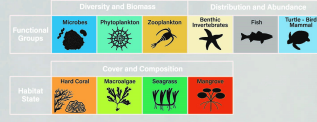# The Global Ocean Observing System for Marine Life

A globally-coordinated and sustained ocean observing system of scientifically and societally relevant biological essential ocean variables is urgently needed to systematically asses the status of the ocean's biodiversity and ecosystems. Tracking how ocean life is responding to increased human use and climate change will empower the global community to predict, mitigate, and manage our ocean.
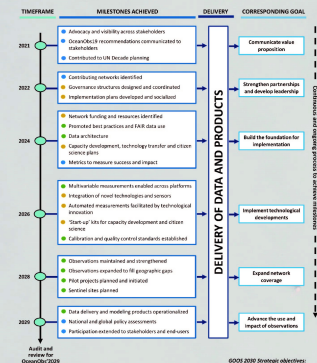
Biological Essential Ocean Variables

Essential Ocean Variables (EOVs) provide one approach to coordinating the observing community. They contribute to the marine biodiversity framework of Essential Biodiversity Variables and deliver to the Global Climate Observing System as Essential Climate Variables (ECVs).

GOOS recommends the monitoring of ten biological essential ocean variables to document trends in diversity, distribution and abundance of marine life globally.

	Diversity and Biomass			Distribution and Abundance		
Functional Groups	Microbes	Phytoplankton	Zooplankton	Benthic Invertebrates	Fish	Turtle – Bird Mammal

	Cover and Composition			
Habitat State	Hard Coral	Macroalgae	Seagrass	Mangrove

Biological observing networks

Observing networks are the building blocks of a comprehensive observing system. Observing networks need to be effectively coordinated to provide the coverage and frequency of observations that make their data relevant to national and international policy and management decisions. Networks contributing to the comprehensive observing systems will require standard operating procedures (SOPs), technology transfer, and in-country support, especially in developing nations.

Fully contributing observing networks will have these attributes

Mission – addresses scientific questions relevant to national and regional science, policy and management needs.

Spatial scale – serves local and national needs but contributes (or aspires to contribute) to a global operational system, including regular reporting to support globally relevant indicators.

Sustainability – surveys produce information on trends over time and are intended to be repeated in the future (Historic data can also be useful and should be archived).

Best practice – network recognizes global accepted standards from data collection to end-user delivery, and is responsive to new technologies, SOPs, data management and delivery.

FAIR and open access data standards – network has clear mechanisms for data attribution and provenance leading to open data, has documented SOPs used for data collection, and adequate metadata to support interoperability, data aggregation and reuse.

Capacity development and technology transfer – supports extension of SOPs and best practices supporting local/regional and/or global needs and priorities

Implementation in the next decade: a roadmap

TIMEFRAME	MILESTONES ACHIEVED	DELIVERY	CORRESPONDING GOAL
2021	● Advocacy and visibility across stakeholders ● OceanObs19 recommendations communicated to stakeholders ● Contributed to UN Decade planning		Communicate value proposition
2022	● Contributing networks identified ● Governance structures designed and coordinated ● Implementation plans developed and socialized		Strengthen partnerships and develop leadership
2024	● Network funding and resources identified ● Promoted best practices and FAIR data use ● Data architecture ● Capacity development, technology transfer and citizen science plans ● Metrics to measure success and impact		Build the foundation for implementation
2026	● Multivariable measurements enabled across platforms ● Integration of novel technologies and sensors ● Automated measurements facilitated by technological innovation ● 'Start-up' kits for capacity development and citizen science ● Calibration and quality control standards established		Implement technological developments
2028	● Observations maintained and strengthened ● Observations expanded to fill geographic gaps ● Pilot projects planned and initiated ● Sentinel sites planned		Expand network coverage
2029	● Data delivery and modeling products operationalized ● National and global policy assessments ● Participation extended to stakeholders and end-users		Advance the use and impact of observations

DELIVERY OF DATA AND PRODUCTS

Continuous and regular proceed to achieve milestones

Audit and review for OceanObs'2029

GOOS 2030 Strategic objectives:
● Deepening engagement and impact   ● System integration and delivery   ● Building for the future