Update on activities and post-2020 vision

AP BON web seminars- October 22nd 2020

Laetitia Navarro, PhD

(interim) Executive Secretary

German Centre for Integrative

Biodiversity Research (iDiv)

Halle-Jena-Leipzig

GEO BON in a nutshell

Mission

Improve the **acquisition**, **coordination** and **delivery** of biodiversity observations and related services to users including decision makers and the scientific community.

- Volunteer-based
- Open
- Small secretariat

GEO GROUP ON EARTH OBSERVATIONS

Flagship

ITC UNIVERSITY OF TWENTE.

ipbes Science and Policy for People and Nature

Convention on Biological Diversity

iDiv

UNEP WCMC

ASEAN CENTRE FOR BIODIVERSITY

MOL MAP OF LIFE

Predicts

NASA

GBIF

esa

OBIS

CSIRO

INSTITUTO HUMBOLDT COLOMBIA

UNIVERSITY OF AMSTERDAM

GEO BON in a nutshell

A global Partnership:
1412 registered members from 117 countries and 921 institutions

GEO BON core focus

Developing the Essential Biodiversity Variables

Developing the Biodiversity Observation Networks

Producing Policy Relevant Outputs

Developing the Biodiversity Observation Networks BONs

Building a Network of National, Regional and Thematic BONs

Contribute to the **collection** and **analysis** of **harmonised biodiversity observations**, the development of integrated and interoperable **biodiversity monitoring programs**

National and Regional BONs

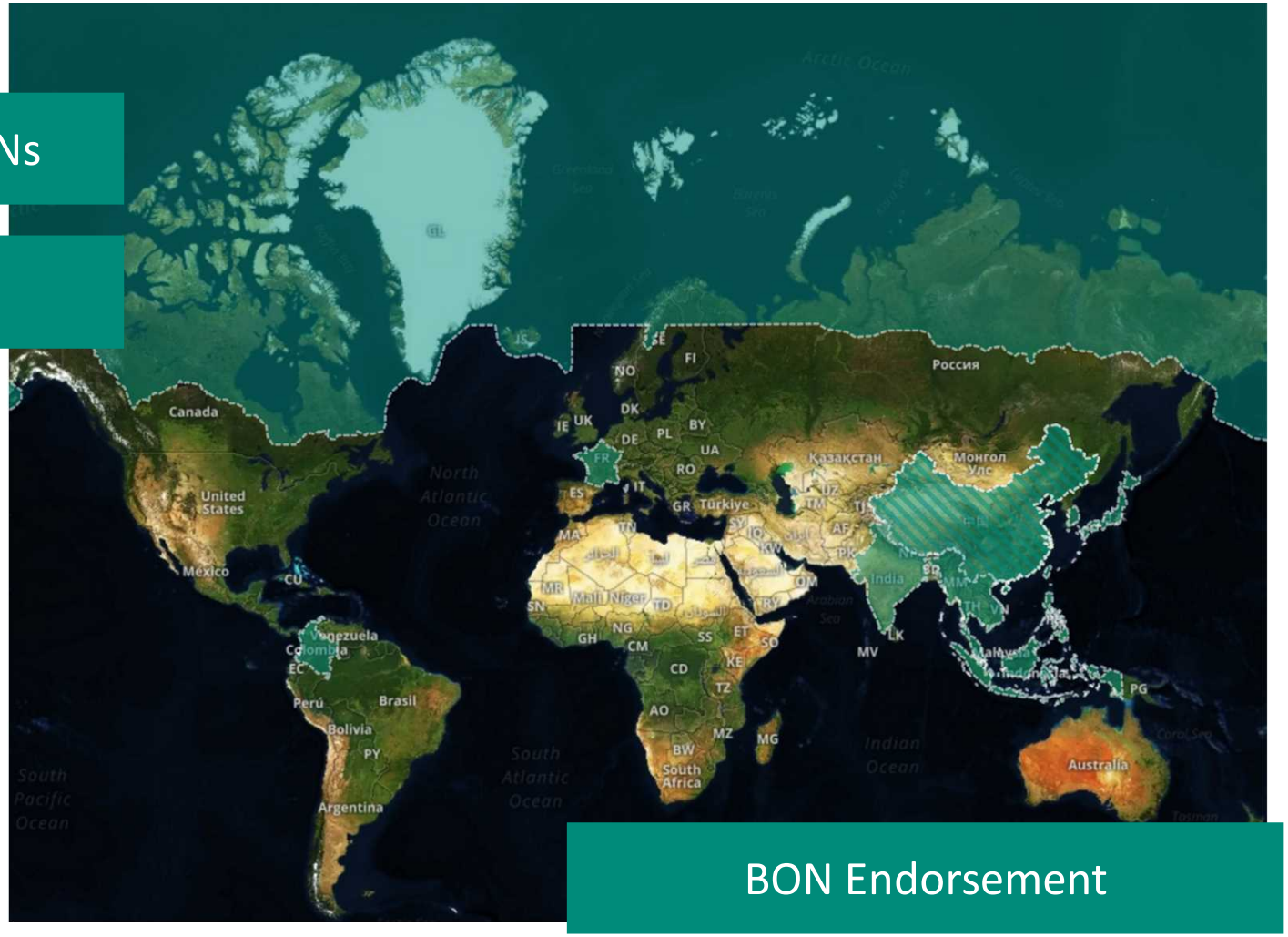
Thematic BONs

MBON
Marine Biodiversity Observation Network

FWBON
Freshwater Biodiversity Observation Network

Soil BON

AP MBON
Marine Biodiversity Observation Network

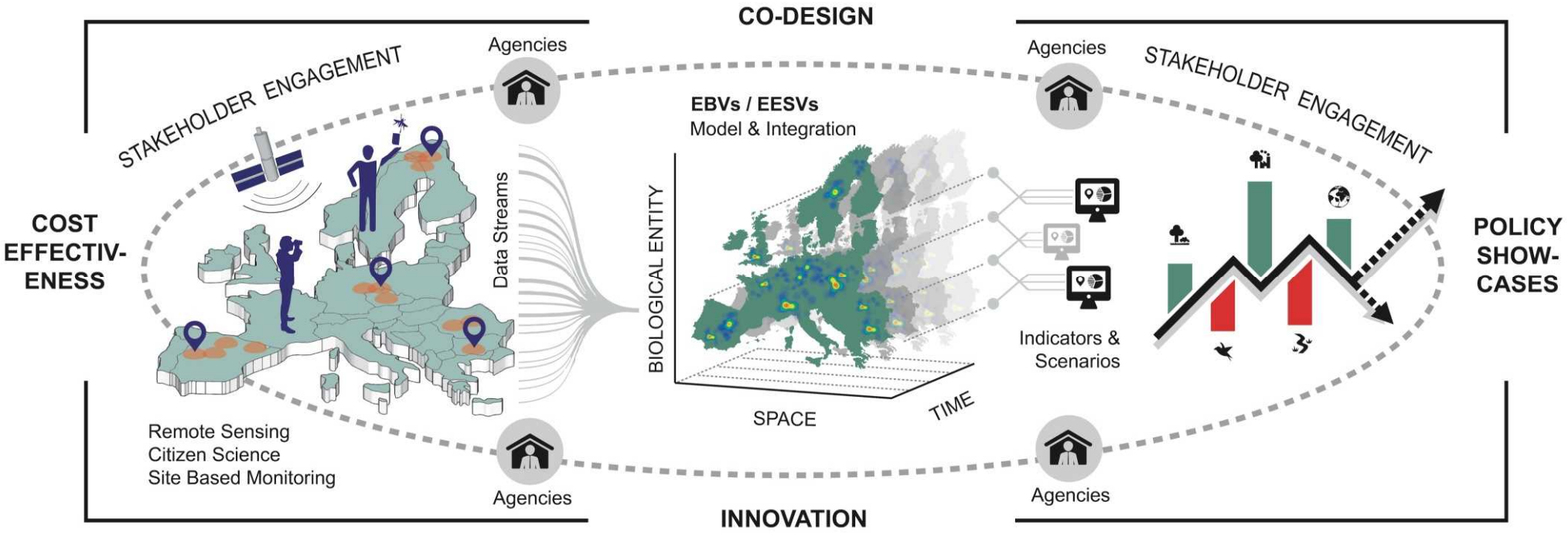


BON Endorsement

GEO BON

EUROPABON

H2020 (2020-2023) – Led by iDiv (Prof. Pereira)

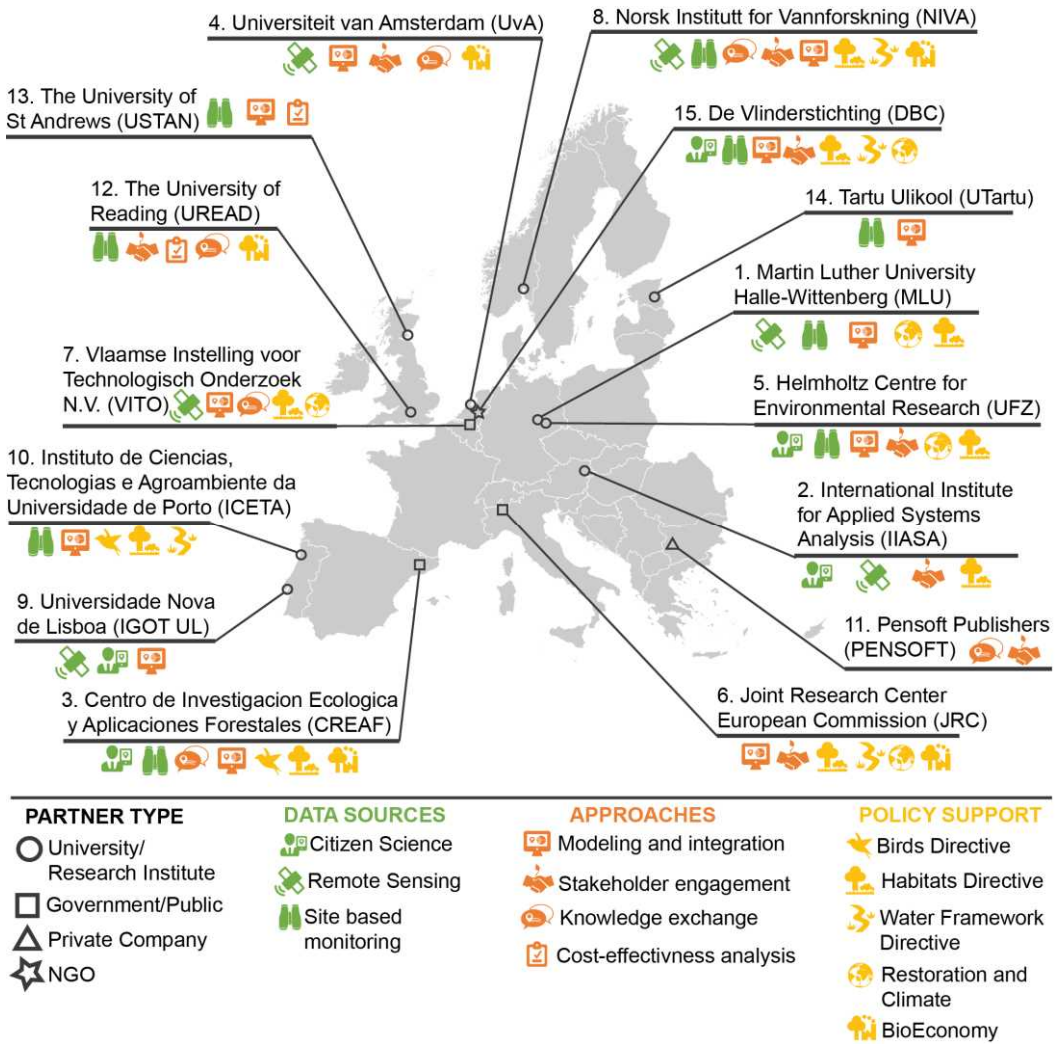


GEO BON

EUROPABON

H2020 (2020-2023) – Led by iDiv (Prof. Pereira)

The Europa BON consortium:



Developing the Essential Biodiversity Variable EBVs

The EBV2020 Initiative

1st workshop: October 15th to 18th (USA)
2nd workshop: February 2020 (Germany)

EBV Data product
EBV
Metric
Unit
Realm
Data sharing policy

Biological entities

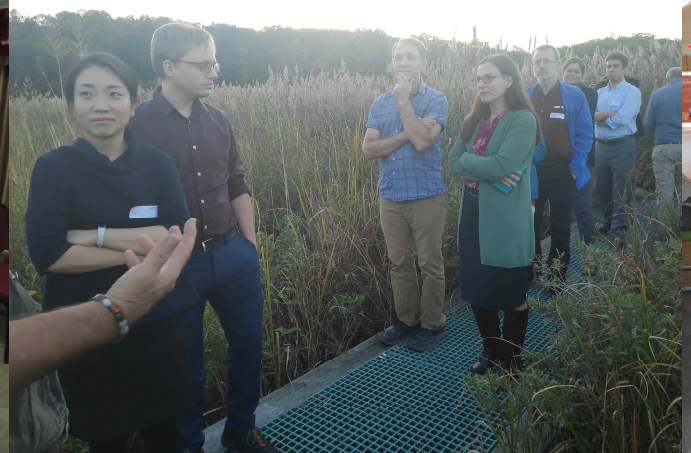
Input data
In situ
Remote sensing

Temporal extent and resolution

Spatial scope, extent and resolution

Policy relevance (e.g. derived indicators)

Modelling/computation/Data processing



The EBV2020 Initiative

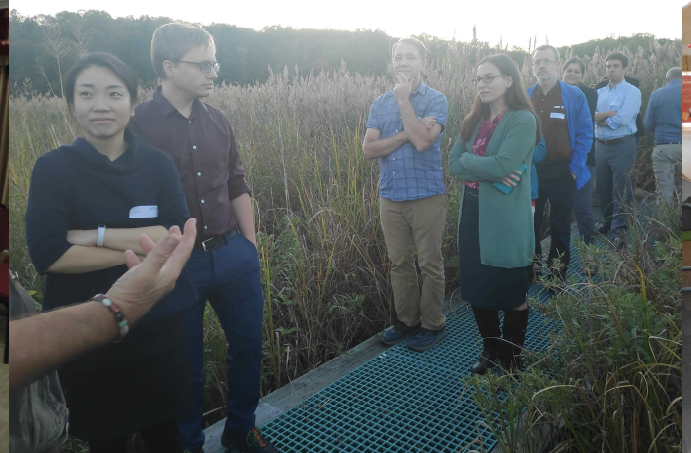
1st workshop: October 15th to 18th (USA)
2nd workshop: February 2020 (Germany)

73 potential EBV/EESV data products Oct.2019

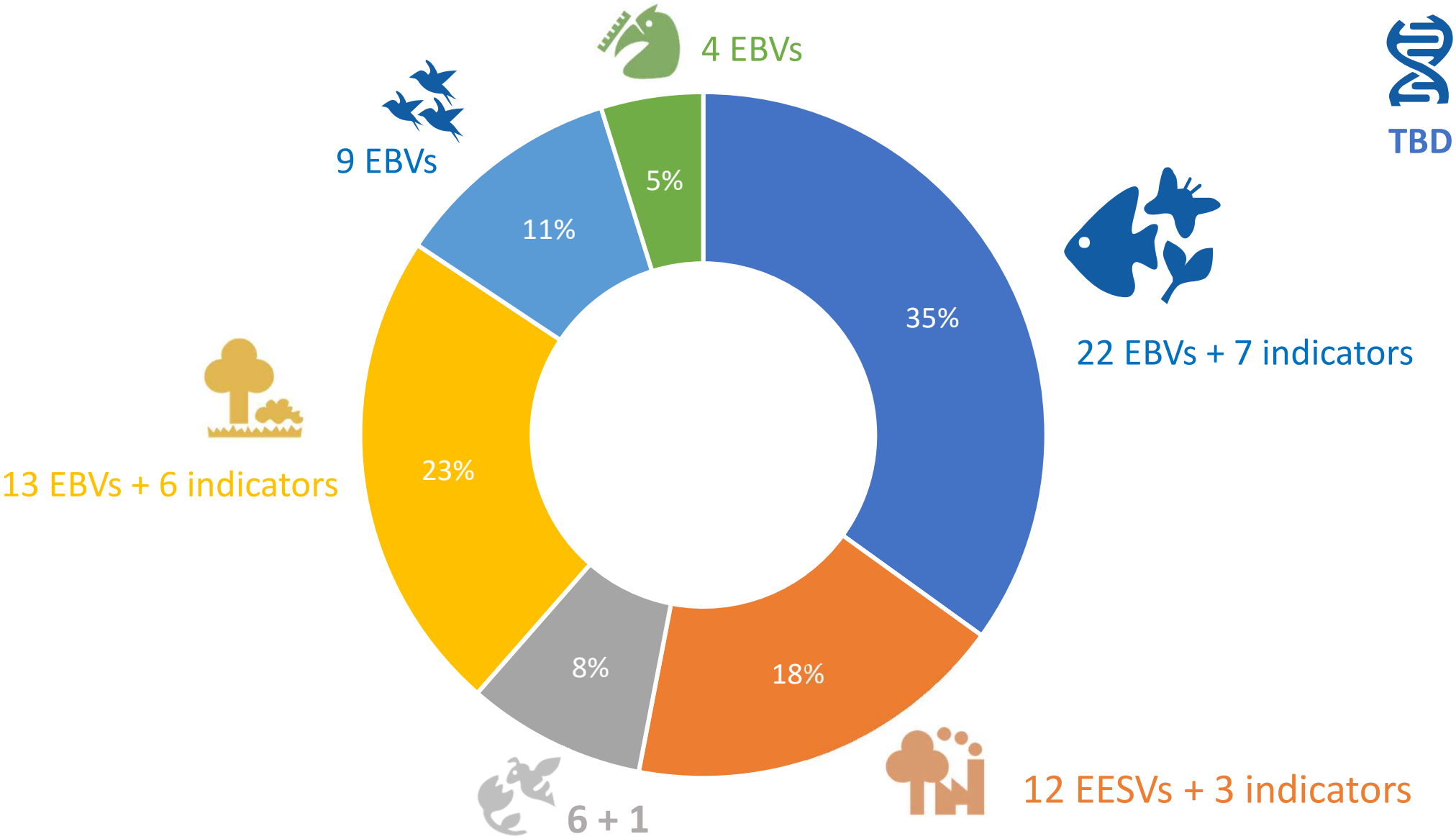
EBVs are:

- ✓ **Biological**
- ✓ **Sensitive to change**
- ✓ **State variables**
- ✓ **Generalizable across realms**
- ✓ **Scalable**
- ✓ **Feasible**

62 EBV/EESV data products & **18** EBV-derived indicators

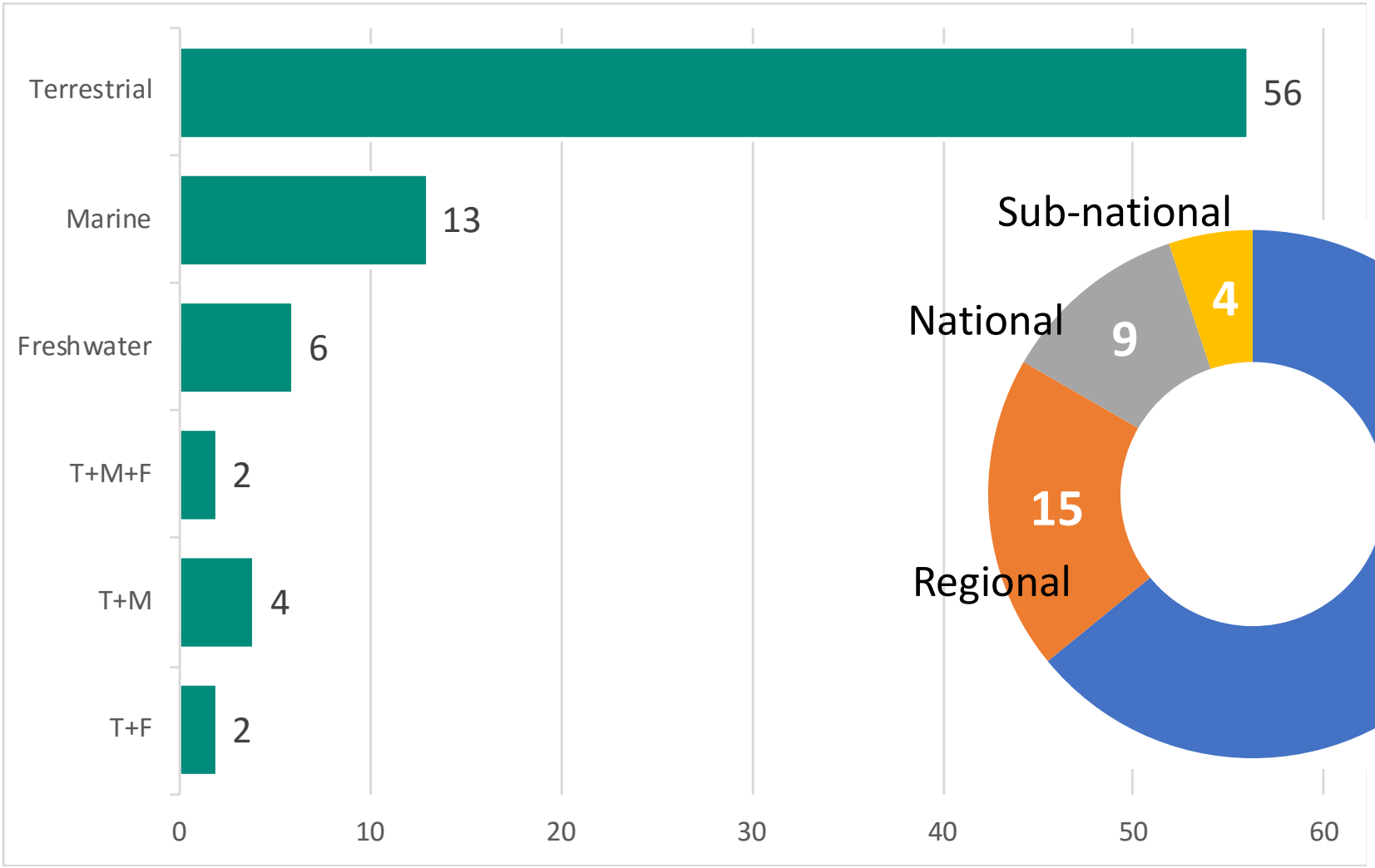


The EBV2020 Initiative – data products



The EBV2020 Initiative – data products

Realm covered by the dataset



The EBV data portal

Beta version

DATASETS

The EBV Data Portal includes a variety of EBV datasets. With a click on the respective dataset you get to the detailed view.

Filter By Year

Publication Year
From 2010 To 2020

Filter By Characteristics

- EBV classes
  - Species populations (1)
  - Community composition (1)
  - Ecosystem structure (5)
  - Ecosystem function (1)
- EBV names
  - Ecosystem phenology (1)
  - Ecosystem distribution (5)
  - Species distributions (1)
  - Taxonomic diversity (1)
- Spatial extent
  - National (1)
  - Global (6)
  - Continental/Regional (1)
- Temporal resolution
  - Yearly (4)
  - Decade (2)
  - Every 5 years (2)

Filter EBV datasets...

Default sorting

8 EBV datasets filtered

GLOBES – 1-KM RESOLUTION GLOBAL ECOSYSTEM DATA CUBE

preview image

Global data cube on the yearly extent of ecosystems following the habitat classification scheme of the IUCN Red List, used in the assessment of over 100,000 species. This data cube is composed by 65 ecosystem t...

Download Data (netCDF / 4.76GB)

Ecosystem extent | Time-series | Global | IUCN Red List

GLOBAL FOREST COVER 2000

preview image

Mean percentage of global tree canopy cover in the year 2000, defined as canopy closure for all vegetation taller than 5m in height.

Download Data (netCDF / 102.78MB)

Forest cover | Mean percentage

CHANGES IN LOCAL BIRD DIVERSITY (CSAR)

preview image

Changes in bird diversity at the grid cell level caused by land-use, estimated by the cSAR model (Pereira et al, doi.org/10.1101/2020.04.14.031716). It reports changes in species number (percentage and absolute...

Download Data (netCDF / 1.49MB)

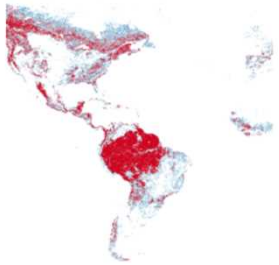
BirdsLUH 2.0 projections | PREDICTS | land-use

FOREST LOSS YEAR

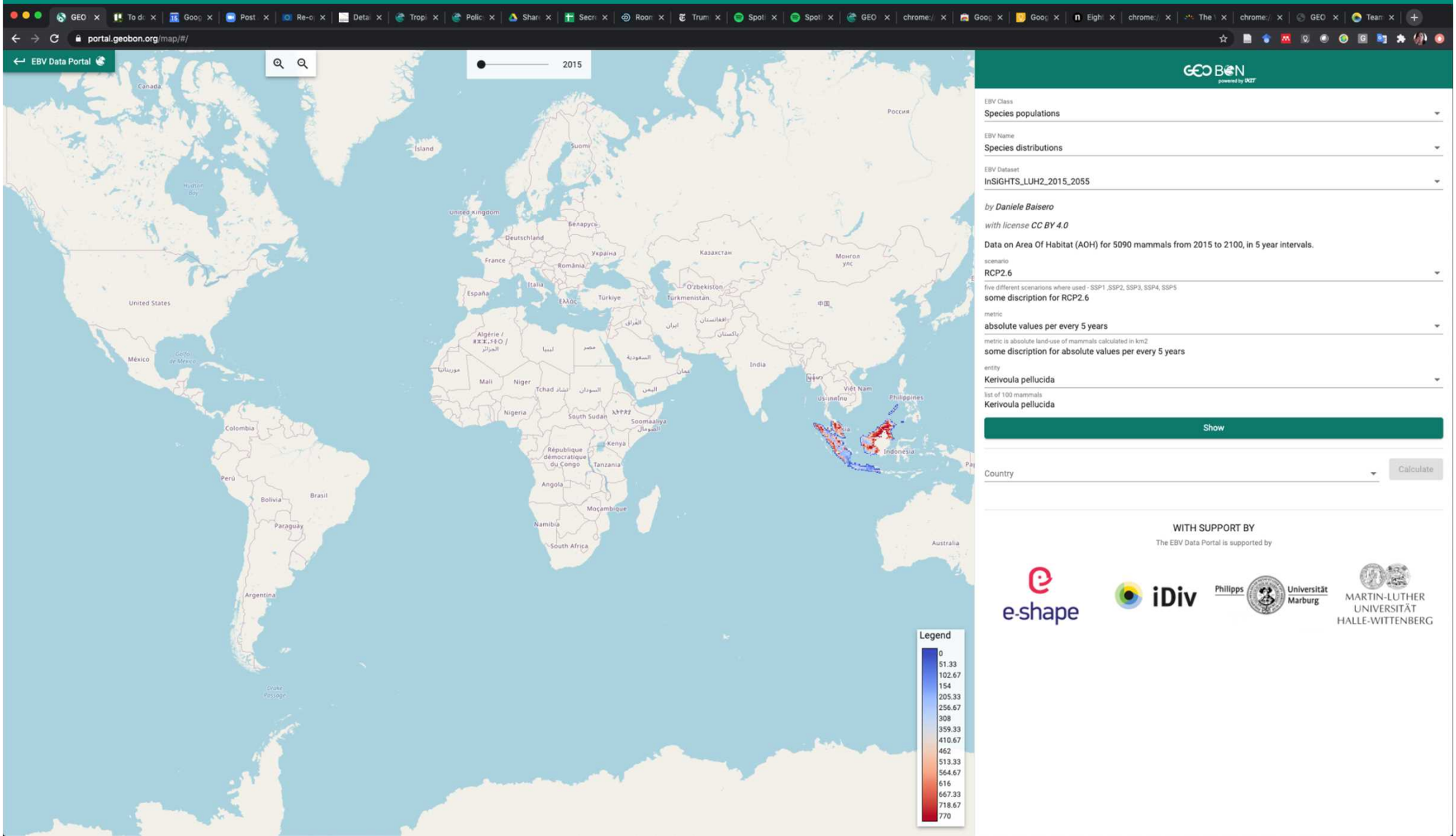
VEGETATION PHENOLOGY IN FINLAND

SYKE

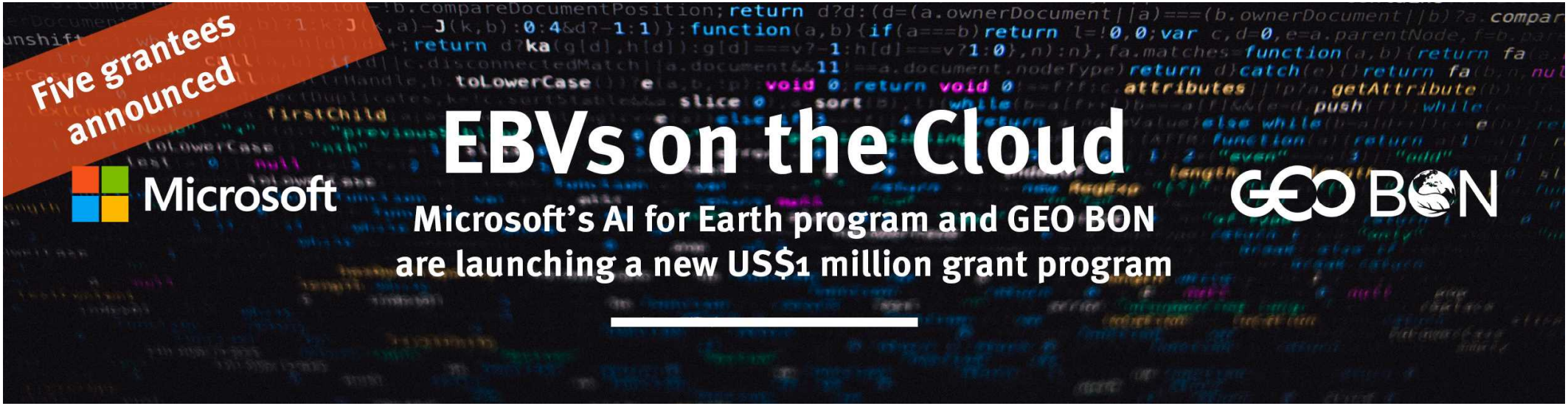
RELATIVE MAGNITUDE OF FRAGMENTATION (RMF)



The EBV data portal



Joint GEO BON and Microsoft AI for Earth Call : EBVs on the cloud



- → Advancing research and applications that leverage cloud-scale computation to expand the geographical and temporal coverage of biodiversity information
- → 60 proposals received by the GEO BON Secretariat
- → 5 grantees
- → All data products and algorythms to be made publicly available by October 2021

Bioacoustics and Machine Learning for Automated Avian Species Monitoring in Global Biodiversity Hotspots

Website: SongsOfAdaptation.org

Contact: naomi.bates@future.edu

Monitoring climate and anthropogenic change through species movement across ecosystem gradients

Bioacoustic and ML tools to inform locally decision-making

Open source tools and data

Specific species insights for species in biodiversity hotspots in Nepal, Bolivia, USA, and Uganda

Naomi Bates, Future Generations University (USA)
Sebastian Herzog, Asociación Armonía (Bolivia)
Hari Basnet, Small Mammals Conservation and Research Foundation (Nepal)
Nawang Gurung, Barun Bachaon Task Force, Future Generations University (Nepal)
Damian Christey, Future Generations University (USA)
Ruth Taylor, Future Generations University (USA)
Jennifer Flippin, Future Generations University (USA)

Future Generations University

AI for the Belize National Marine Habitat Map

Goal: To use Microsoft Azure's cloud computing power in conjunction with field surveys, 3m PlanetScope imagery, supplementary 10m Sentinel-2 imagery, and Machine Learning techniques, to develop an updated, finer-scale version of the National Marine Habitat Map for the period 2020 / 2021.

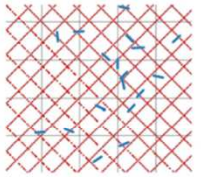
Scope: The project's geographic focus will be Belize's coastal and marine ecosystems, with particular attention focused on coral reefs, seagrass pastures, and mangrove ecosystems.

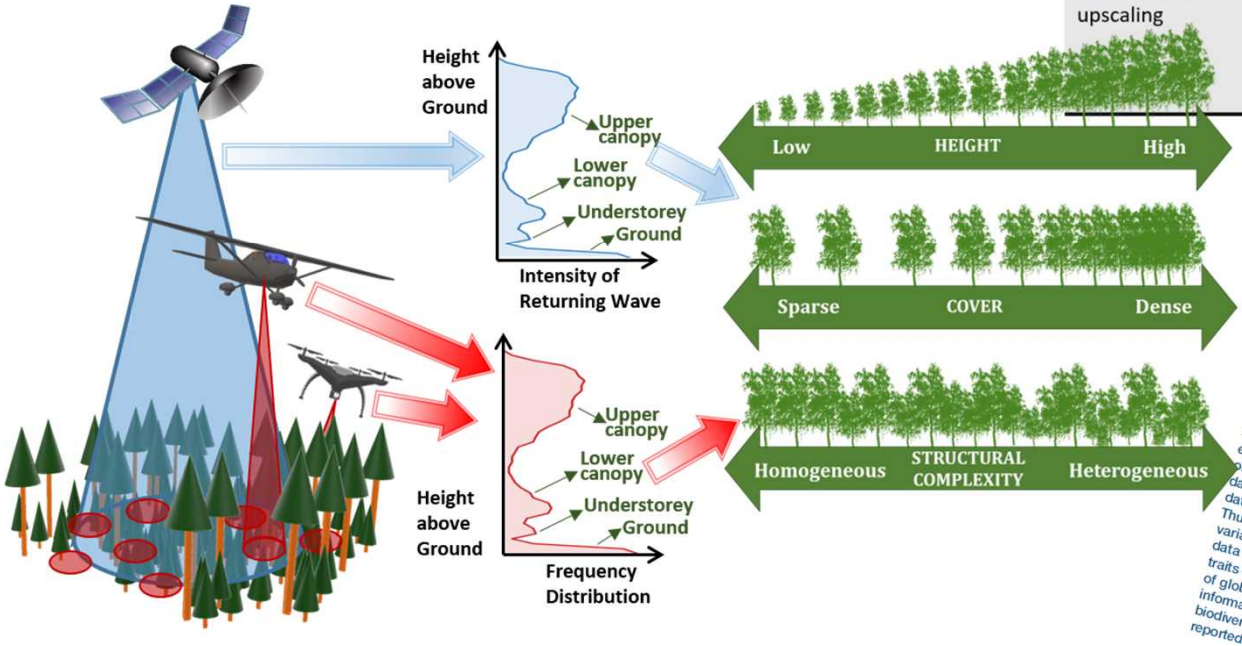
Partnership: Lead - Coastal Zone Management Authority and Institute, Belize, C.A. | Partner- GRH Consulting, LLC, Alabama, U.S.A.

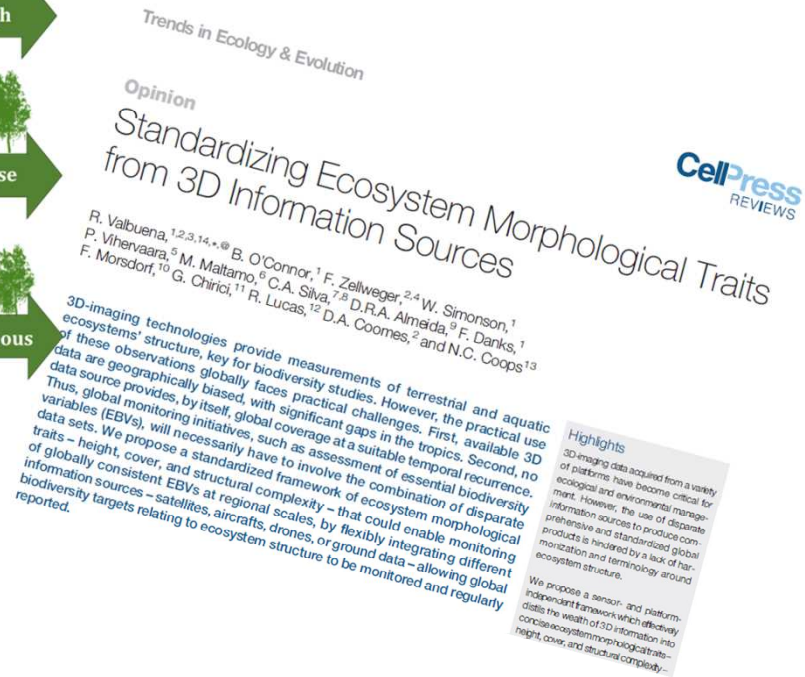
AMAZECO:
Covering the Amazon with an Ecosystem Structure EBV product combining satellite and airborne LIDAR

Rubén Valbuena (1), Eric B. Görgens (2) & Carlos A. Silva (3)

(1) Bangor University, UK.
(2) Universidade Federal dos Vales do Jequitinhonha e Mucuri, Brazil.
(3) University of Florida, US.

Project workflow	Extension/Scale	Objective/ Question	Output/ Deliverable
WP2 Research component: effective satellite/airborne LIDAR combination	Airborne transects only 	Which Metrics? Processing workflows? →	Scientific paper(s)
WP3 Derivation of gridded products. T3.1 Small area pilot study	Pilot Area 	Which resolution? Uncertainty measures? →	Processing workflows ➢ rGEDI function ➢ HPC pipelines
WP3 Derivation of gridded products. T3.2 Geographical upscaling	Whole Amazon 	High Performance Computing (HPC) upscaling?	Amazon map of ecosystem morphological traits




Trends in Ecology & Evolution

Opinion

Standardizing Ecosystem Morphological Traits from 3D Information Sources

CellPress REVIEWS

R. Valbuena,[1,2,3,14,*,@] B. O'Connor,[1] F. Zellweger,[2,4] W. Simonson,[1] P. Vihervaara,[5] M. Maltamo,[6] C.A. Silva,[7,8] D.R.A. Almeida,[9] F. Danks,[1] F. Morsdorf,[10] G. Chirici,[11] R. Lucas,[12] D.A. Coomes,[2] and N.C. Coops[13]

3D-imaging technologies provide measurements of terrestrial and aquatic ecosystems' structure, key for biodiversity studies. However, the practical use of these observations globally faces practical challenges. First, available 3D data are geographically biased, with significant gaps in the tropics. Second, no data source provides, by itself, global coverage at a suitable temporal recurrence. Thus, global monitoring initiatives, such as assessment of essential biodiversity variables (EBVs), will necessarily have to involve the combination of disparate data sets. We propose a standardized framework of ecosystem morphological traits – height, cover, and structural complexity – that could enable monitoring of globally consistent EBVs at regional scales, by flexibly integrating different information sources – satellites, aircrafts, drones, or ground data – allowing global biodiversity targets relating to ecosystem structure to be monitored and regularly reported.

Highlights

3D-imaging data acquired from a variety of platforms have become critical for ecological and environmental management. However, the use of disparate information sources to produce comprehensive and standardized global products is hindered by a lack of harmonization and terminology around ecosystem structure.

We propose a sensor- and platform-independent framework which effectively distils the wealth of 3D information into concise ecosystem morphological traits – height, cover, and structural complexity –

Extracting the signal of change in community-composition EBVs from big unstructured species-occurrence datasets through Azure-enabled spatiotemporal analytics

PIs: Simon Ferrier & Andrew Hoskins

Team members: Chris Ware, Justin Perry, Steve Van Bodegraven

Institutional partners: Atlas of Living Australia, NatureServe, EcoHealth Alliance

GEO GNOME

OBSERVING MOUNTAIN ENVIRONMENTS

1st GEO BON – Microsoft joint call: EBVs on the cloud

Using AI to validate and downscale ecosystem-related Essential Biodiversity Variables in mountain environments

Ruth Sonnenschein, Alexander Jacob, Marc Zebisch (EURAC Research), Roger Sayre (USGS),
Carolina Adler, Aino Kulonen, James Thornton (MRI) & Elisa Palazzi (ISAC-CNR)

- Mountain biodiversity is vital for the well-being of people and ecosystems, worldwide.
- '**Ecosystem extent**' and '**Ecosystem fragmentation**' are key priority EBVs to monitor and understand changes in mountain ecosystems and their species-level biodiversity.
- Maps of ecosystem occurrences and distributions are needed to determine areas occupied by ecosystems and how/where these are affected by natural and human-caused disturbances.
- This project will use AI to address issues with validation and coarse spatial resolution, incorporating remote sensing data to produce these maps through time, thereby enabling a comprehensive assessment of ecosystem change and fragmentation.
- Project aims at contributing insights that support additional research and respond to key policy-relevant knowledge needs to support mountain biodiversity monitoring.

A collaboration led by:

MOUNTAIN RESEARCH INITIATIVE

eurac research

USGS science for a changing world

ISAC

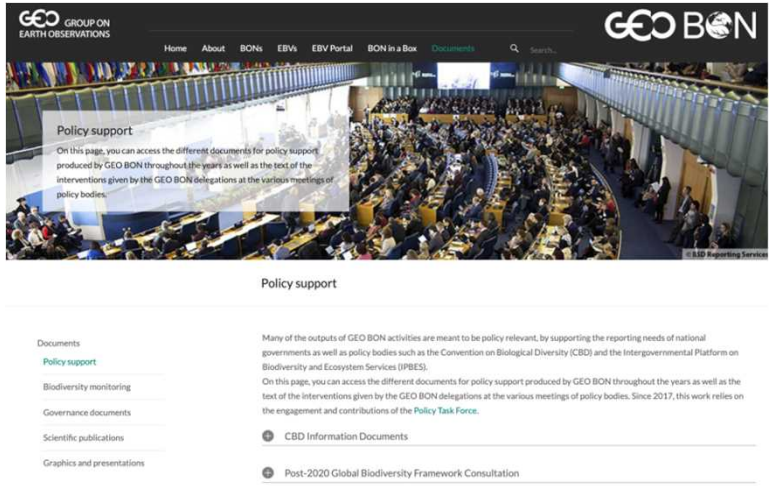
www.mountainresearchinitiative.org/activities/projects/geo-gnome | @GEO_Mountains

GEO BON involvement in discussion on post-2020 biodiversity framework

1. Beijing call (and revision of Aichi target 18/19) as contribution to post 2020 strategy of CBD
2. Contributions of GEO BON Working Group on Genetic Composition
3. EBV2020 and EBV derived indicators for Monitoring Framework of the post-2020 Global Biodiversity Framework

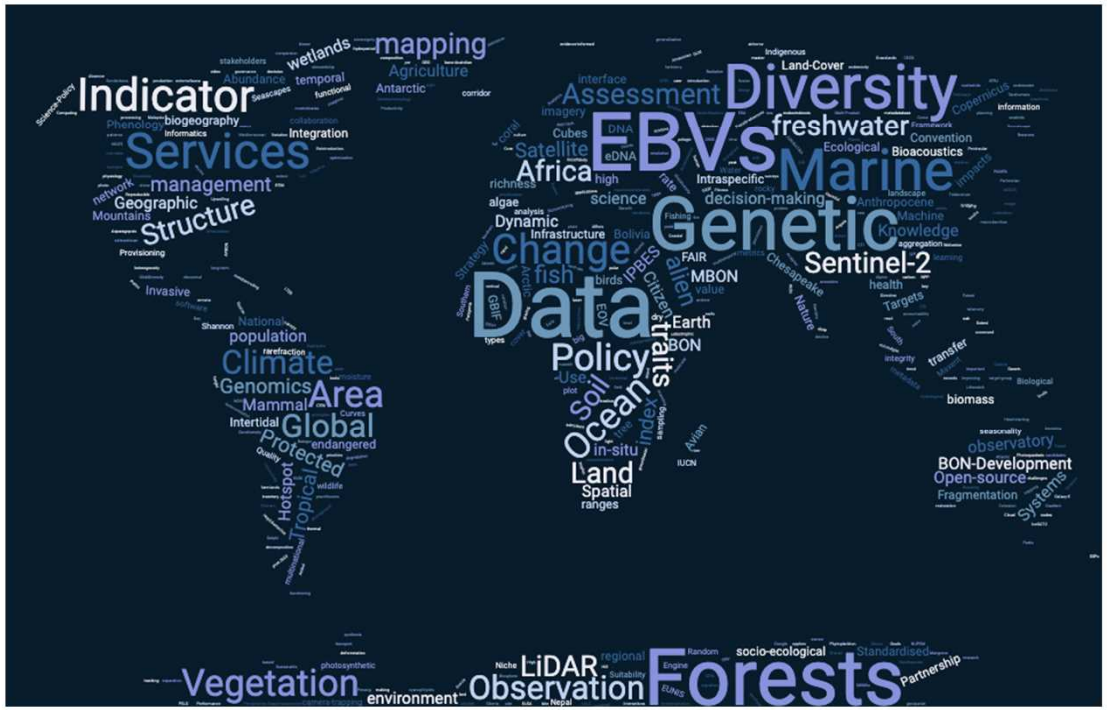
On going efforts to connect with EO4EA (GEO) and UNSEEA.

All relevant resources available on the GEO BON website: https://geobon.org/documents/policy-support/



2020 Milestones for the GEO BON Secretariat

2020: Important Milestones for the GEO BON Secretariat



2020: Important Milestones for the GEO BON Secretariat

25 October 2019

Coming Shortly:

Call for Expression of Interest

to Host Secretariat of the Group on Earth Observations Biodiversity Observation Network (GEO BON)

GEO BON's secretariat is moving to Montréal

Supported by the Government of Canada, the Governments of Québec, Canada, and the City of Montréal, and the academic community.

- Montreal is home to the secretariats of the CBD, Future Earth and the Commission for Environmental Cooperation.
- Global hub for biodiversity science, Earth Observation and applied Artificial Intelligence.
- Montréal has one of largest the populations of post-secondary students in the world.

Built on strong partnerships

Hosted by the *Quebec Centre for Biodiversity Science* McG University.

Financial Partners:

Fonds de Recherche Quebec

Montreal International

Academic Partners:

McGill University, Université de Montreal and Université de Sherbrooke, Humboldt Institute.

Institutional partnerships:

- Secretariat to Convention of Biological Diversity
- Future Earth
- Synthesis centres (e.g. iDiv, CIEE)

Growing the secretariat's capacity to support the community

Andy Gonzalez
Professor, co-Chair

Host institution Supporting organizations	**Quebec Centre for Biodiversity Science** Montreal International, Fond de Recherche du Quebec, McGill University, U of Montreal, U of Sherbrooke
Staff supported	Executive secretary, 1 IT scientist, 1 Science officer, 1 communication officer, 1 Admin assistant, 1 communications assistant, 1-2 PDF.
Annual budget	Years 1 - 6: $354,500 - $439,500
In-kind support	Office space, meeting space, support services at McGill University

A secretariat with 6 core activities

1. **Coordination**: Working groups (WG) and Task forces (TF) and BONs (thematic, regional and national). Best practices.

2. **Technical support:** data collection, storage, processing, and sharing

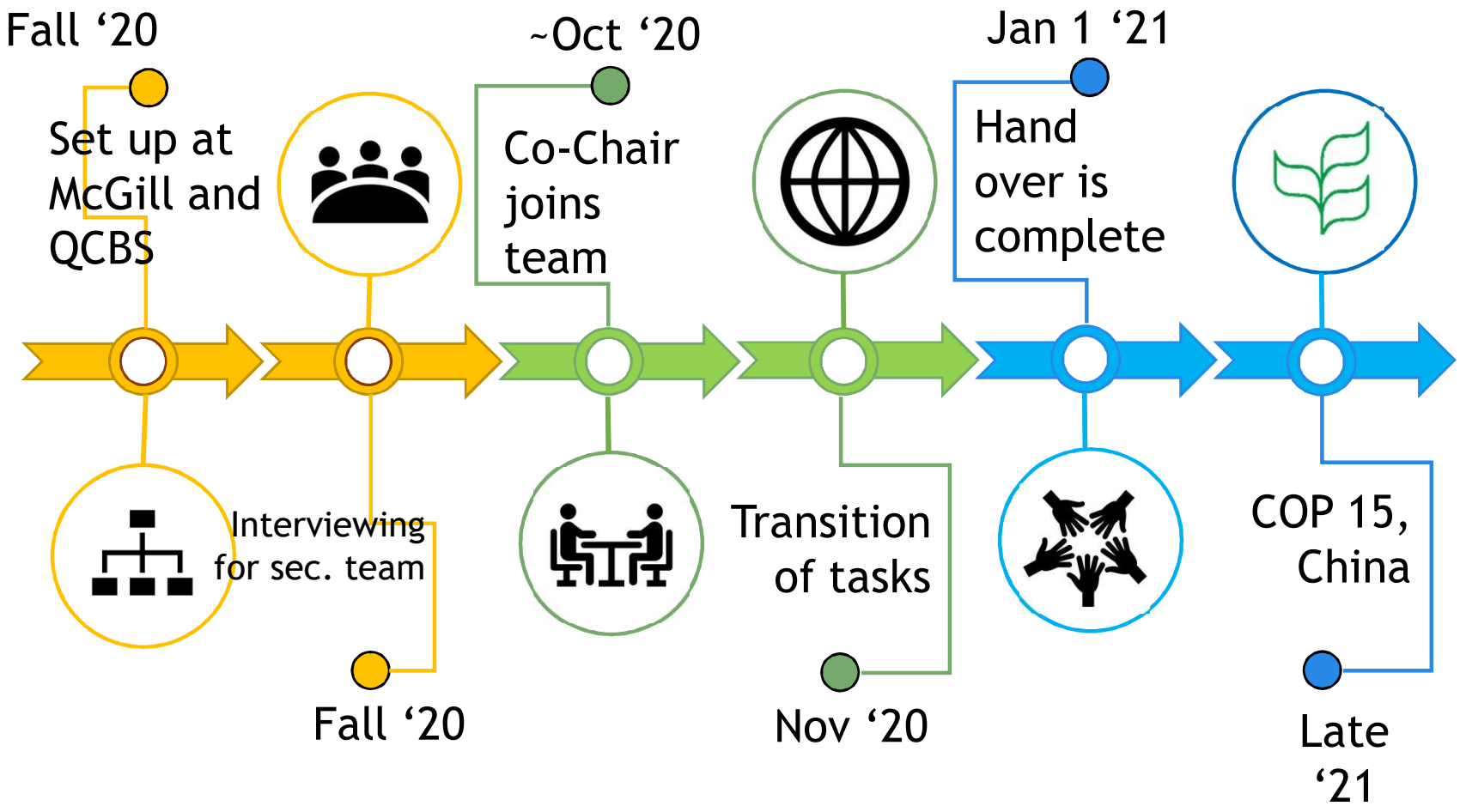
3. **Raising funds:** for GEO BON activities and projects

4. **Engagement plan**: with GEO BON partner institutions and stakeholders, in particularly the CBD and IPBES

5. **Major events**: Organize and coordinate the GEO BON conference and All Hands meetings

6. **Communication strategy**: convey the value offer of GEO BON

Timeline for transition



Thank you

For more information:

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