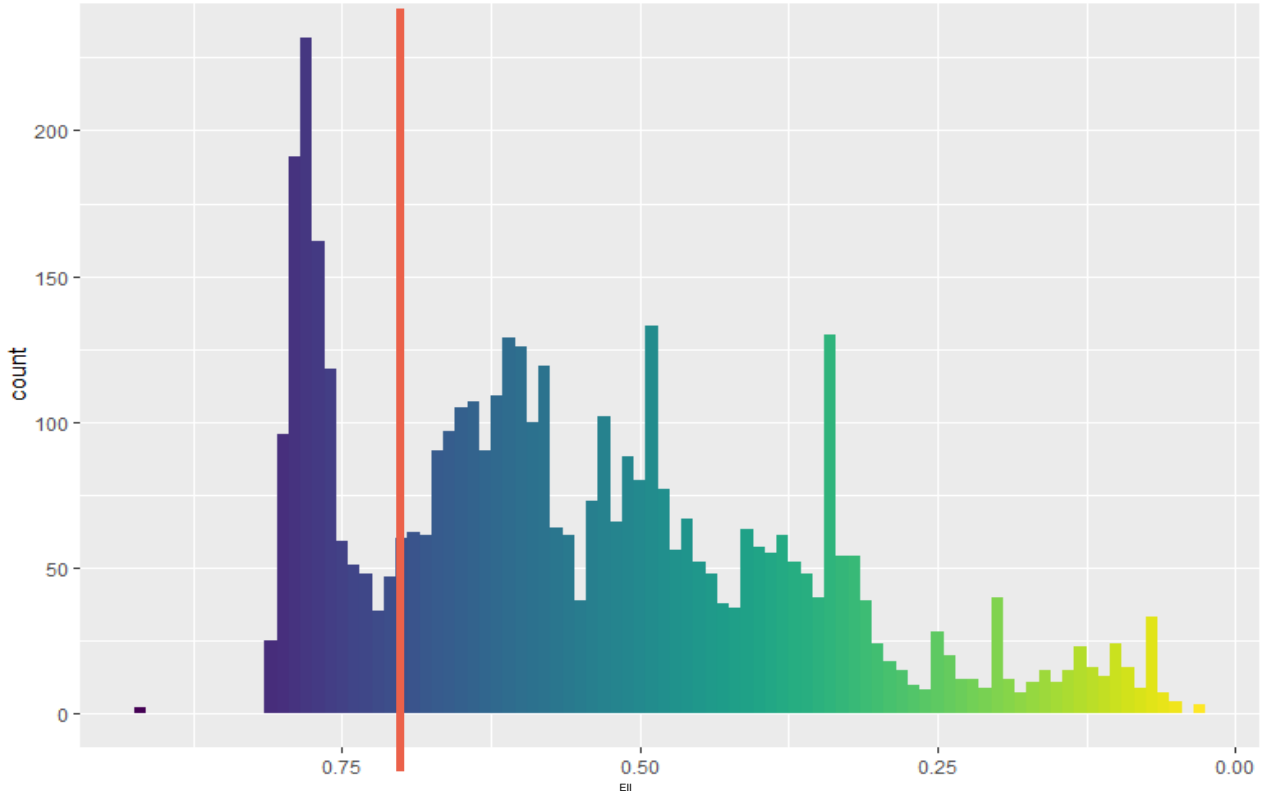
Step 1. Screen company's holdings with global EII layer



TARGET SETTING WITH SPATIAL DATA

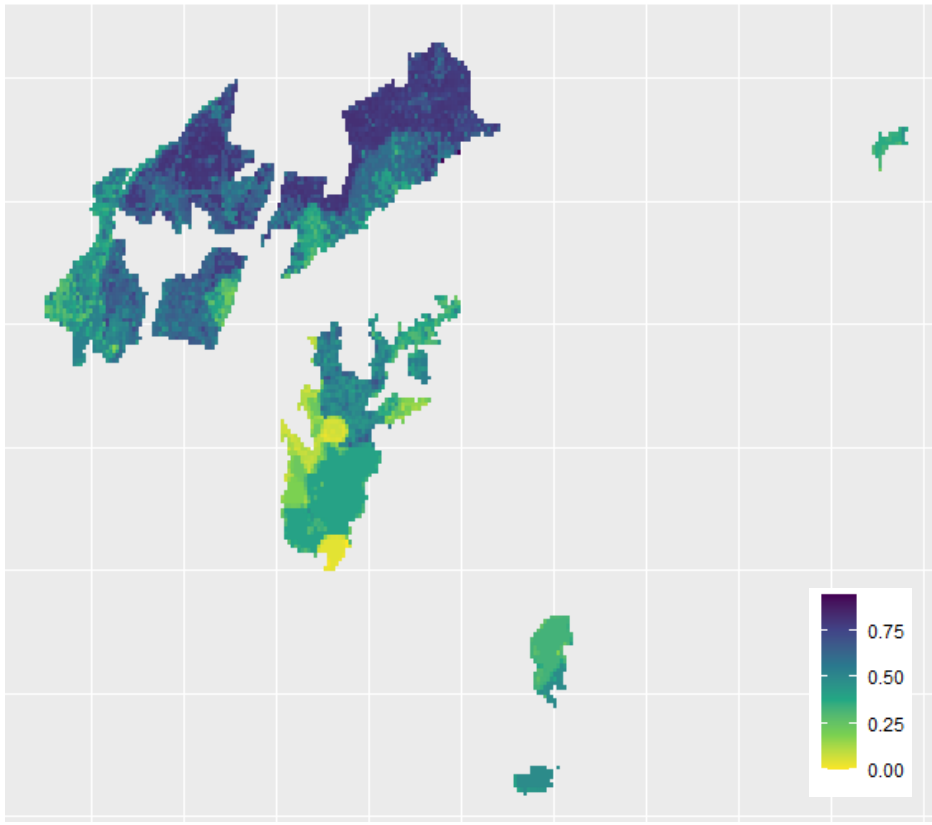
Step 2. Natural vs non-natural assigned to all areas

[Note: possibility to substitute with company data]



Natural

Non-natural



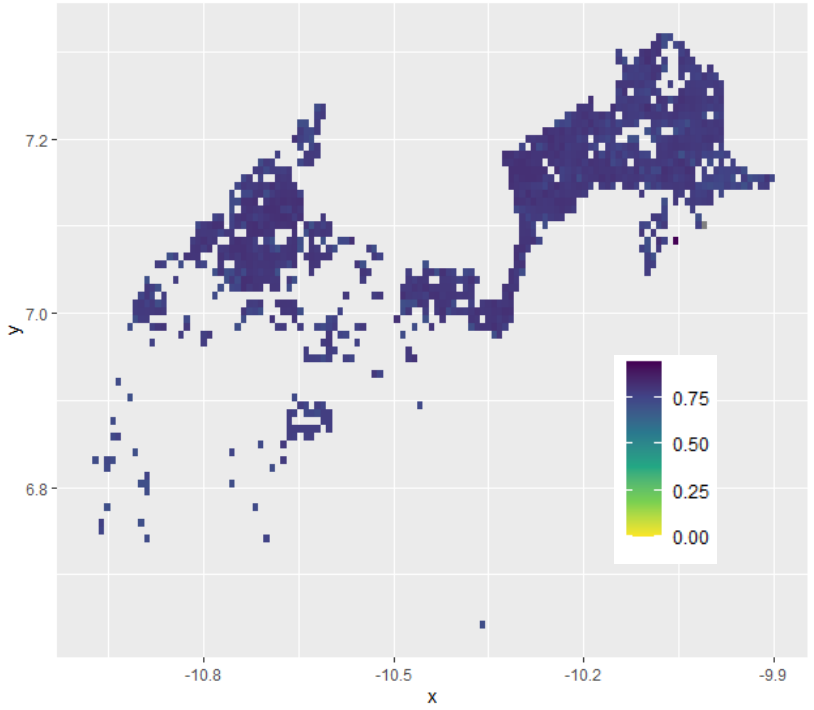
TARGET SETTING WITH SPATIAL DATA

Step 3. Natural: target of increase of EII applied to all natural areas using AVOID or RESTORE actions

Principles of *no further degradation* and *restoration where possible*

Targeted restoration actions including:

- Removal from use and/or active restoration
- Increase in connectivity
- Sustainable use including local harvest



TARGET SETTING WITH SPATIAL DATA

Step 4. Non-natural: target of net increase of EII

4a Characterisation of current production archetypes

Production system archetype	EII
Monoculture oil palm plantation	0.30
Monoculture oil palm plantation with forest strips	0.45
Agroforestry system	0.75

TARGET SETTING WITH SPATIAL DATA

Step 4. Non-natural: target of net increase of EII

4a Characterisation of current production archetypes

4b Calculation of expected change in EII through change in production archetype/management action

Production system archetype	EII
Monoculture oil palm plantation	0.30
Monoculture oil palm plantation with forest strips	0.45
Agroforestry system	0.75

TARGET SETTING WITH SPATIAL DATA

Step 4. Non-natural: target of net increase of EII

4a Characterisation of current production archetypes

4b Calculation of expected change in EII through change in production archetype/management action

4c Calculation of area expected to be impacted

Holdings	ΔEII	Area (km^2)
Farm 1	0.20	30
Farm 2	-0.39	5

TARGET SETTING WITH SPATIAL DATA

Step 4. Non-natural: target of net increase of EII

4a Characterisation of current production archetypes

4b Calculation of expected change in EII through change in production archetype/management action

4c Calculation of area expected to be impacted

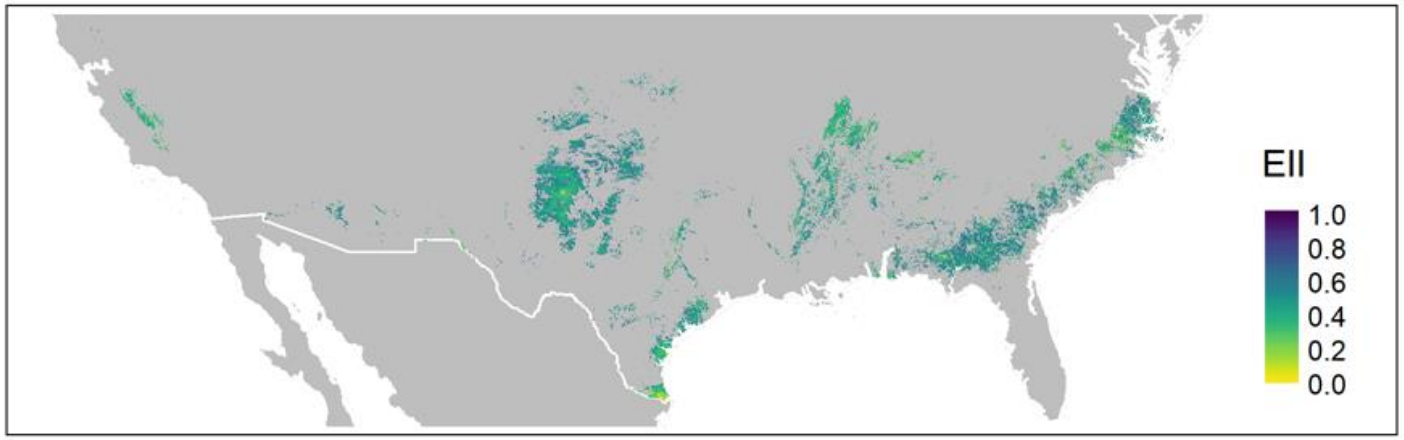
4d Area impacted x change in EII summed across all holdings with a target of positive change

(0.2x30)+(-0.39X5) = 4.05

$$\sum_{n=1}^{x} \Delta EII_n . A_n > 0$$

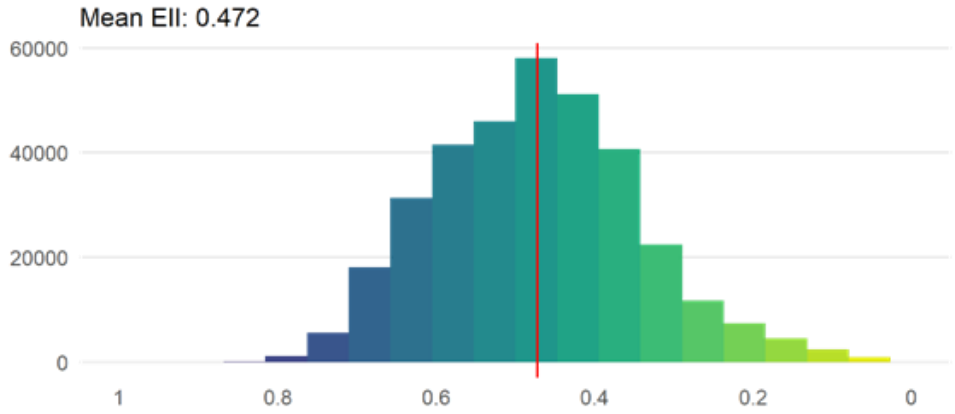
Holdings	ΔEII	Area (km^2)
Farm 1	0.20	30
Farm 2	-0.39	5

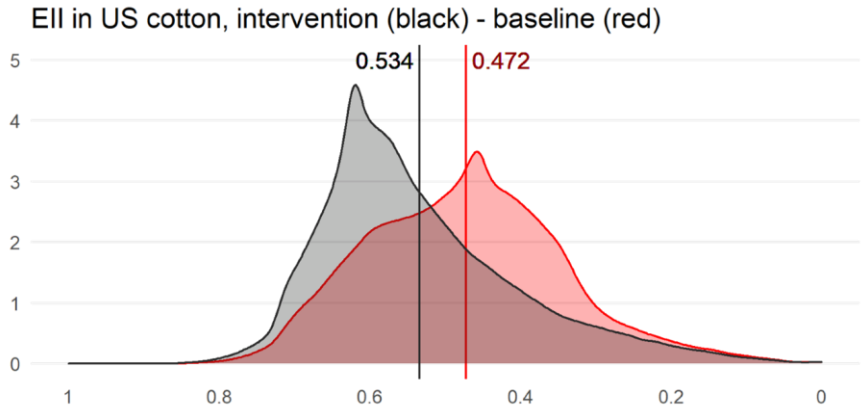
ECOSYSTEM INTEGRITY INDEX
B) PROJECTING THE IMPACT OF BUSINESSES' INTERVENTION



Example 1

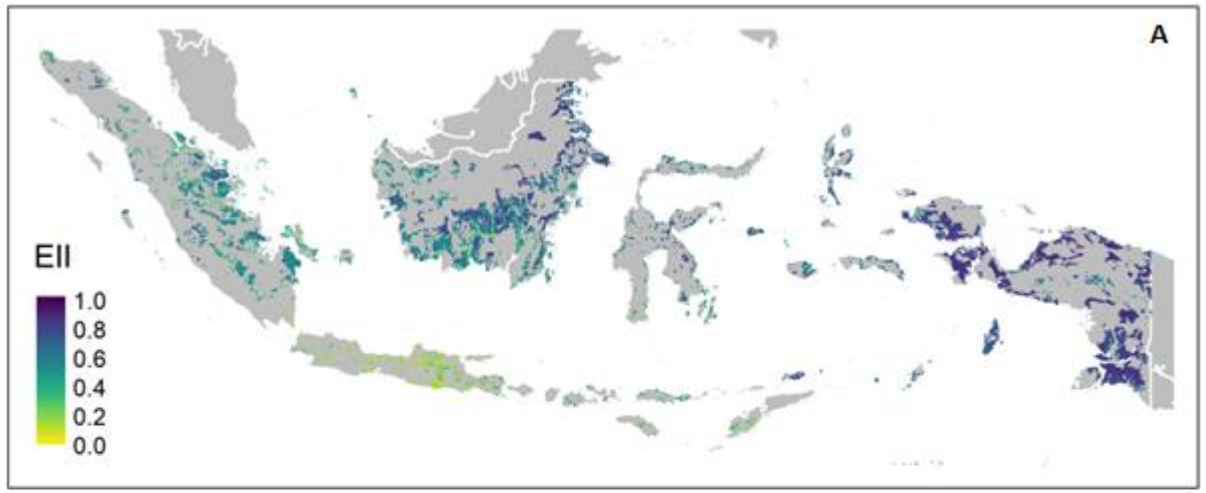
Figures show the estimated impacts of a switch in cotton production from traditional to organic practices in cotton fields found in the USA

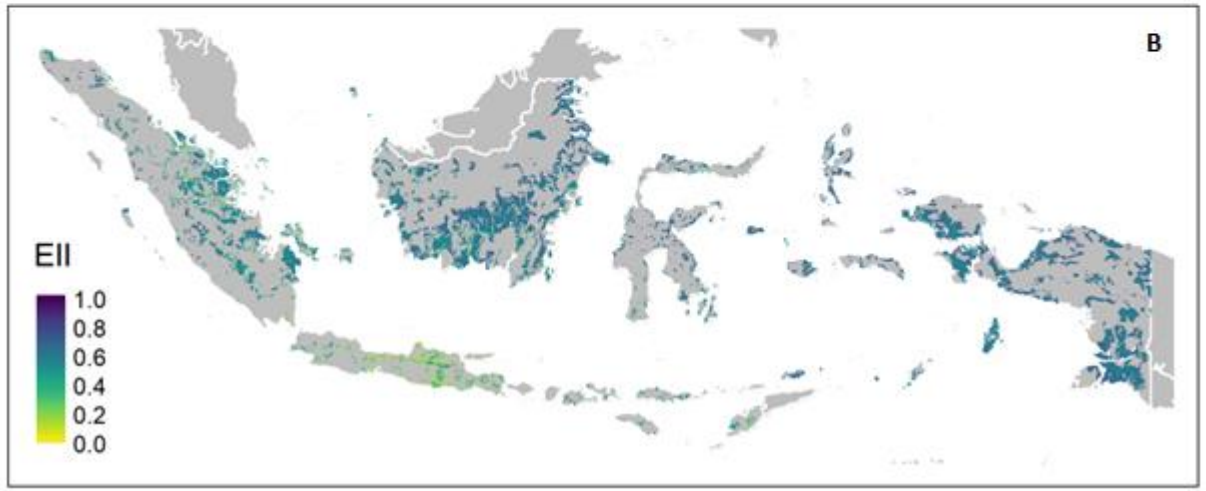


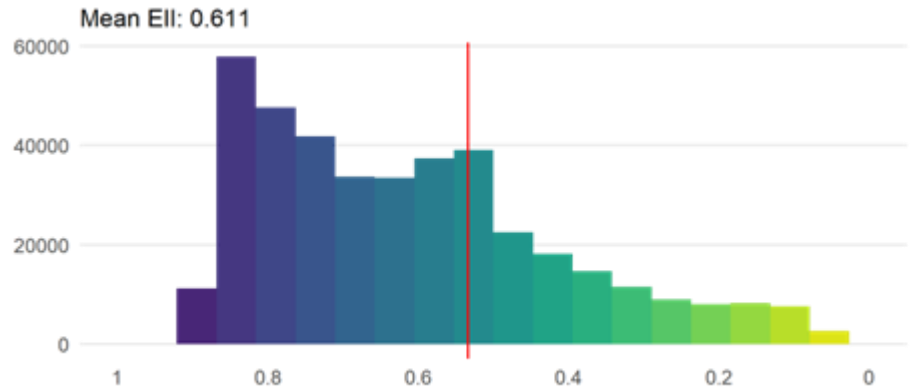


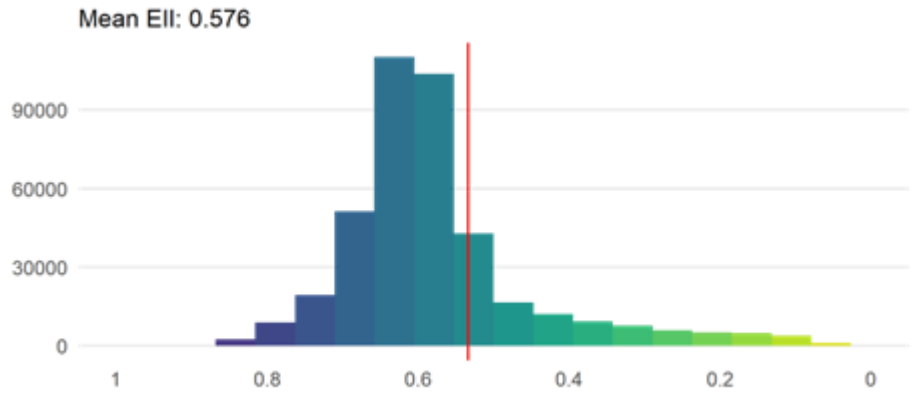
Example 2

The maps show (A) EII of viscose producing areas in Indonesia with areas predicted to be deforested left intact (intervention scenario), and (B) with deforestation occurring in predicted areas (no intervention).





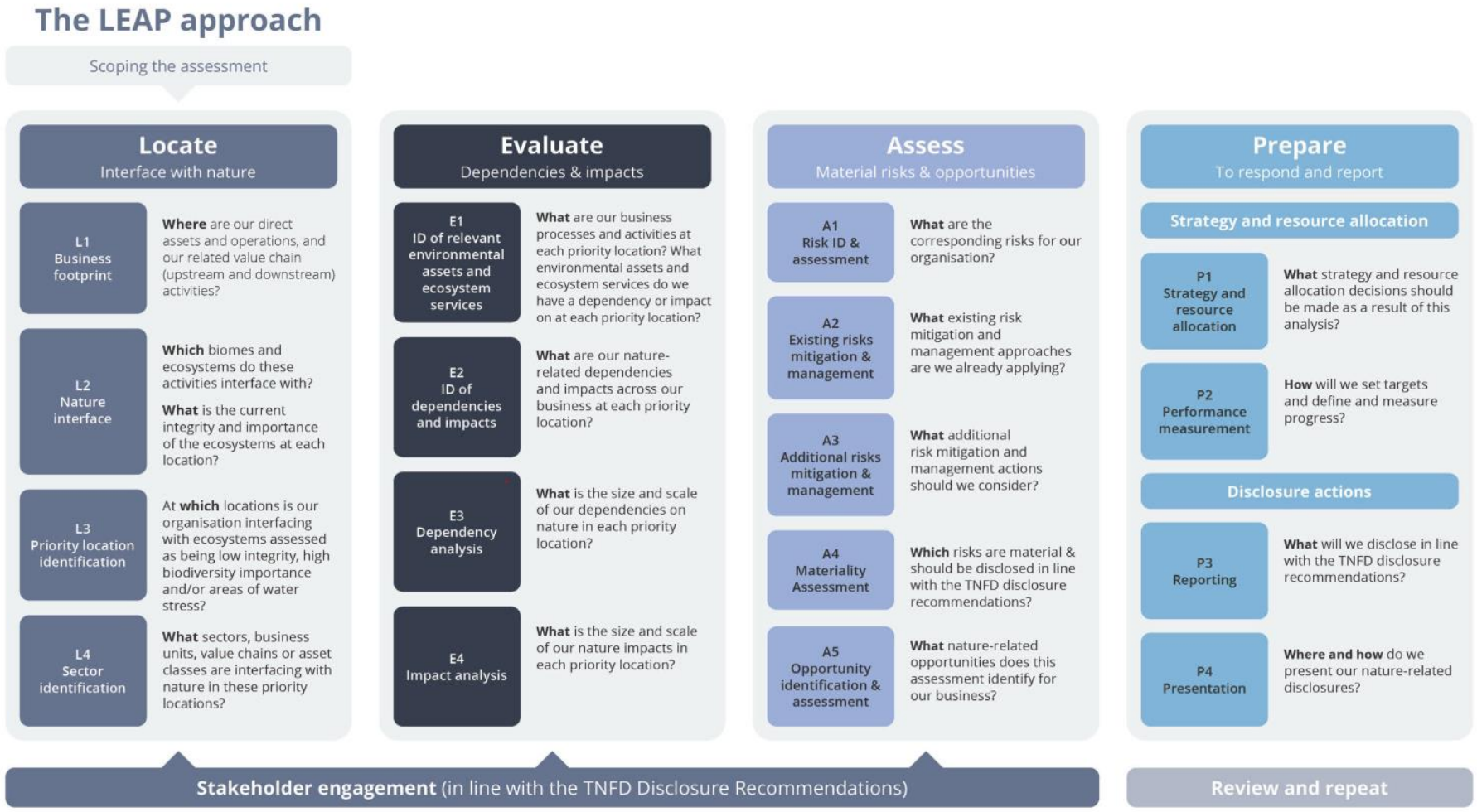




EII AND SBTN INITIAL GUIDANCE

SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE

POTENTIAL USE OF EII IN TNFD



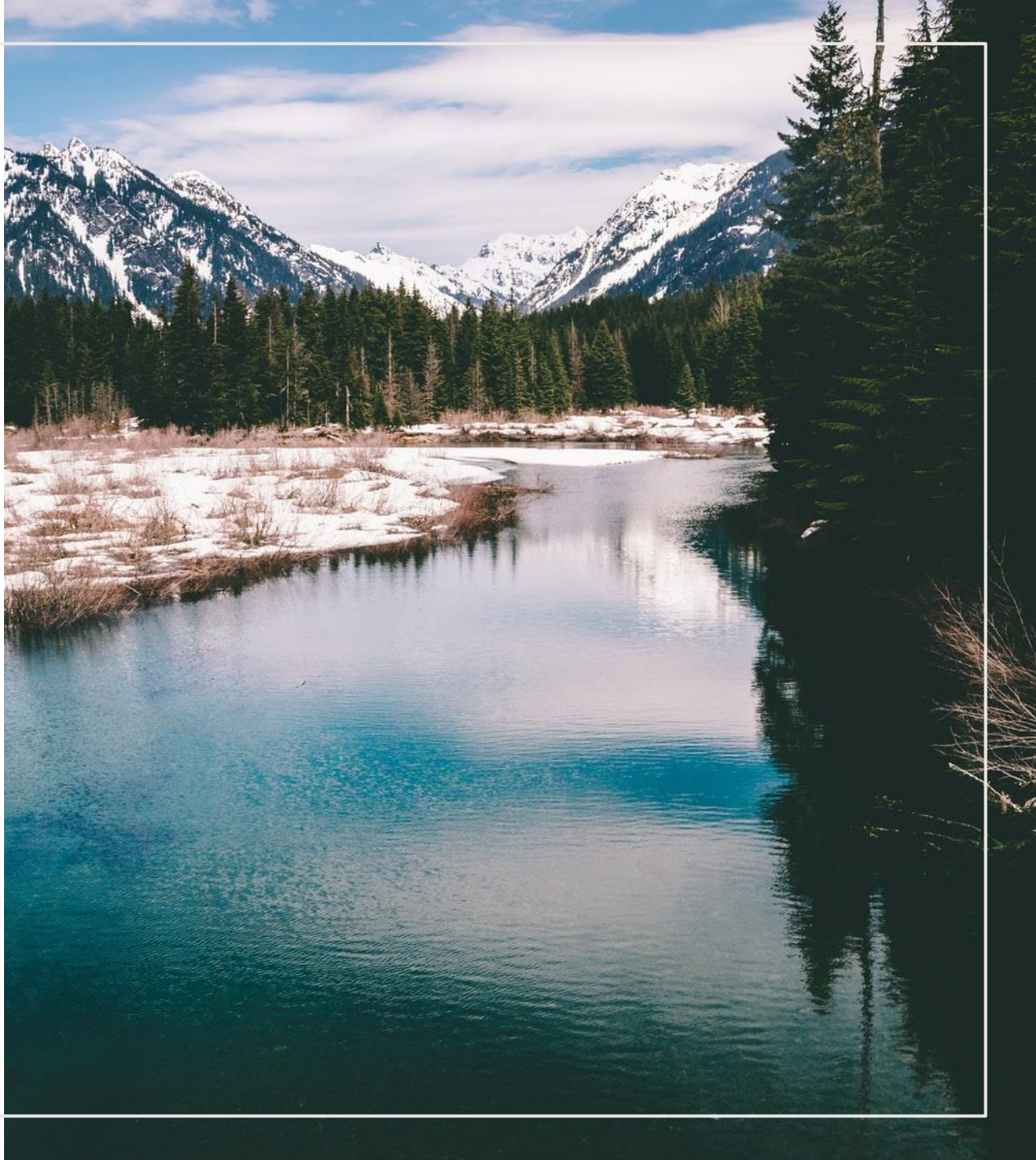
* The integration of EII in TNFD is not confirmed.

TNFD Beta framework v0.2, 2022

THE EII METHODOLOGY PAPER AND NEXT STEPS

NEXT STEPS

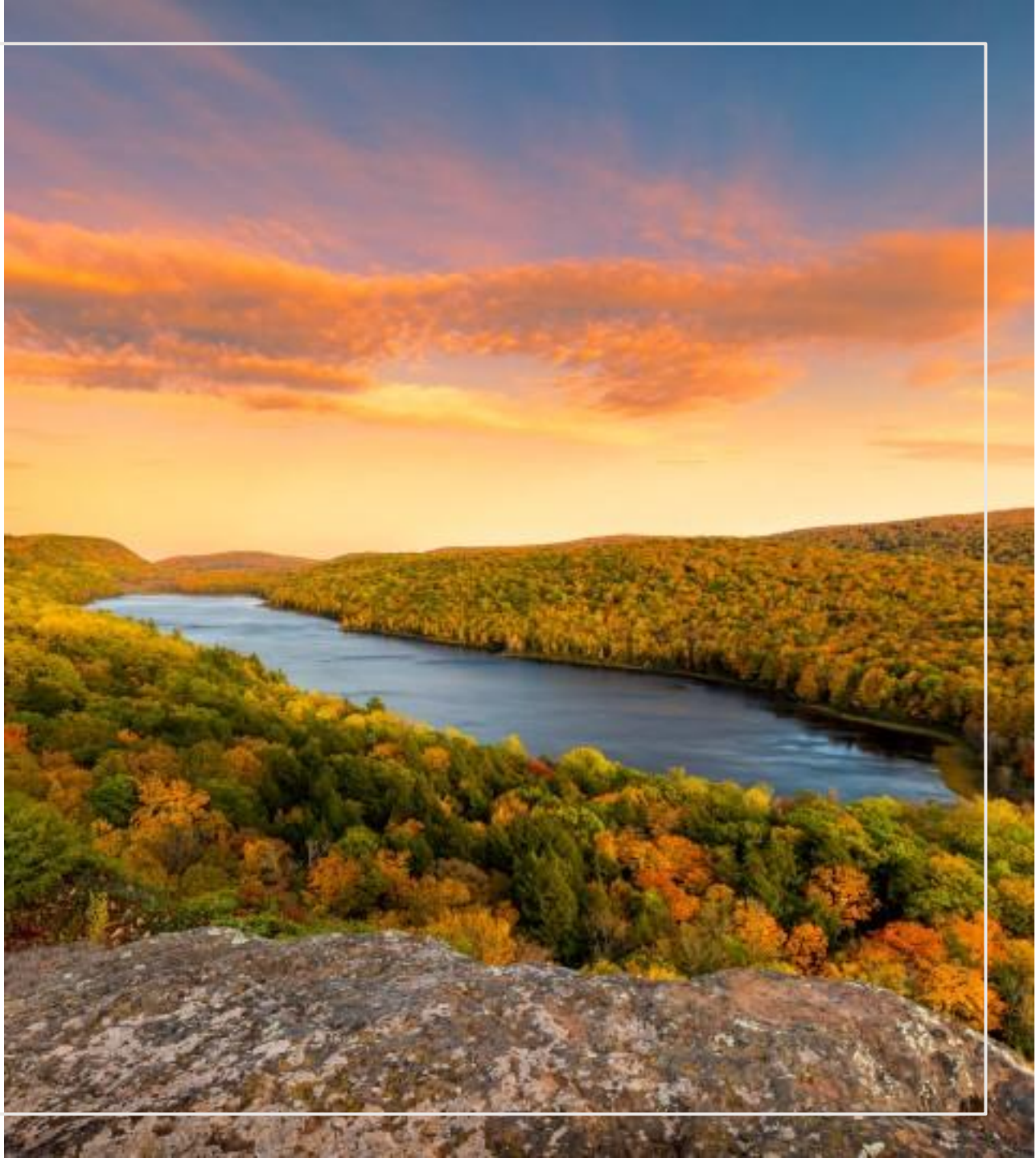
1. Peer-review publication of EII
2. Build a portfolio of EII production archetypes
3. Methodology for businesses paper



HOW TO ACCESS EII LAYER AND METHODS

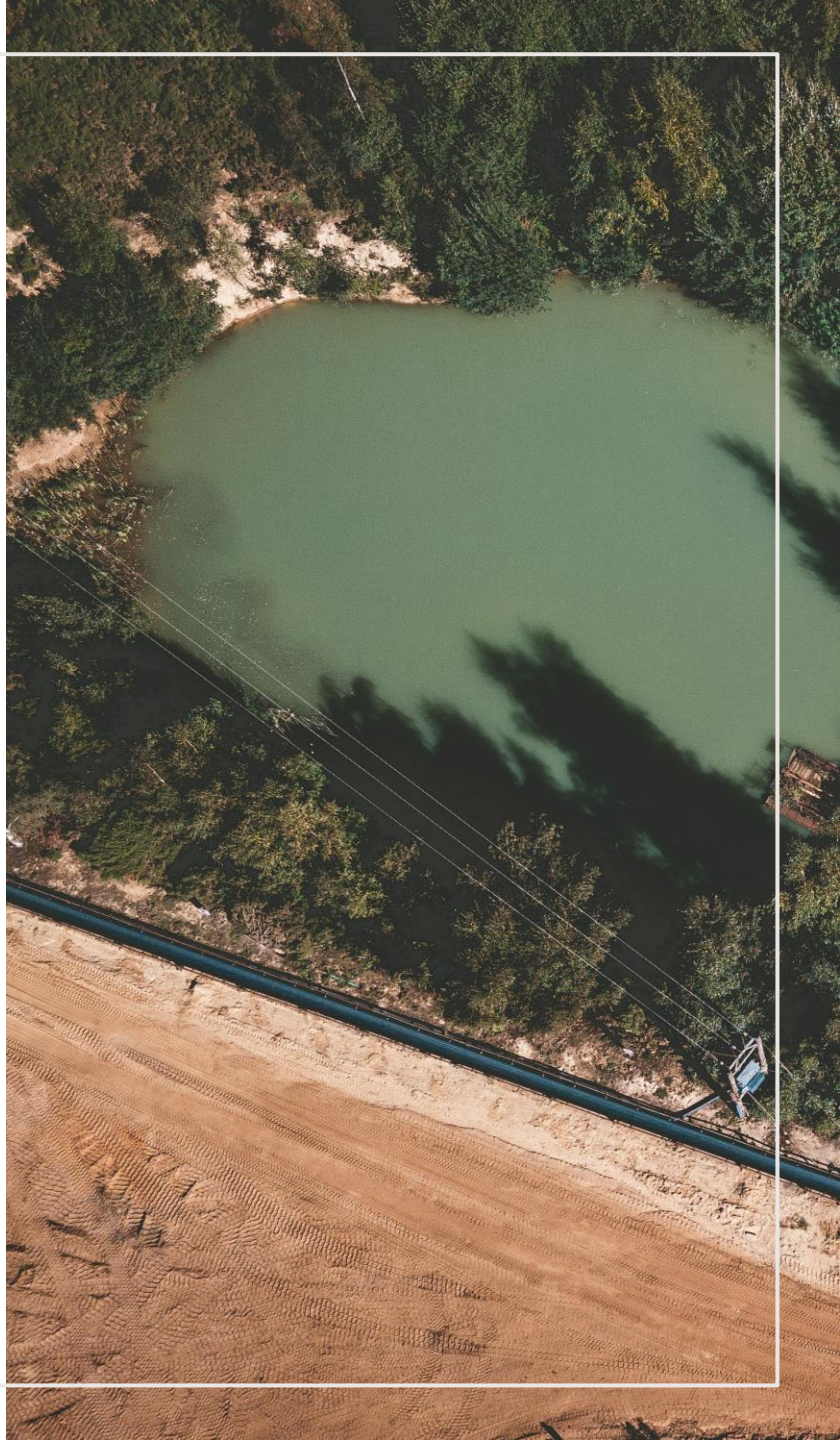
- Release of EII layer for commercial use with peer-reviewed publication

- Share your interest in piloting EII by reaching out to the UNEP-WCMC Proteus team



PROVIDING FEEDBACK TO EII DEVELOPMENT AND METHODS

- Share with us your use cases
- Does your spatial look different? (type of data, resolution)



Thank you

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