

Essential Ocean Variables (EOVs)

Monitoring the state and health of the ocean

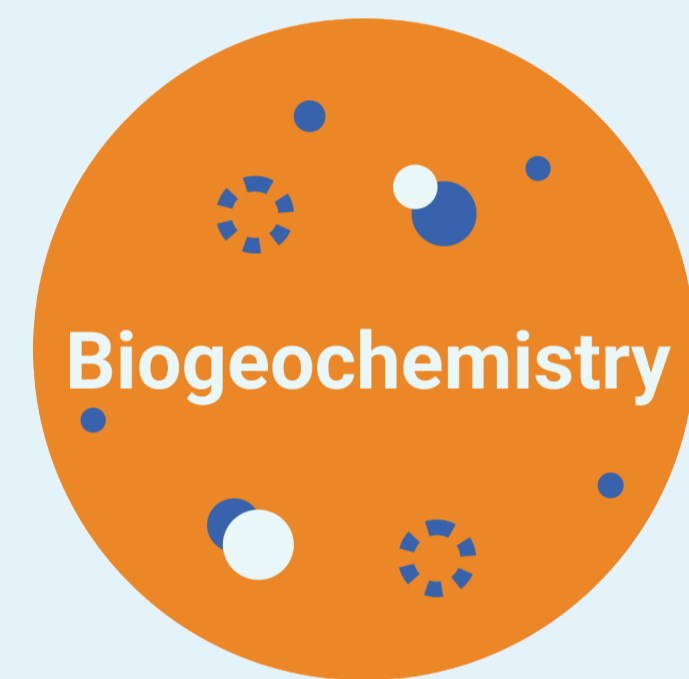
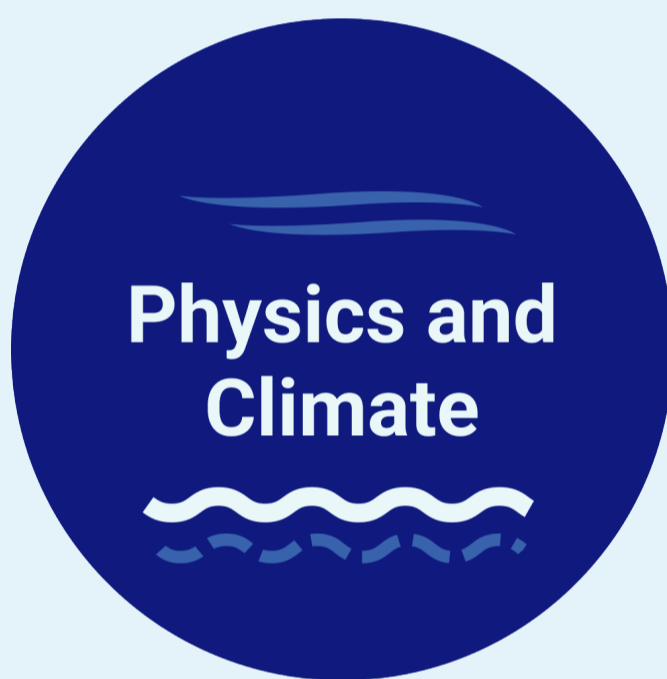
EOVs are the minimum set of ocean variables needed to understand the state of the ocean and the variability of important oceanic processes. They provide information to manage activities that benefit society. EOVs are defined and standardised by the **Global Ocean Observing System (GOOS)**.



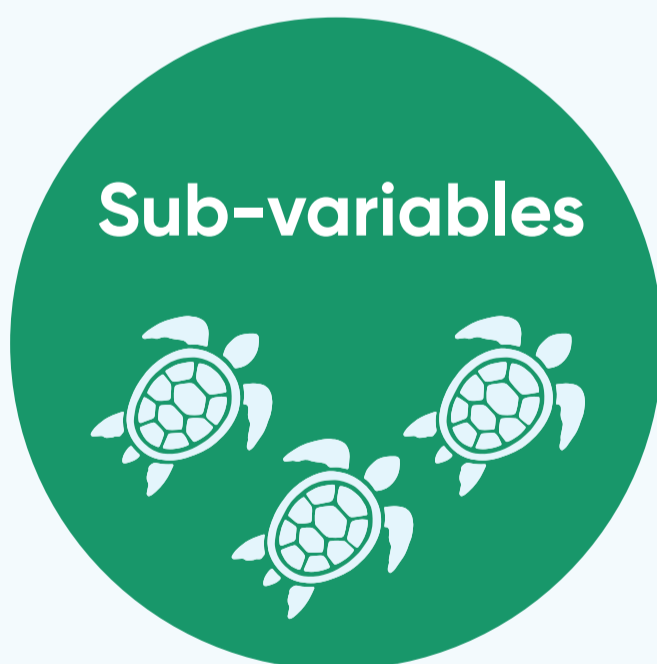
EOVs focus on **three** main delivery areas:



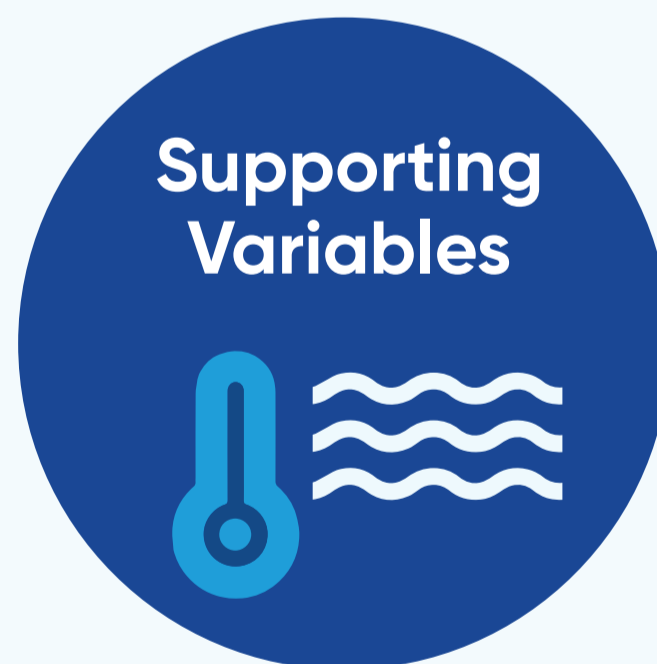
EOVs are grouped by discipline and are overseen by **three** GOOS expert panels:



EOVs can be described by **three** key elements:



Basic measurements for estimating the main EOV (e.g., counting marine turtles)



Additional measurements offering context (e.g., measuring water temperature for understanding environmental conditions affecting turtles)



Outputs calculated from the sub-variables and other relevant information (e.g., visible changes in turtle population using turtle count and water condition)

EOVs make it easy to measure and compare ocean data from all corners of the world!

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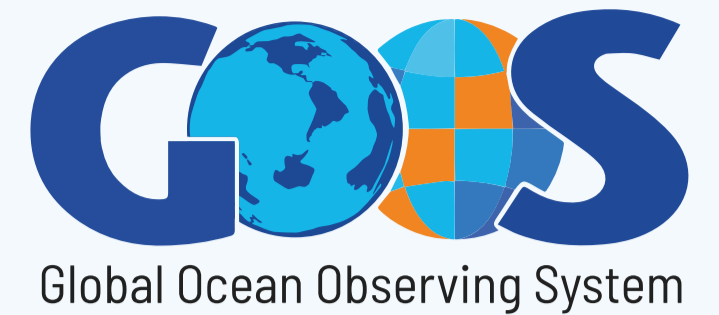


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Biology & Ecosystem Essential Ocean Variables (BioEco EOVs)

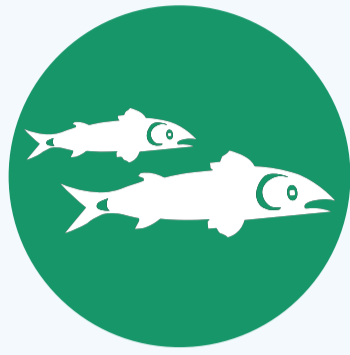
BioEco EOVs were identified by the **Global Ocean Observing System (GOOS)** to meet needs for understanding and forecasting marine life. They provide a framework for coordinating ocean observations, ensuring globally comparable and combinable data.



Phytoplankton
Diversity and biomass



Zooplankton
Diversity and biomass



Fish
Abundance and distribution



Sea Turtles
Abundance and distribution



Sea Birds
Abundance and distribution



Marine mammals
Abundance and distribution



Ocean sound
Cross-disciplinary



Corals
Cover and composition



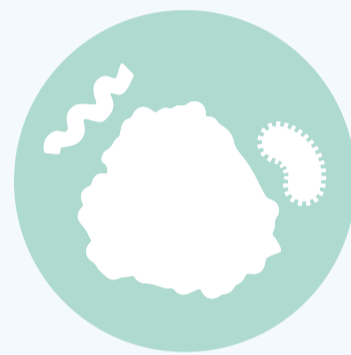
Seagrass
Cover and composition



Macroalgal canopy
Cover and composition



Mangrove
Cover and composition



Microbes
Diversity and biomass (Pilot)

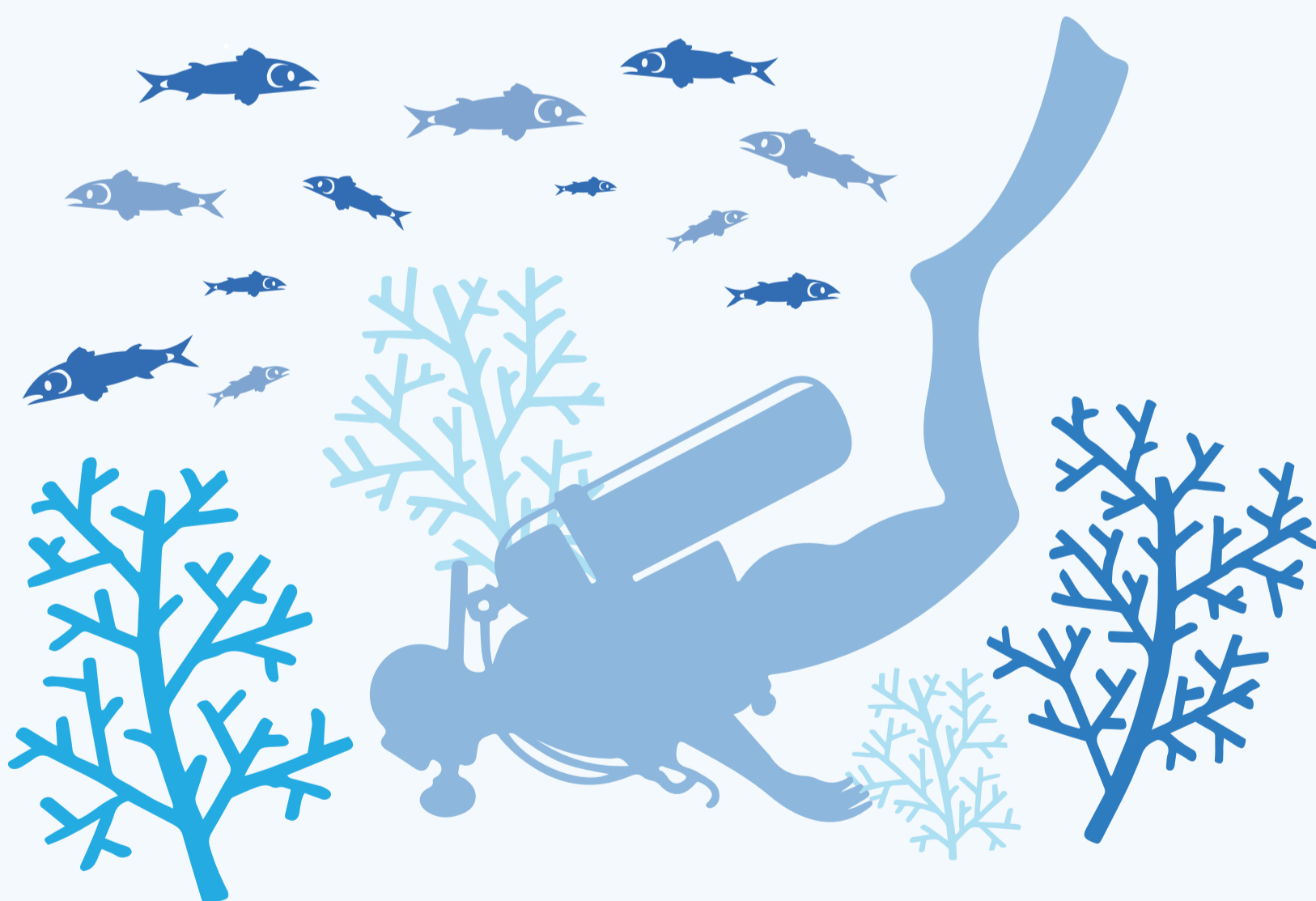


Benthic invertebrates
Abundance and distribution (Pilot)



Ocean colour
Cross-disciplinary

Good, consistent data is fundamental for making smart decisions that keep our oceans healthy and thriving. When ocean observations are comparable, accessible, collected with care, and with accepted protocols, they can enable effective action, investment, and decision-making across ocean management, conservation, industry, and more, helping us sustainably manage our marine resources.



We have the science, the resources, and the information, but we need standardised, globally comparable data to make it useful for everyone.

Your data is not just a byproduct of your research – it's the heart of it. Standardise and share your data to ensure it can have a real impact!

Standardising data for EOVs is a global effort involving many dedicated organisations.

To learn more about EOVs and to contribute, please visit the GOOS website: www.goosocean.org

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Essential Biodiversity Variables (EBVs)

Using biodiversity observations to understand its status and trends

EBVs are biodiversity data tracked over time, mapped or calculated from basic measurements. Managed by the **Group on Earth Observations Biodiversity Observation Network (GEO BON)**, EBVs help monitor changes in biodiversity over time and space.

This **standard approach to evaluating change in biodiversity metrics** helps us understand changes over time and space using models and time series, and make better choices to protect our environment.

EBV classes and EBV names:



Genetic Composition

- Genetic diversity
- Genetic differentiation
- Effective population size
- Inbreeding



Species Population

- Species distributions
- Species abundances



Species Traits

- Morphology
- Physiology
- Phenology
- Movement
- Reproduction

- Community abundance
- Taxonomic/
phylogenetic diversity
- Trait diversity
- Interaction diversity

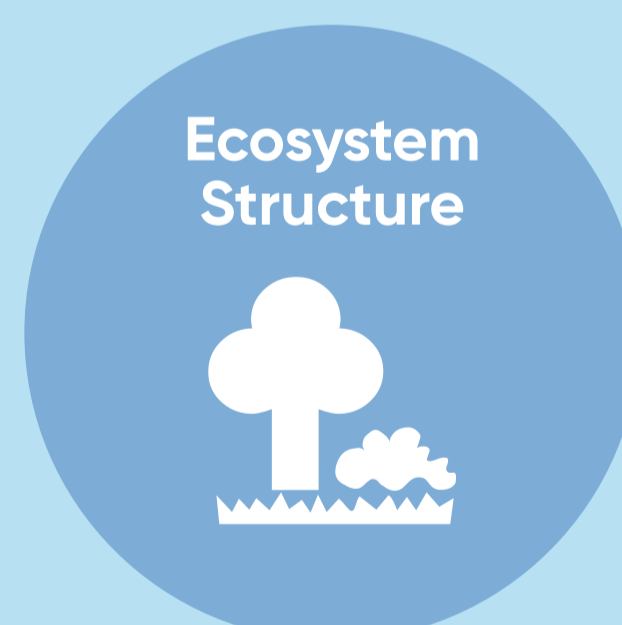


Community Composition



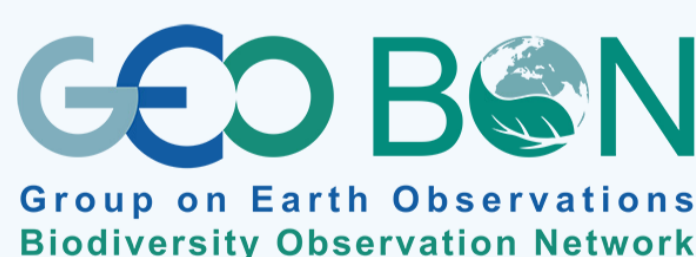
Ecosystem Functioning

- Primary productivity
- Ecosystem phenology
- Ecosystem disturbances



Ecosystem Structure

- Live cover fraction
- Ecosystem distribution
- Ecosystem Vertical Profile



More information on the EBVs can be found on the GEO BON website www.geobon.org

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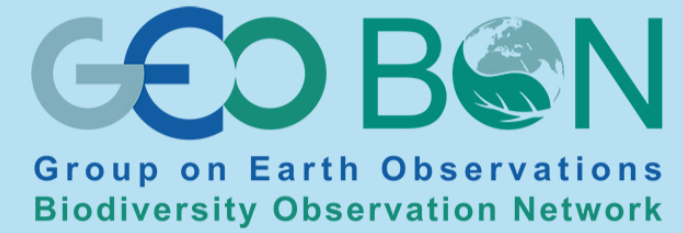
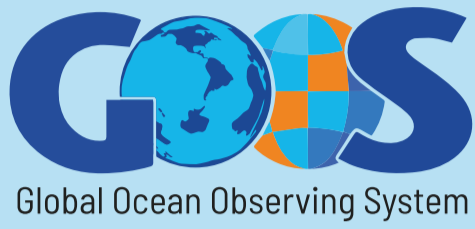


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Essential Ocean Variables (EOVs) & Essential Biodiversity Variables (EBVs)

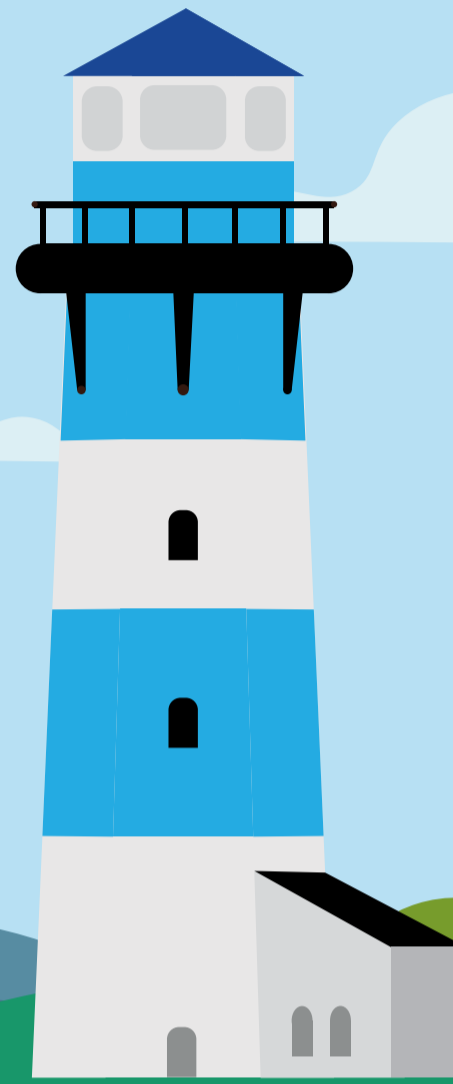
Coordinating monitoring frameworks for marine biodiversity data

Coordinating biodiversity observations through standardised frameworks is essential to making data comparable and useful at different scales and worldwide. The **Global Ocean Observing System (GOOS)** and the **Group on Earth Observations Biodiversity Observation Network (GEO BON)** are strengthening their collaboration, enabling more standardisation in marine biodiversity data so that the resulting information can be shared and used more widely.

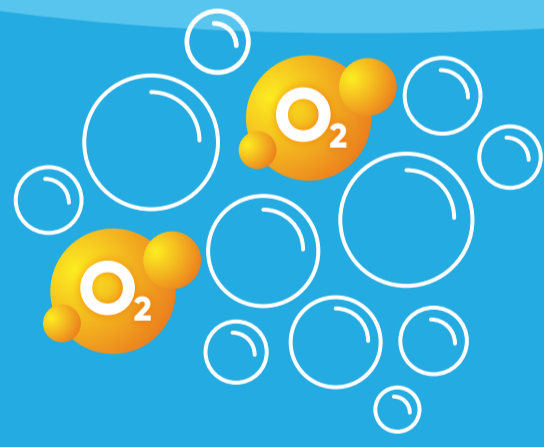


International scientists on the **GOOS** Expert Panels develop **EOV** guidelines, based on user needs, to ensure consistent and comparable global observations across **physics & climate**, **biogeochemistry**, and **biology & ecosystems**. The Biology & Ecosystems Panel develops the **EOV** guidelines that support marine biodiversity monitoring.

GEO BON supports data sharing and guides conservation and policy decisions globally by developing **EBVs** to monitor changes in biodiversity across **terrestrial**, **marine** and **freshwater** ecosystems.



PHYSICS & CLIMATE EOVS



BIOGEO-CHEMISTRY EOVS

BIO-ECO DATA

Observations can be combined into **EOVs** and/or integrated across space and time and with other biodiversity data to form **EBVs**.

Both frameworks help translate raw data into policy-relevant indicators that address societal needs.

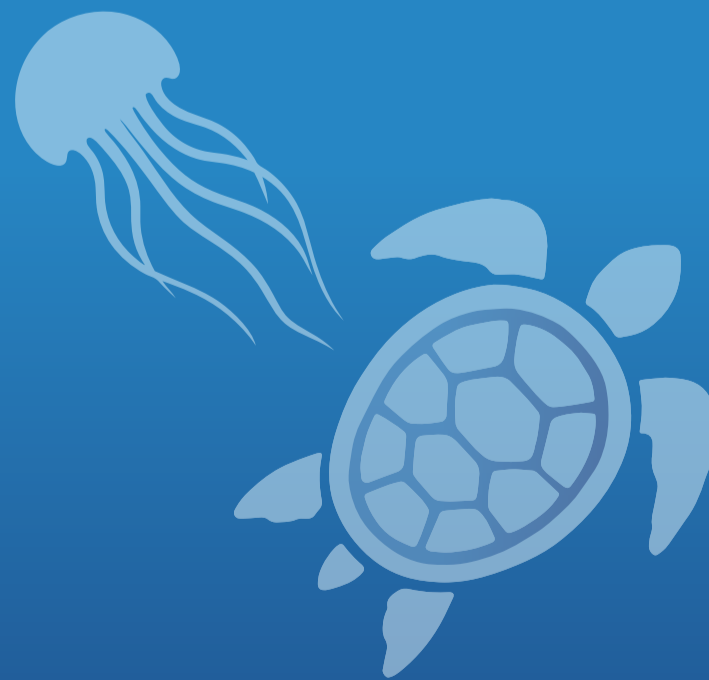
TERRESTRIAL EBVs

FRESHWATER EBVs

BIOLOGY & ECOSYSTEMS EOVS

MARINE EBVs

EOVs are the minimum set of variables (e.g., **water temperature**, **dissolved oxygen**, and **species abundance and composition**) needed to assess ocean state and variability. Standardisation makes these observations comparable and globally scalable.



EBVs are created by turning diverse biodiversity observations into standardised, modelled and repeatable variables that capture aspects of biodiversity change across space and time.

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