The Global Ecosystems Atlas

BioClima Webinar: Understanding Biodiversity in Times of Climate Change (24 April 2026)

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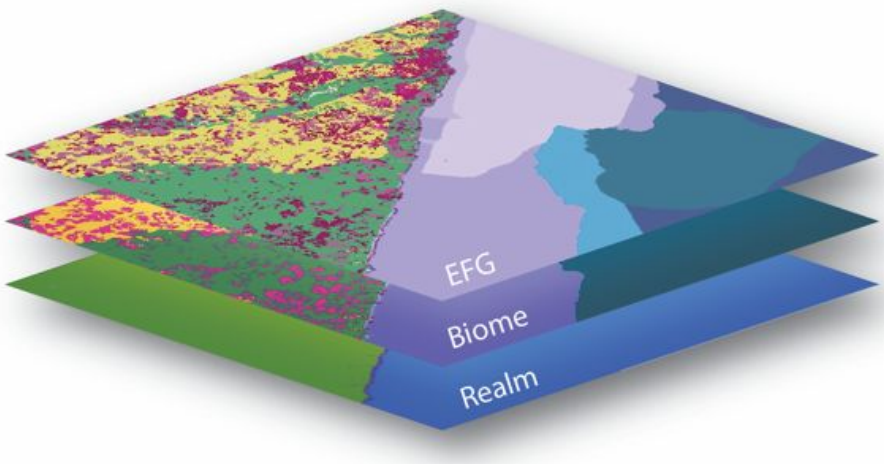
The GEO Global Ecosystems Atlas

- A **comprehensive, harmonised, open resource** on the extent of all the world's ecosystems.
- A Global Biodiversity Framework (GBF) supported project.
- Aims to enable **global scale** ecosystem assessments, environmental accounting, spatial planning, with consistency, comparability and coherence.
- Streamlines national reporting on **ecosystem-related indicators** of the GBF and strengthen implementation of NBSAPs.

Phase 1: Why start with a synthesis map?

A Global Ecosystems Atlas data product representing the known distribution of ecosystems is needed to **underpin** a very broad range of downstream initiatives.



Baseline knowledge

- Global extent of ecosystem type (e.g. Allen Coral Atlas)
- Identifies data gaps on Earth where there are no spatial data on ecosystem distributions
- Offers boundaries for *any* ecosystem analysis (e.g. intactness, proportion degraded)
- **Needed for ecosystem richness (number of ecosystem types per given area)**

Proportion of ecosystem protected (%)

- 30 x 30 targets

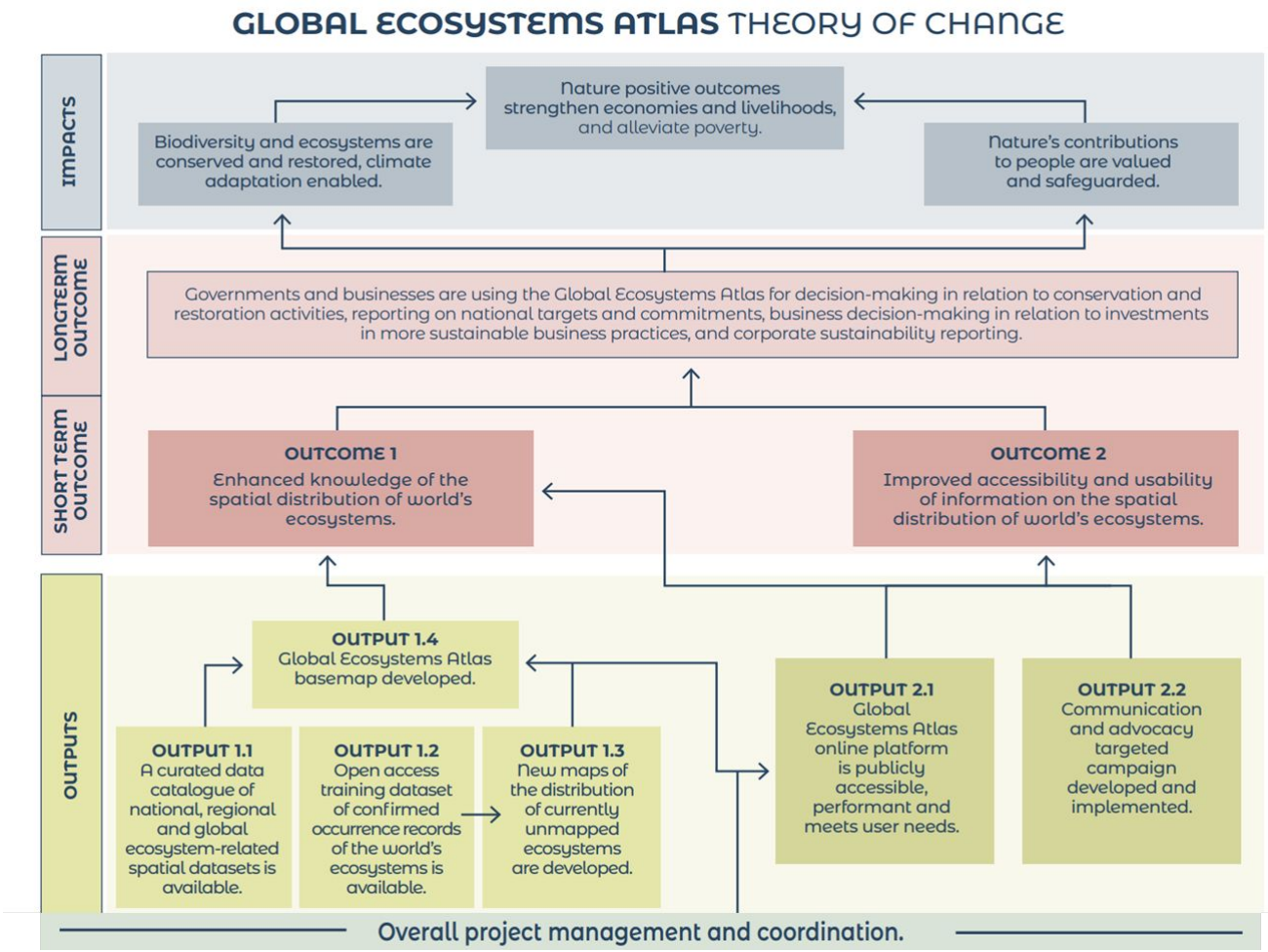
Underpins proportion of ecosystem degraded (%)

- GBF Target 3
- Red List of Ecosystems

Underpins change mapping (% change)

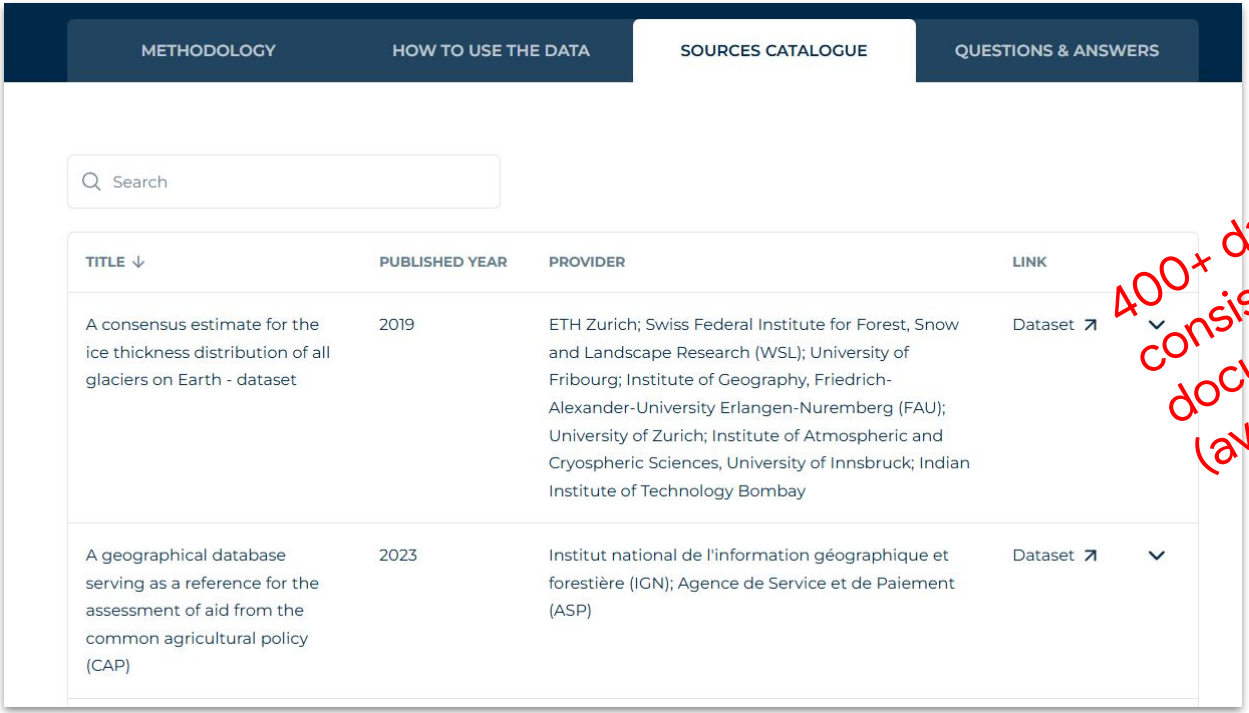
- First in a **time-series** of extent maps (e.g. Global Mangrove Watch, Global Tidal Flats, Sea Ice monitoring data)
- Baseline for advanced **change detection** methods and **alert systems** (e.g. Global Forest Watch, Global Intertidal Change)

Global Ecosystems Atlas: Phase 1 value offering



1. Synthesis workstream: existing data

The Atlas data catalogue



400+ datasets now consistently documented (available on github)

www.globalecosystemsatlas.org

Evaluation procedure

- Supports synthesis decisions during data synthesis
- Enables quality data into the Atlas
- Currently founded on a set of data evaluation attributes at the ‘metadata’ level:
    - Intended to represent ecosystems
    - Detailed documentation
    - Validation reported
    - Time since development (currency of data)

Cross-referencing using the IUCN Global Ecosystem Typology

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A function-based typology for Earth's ecosystems

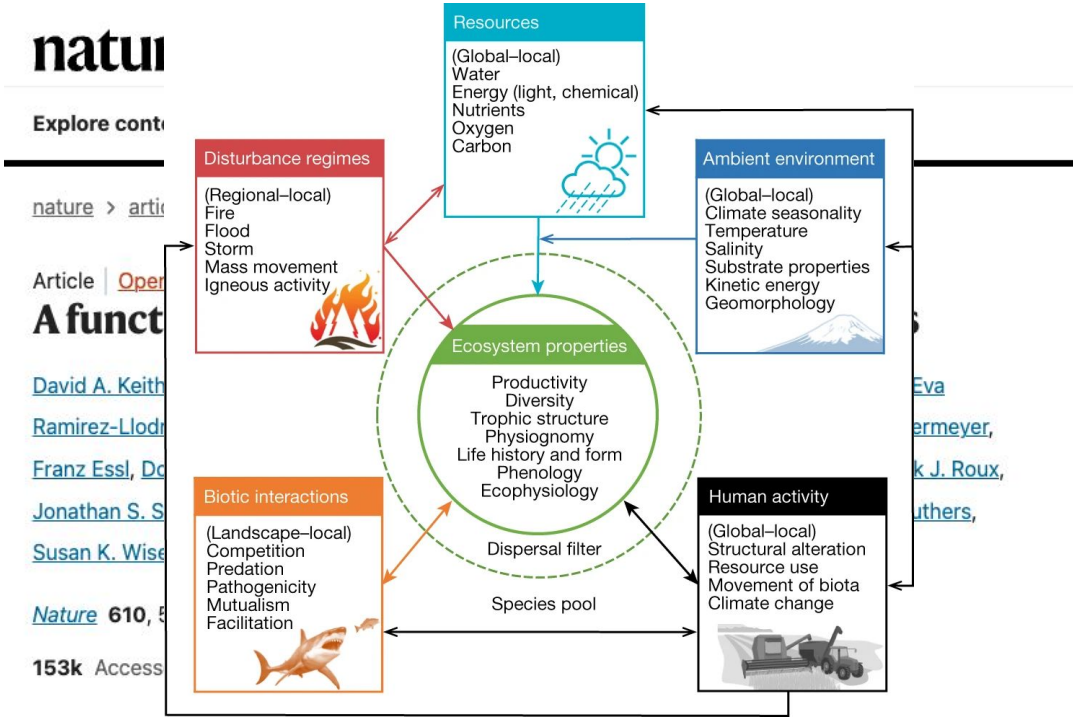
David A. Keith, José R. Ferrer-Paris, Emily Nicholson, Melanie J. Bishop, Beth A. Polidoro, Eva Ramirez-Llodra, Mark G. Tozer, Jeanne L. Nel, Ralph Mac Nally, Edward J. Gregr, Kate E. Watermeyer, Franz Essl, Don Faber-Langendoen, Janet Franklin, Caroline E. R. Lehmann, Andrés Etter, Dirk J. Roux, Jonathan S. Stark, Jessica A. Rowland, Neil A. Brummitt, Ulla C. Fernandez-Arcaya, Iain M. Suthers, Susan K. Wiser, Ian Donohue, ... Richard T. Kingsford + Show authors

Nature **610**, 513–518 (2022) | Cite this article

153k Accesses | **309** Citations | **557** Altmetric | Metrics

https://www.nature.com/articles/s41586-022-05318-4#

Cross-referencing using the IUCN Global Ecosystem Typology



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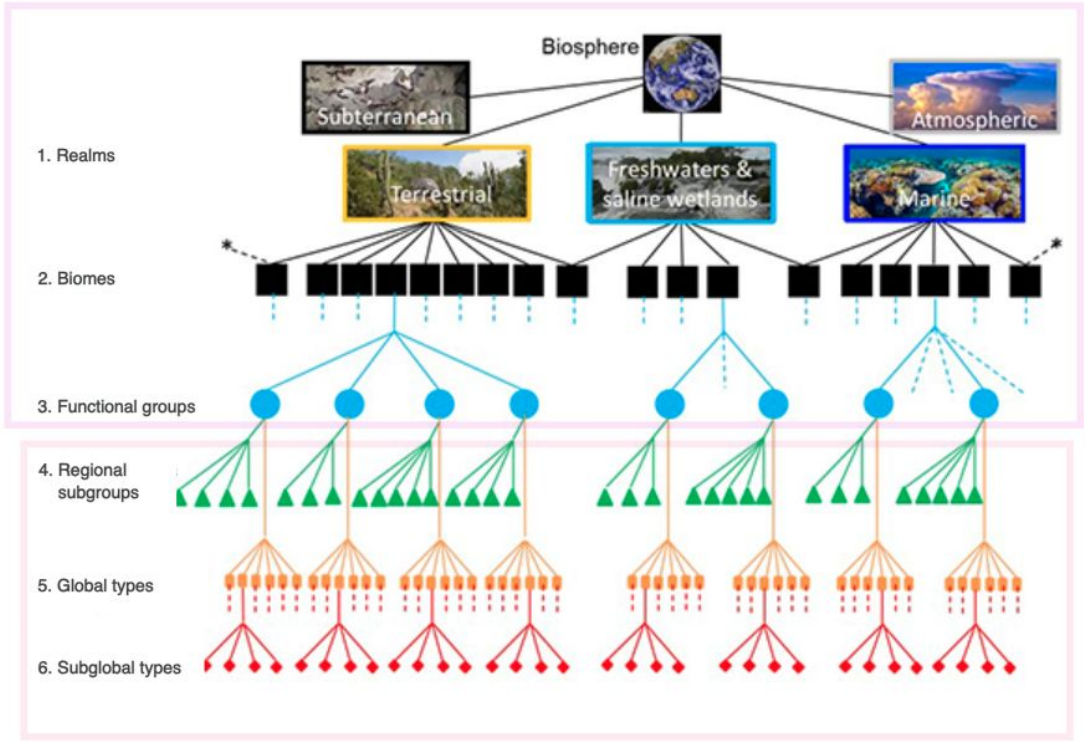

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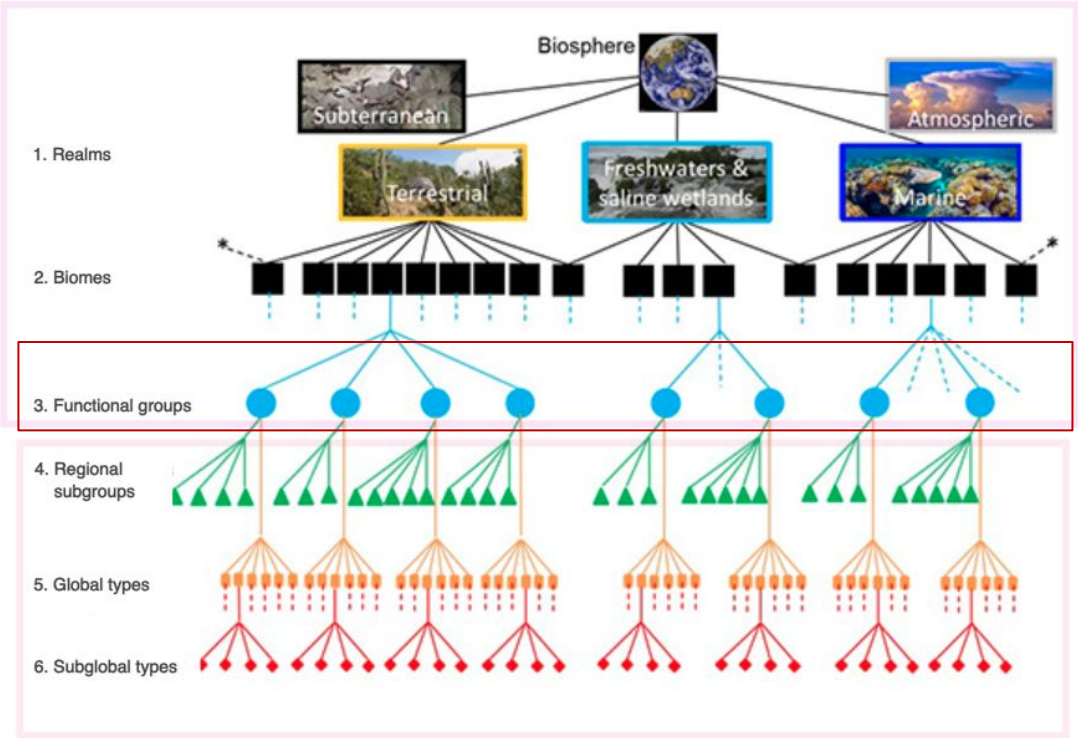
Cross-referencing using the IUCN Global Ecosystem Typology



https://global-ecosystems.org/

Cross-referencing using the IUCN Global Ecosystem Typology

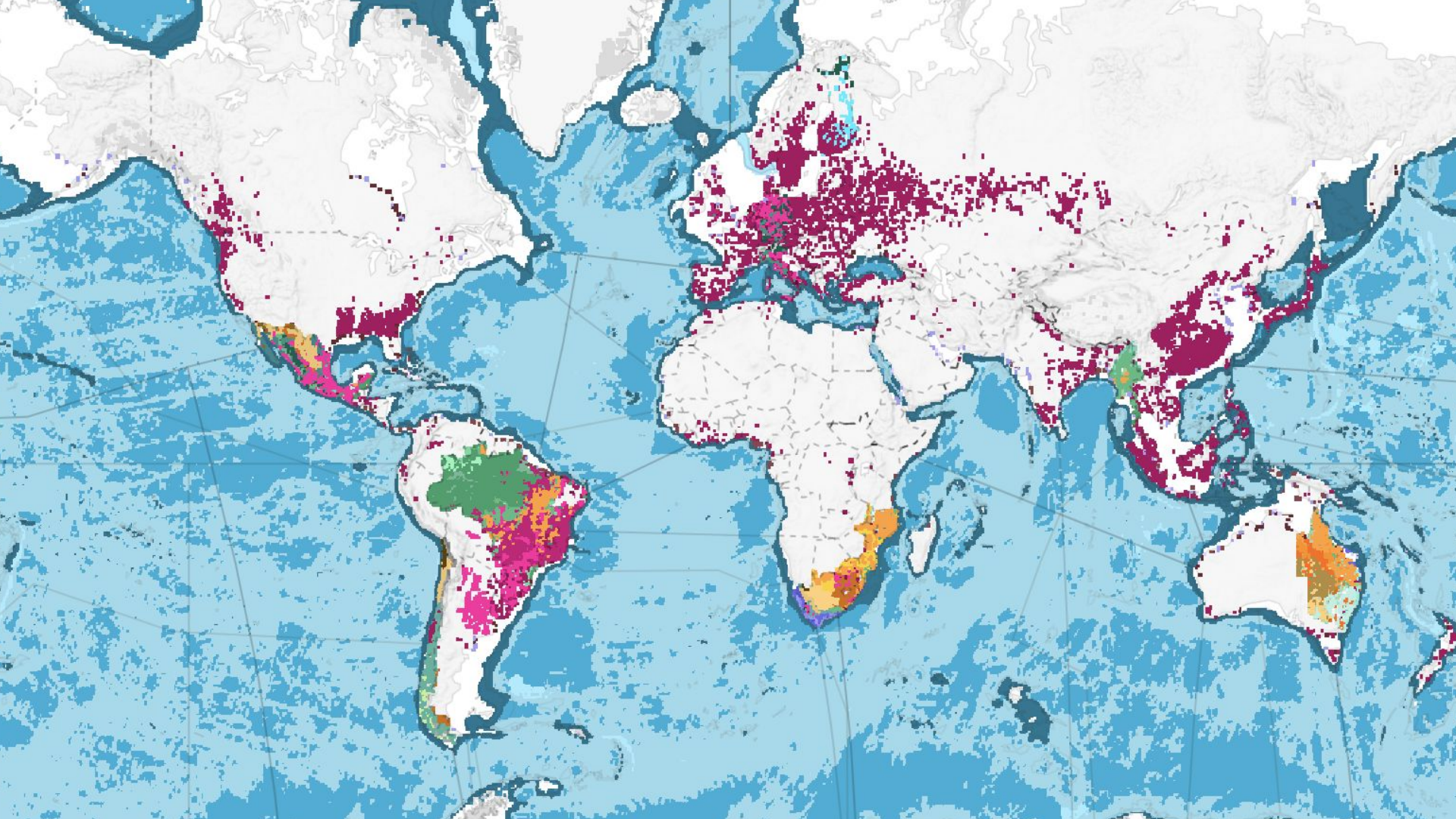
Standards, methods and guidelines for cross-referencing ecosystem classifications and maps to the IUCN Global Ecosystem Typology

IUCN Commission on Ecosystem Management
Red List of Ecosystems Thematic Group

Edited by David A. Keith, Anisha Dayaram, Amanda Driver, José Ferrer-Paris, Roxane Francis, Sylvia Hay, Nicholas J. Murray, Emily Nicholson, Julianna Santos, Andrew L. Skowno and Mark G. Tozer

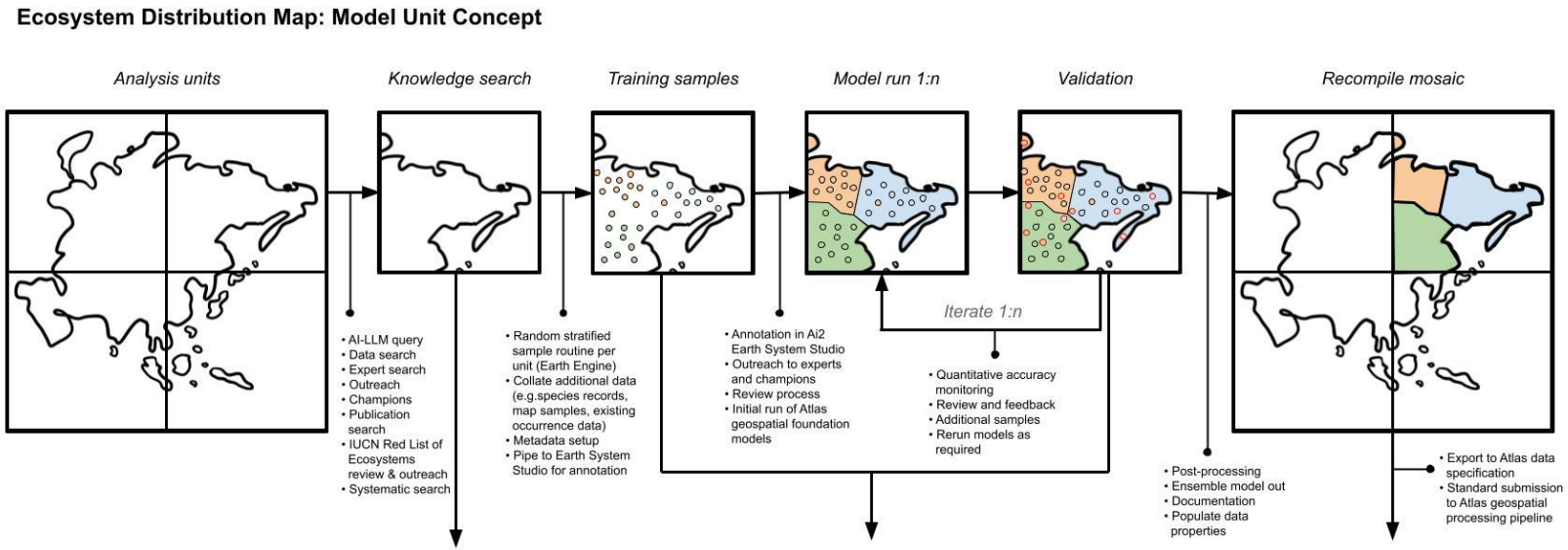
Version 1.0

https://portals.iucn.org/library/node/52571



2. Spatial modelling stream

AI and the use of geospatial foundation models



Global Ecosystems Data Catalogue

A database that collates metadata on the world's existing geospatial data of ecosystems.

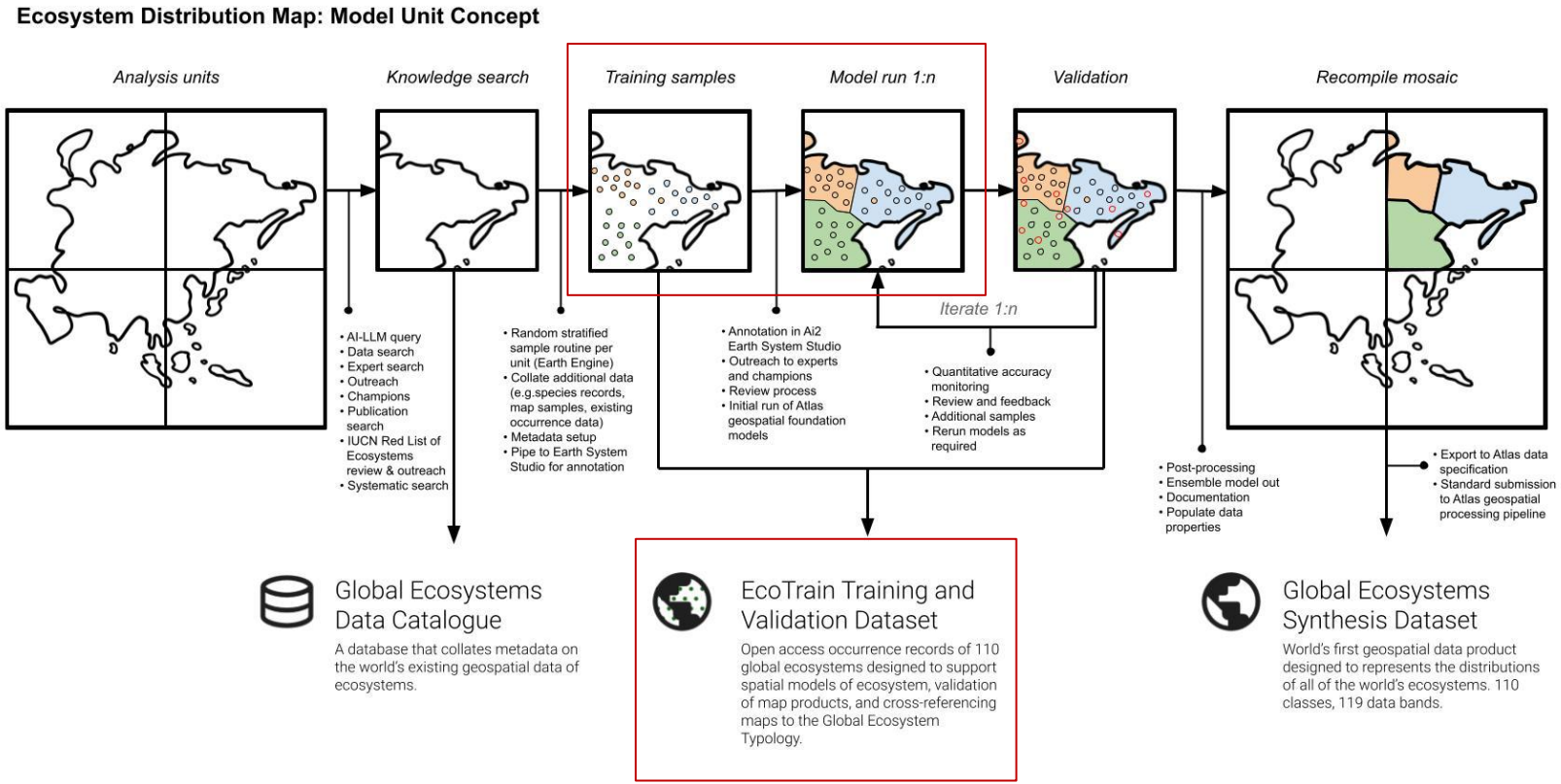
EcoTrain Training and Validation Dataset

Open access occurrence records of 110 global ecosystems designed to support spatial models of ecosystem, validation of map products, and cross-referencing maps to the Global Ecosystem Typology.

Global Ecosystems Synthesis Dataset

World's first geospatial data product designed to represents the distributions of all of the world's ecosystems. 110 classes, 119 data bands.

AI and the use of geospatial foundation models



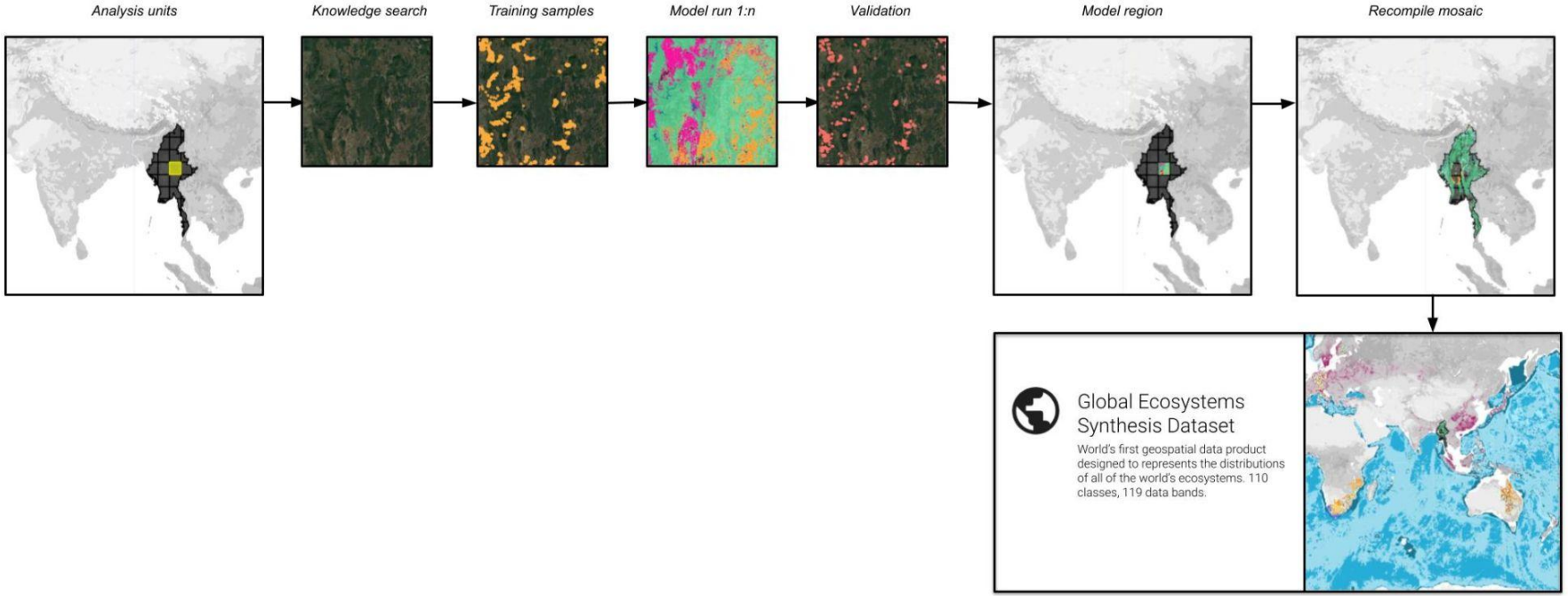
Activating new sources of data for interpretation: GBIF integration

Activating new sources of data for interpretation: GBIF integration

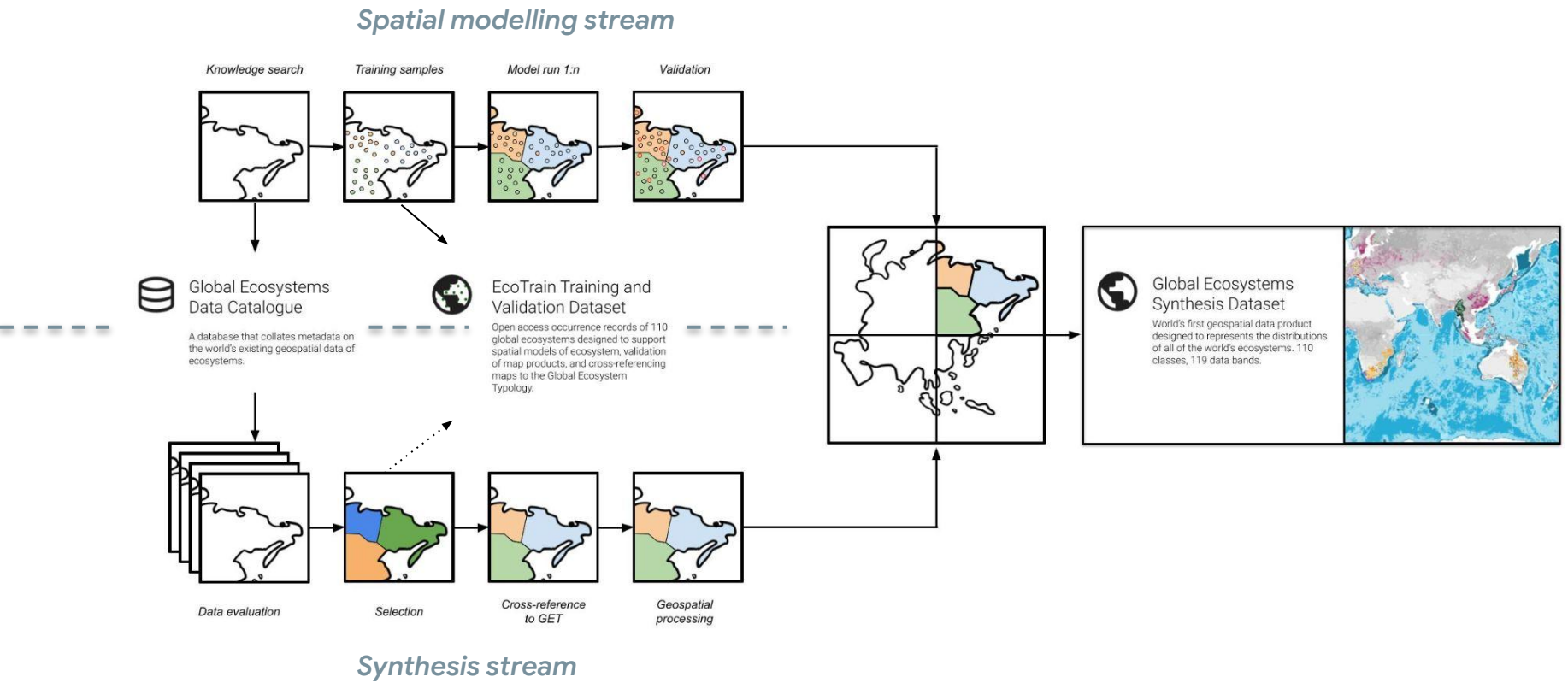
- **Example -** *Sphagnum rubellum* and *S. capillifolium* are wetland mosses which commonly make up acidic low nutrient peat bogs (TF1.6) whereas *S. warnstorfii* is typically associated with with fens due to alkaline and minerotrophic conditions (TF1.7).

Foundational open access data: GEA Training and validation dataset

Real-world foundation model workflows for mapping ecosystems



The two analytical streams of the Global Ecosystems Atlas



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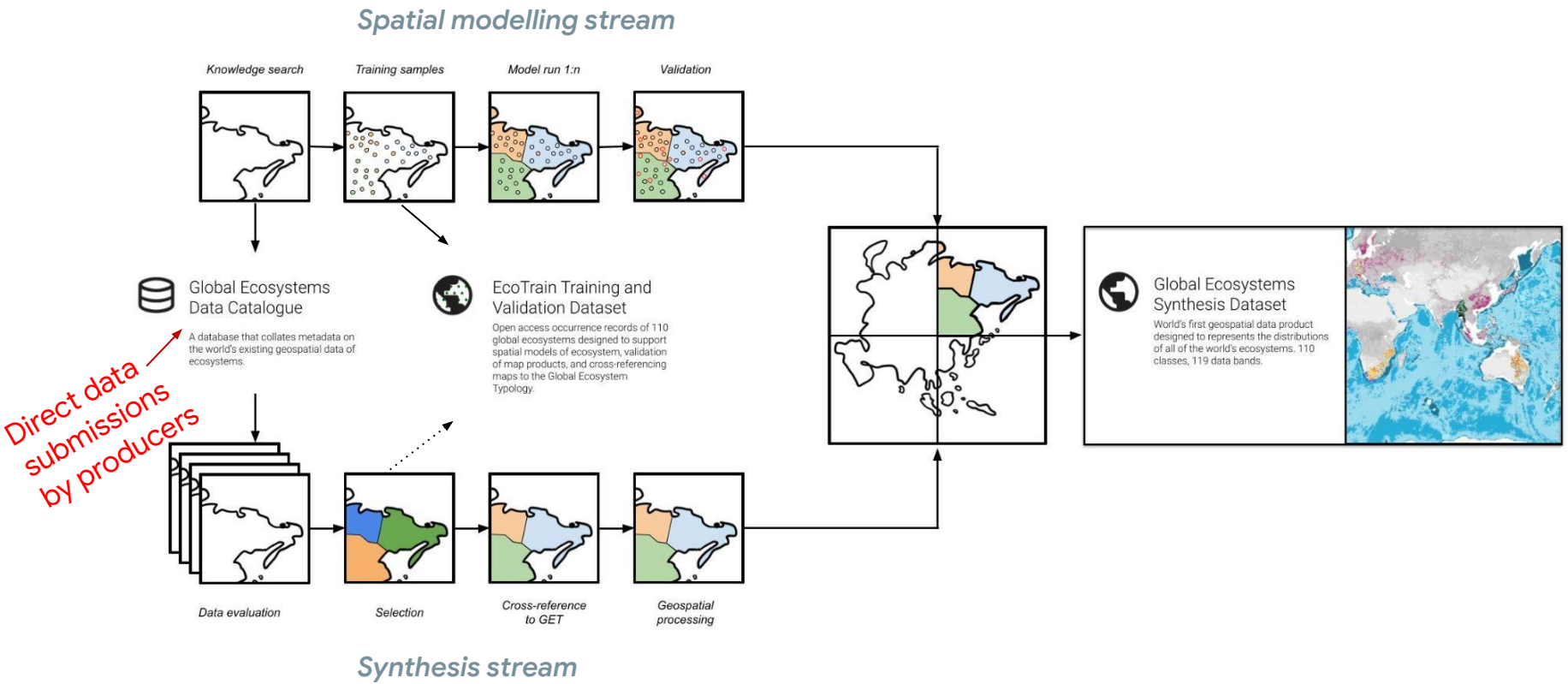

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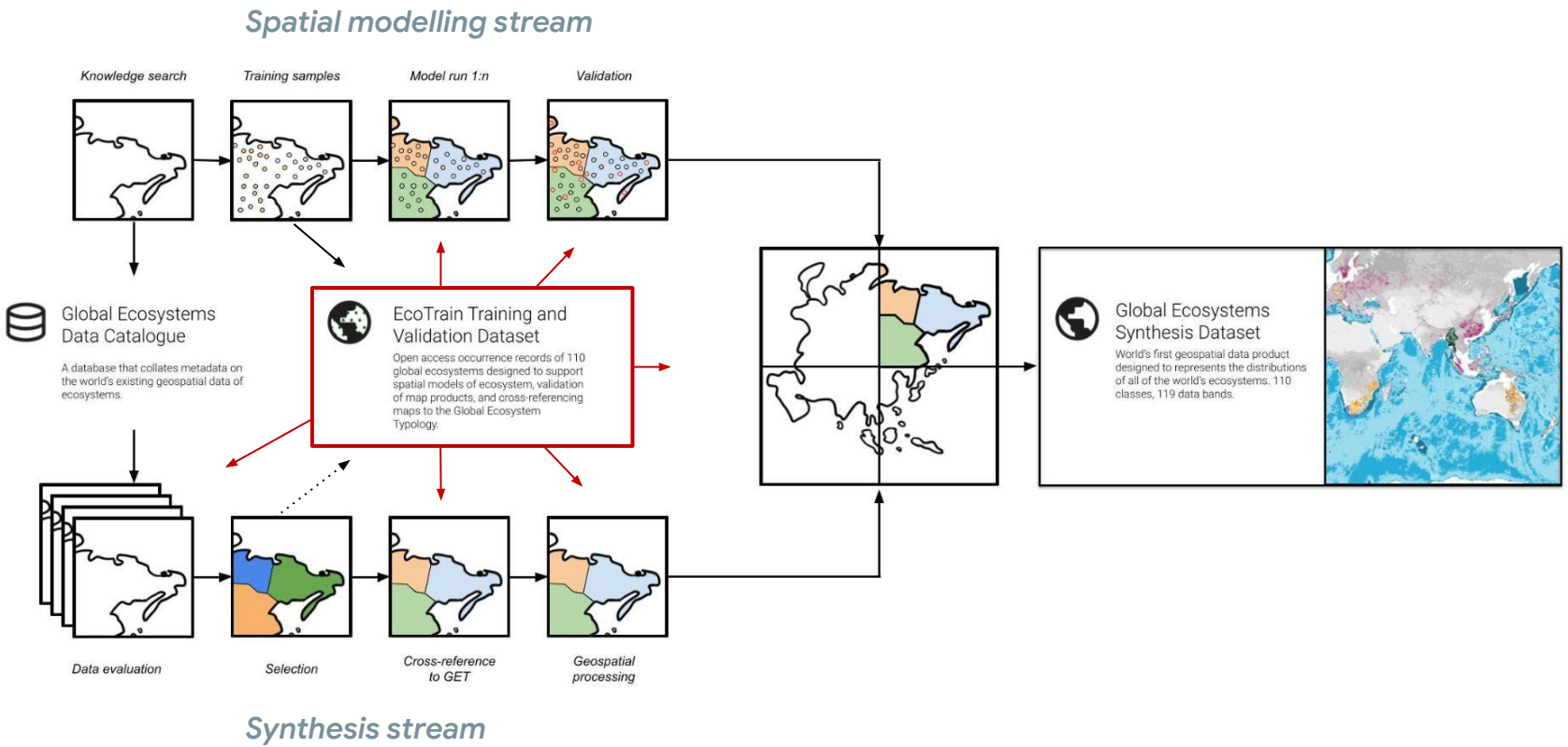

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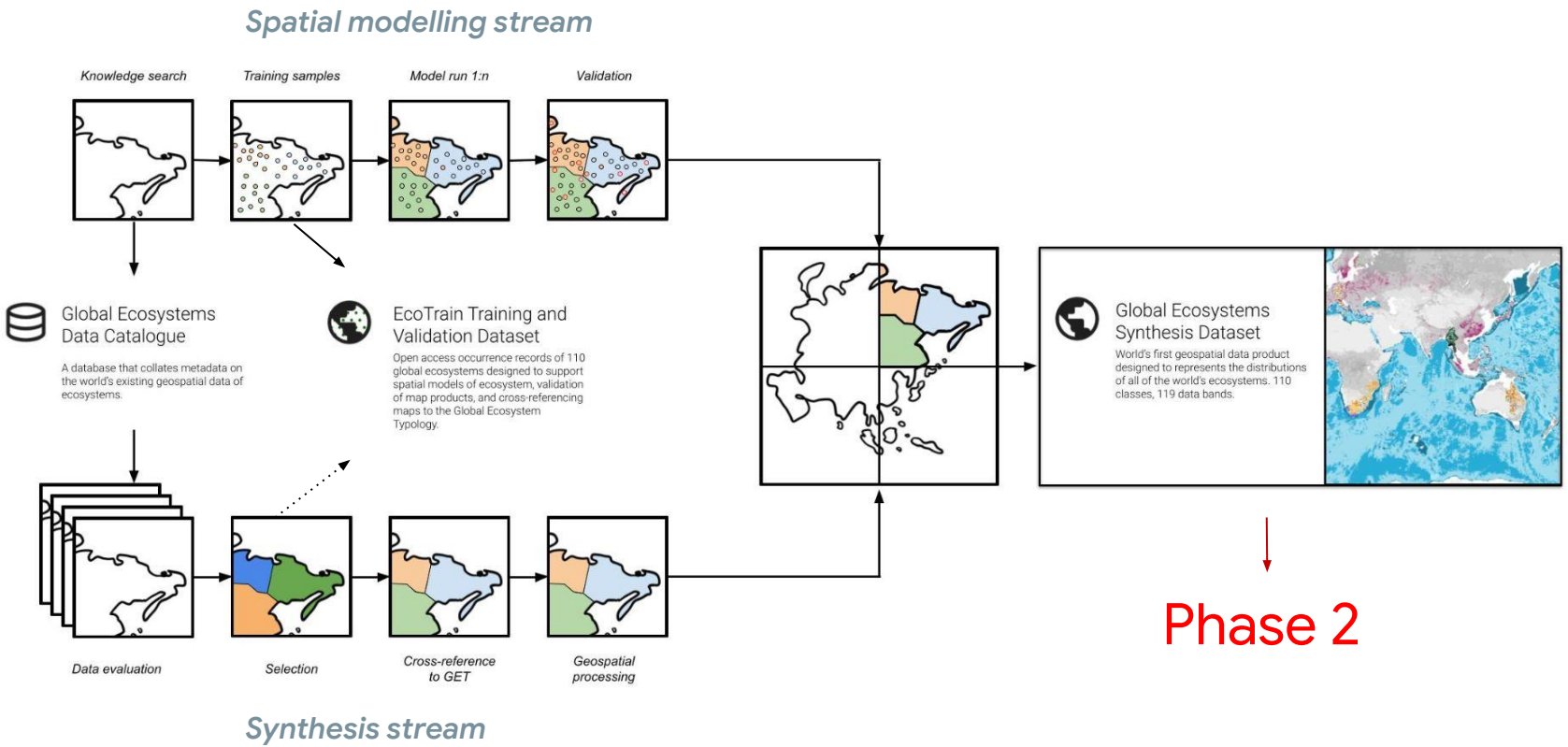

The Global Ecosystems Atlas: Future Phases

Proof of Concept	Phase 1	Phase 2
2024	2025-26	2026-2029
Community building, convening of partners and stakeholders	Sustainable internal and external **systems** being implemented for focused delivery	**Time-series** and **change** addressed through implementation of **alert system** models and **versioned updates**
Organisational structures and project oversight established	**Training dataset** complete and available, being used for **supporting AI-enabled mapping** workflows	Accommodation of **levels 4, 5 & 6** of the GET into the synthesis map data model
Data product co-design and launch of proof of concept	**Synthesis map** and **data catalogue** becomes **openly available** to all users via online application	Contributing to **ecosystem condition** spatial models that vary by ecosystem type (enabled by synthesis map)

The Global Ecosystems Atlas

- A **comprehensive, harmonised, open resource** on the extent of all the world's ecosystems.
- The Atlas combines two analytical streams:
    - Synthesis
    - Spatial modelling
- We only make maps in places with no existing data - **local knowledge and expertise** is better than top-down modelling approaches
- The synthesis map serves as a **baseline** (Phase 1) on which further tools can be developed (Phase 2)

Supported by UN Conventions

United Nations Convention to Combat Desertification

Convention on Biological Diversity

United Nations Framework Convention on Climate Change

Resilience Frontiers

Ramsar Convention on Wetlands

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