Marine indicators and monitoring

for the Global Biodiversity Framework
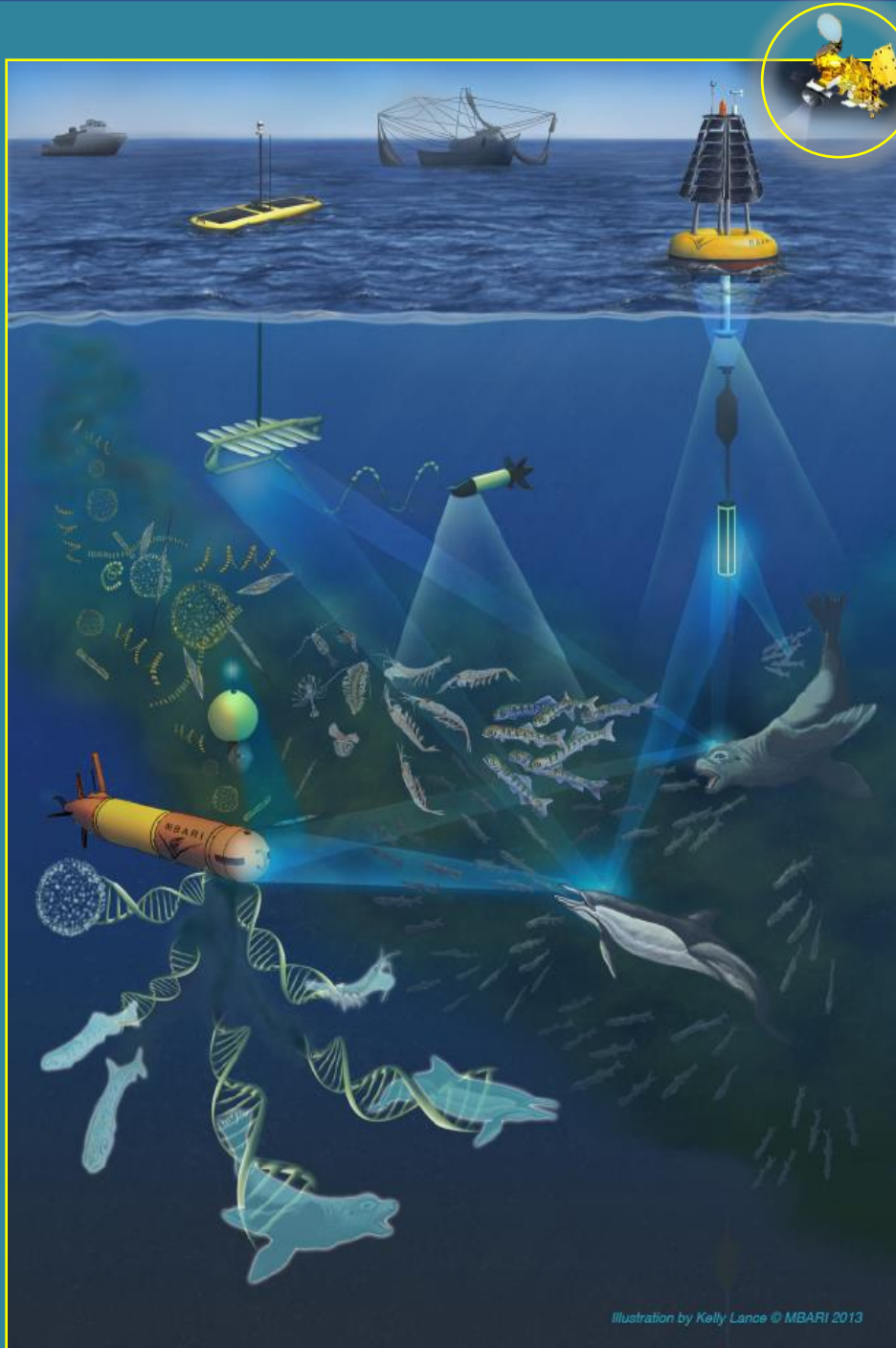
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Illustration by Kelly Lance © MBARI 2013
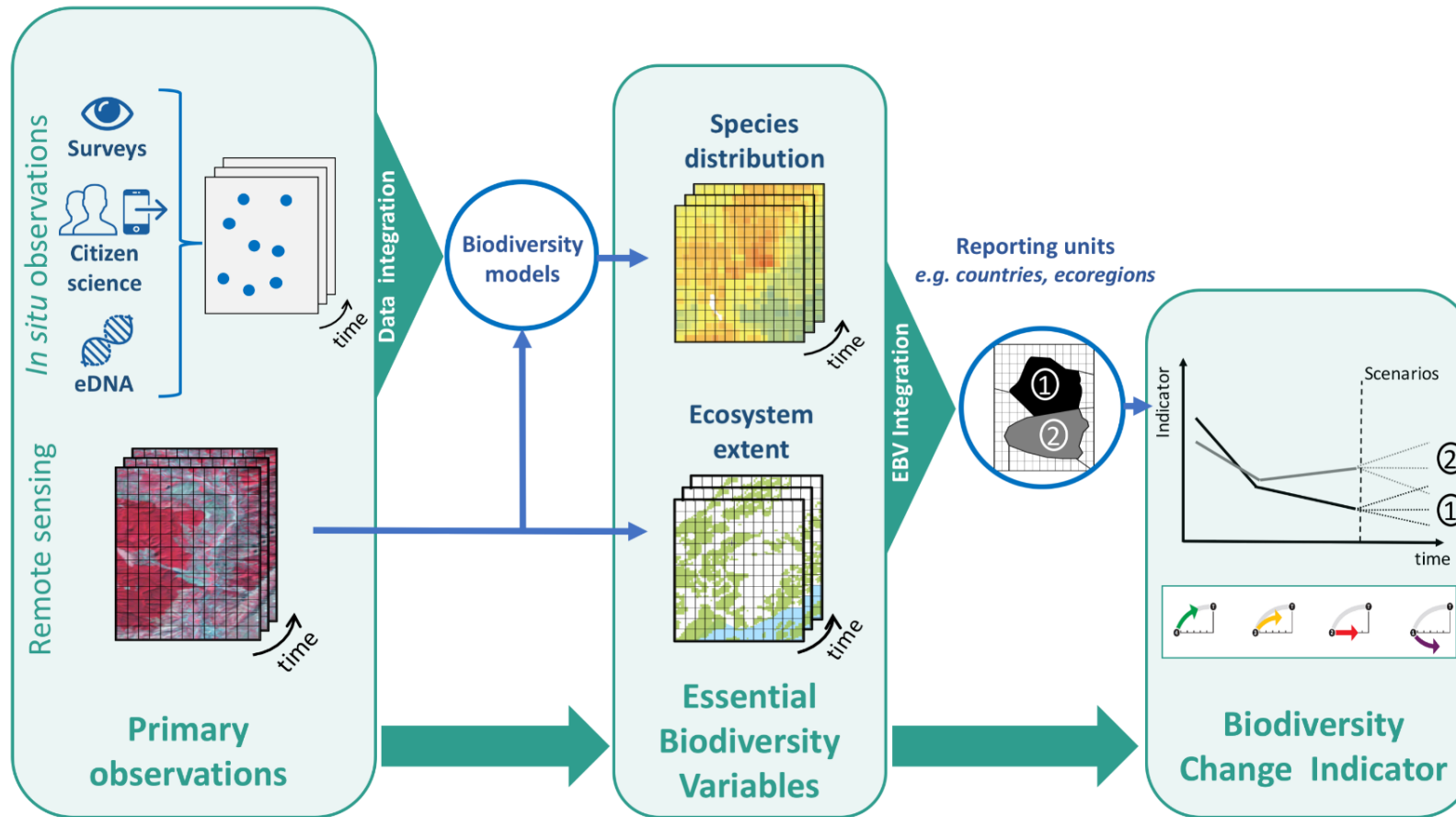
GEO BON

MBON
Marine Biodiversity
Observation Network

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

Illustration courtesy of F. Chavez/K. Lance (Monterey Bay Research Institute/MBARI)

Developing the Essential Biodiversity Variables
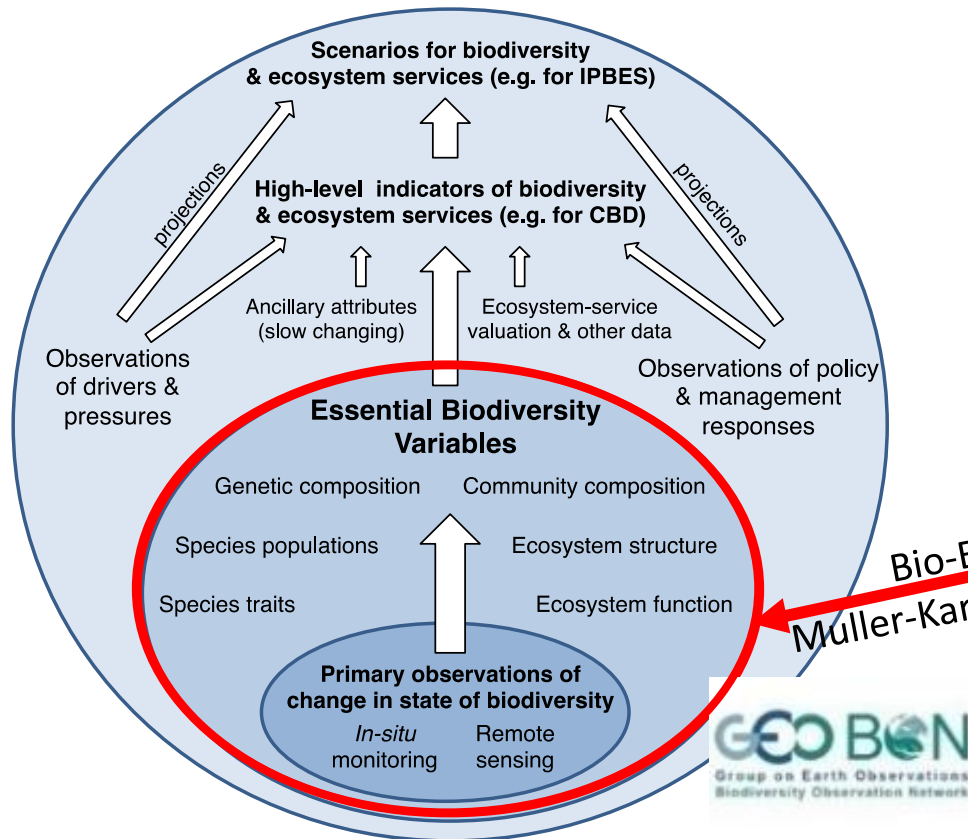

Navarro et al. 2017

Essential Variables – *putting data to use to improve understanding and decision-making*

Essential Biodiversity Variables (EBVs)
GEO BON, Pereira et al. (2013)

Essential Ocean Variables (EOVs)
Framework for Ocean Observing (2012)
http://www.oceanobs09.net/foo/

Bio-Eco EOV
Muller-Karger et al. 2019
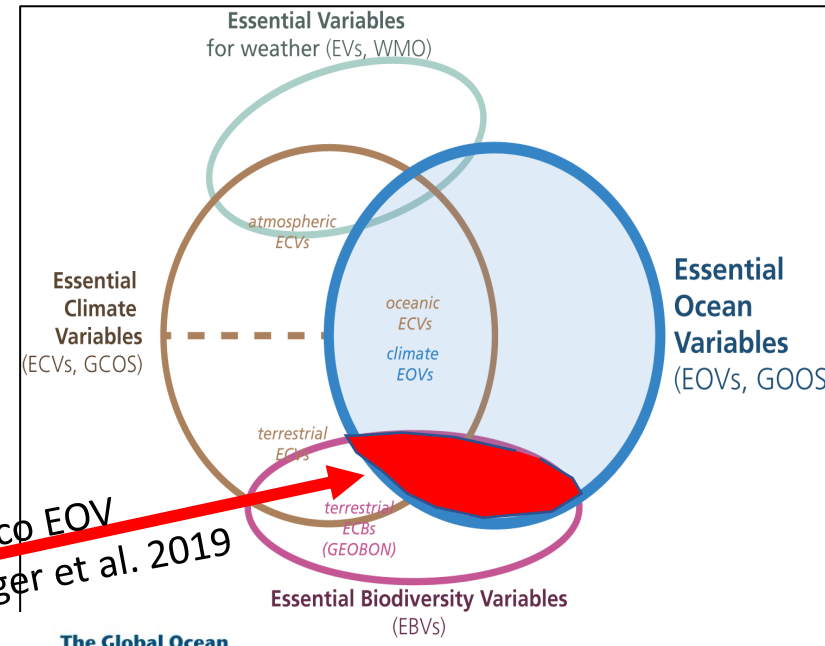
- Phytoplankton biomass and diversity
- Zooplankton biomass and diversity
- Fish abundance and distribution
- Marine turtles, birds, mammals abundance and distribution
- **Hard coral cover and composition**
- Seagrass cover and composition
- Macroalgal canopy cover and composition
- Mangrove cover and composition
- Microbe biomass and diversity (*emerging)
- Invertebrate abundance and distribution (*emerging)

# Headline, Component and Complementary Indicators

Actions affecting drivers

Outcomes for/state of biodiversity

Component and complementary indicators

Action Targets/Drivers
Indirect   **Direct**

Mile-stones   **Goals**

Headline indicators *(Aug 2021)*

Area under protection
Management effectiveness

1.0.1 Percentage of land and seas covered by spatial plans that integrate biodiversity

5.0.2 Proportion of fish stocks within biologically sustainable level

T1 - Spatial plan
T14- Mainstreaming
T15- Sust. production
T16- Sust. consumption
T17- Biotechnology
T18- Harmful subsidies
T19- Financial resources
T20- Knowledge, TEK
T21- Participation

T1–Intact/Wilderness areas
T2–Restoration
T3–Protected Areas & OECM
T4–Species
T5–Wild Species Use
T6–Invasive Alien Sp
T7–Pollution
T8–Climate action
T9–Benefits from Sust. Use
T10–Managed Ecosystems

Timeframes
1-3 years // 2022-2024
5-10+ years // 2025 – 2030+
10-30 years // 2030-2050

A1–Ecosystems
A2–Species
A3–Genes

A-Conservation

Fig. 2; CBD/WG2020/3/INF/11
CBD/SBSTTA/24/INF/31; 18 January 2022
GEOBON/bioDISCOVERY (Future Earth)

A.0.1 Extent of selected natural ecosystems
A.0.2 Species Habitat Index
A.2.1 CMS connectivity indicator
A.3.1 Ecosystem Integrity Index

A.0.3 Red list index
A.0.4 The proportion of populations, Pe>500
A.4.1 Species status information index

A.8.1 Proportion of populations maintained within species

1. ecosystem area
2. ecosystem connectivity
3. ecosystem integrity
4. species extinction
5. species extinction risk
6. species abundance
7. genetic diversity

10.0.1 Proportion of agricultural (aquaculture) area under productive and sustainable agriculture (aquaculture)

Coral Reefs

The Global Coral Reef Monitoring Network as the coral reef BON

https://gcrmn.net/2020-report/

2nd variable (EBV/EOV-ecosystem integrity, A.3.1) - Algae cover (%) or coral:algae ratio
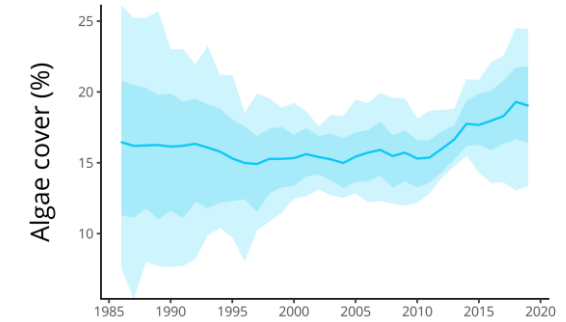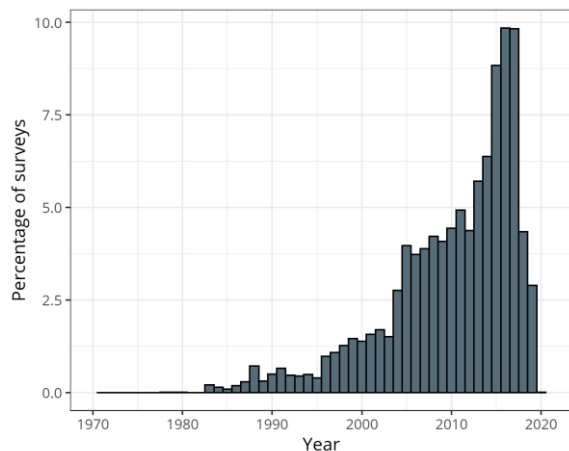

Global coral bleaching events
1998
2010
2016
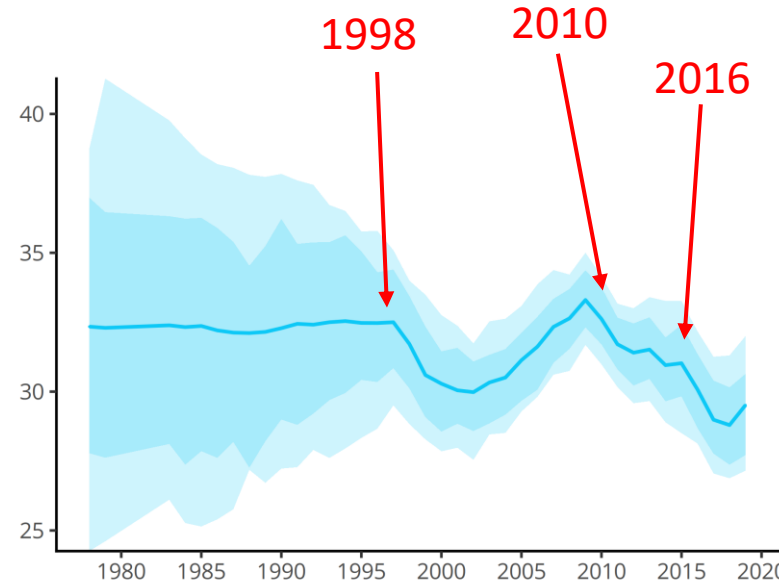
Regional networks and reporting, supporting national and management indicators

Red List of coral species,
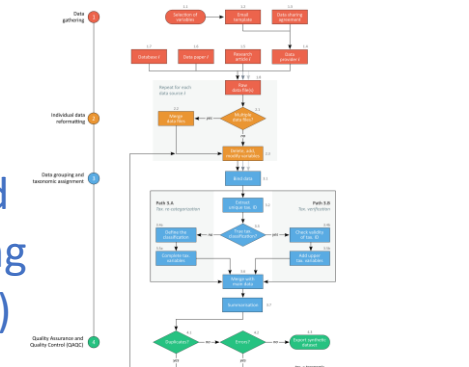*Red List of ecosystems for coral reefs*
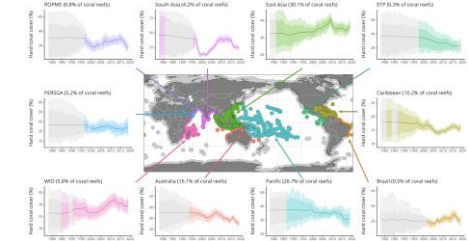
Number of observations, 1970-2020

- released October 2021
- ~2 million observations
- >300 Scientists
- 41 years (1978 – 2019)
- From 12,000 sites
- From 73 countries

WHAT OTHER INDICATORS?

Data model and capacity building (2022 and later)

International Coral Reef Initiative *(ad hoc committee on post-2020 process)*

Recommendations for coral reef indicators

GCRMN	Goal	Target
Live Coral Cover	A	1
Fleshy Algae Cover and Cover of key benthic groups	A	1, 8

OTHER SOURCES	Goal	Target
Coral Reef Extent	A	
Fish Abundance and Biomass	A	1
[Percentage area] of coral reefs included in [effectively managed] MPAs and OECMs		3
Index of coastal eutrophication		7
Live coral cover in restored coral reef areas		2

Future indicators for priority development	Goal	Target
Red list of ecosystems	A	1
Hard coral genera richness	A	1
Structural complexity of coral reefs	A	1, 8
CATAMI Classification Scheme	A	1
Carbonate budgets	A	1, 8

- at smaller scales (regional, national, local), a greater number of variables become available (link national to regional and global reporting).

- Link to other/existing processes where resources may be available (e.g. EIA, resource use, polluter pays, etc).

- Critical need for indicators on DRIVERS – economic sectors (e.g. tourism, transport, agriculture, fisheries), trade, etc. to link monitoring of ACTION TARGETS to BIODIVERSITY OUTCOMES
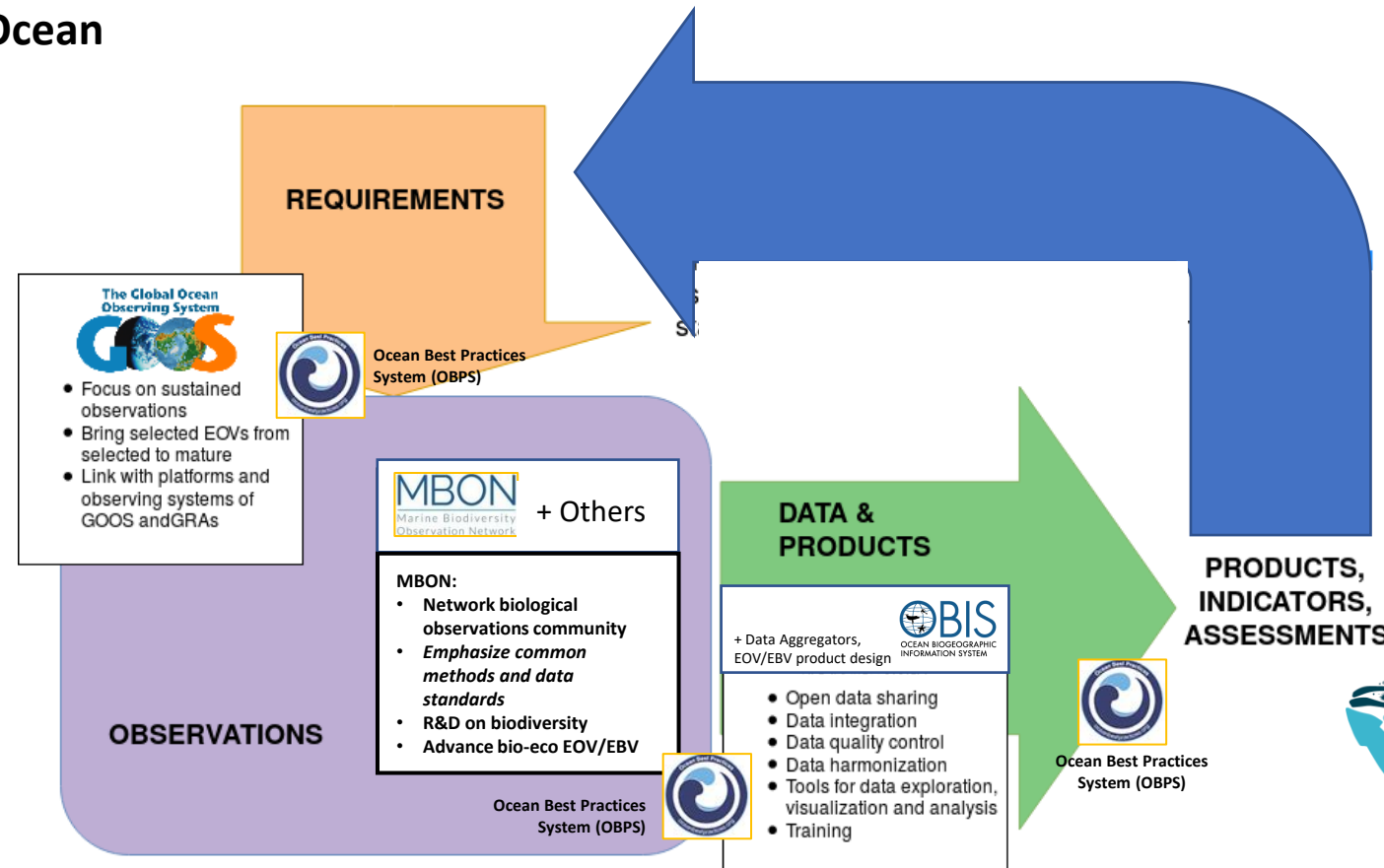
Monitoring, data and reporting platforms

Building the infrastructure needed to monitor and report on biodiversity and its benefits to people, from national to global scales

Marine Life 2030

Biological GOOS Framework for Ocean Observing in the Ocean Decade

Building a coherent, consistent, coordinated ocean observing system to assess the state and trends of the ocean's biological resources and ecosystems as relevant and useful to the world

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

REQUIREMENTS

The Global Ocean Observing System GOOS
- Focus on sustained observations
- Bring selected EOVs from selected to mature
- Link with platforms and observing systems of GOOS and GRAs

Ocean Best Practices System (OBPS)

OBSERVATIONS

MBON Marine Biodiversity Observation Network + Others

MBON:
- Network biological observations community
- *Emphasize common methods and data standards*
- R&D on biodiversity
- Advance bio-eco EOV/EBV

Ocean Best Practices System (OBPS)

DATA & PRODUCTS

+ Data Aggregators, EOV/EBV product design

OBIS OCEAN BIOGEOGRAPHIC INFORMATION SYSTEM
- Open data sharing
- Data integration
- Data quality control
- Data harmonization
- Tools for data exploration, visualization and analysis
- Training

Ocean Best Practices System (OBPS)

PRODUCTS, INDICATORS, ASSESSMENTS

http://iobis.org/2016/12/15/goosgeobonobis/

Marine Life 2030

Concluding remarks

- *What existing (or emerging) indicators do we collect in the marine science/conservation community that can be packaged under the headline, component and complementary indicators?*

- *Are there any improvements to the wording/definitions of headline, component and complementary indicators that might make them more applicable, supply of data more tractable, interpretation more meaningful?*

- *Are there key elements/components of biodiversity, or actions related to direct or indirect drivers that are missing, important to include in monitoring?*

- *What existing national/international/convention monitoring and reporting processes can supply the required data (minimal additional investment needed)?*

- *Roles of GEOBON/MBON/GOOS/MarineLife 2030/Ocean Decade/OBIS to assure marine data and information is fully incorporated in the GBF monitoring framework*

- *Primary roles of national delegations and frameworks underpinning finalization of the monitoring framework and responsibilities and validation for reporting.*