



# Global to National Data Initiatives: linking and scaling data and indicators with the SEEA Ecosystem Accounting – An overview of GEO BON EBV & EESV framework



**SEEA Expert Forum**

**Group on Earth Observations  
Biodiversity Observation Network**

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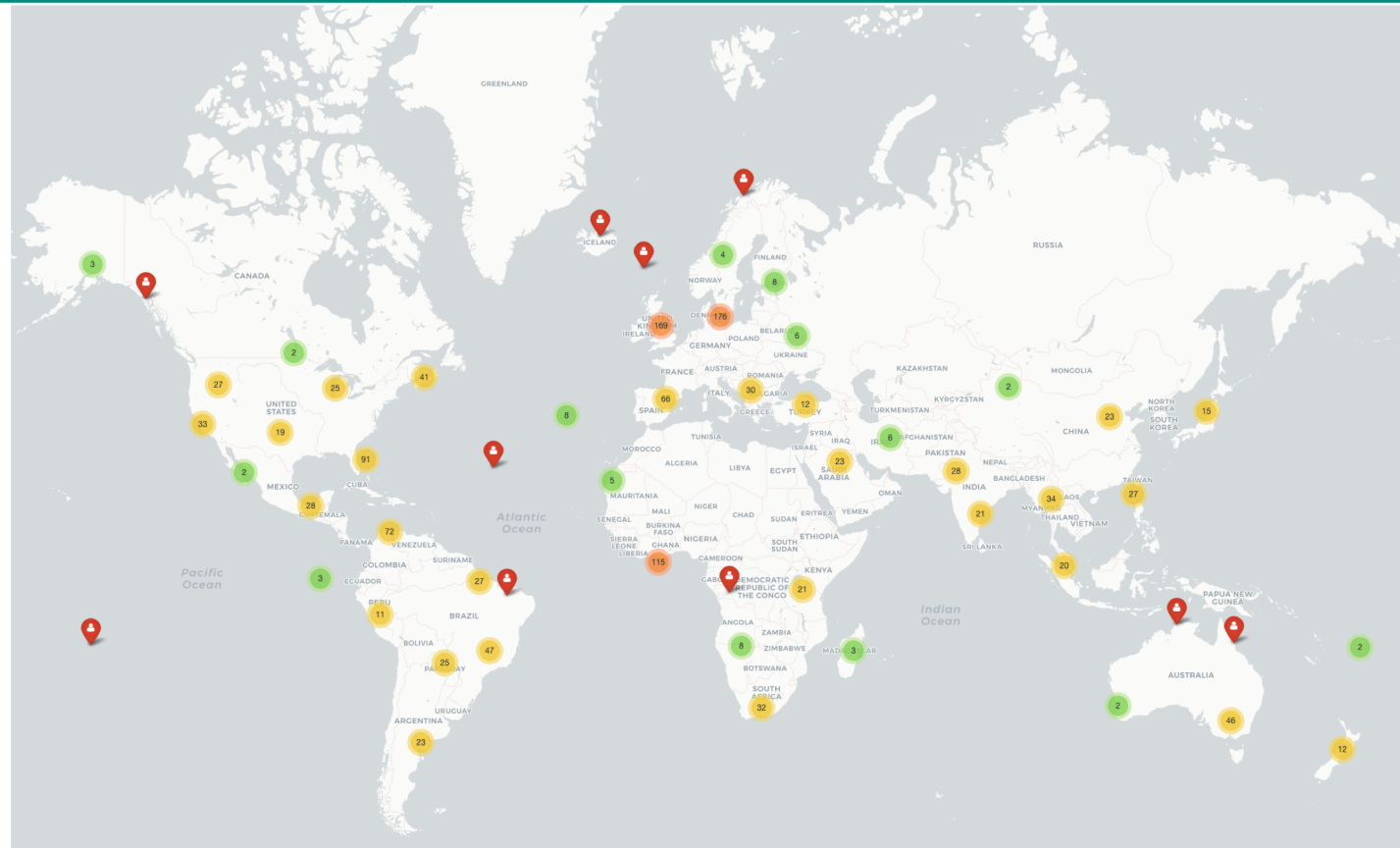
10 November 2020

# The Group on Earth Observations Biodiversity Observation Network

## Mission

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

- Volunteer-based
- Open network
- Scientific strength



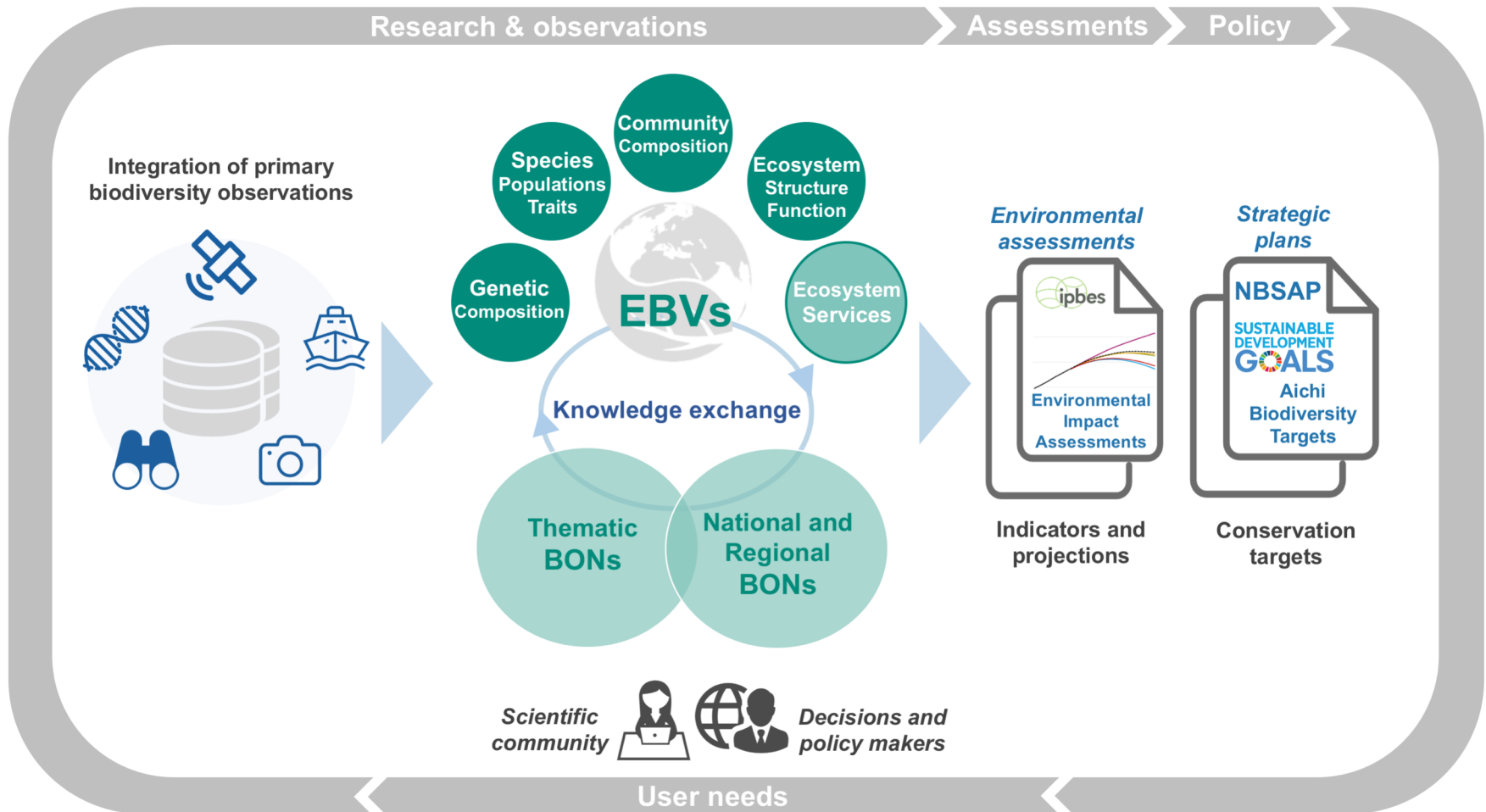
**GO** GROUP ON  
EARTH OBSERVATIONS  
Flagship

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

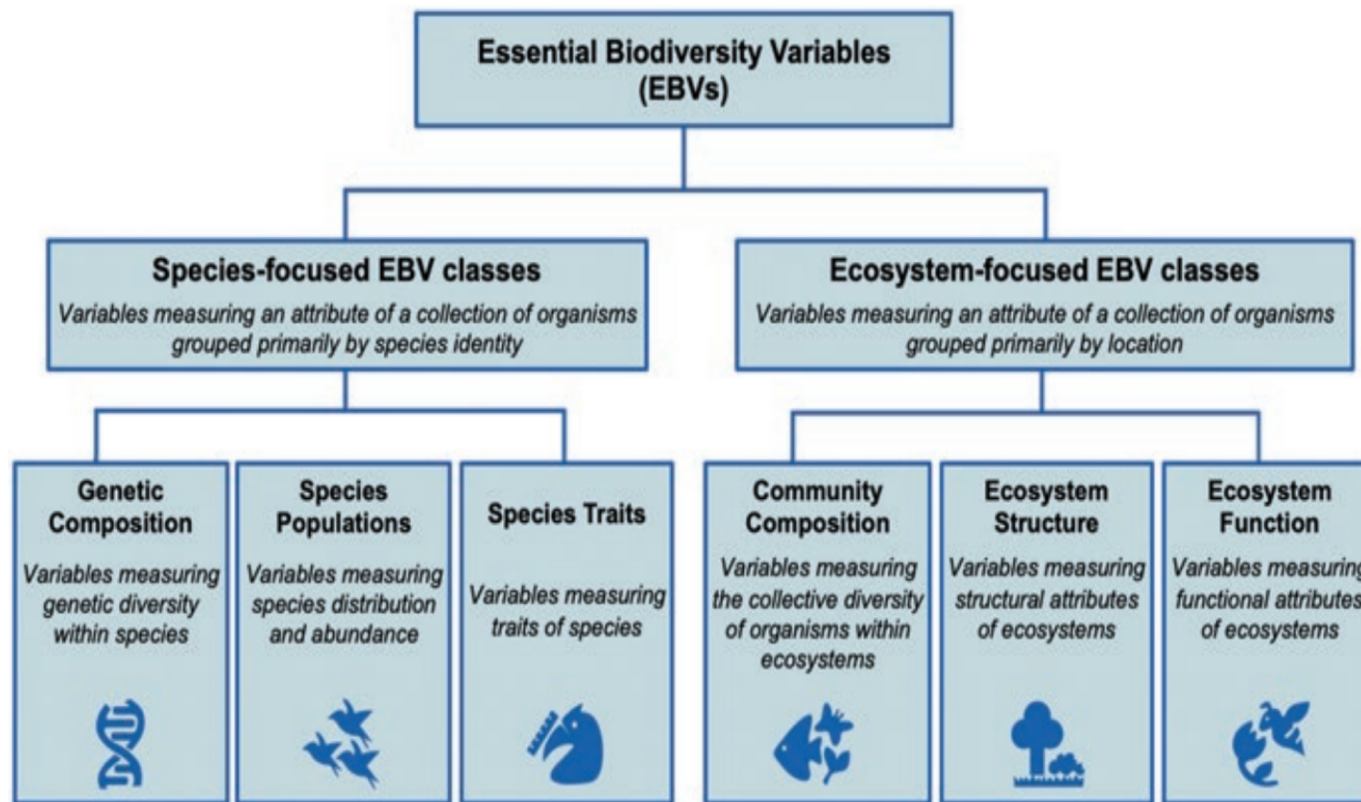
# The Group on Earth Observations Biodiversity Observation Network

## Vision

A global biodiversity observation network that contributes to effective management policies for the world's biodiversity and ecosystem services.



# Essential Biodiversity Variables (EBV) Framework



**EBVs** are defined as derived measurements required to study, report, and manage biodiversity change, focusing on status and trend in elements of biodiversity.

## Criteria

Biological  
State

Sensitive to change  
Ecosystem agnostic

Feasible

Scalable

Relevant

Data available



# Essential Ecosystem Services Variables (EESV) Framework

Table 1. A first set of Essential Ecosystem Service Variable classes to support the design and implementation of a universal monitoring system on the contributions of nature to societies.

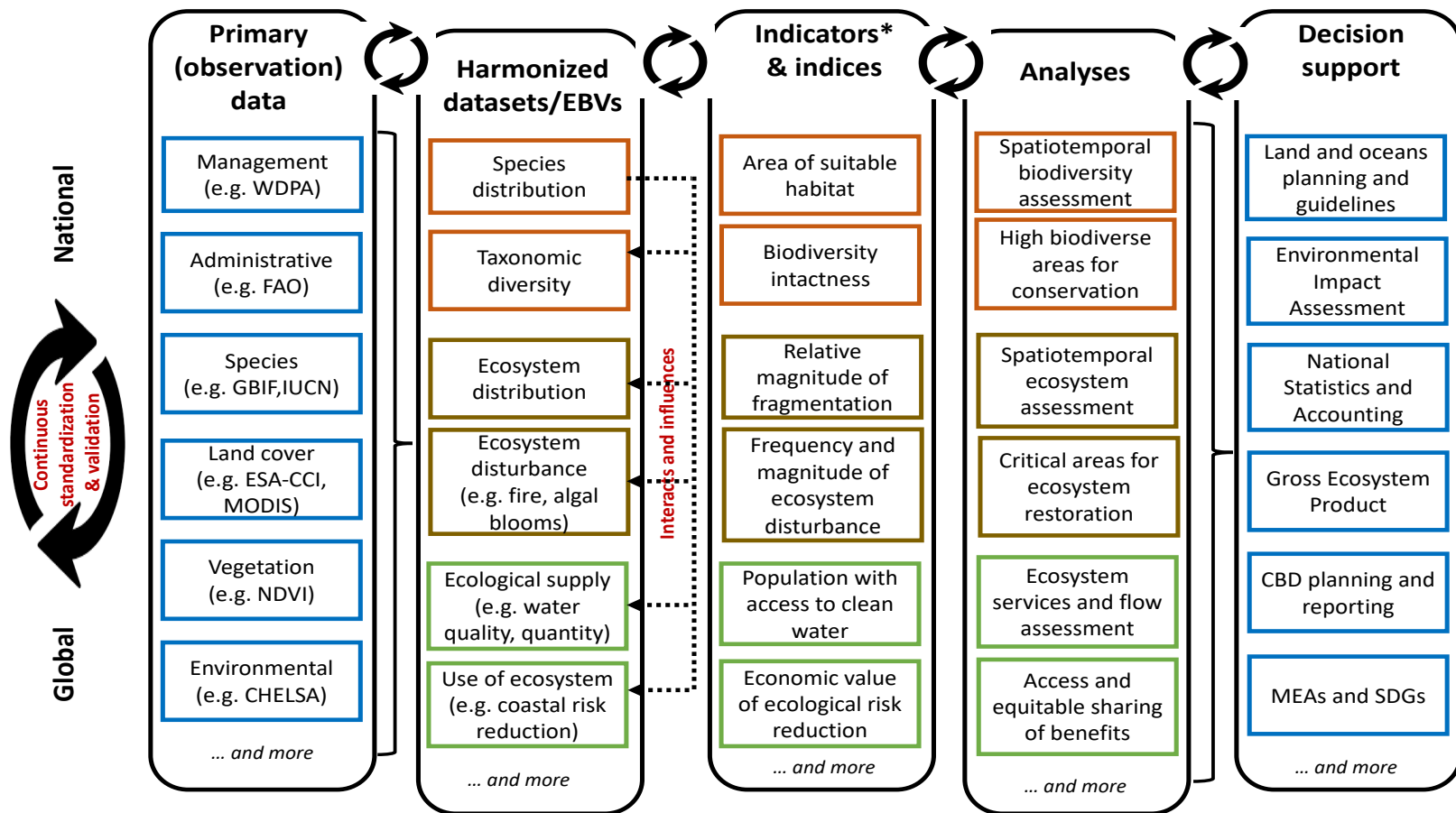
Essential Ecosystem Service Variable Classes (EESV classes)	EESV class definition
Ecological supply	The ecosystem structure and functions that underlie the potential capacity of ecosystems to provide ecosystem services.
Anthropogenic contribution	The efforts that humans invest to enhance ecological supply and to make use of ecosystem services. Anthropogenic contributions and ecological supply interact through the process of co-production.
Demand	Explicitly or implicitly expressed human desire or need for an ecosystem service, in terms of its quantity or quality, irrespective of whether awareness exists about such need.
Use	Active or passive appropriation of an ecosystem service by people.
Instrumental values	The importance of an ecosystem service to societies or individuals as a means to achieve a specific end (e.g. some dimension of human well-being).
Relational values	The importance ascribed to how ecosystems contribute to desirable and meaningful interactions between humans and nature and between humans in relation to nature.

**Essential Ecosystem Services Variables (EESV)** are the minimum set of core variables needed to identify key changes in ecosystem services, and in the interactions between nature and society, that generate ecosystem services, in social-ecological systems.

Source: Balvanera et al. In review.  
*Nature Ecology and Evolution*

# EBV workflow from primary data to decision support

Figure X. Example workflow of Essential Biodiversity Variables (EBVs) from primary data to decision support



\*Some EBV datasets can be used directly as indicators with simple derivation, e.g. distribution of forest, wetland.

Source: Kim, Navarro et al. Essential Biodiversity Variables for Conservation Post-2020. Forthcoming.

# Crosswalk of EBV and EESV frameworks with SEEA EA

SEEA EEA Framework			Ecosystem Extent Account	Ecosystem Condition Account						Ecosystem Services Account		
				Abiotic Ecosystem Characteristics		Biotic Ecosystem Characteristics			Landscape level characteri- stics			
Type	Class	EBVs / EESVs		Physical state	chemical state	Compositi- onal state	Structural state	Functional state	Landscape and Seascape	Provisioning	Regulating	Cultural
EBV	Species Populations	Species distribution			x		x				x	
EBV	Species Populations	Population abundance			x		x				x	
EBV	Community Composition	Taxonomic diversity			x							
EBV	Community Composition	Phylogenetic diversity			x							
EBV	Community Composition	Multi-trophic interaction diversity			x							
EBV	Community Composition	Biomass distribution				x						
EBV	Ecosystem Structure	Ecosystem distribution	x									
EBV	Ecosystem Structure	Ecosystem live cover				x						
EBV	Ecosystem Structure	Ecosystem vertical profile				x						
EBV	Ecosystem Functions	Disturbance					x					
EBV	Ecosystem Functions	Ecosystem phenology					x					
EBV	Ecosystem Functions	Net primary productivity					x					
EBV	Ecosystem Functions	Secondary productivity					x					
EESV	Ecosystem Services	Ecological supply		x	x				x	x		
EESV	Ecosystem Services	Anthropological contribution							x			
EESV	Ecosystem Services	Demand										
EESV	Ecosystem Services	Use							x	x	x	

\* The table includes those EBVs and EESVs that are currently available for use and excludes Genetic Composition and Species Trait classes. They may be suitable for the thematic account on Biodiversity in SEEA EEA. The EBVs also include marine data products, which can be used in the thematic account on Oceans.

Source: Kim, Navarro et al. Essential Biodiversity Variables for Conservation Post-2020. Forthcoming.

## EBV and EESV metrics available for SEEA EA

Ecosystem Extent	Ecosystem Conditions	Ecosystem Services
Ecosystem distribution Extents/areas of 69 standardized ecosystem types Forest distribution Kelp canopy extent Seascape ecosystem distribution Habitat suitability	Area of habitat Extent of suitable habitat Range - size, connectivity Species distribution (current) Change in local terrestrial diversity Species richness Functional diversity – alpha, beta Functional diversity of mammals and birds (current) Phylogenetic diversity – alpha, beta Phylogenetic diversity of mammals and birds (current) Interaction networks Biomass - density by size class, per functional type Phytoplankton functional types and size distribution Habitat suitability 3D vegetation structure - cover, height, vertical & horizontal variability Ecosystem live cover Light attenuation coefficient (Kd 490) Vegetation - height, vertical profile Algal blooms Land surface phenology Productivity seasonality Net primary production Maximum catch potential	Nitrogen retention Water provision Water quality Carbon storage Food production Coastal risk reduction Fisheries catches Nature-based tourism River flood protection Sediment retention Erosion control Pest control Pollination



# EBV Data Portal

f t y Beta version



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## EBV DATA PORTAL

The EBV Data Portal includes a variety of EBV raster datasets. You can import these datasets into the map with a single click. You can also upload your own EBV raster data or vector data for private use or sharing with others.

 Search EBV datasets...

<https://portal.geobon.org/>



Thank you

## Ecosystem Extent

EBV Class	EBVs	Metric	Ecosystem Extent Account
Ecosystem Structure	Ecosystem Distribution	Ecosystem distribution	x
Ecosystem Structure	Ecosystem Distribution	Extents/areas of 69 standardized ecosystem types	x
Ecosystem Structure	Ecosystem Distribution	Forest distribution	x
Ecosystem Structure	Ecosystem Distribution	Kelp canopy extent	x
Ecosystem Structure	Ecosystem Distribution	Seascape Ecosystem Distribution	x
Ecosystem Structure	Ecosystem Distribution	Habitat suitability	

## Ecosystem Condition (1)

			Ecosystem Condition Account					
			Abiotic Ecosystem Characteristics		Biotic Ecosystem Characteristics			Landscape level characteristics
EBV Class	EBVs	Metric	Physical state	Chemical state	Compositional state	Structural state	Functional state	Landscape and Seascap
Species Populations	Species Distribution	Area of habitat			x		x	
Species Populations	Species Distribution	Extent of Suitable Habitat, Population size			x			
Species Populations	Species Distribution	Range size, Range connectivity						
Species Populations	Species Distribution	Species distribution (current)			x		x	
Community Composition	Taxonomic diversity	Change in local terrestrial diversity			x			
Community Composition	Taxonomic diversity	Species richness			x			
Community Composition	Functional Diversity	Alpha functional diversity			x		-	
Community Composition	Functional Diversity	Beta functional diversity			?		-	x
Community Composition	Functional Diversity	Current global functional diversity of mammals and birds			x		-	
Community Composition	Phylogenetic Diversity	Alpha phylogenetic diversity			x			
Community Composition	Phylogenetic Diversity	Beta phylogenetic diversity			?			x
Community Composition	Phylogenetic Diversity	Current global phylogenetic diversity of mammals and birds			x			
Community Composition	Multi-trophic interaction diversity	Interaction networks			x	-		
Community Composition	Biomass distribution	Biomass density by size class				x		
Community Composition	Biomass distribution	Biomass per functional type - Phytoplankton functional types and size distribution				x		



## Ecosystem Condition (2)

			Ecosystem Condition Account					
			Abiotic Ecosystem Characteristics		Biotic Ecosystem Characteristics			Landscape level characteristics
EBV Class	Variable or Indicator	Metric	Physical state	chemical state	Compositional state	Structural state	Functional state	Landscape and Seascape
Ecosystem Structure	Ecosystem Distribution	Habitat suitability			?			
Ecosystem Structure	Ecosystem Live Cover	3D vegetation structure (various metrics related to cover, height, vertical variability, horizontal variability)				x		
Ecosystem Structure	Ecosystem Live Cover	Ecosystem live cover				x		
Ecosystem Structure	Ecosystem Live Cover	Live Cover via Vegetation Continuous Fields				x		
Ecosystem Structure	Ecosystem Vertical Profile	Light attenuation coefficient (Kd 490)				x		
Ecosystem Structure	Ecosystem Vertical Profile	Vegetation Height				x		
Ecosystem Structure	Ecosystem Vertical Profile	Vegetation Vertical Profile				x		
Ecosystem Functions	Disturbance	Algal Blooms				?	x	
Ecosystem Functions	Ecosystem phenology	Land Surface Phenology					x	
Ecosystem Functions	Ecosystem phenology	Productivity Seasonality					x	
Ecosystem Functions	Net primary productivity	Net primary production					x	
Ecosystem Functions	Secondary productivity	Maximum catch potential					?	

# Ecosystem Services

		Abiotic Ecosystem Characteristics		Ecosystem Services		
EESV Class	Metric	Physical state	chemical state	Provisioning	Regulating	Cultural
Ecological Supply	Nitrogen retention				x	
Ecological Supply	Water provision	x		-		
Ecological Supply	Water quality: N, P		x		-	
Ecological Supply	Carbon storage	x			-	
Anthropological contribution	Food production			x		
Demand						
Use	Coastal risk reduction				x	
Use	Fisheries catches			x		
Use	Nature-based tourism					x
Use	River flood protection				x	
Use	Sediment retention				x	
EESV-derived indicator	Erosion control				x	
EESV-derived indicator	Pest control				x	
EESV-derived indicator	Pollination			-	x	

# South Africa country case: spatial biodiversity assessment workflow

Biodiversity  
Observation  
Network (BON)

## EBVs & EBV derived indicators

Entry point

