Marine Life 2030: Forecasting Changes to Ocean Biodiversity to Inform Decision - Making: A Critical Role for the Marine Biodiversity Observation Network (MBON)

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Vision

Marine Life 2030 will establish the globally coordinated system to deliver actionable, transdisciplinary knowledge of ocean life to those who need it, promoting human well - being, sustainable development, and ocean conservation.

The Marine Biodiversity Observation Network (MBON) is the platform to build the community of practice needed to implement Marine Life 2030.

Justification

Biodiversity at all levels (genes, species, habitats) is a fundamental characteristic of marine ecosystems. Many of the benefits we derive from the ocean come from this biodiversity, yet this is the weakest link in ocean observing. Particular species support multiple fisheries, tourism, medicines and materials, and ecosystem functions like carbon and nitrogen cycling. Human impacts on these living communities in turn impact services that sustain human well-being and economies. Understanding the composition and distribution of life in the sea is essential to management, conservation, and development. To address these needs, MBON unites partners to 1) measure, monitor, and forecast changes in marine biodiversity, 2) understand effects of climate change and other stressors on biodiversity, and 3) assess and predict how those changes affect ecosystem function and services. Marine Life 2030 will leverage and build on the trans-disciplinary, inclusive foundation of MBON to bring rigorous marine biodiversity observations to inform conservation and management decisions, building stronger connections with stakeholders involved in "on-the-water" decision-making. The Marine Life 2030 framework is central to meet all the Ocean Decade Challenges and to achieve the ambitious goals traced for the decade.

Approach: Partnerships, Capacity Exchange, and Inclusion

Marine Life 2030 will transform how we understand and use the ocean, by integrating biodiversity, the heart of functioning ec osy stems, into the multidisciplinary web of ocean science. The program will develop linkages between government agencies, non - governmental organiza tions, the private sector, and academia, building on the MBON established through the National Oceanographic Partnership Program (NO PP) and advancing the legacy of the Census of Marine Life. MBON provides a transdisciplinary framework for the co - development of best pr actices and interoperability. It coordinates among national and international groups to integrate critical biological observations into o cea n observing, mapping, exploration, characterization, and forecasting strategies and programs.

The Marine Life 2030 framework is fundamental to meet the U.S. needs for ocean policy and for executing Ocean Decade Actions inc luding:

- Mapping resources of the US EEZ as mandated in the federal National Ocean Mapping, Exploration, and Characterization (NOMEC) plan, across disciplines, in four dimensions (horizontally and vertically from seabed to surface, watershed to the ocean interior, and in time).
- Assessing biodiversity value for societal benefit.
- Advancing ecological forecasting and applications.
- Emerging approaches for biodiversity assessment and research (including eDNA, imaging, acoustics, movement, AI, remote sensing).
- Expanding capacity, literacy, participant diversity, and use of traditional knowledge for inclusion and representativeness.

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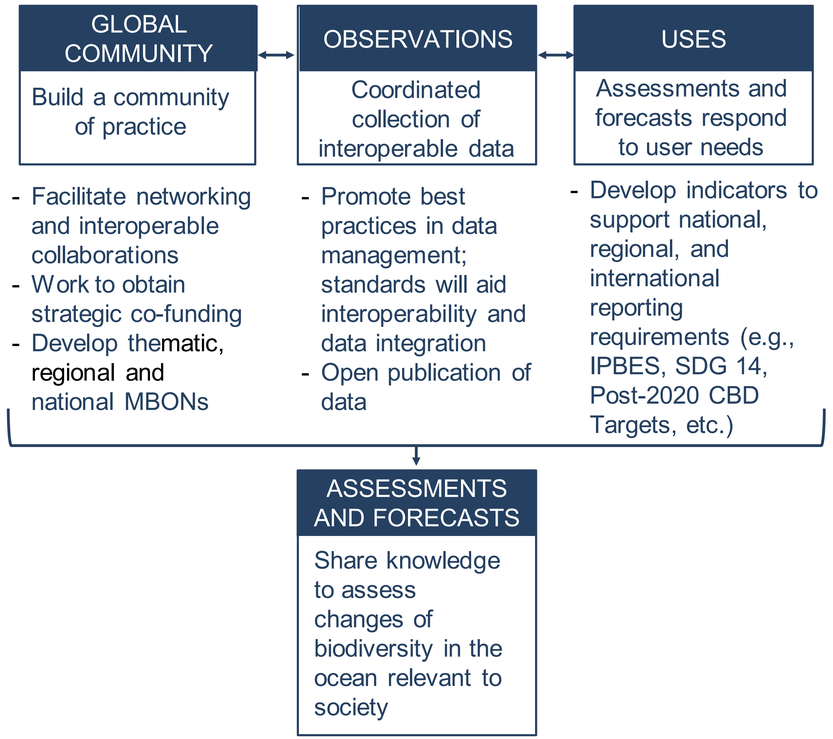
Conceptual Framework of MBON

MBON Marine Biodiversity Observation Network

Vision: Observations of marine biodiversity, from local to global scales, are part of multidisciplinary observing systems to inform society for sustainable development and conservation



- Users and MBON members interact to satisfy government and intergovernmental policies relevant to the conservation and sustainable use of marine biodiversity.

- Contribute to Ocean Best Practices – a compendium of methodologies for marine biodiversity observations

Benefits to Participants

Change happens when people engage together to address a common need, creating mutual benefit, and develop evidence-based solutions resting on shared understanding.

Benefits of joining MBON include:

- Expanded capacity for contributors to address research goals and grand challenges that no-one can address alone.
- Leverage resources, including expertise, technologies, and funding by aligning priorities.
- Linkage to and networking with researchers across sectors and locations.
- Increased visibility to scientific, philanthropic, resource management, and other sponsors.
- Sharing and spreading best practices in research design, data management, and other areas.
- Improved international linkages of relevant US research and applications programs.
- Understanding of ecosystem change, causes, and defining potential management responses.
- Accessing a platform for public communication about biology; opportunities for citizen science.
- Enhancing university partnerships, a mainstay of ocean research.
- Linking natural science with socio-cultural-economic information, to answer policy questions.
- Engaging in the implementation of the *UN Decade of Ocean Science for Sustainable Development*.

Early-career and under-represented community benefits:

- Fast-tracking early-career researchers to funding opportunities and positions of responsibility.
- Expanding the scientific and social networks of early-career researchers in international science, policy, paradigms, and cultures.
- Empowering and exchanging capacity to address issues of concern to humanity, including climate change, biodiversity loss, and others.

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International Framework for MBON

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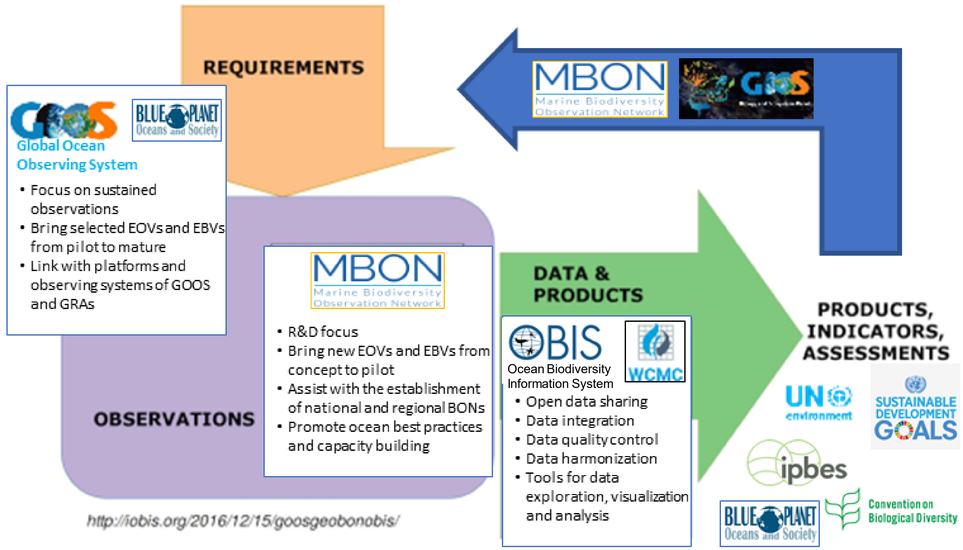
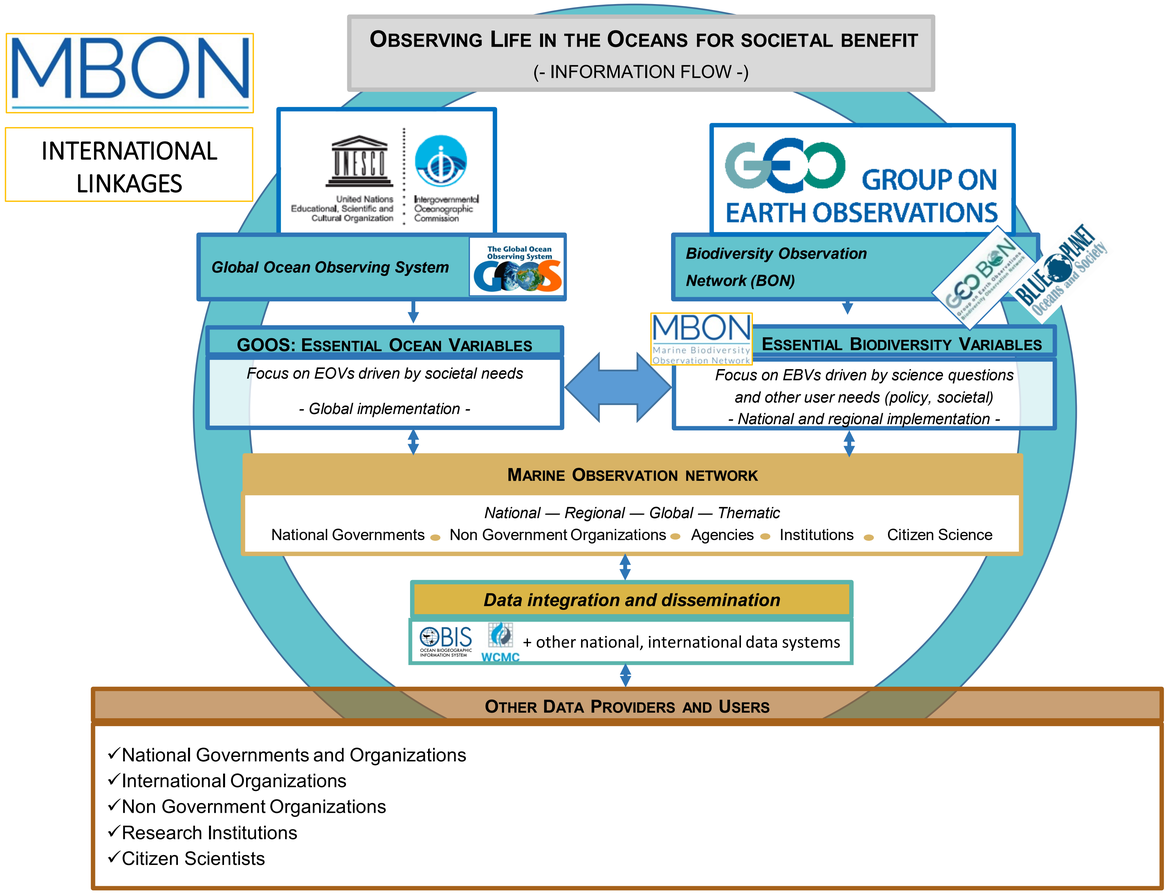


Requirements for ocean observing (information types, formats, locations) are collected and synthesized by the Global Ocean Observing System

MBON works to develop the community of practice that uses these requirements to collect observations following best practices and interoperability guidelines

OBIS and partner data and information management systems curate the data and generate products that will be used by stakeholders



The Marine Biodiversity Observation Network is an activity under the Group on Earth Observations (GEO). It has developed strong collaborations with programs in the Intergovernmental Oceanographic Commission (IOC) to coordinate observing based on requirements defined by GOOS and to deliver information to stakeholders via OBIS and other information management systems