

## **Marine Life 2030:**

### **A Global Integrated Marine Biodiversity Information Management and Forecasting System for Sustainable Development and Conservation**

REQUEST FOR ENDORSEMENT OF DECADE ACTION: DECADE PROGRAMMES

#### **1. Overview of Proponent and Proposed Decade Programme**

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## **6. Partner details if relevant (for each partner please list Institution name, contact details including address & email and role of partner)**

Partners listed below have demonstrated interest in engaging in the Ocean Decade Marine Life 2030 Programme. The Partners have a wide range of roles, coming from Academia (research, education, and community service), Government (coordination, sponsorship, policy design and implementation), Non-Government Organizations (coordination, sponsorship, policy design and implementation), and the Private Sector (data aggregation, product development and use, sponsorship). Specific Ocean Decade Programmes, and existing projects and initiatives, have also expressed interest in participating. They are engaged in data collection, management, education, and policy implementation. Specific roles will be defined as the Programme is organized and implemented.

Marine Life 2030 is open to additional partners and collaborators, and welcomes partners to engage in the planning, implementation, and sponsorship of actions (projects and activities).

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## PARTNER OCEAN DECADE PROGRAMME PROPOSALS

Connecting Marine Protected Areas (MPAs) through ocean swimways to protect migratory  
routes and critical habitats of endangered species

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### \* 7. Name of proposed Decade Programme

**Marine Life 2030: A Global Integrated Marine Biodiversity Information Management and Forecasting System for Sustainable Development and Conservation**

### 8. Short title / acronym of proposed Decade Programme for communications purposes (if any)

Marine Life 2030 / ML2030

### \* 9. Summary description of proposed Decade Programme

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. Within a decade, Marine Life 2030 will unite existing and frontier technologies and partners into a global, interoperable network and community of practice advancing observation and forecasting of marine life. This network of networks will link technical, management and policy stakeholders to build and exchange capacity for advancing society's grand challenges of managing activities for a healthy and resilient ocean and the vibrant and healthy society that depends on it.

## \* 10. Start & end date of proposed Decade Programme

1 July 2021  
12 December 2030

## \* 11. Estimated total budget of proposed Decade Programme

US\$ 1,200 M

Funding support for specific Actions (projects and activities) will be required, including in the following categories:

- **Coordination and management of Marine Life 2030.** Networking activities to facilitate co-development of solutions between natural and social sciences, including users, researchers, technologists and engineers, and networking among industry, academia, and civil society. This effort will require support for both management and fundraising for Decade Actions.
- **Information technologies and management.** Curation, analyses, and accessibility of data and information on marine biodiversity and its integration with other scientific and socioeconomic data. Additional resources are necessary for the Ocean Biodiversity Information System (OBIS) to curate and publish the observations and basic synthesis products generated under the Marine Life 2030 framework.
- **Interoperability and best practices.** Development, documentation, curation, publication, and socialization of standards and best practices will be coordinated with the Ocean Best Practices System.
- **Development of research and scientific solutions.** Field expeditions, laboratory processing, bioinformatics analysis and curation, and engagement of expert taxonomists from regions around the world to build out the global Ocean Biocode sequence-based library of ocean life.
- **Cross-Decade engagement.** Collaboration with other Ocean Decade actions, programmes, and activities, and with the UN Decade on Ecosystem Restoration, to co-develop activities for the regional initiatives and national committees, aiming to establish national and/or regional Marine Life 2030 task forces.
- **Social science strategies and valuation.** Contribution to development of ocean accounting, including valuation strategies for ecosystem functions, working with local stakeholders and national statistical offices.
- **Technology development and integration with existing ocean observing systems.** Field instrumentation, automated platforms, uncrewed systems and remote sensing technologies.
- **Applications for data access and use.** Development of applications that facilitate integration, visualization, and analysis of observations, including 'apps' tailored for access to observations and forecasts, with emphasis on development by and for LDCs, SIDS, and other groups with urgent needs. Examples include the Ocean Biodiversity Information System (OBIS), the SIMAR Earth observations explorer developed by CONABIO in Mexico for the Caribbean region, GOOS Regional Alliance platforms and apps for mobile use, and the COVERAGE effort under CEOS to integrate Earth observations from multiple international satellites into a virtual constellation. Such efforts also need to be cross-linked.

- **Capacity exchange.** Building new knowledge through exchange of capacity between groups of people from different backgrounds, including traditional formal and informal education efforts, training, and professional development. A significant activity will be coordinating between major formal and informal education, outreach and extension groups and professional societies in the network to focus on co-development of solutions, convergence of data collection, data processing and formatting, applications, ethics and inclusion. Examples are workshops designed to incorporate traditional knowledge into management practices, specific opportunities for joint field work and analyses, and application of best practices for data management and applications. For example, Mexico (UNAM), REV Ocean, and Schmidt Ocean Institute offer support for cruise proposals through competitive peer-reviewed programmes. REV Ocean supports IDEAS cruises (Inspire, Discover, Educate and Solve), which are visionary activities aimed at policymakers, workshops on board, training, education, capacity building and communication regarding long-term routine sampling of biological material.
- **Coordination between Indigenous partners and ocean observing systems** (Ocean Networks Canada, GOOS, Coast Predict, MBON, other). Development of a network of coastal biodiversity observations with a strong biocultural component. The goal is to make unique contributions to scientific data collection in Indigenous traditional ocean territories and protected areas. This co-designed network will also develop a modeling framework for pairing Indigenous knowledge with sensor-based ocean monitoring to support ecosystem management; undertake research that examines how aquaculture techniques can be combined with contemporary ocean monitoring to increase the sustainability of seafood farming and promote Indigenous food sovereignty; develop recommendations for improving management outcomes for fisheries harvested by Indigenous peoples through the incorporation of traditional knowledge in practice, policy, and procedures decision-making; apply lessons learned in other contexts and in different areas.
- **Development of policy options and management actions.** Coordination of partner efforts to develop observations, address international reporting requirements, and develop indicators requires support. The indicators and information required for reporting will be the result of co-development activities conducted with groups and agencies that have the responsibility to design and carry out policy. Marine Life 2030 provides a forum to test scenarios, evaluate the state of the science, and provide advice on consequences of policy options.

## 12. Percentage of estimated budget that is secured

About 8% per budget year in existing project commitments through at least 2025.

## 13. Secured funding sources (donor name and approximate amount secured)

The secured funding indicated below represents existing, planned activities at the national and international level that contribute directly to, and provide the foundation of, Marine Life 2030. This is not a comprehensive list. These programs are critical to the success and process of engagement across the breadth of Marine Life 2030 program objectives. Additional resources are required to leverage these investments to implement a fully representative global program. Dollar figures provided are approximate amounts:

- **Brazil:** US\$100,000/2021 and onward: The Long-term Ecological Research Program Coastal Habitats of Espírito Santo (PELD HCES)/Universidade Federal do Espírito Santo to take place

from 2021 to 2024; Granted to Dr. Angelo Bernardino (coordinator), Dr. Ana Carolina Mazzucco (co-PI and data manager), and collaborators from several universities in Brazil. Continued funding for subsequent years of multi-year projects will be contingent upon acceptable performance.

- **European Union:** AtlantECO Program: 10.9M Euro through 2024-2025; 36 partners from 13 countries (including South Africa and Brazil) (Contact: Daniele Iudicone).
- **Japan:** US\$26.1K/year (JPY2.7M/year): Japan/Hokkaido University/Japan Agency for Marine-Earth Science and Technology; International Research Center for Agricultural Science/Marine Ecology Research Institute/Japan; US\$ 57.0K/year (JPY5.9M/year): Japan/ University of the Ryukyus. JSPS Core to Core Program for FY2020-2022, title: Global analyses of mangrove ecosystem by eDNA metabarcoding. Granted to University of the Ryukyus (coordinator: Dr. Tadashi Kajita). Overseas core institutions from Indonesia, China, Philippines, Thailand, Malaysia, India, Sri Lanka, South Africa and Senegal. Project HP: <https://c2c.mangroves.info/>. In-kind resources: Access to OBIS node BISMAL of JAMSTEC and high resolution marine environmental data of East Asia (around Japan) (FORA and FROP (planned) provided by JAMSTEC).
- **Malaysia:** USD45K/year (MYR200,000/year): Government of Malaysia, Ministry of Higher Education, Long term research grant scheme (LRGS).
- **Mexico:** US\$120,000/2021 and onward: Mexico/Universidad Nacional Autonoma de Mexico (UNAM); ~6 days ship time on board R/V Justo Sierra UNAM to take place in 2021 or 2022 if COVID allows. \$20,000 USD/day, 6 days ship time. Granted to Dr. Elva Escobar for cruises SIGSBEE 23 and 24 to take place in the Gulf of Mexico under the funding opportunity that evaluated projects based on the quality of applications received and the budgets proposed by successful applicants. Leveraging additional resources in the form of in-kind support if permitted, in addition to the secured ship time can include talent, equipment to work onboard, computational resources, data management, and/or funding from public partners e.g. the Call PAPIIT-DGAPA 2022 e) modality (<https://dgapa.unam.mx/index.php/impulso-a-la-investigacion/papiit>) to be prepared and submitted jointly in June 2021. Continued funding for subsequent years of multi-year projects will be contingent upon acceptable performance.
- **Portugal/Azores:** US\$190K (2021, 2022): Atlantic International Research Centre (AIR Centre), including human resources (two persons 50% during 2021 and 2022), cost for organizing an international in-person / online hybrid event/year (US\$50K) and workshops (1 by year) of capacity building and technology transfer (US\$ 40K). In-kind resources: AIR Center IT infrastructure comprising i) Direct Receiving Station (DRS) in Azores Terceira Island for satellite data reception (X-Band Earth observation satellites. Terra, Aqua, Suomi-NPP, JPSS and FengYun-3), ii) access to AIR Data Net for processing and storage of earth observation data, iii) advanced video conferencing / broadcasting platform.
- **USA:** US\$3M/year for implementation of the US Marine Biodiversity Observation Network with the US Animal Telemetry Network (ATN) and US Integrated Ocean Observing System (US IOOS), coordinated by the National Oceanographic and Atmospheric Administration on behalf of the U.S. National Oceanographic Partnership Program (NOAA, NASA, BOEM, ONR, USGS; Smithsonian Institution). Contact Gabrielle Canonico.

- **OBIS Nodes networks:** The present expected funding is not adequate to implement the Ocean Decade. Present funding is US\$2M/year for salary, travel and infrastructure; these are existing funds which represent the aggregated budget of 31 OBIS nodes distributed globally and the central global node (OBIS secretariat). Approximately 10% of this is covered by UNESCO-IOC.

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**\* 14. Do you require support to find additional resources for your Decade Programme?**

YES

**\* 15. Would you like to be put in touch with partners working on similar issues or proposing Decade Actions that could have synergies with your proposed Action?**

YES

**\* 16. Countries in which the proposed Decade Programme will be implemented**

All Member States of the Intergovernmental Oceanographic Commission

**\* 17. Ocean basins in which the proposed Decade Programme will be implemented**

Indian Ocean  
 North Pacific Ocean  
 South Pacific Ocean  
 North Atlantic Ocean  
 South Atlantic Ocean  
 Arctic Ocean  
 Antarctic Ocean

## 2. Description of the proposed Decade Programme

**18. What is the high-level objective(s) of your proposed Decade Programme?**

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.

Many societal problems depend on answers to questions like: How are distribution and abundance of organisms changing over time and across the ocean, and what are the impacts of these changes? How do climate warming, acidification, pollution, and a host of other stressors affect the services marine life provides to society? Can marine ecosystems recover from disturbance, and what management interventions will help them do so?

These questions highlight that life is at the core of healthy, functioning ecosystems and the services they provide to humanity. Yet biology is the critical missing piece in most ocean observing programs. Integrating biodiversity into global ocean observing and sustainable development is hampered by three challenges: (1) most marine species and great swaths of the ocean's ecosystems remain unstudied, and management of marine living resources relies mainly on proxy variables like temperature, salinity, and topography -- generally without measuring biology itself; (2) even existing data on ocean species are inadequately coordinated, undigitized, of widely varying quality, and largely inaccessible; (3) marine biodiversity science and observations are poorly linked to user communities. Marine Life 2030 will unite communities around the world to solve these challenges, transforming ocean science and democratizing it through seven objectives:

**OBJECTIVE O1: Nurture global capacity for sustainable ocean development.** Marine Life 2030 will catalyze global capacity for collecting and delivering interoperable biological data and knowledge that is fit to the purpose of informing sustainable management, policy, and development. This requires local engagement of multiple sectors. Working with Centres for Collaboration (Objective 3 below), capacity exchange will target partners and users from LDCs and SIDS, providing scientific information and indicators tailored to support assessments and reporting requirements of nations, groups, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the Convention on Biological Diversity (CBD), and the Intergovernmental Panel on Climate Change (IPCC). Actions will include technology development, testing and implementation, and integration with the existing ocean observing systems, all co-designed with end-users. This includes field instrumentation, automated platforms, un-crewed systems and remote sensing technologies, and work with partners to transfer the technology, ensure sustained use for high-quality observations, and help detect and forecast ecological change.

**OBJECTIVE O2: Establish a global framework for coordination and integration.** Realizing a global, interoperable system for marine biological observing and knowledge delivery requires effective coordination among existing observing networks, and strategic development of new links with user communities. As a first order of business Marine Life 2030 will initiate a facilitated process of consultation and workshops with diverse stakeholders, through year 1, to co-design and implement the programme coordination and management framework, to include a ML 2030 Programme Office, and Science and User Advisory Committees. These bodies will serve both to develop and integrate the network of partners, and to advance interoperability, standardization, and open access of biodiversity data and knowledge to expand geographic and temporal coverage. Projects and activities will aim to support the development of indicators and reporting requirements. This process will provide linkages between the Ocean Decade and the UN Decade on Ecosystem Restoration to co-develop regional initiatives, and to inform national committees through national and/or regional Marine Life 2030 task forces.

**OBJECTIVE O3: Build lasting partnerships and collaboration.** The coordination framework and committees established in Year 1 will then focus on building out the partnerships required to sustain a functional global network. This includes leveraging and amplifying existing infrastructure and capacity, especially by co-locating biological observing with existing ocean physical and geochemical observing, and by strategically building new partnerships in under-represented geographies and communities (e.g., SIDS and LDCs) and with end-users in management, conservation, industry, and development sectors. Marine Life 2030 will work closely with the complementary Decade programmes and projects listed above to achieve these goals.

**OBJECTIVE O4: Build the Ocean BioCode.** Realizing a global observing system that efficiently collects and delivers timely, high-resolution biodiversity knowledge globally will rely heavily on rapidly developing approaches based on DNA sequence data. This is reflected in the rapid expansion of eDNA and metabarcoding approaches to biological monitoring over the last decade. But interpreting these data depends critically on rigorous, taxonomically vetted reference libraries that connect the strings of DNA base sequences to species names, knowledge of organisms, and their ecologically important traits. These libraries are currently rudimentary for many marine taxa and regions. This next generation of natural history knowledge is essential to predict future resource and ecosystem trajectories, inform stakeholders, build alert systems for biological hazards such as pathogens and harmful algal blooms, and shape policy to manage and conserve living resources. Marine Life 2030, led by the Smithsonian, will address this challenge directly by coordinating the world's marine taxonomic experts to build out the digital library of ocean biodiversity via a strategic program of field sampling that links expert-identified voucher specimens with DNA sequences and images. Development of the Ocean BioCode library will co-prioritize geographies, standardized sampling methods, and taxa in consultation with partners, experts, and end-users worldwide.

**OBJECTIVE O5: Nurture Centers for Ocean Collaboration.** Sustaining the global ocean and the people who depend on it requires global collaboration. A key complement to ML 2030's coordination framework and bodies (O1) will be Centers of Collaboration (i.e., AIR Centre, Hakai Institute) that coordinate and network project-based and longer-term strategies to host regular co-designed knowledge exchange activities (webinars, workshops, and project co-development) with data providers and end-users to strengthen the foundation for ocean biology stakeholders worldwide, with emphasis on exchanging capacity with under-represented communities and regions, including SIDS, LDCs, and indigenous communities.

**OBJECTIVE O6: Sustain the Marine Biodiversity Observation Network.** The scientific foundation of Marine Life 2030 is a vigorous global network of networks that shares interoperable protocols and open data on status and trends of the ocean's diverse life. Supported by the Smithsonian Institution, POGO, and related initiatives, MBON will integrate with GOOS and end-users to co-design and co-deliver solutions to user needs for global and local biological knowledge. Observing will strive to be fit-to-purpose, co-developing priorities with Scientific and User Advisory Groups (Objective 1) and relevant stakeholders from the relevant regions.

**OBJECTIVE O7: Fundraising.** Marine Life 2030 is an ambitious, decade-long program and will require substantial resources. A core function of the programme coordination team, working with the Collaborative Centers and partners, will be facilitation, procurement of support and funding, and helping partners to connect with sponsors.

**\* 19. What are the key expected outcomes of your proposed Decade Programme?**

Knowledge of the ocean's diverse life (>200,000 described species, not including microbes, and many more undescribed) is fragmentary and poorly integrated into ocean observing and policy, representing the weakest link in our understanding of marine ecosystems. Marine Life 2030 will facilitate new partnerships, engaging policy-makers and other sectors, to inform solutions to development needs, delivering the following outcomes by the end of the Decade:

**OUTCOME O1: Sustainable ocean development enabled and conducted by professionals and activities in all nations with marine and maritime interests.** Sustainable development

requires best scientific evidence, local knowledge, and participation of stakeholders. Marine Life 2030 fundamentally changes the way we interact internationally by providing a participatory community of practice based on justice, equity, inclusion and diversity of thought, gender, cultural and geographic background, and career stage. Consistency and flexibility in international capacity development are enhanced for collecting and using information on marine life.

**OUTCOME O2: Global framework for coordination and integration established.** Marine Life 2030 fosters a paradigm shift in understanding marine life by integrating many currently uncoordinated parts into a functioning whole, and strengthening linkages between science, policy, and end-user communities to advance conservation and sustainability. Comprehensive frameworks and communities are in place for data and information management, and for some types of observations. These enable local, regional, and global assessments, provide global context for interpreting local change, and advance open data and FAIR and CARE principles. Methodologies are fit for purpose, advance interoperability, and endorsed as best practices.

**OUTCOME O3: Lasting partnerships and collaboration established.** Collaborations between natural and social scientists are active and effective, as are collaborations among experts of all ages, genders, and backgrounds. The network of networks actively and effectively engages indigenous communities as equal partners, and incorporates traditional knowledge. Specifically, indigenous partners and ocean observing systems (Ocean Networks Canada, GOOS, Coast Predict, MBON, animal telemetry, others) function as a network of biodiversity observing with strong biocultural components and co-designed scientific activities and goals. Ocean observing activities and uses of their products follow agreed upon standards of ethical conduct, inclusivity, and respect for nature, people, and national sovereignty, and follow laws of all relevant jurisdictions.

**OUTCOME O4: Comprehensive Ocean BioCode complete and accessible.** The digital library of marine species is essentially complete for all marine ecoregions (meaning that all marine DNA sequences can be identified to a low taxonomic level, if not species), are open-access, and available through user-friendly portal(s) that link expert-identified voucher records to DNA sequences, taxonomic descriptions, and organismal traits. Coverage is complete at species level for threatened and endangered marine species, recognized invasives, harmful bloom-forming algae, known pathogens, key fishery species, and culturally important organisms.

**OUTCOME O5: Centers for Ocean Collaboration integrated into global science and policy.** The Collaborative Centers (Hakai, AIR Centre/MBON) lead Ocean Decade processes to support administration, science coordination, development of applications ecological forecasting; technology and innovation; stakeholder engagement; and capacity development, exchange, and ocean literacy: for observing, mapping, exploration, characterization, and the co-delivery of solutions by international stakeholders. This includes use of traditional knowledge, inclusion and representativeness in the definition of policy options. The outcome will be motivated policymakers and industry sectors who will engage and invest in the Ocean Decade, highlighting social and economic payoffs of ocean stewardship and sustainable development.

**OUTCOME O6: Marine Biodiversity Observation Network integrated with a Global Ocean Observing System and an Ocean Biodiversity Information System, fully operational, together delivering interoperable information to policy bodies and research efforts.** Integration of biology into a global ocean observing system that spans the watershed on land and coastal areas to the ocean interior, from the surface to the bottom. A biological standards



toolkit is accepted and widely used, including a set of consensus-based specifications, standards, and best practices for in situ, remote observing, and modeling technologies. Processes of consultation and feedback for reviewing and modifying best practices are established. Regular marine biological (and physical, geochemical) observing and forecasting using interoperable protocols is established in all marine provinces, and ideally all ecoregions, with data products open and readily accessible to end-users locally and globally. Management strategies for data, metadata, and associated relevant information follow at least minimal specifications and conventions everywhere and are interoperable.

**OUTCOME 07: A sustainable community of practice that interacts with civil society and solves problems.** Ensuring sustainable benefits from a healthy ocean for society is the ultimate outcome expected for the Ocean Decade. Sustainability means long-term support for the complex set of capacity exchange, innovation, deployment and maintenance, synthesis, and co-development processes required to implement a useful, practical, and fully representative global program. A key element are the development of policy options and management actions, including addressing reporting requirements and the design of indicators.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the Convention on Biological Diversity (CBD), and the Intergovernmental Panel on Climate Change (IPCC) are intergovernmental and science bodies that assess the state of biodiversity and ecosystem services. Their assessments respond directly to requests from international decision makers. The CBD provides important targets for nations and guides policy on biodiversity conservation. Many Marine Life 2030 participants are closely linked to these intergovernmental bodies, to the Intergovernmental Oceanographic Commission, and to other UN bodies. Marine Life 2030 will seek regular input from these bodies to co-design the observing system that they require to address the large existing gaps in marine biodiversity assessments.

Marine Life 2030 will address important gaps in national reporting of marine biodiversity (e.g. National Biodiversity Strategies and Action Plans) working in partnership with national groups and the partners submitting this Programme proposal.

Marine Life 2030 will co-develop indicators, including refining indicators for CBD and SDG targets. Activities will be designed to work on indicators associated with the emerging post-2020 global biodiversity framework.

The indicators and information required for reporting will be the result of co-development activities conducted with groups and agencies that have the responsibility to design and carry out policy.

Each outcome will include metrics for developers of observing systems, applications, policy-makers, and sponsors against which progress can be measured.

#### **\* 20. Please describe the activities that will be implemented as part of the proposed Decade Programme**

Marine Life 2030 will bring together diverse global communities in science, traditional knowledge, resource management, policy, and applications to align with an efficient value chain of ocean science to product delivery.

**ACTIVITY O1: Nurture global capacity for sustainable ocean development.** Effective solutions for global marine life observations and knowledge delivery will transform our ability to collect and use marine life information for co-developed policy and sustainable development. Marine Life 2030 will foster this inclusive process by: building new knowledge through capacity exchange among diverse groups; providing formal and informal education, training, and professional development; expanding global coverage and interoperability through existing networks, socializing standards and best practices; integrating new technologies; ensuring resources for OBIS; and co-developing products and tools for biodiversity data analysis and visualization.

**ACTIVITY O2: Establish a global framework for coordination and integration.** A key priority in the first year will be convening a process of stakeholder workshops to co-design the Marine Life 2030 coordination framework and implementation plan. Facilitated by the UN Decade Collaborative Centres, contributors will include natural and social scientists, managers, policy makers, indigenous groups, representatives of IPBES, IPCC, and CBD, and other end-users. The resulting framework will then foster coordination of activities proposed by Marine Life 2030 partners.

**ACTIVITY O3: Build lasting partnerships and collaboration.** Marine Life 2030 will expand the network of networks by building on a wealth of existing programs and partnerships, listed above. Current collaborations include the Smithsonian Institution and its MarineGEO program, the Marine Biodiversity Observation Network (MBON), Global Ocean Observing System (GOOS), Ocean Biodiversity Information System (OBIS), Ocean Best Practices System (OBPS), UNEP World Conservation and Monitoring Centre (WCMC), Group on Earth Observations (GEO BON, Blue Planet), OceanTeacher Global Academy (OTGA), eDNA Initiative of the Partnership for Observation of the Global Ocean (POGO), and Global Ocean Acidification Observation Network (GOA-ON).

**ACTIVITY O4: Build the Ocean BioCode.** Marine Life 2030 will coordinate existing and anticipated initiatives to build out the Ocean Biocode, a global, digital library of marine species that links DNA sequences to expert-vetted voucher specimens, names, and images. The BioCode will serve as a “rosetta stone” to translate the massive growth of marine sequence data anticipated during the Decade into usable, spatially explicit knowledge on marine organism diversity, distribution and extent, abundance, and mediation of ecosystem process. The BioCode will be built out via strategic field programs to eliminate “dark taxa”, and the knowledge served through FAIR, open platforms.

**ACTIVITY O5: Nurture Decade Collaborative Centres.** Collaborative Centres facilitate communications and links to other Ocean Decade Programmes, National Decade Coordination and Decade Regional Planning groups, and the Ocean Decade and the Decade for Ecosystem Restoration. They are open to all stakeholders. Collaborative Centres will help co-design short- and longer-term coordination and networking strategies, hosting knowledge exchange activities (webinars, workshops, and co-development of projects) with data providers and users.

**ACTIVITY O6: Sustain the Marine Biodiversity Observation Network (MBON).** MBON is an international platform, under GEO, that connects marine biodiversity observing worldwide. MBON will continue to develop the community of practice and implementation of marine biodiversity observations foundational to Marine Life 2030. These will in turn advance interoperability and best practices, biodiversity data collection, and integration with environmental information, to support ecological forecasting prediction, scientific solutions,

ocean accounting, technology development and applications, capacity exchange, and evidence-based policy and management actions.

**ACTIVITY 07: Fundraising.** Marine Life 2030 will work with its large and diverse coalition of partners to obtain sponsorship and support for its objectives via financial and in-kind support from governments, international bodies, NGOs, private sector, and philanthropy, targeted for particular components and regions as appropriate.

**\* 21. Please describe the theory of change that underpins your proposed Decade Programme i.e., how will the activities being carried out achieve the outcomes and objectives that you envisage**

Change happens when people engage together to address a common need, creating mutual benefit, and develop evidence-based solutions resting on shared understanding. Change is hard, often challenging tradition and custom. Thus, recognizing the sources of ideas and co-developing common goals takes time, reinforcing mechanisms, and good leadership.

The need for a coordinated program to understand marine biodiversity and ecosystems, and their provision of sustainable services has been articulated by many groups for over 50 years, culminating in UN Agenda 2030 (A/RES/70/1). However, a framework to achieve this goal has been slow in coming. Marine Life 2030 will accomplish this change by setting common goals, focusing on Ocean Decade outcomes, organizing enablers, and carrying out complementary projects and activities. Programme activities will advance a common vision, co-develop the research to solve problems, address local issues in interoperable ways, and engage a community of partners in global monitoring. Impact will come through inclusive and equitable opportunities for diverse groups with tangible benefits for participants.

The **outcomes** of Marine Life 2030 are listed in Section 19. These include **intermediate outcomes with milestones** to ensure incremental progress. Each outcome will include metrics for developers of observing systems, applications, policy-makers, and sponsors against which progress can be measured. **Transparency** is critical to enable effective change, and will be ensured via standardized measurements and interoperable data, interconnected data repositories, and open access to information, coordinated by an inclusive, equitable, consultative, and transparent international consortium.

The Programme will provide incentives that enable each participant to enhance their strengths and achieve their own goals while contributing to solutions that cannot be developed by individuals or small groups. Elements of the network of networks will address pieces of the problems, addressing **assumptions** and building on partnerships.

Marine Life 2030 will not be sustainable in the long term without clear benefits to participating parties. These include: alignment of priorities and leveraging of expertise, technologies, and funding; enhanced partnerships and visibility to sponsors and funders; Access to and training in best practices to augment each group's work; rapid knowledge transfer and application; opportunities for early-career and under-represented communities in funding, leadership development, international networking, and work on issues of concern to humanity; experience and knowledge exchange in public communication and citizen science; other benefits of participation in the Ocean Decade.

**\* 22. Will your proposed Decade Programme enhance the sustainability of ocean science initiatives, including infrastructure or individual / institutional capacity, in light of the current Covid-19 pandemic?**

YES

**23. If yes, how will your proposed Decade Programme enhance the sustainability of ocean science initiatives, including infrastructure or individual / institutional capacity, in light of the current Covid-19 pandemic ?**

Social and economic inequalities within and across countries are differentiating the impact of COVID-19. A decrease in monitoring, fiscalization, and the presence of people (including tourists) has led to increased poaching and ecosystem degradation worldwide (e.g., deforestation, degraded water quality). Loss of indigenous elders due to the pandemic has cultural implications for the transmission of traditional knowledge including marine biodiversity conservation and customary law and governance (UN/DESA, 2020). Suspension of ocean observing except by automated systems that collect physical observations impacted acquisition of marine ecosystems information globally.

Ocean ecosystem knowledge is critical to governments, private sector, development banks, and others to plan and monitor COVID-19 economic recovery investments (IKI, 2020). Marine Life 2030 sets the stage for investments in coastal and marine ecosystem restoration and protection, coastal and marine tourism, mariculture, fisheries, and other industries, and in linked marine conservation and protection efforts. These will create jobs and economic growth in the immediate term, alleviating inequities that have affected women, indigenous communities, young people, and informal workers globally (Northrop et al., 2020; IKI, 2020).

References:

IKI, 2020. <https://www.international-climate-initiative.com/en/coronaresponse>

Northrop et al. 2020. <http://www.oceanpanel.org/bluerecovery>

UN/DESA, 2020. Policy Brief #65.

**\* 24. Please describe the coordination / management structure for the proposed Decade Programme**

An international consortium provides core support, including the Smithsonian Institution, MBON, NOAA, GOOS, UNEP-WCMC, OBIS, OBPS, GEO and GEO BON, C4IR Ocean, and POGO. The consortium will craft operational and fundraising strategies and formalize a Steering Committee. It will advance the programme coordination and management framework, to include a ML2030 Programme Office and Science and User Advisory Committees. The programme office, a Network Project Office (NPO) and Coordination Team will be a partnership with the proposed AIR Centre and Hakai Institute Decade Collaborative Centres.

The management roles include:

- Programme Office (PO) Director
- Programme Coordinator
- Network Communications Coordinator
- Webmaster

- Advisory Group Engagement (Science and User Advisory Committees)
- Working Group Coordination (thematic/science; data management; evaluation; international coordination; equity, balance and inclusion; and early career)

The Programme will be implemented in a phased approach:

**Phase 1 (Y1-2) - Governance and Organization:** Initiate a collaborative process to establish the management structure. Convene network members, identify specific initial problems and needs, co-develop solutions for early co-delivery, and conduct fundraising collaborating with the Ocean Decade.

An Outreach and Communications Team will define strategies to engage and mentor students and early career participants, involve networks in the operation of Marine Life 2030, and cross-link groups with complementary interests (“regional”, “deep ocean”, “omics”, “imaging”, etc.). Technologies for virtual dialogue will broaden opportunities and minimize expenses. Social and natural science researchers will co-develop modules for capacity exchange in formal and informal education settings, using input from the Ocean Decade regional workshops. We will work to link capacity development with job placement.

A series of Working Groups will be formed to identify fit-for-purpose thematic needs and science problems and engage complementary groups. A Data Management Plan (see supplementary document) and Data Working Group will advance recommendations of IWG-SODIS and Marine Life 2030 data partners.

The Evaluation Working Group will collect quantitative and qualitative data on how the Programme has (1) formed a network of networks; (2) engaged the next generation of researchers including underrepresented and early career groups; and (3) addressed Ocean Decade Challenges and Outcomes. The plan includes using front-end, formative, and summative evaluation methods.

**Phase 2 (Y3-5) - Engagement, Evaluation and Pilot:** Solidify and use coordinating mechanisms; introduce demonstration areas to exercise the network; strengthen coordination; improve communication and network; conduct evaluation and get feedback to address issues.

**Phase 3 (Y5-10) - Implementation and Expansion:** Expand efforts and objectives; implement sustainability mechanisms; assess progress; report on effectiveness

### **3. Contribution of Proposed Decade Programme to the UN Decade of Ocean Science for Sustainable Development (refer to the [Ocean Decade Implementation Plan](#) for details)**

**\* 25. To which Sustainable Development Goal(s) (SDG) will your proposed Decade Programme contribute? Please select a maximum of three SDGs.**

GOAL 4: Quality Education

GOAL 14: Life Below Water

GOAL 17: Partnerships to achieve the Goal

**\* 26. How will your proposed Decade programme contribute to the SDGs selected? Please Explain**

The co-design of knowledge and continuous update of information about the status and trends of marine ecosystem elements (SDG 14) are based on education (SDG 4). Marine Life 2030 will help realize SDG 14 by focusing on Target 14.2, 14.5, 14.A, and 14.B. Marine Life 2030 will also contribute to SDG 4 (Education) by reducing disparities in education and vocational training by gender and among indigenous peoples (Target 4.5), spreading knowledge and skills that promote sustainable development (4.7), and by providing support for training and technology of individuals from developing countries (4.B). Developing and implementing the value chain that generates transformational products and co-delivers information to those that can apply it to meet society's needs depend on partnerships and trust (SDG 17). The programme's capacity development and exchange are central components, contributing to SDG 17 (Partnerships) targets 17.6, 17.7, 17.8, and 17.9.

**\* 27. How will your proposed Decade Programme contribute to the vision and mission of the Decade?**

Marine Life 2030 envisions a transdisciplinary and interoperable system, deployed and coordinated globally by partners of diverse backgrounds, to co-deliver the scientific knowledge about marine life that we need for the ocean we want. It thus maps directly onto the vision of the Decade (Ocean science for the future we want). The vision will drive the co-development of actions to focus research, new and cheap technologies (instrumentation systems, remote sensing seascapes, e-DNA, etc.), and integration of transdisciplinary observations to inform policies.

Marine Life 2030 contributes to the mission of the Decade (Transformative ocean science solutions for sustainable development, connecting people and our ocean) by harnessing the power of networks to co-develop and implement actions that advance capacity and technology exchange, lower cost of technologies, generate high quality transdisciplinary research, and modernize policy development for wise ocean uses. This includes better understanding how land uses, ocean uses, and climate change interact to affect life in the sea. The mission is to embed biology into the information stream that allows society to flourish, by forecasting risks to marine and human life, building resilience in the era of COVID and other risks to society, and including scientists and policy makers in a conversation about human and ocean ecosystem health.

Many of the building blocks for this transformation on assessing and forecasting the status of marine life are already in place, including international networks and agreements, new cutting-edge technologies, and infrastructure. While we have only sampled or visually-investigated a very small proportion of marine life in the ocean to date, the current state of knowledge of how we link marine life to societal welfare has matured and ocean policy options are evident. Marine Life 2030 builds on and expands an existing coalition of partners to integrate biology into current and planned coastal and ocean observing systems.

The recognition that measuring the biological elements of ecosystems is now possible will further transform technology, industry, and information management. The transformation will come by working together for a larger purpose, helping those that need it the most, lowering costs of observing, and by implementing a framework for equity and diversity in partnerships. It

will come by linking the extensive but uncoordinated assets that exist today into an interoperable system. The technology and philosophy for inclusion of diverse groups into transdisciplinary teams to accomplish the mission are now within reach for the first time.

**\* 28. To which Decade outcome(s) will your proposed Decade Programme contribute?**

Outcome 2: A healthy and resilient ocean where marine ecosystems are understood, protected, restored and managed.

Outcome 6: A transparent ocean with open access to data, information and technologies.

**\* 29. How will your proposed Decade Programme contribute to the Decade outcomes selected?**

MarineLife 2030 contribute to Ocean Decade Outcomes 2 (“A healthy and resilient Ocean where marine ecosystems are understood, protected, restored and managed”) and 6 (“A transparent ocean with open access to data, information and technologies”). Insufficient knowledge of diverse ocean life represents the weakest link in our understanding of marine ecosystem function. The programme will advance these outcomes by facilitating new partnerships, sharing standards and best practices for interoperability, growing our knowledge base of marine life, developing and sharing technology, and promoting robust data and information management, analysis and exchange.

The Programme will expand global capacity to track and forecast ocean ecosystem health from the watershed to the ocean interior, and surface to ocean bottom, through co-design of monitoring programs for all forms of marine life and delivery of that information to a broad range of stakeholders. A core theme of the programme is an iterative process of capacity exchange and information management, including rescuing historical data, cleaning and standardizing data and metadata, and publishing to open data repositories. Marine Life 2030 will facilitate interoperability and development of applications of information for improved management and policy, public use, and optimizing industries (pharma, minerals and other materials, fisheries, tourism).

**\* 30. To which Ocean Decade Challenge(s) will your proposed Decade Programme contribute?**

Challenge 2: Understand the effects of multiple stressors on ocean ecosystems, and develop solutions to monitor, protect, manage and restore ecosystems and their biodiversity under changing environmental, social and climate conditions.

Challenge 9: Ensure comprehensive capacity development and equitable access to data, information, knowledge and technology across all aspects of ocean science and for all stakeholders.

**\* 31. How will your proposed Decade Programme contribute to the Decade Challenges selected?**

Marine Life 2030 will contribute to Ocean Decade Challenges 2 and 9 by implementing transformational capacity exchange programs that build on and expand on decade actions that integrate biology into ocean observing systems. The implementation will allow local programs that characterize marine life from the surface to the deep sea floor and from the coast to offshore areas, in a manner that can be replicated to regional and global scales. Exchange of capacity and co-development of programs, technology, information and applications will generate new knowledge of species, habitats and ecosystems. This knowledge is critical to evaluate human and climate change impacts, and to support modeling of scenarios of possible interventions on future use, restoration, and conservation. MarineLife 2030 will exchange capacity and literacy at sea, in labs, and institutions (e.g. through workshops and mentoring), building and sharing best practices in themes for research required locally and regionally. The emphasis will be to evaluate change and that each measurement can be used many times. Information will be managed by repositories that provide better and standardized data, specimens identification and curation, and enable joint research, publications and applications in an inclusive, equitable agenda for the collective benefit.

**\* 32. To which Decade Objective(s) will your proposed Decade Programme contribute?**

Objective 1: Identify required knowledge for sustainable development, and increase the capacity of ocean science to deliver needed ocean data and information

Objective 2: Build capacity and generate comprehensive knowledge and understanding of the ocean including human interactions, and interactions with the atmosphere, cryosphere and the land sea interface.

Objective 3: Increase the use of ocean knowledge and understanding, and develop capacity to contribute to sustainable development solutions.

**\* 33. How will your proposed Decade Programme contribute to the Decade Objective(s) selected?**

Marine Life 2030 will establish a comprehensive and transformative set of actions to support Decade Objectives (DO):

DO1: Marine Life 2030 will greatly improve the scientific foundation necessary for sustainably managing living marine resources, exploring and characterizing biological, biodiversity, and ecological processes across expanded geographies and temporal resolution, from the surface to the seafloor, and from the coast to offshore by coordinating and standardizing observations, filling marine life knowledge gaps, and accelerating data discovery and use..

DO2: The programme will expand efforts to exchange capacity and knowledge about marine life and how humans interact with and depend on ocean ecosystems. A key goal of Marine Life 2030 is forecasting of ecosystem states and changes, impacts due to humans and climate, and forecasting impacts on society under different ocean ecosystem change scenarios.



DO3: The Programme will define guidelines for diversity, equity, and inclusion in Decade projects and activities. The actions will engage early career and other diverse groups, and assist scientists and policymakers from least developed countries (LDCs) and small island developing states (SIDS) to identify needs and existing knowledge, and implement best practices for sampling, data management, and knowledge application.

**\* 34. With respect to the Decade Objectives selected above, to which Decade Sub-Objective(s) will your proposed Decade Programme contribute?**

1.1: Provide the scientific basis for regular integrated assessments of the state of the ocean and identify priority gaps at different scales and in different geographies to frame efforts in exploration, observations and experimentation.

1.2: Promote new technology development and enhance access to technology to generate ocean data, information and knowledge.

1.3: Enhance and expand existing ocean observing systems across all ocean basins to deliver information on standardized essential ocean variables including social and economic, geological, physical, chemical, bathymetric, biological, ecological parameters, and observations on human interactions with the ocean.

1.4: Develop mechanisms that support community-led science initiatives and the recognition and inclusion of local and indigenous knowledge as a fundamental source of knowledge.

1.5: Undertake regular assessments of the state of ocean science capacity to identify and overcome barriers to generational, gender and geographic diversity, and promote sufficient and sustainable investment.

2.1: Generate a comprehensive inventory, mapping, and understanding of the role and function of ocean components including their human interactions and interactions with the atmosphere, cryosphere and the land sea interface.

2.2: Generate a comprehensive understanding of thresholds and tipping points for ocean components, including human interactions.

2.3: Innovate and expand the use of historical ocean knowledge to support sustainable development solutions.

2.4: Improve existing, and develop new generation ocean models for improved understanding of the past, current and future states of the ocean, including human interactions.

2.4: Improve prediction services and increase predictive capability for oceanic hazards or events including extreme weather and climate.

2.5: Expand cooperation in ocean-related education, training, capacity development and transfer of marine technology.

3.1: Broadly communicate and promote the role of ocean science for sustainable development across diverse stakeholder groups including through formal and information education and an expansion of ocean literacy approaches across stakeholder groups.

3.2: Develop interoperable, open access platforms and applications to share data, information and knowledge in a format that connects knowledge generators and users.

3.3: Undertake interdisciplinary, multi-stakeholder co-design and co-delivery of ocean solutions including policy, decision making, integrated ocean management frameworks, applications and services, and technology and innovation.

3.4: Expand and enhance spatial planning processes to contribute to sustainable development across regions and scales.

3.5: Expand and enhance inclusive and integrated management frameworks and tools, including nature-based solutions, to maintain ecosystem functioning, provide for adaptive processes under changing ocean conditions, and incorporate community values and needs.

3.6: Expand and enhance services, applications and management tools for building and mainstreaming preparedness and adaptive responses to multiple stressors and hazards.

3.7: Expand and enhance tools, applications and services that integrate and facilitate use of data, information, and knowledge on ocean-related natural capital including the social, cultural, environmental, and economic characteristics of the ocean.

**\* 35. How will your proposed Decade Programme contribute to the Decade sub-objectives selected?**

Marine Life 2030 will co-develop a series of transformational actions that directly address several sub-objectives simultaneously. As listed in Question 33, the Programme addresses the three overarching Decade Objectives, including many of the sub-objectives.

**\* 36. Please check which of the following criteria are relevant to your proposed Decade Programme as far as they are relevant to your proposal:**

Accelerate the generation or use of knowledge and understanding of the ocean, with a specific focus on knowledge that will contribute to the achievement of the SDGs and complementary policy frameworks and initiatives.

Is co-designed or co-delivered by knowledge generators and users, and does it facilitate the uptake of science and ocean knowledge for policy, decision making, management and/or innovation.

Ensure that all data and resulting knowledge in an open access, shared, discoverable manner and appropriately deposited in recognized data repositories consistent with the IOC Oceanographic Data Exchange Policy[1] or the relevant UN subordinate body data policy.

If you check this criteria, please provide in the question below details of where data will be deposited and where it exists, attach a data management plan.

*See attached Supplementary Documentation*

Strengthen existing or create new partnerships across nations and/or between diverse ocean actors, including users of ocean science.

Contribute toward capacity development, including, but not limited to, beneficiaries in Small Island Developing States, Least Developed Countries and Land-locked Developing Countries.

Overcome barriers to diversity and equity, including gender, generational, and geographic diversity.

Collaborate with and engage local and indigenous knowledge holders.

**\* 37. How will your proposed Decade Programme contribute to the Decade criteria?**

All the criteria listed in Section 36 are relevant to the Marine Life 2030 Programme. The various sections of this proposal outlining Programme Objectives, Outcomes, Actions (projects and activities), and Theory of Change emphasize a strategy that aligns Marine Life 2030 with the vision and mission of the Ocean Decade. The actions will be transformational for our community and for how society uses knowledge about the ocean. They will be co-designed to help define ocean policy options that are visionary, focusing science on sustainable development and ocean stewardship. Marine Life 2030 will result in opening access to biological data by working with the IOC and other international bodies, but in particular by providing incentives and benefits to ocean observers. This includes the flexibility for data aggregators and the private sector to have sustainable business plans, while ensuring the knowledge is not beyond the access of those that need it the most. A data management plan submitted with this proposal outlines the technical aspects of how Marine Life 2030 seeks to manage information and knowledge.

The success of Marine Life 2030 is founded on partnerships, collaborations, and personal relationships between different groups. The activities of the Programme will lead to a deep change in the culture of how the scientific community develops relationships, conducts mentoring, and provides services to society. The Programme highlights equity, diversity and inclusion in every single aspect of each activity. The change will be part of every capacity exchange activity and effort, so that benefits extend fully to indigenous communities, SIDS, LDCs, Land-locked Developing Countries. In turn, the experience from these communities will benefit and inform science and other groups of civil society, as Marine Life 2030 seeks to enable a true capacity exchange process.

## 4. Communications

**\* 38. Please describe how you plan to communicate about your proposed Decade Programme including main target audiences and methods of communications.**

Marine Life 2030 will develop a communications strategy in close coordination with the IOC's Ocean Decade Coordination Unit, relevant Regional and Thematic Stakeholder Platforms, The Ocean Decade Alliance, and Implementing Partners. The strategy will involve professional facilitation to ensure coherence of the network of networks. The strategy will include several elements:

- Website, with a Content Management System to update news, events, resources, and links to products and applications. This includes a Quarterly Newsletter to highlight work of projects, with content mined from each Action (progress, events, resources, outcomes, opportunities, upcoming conferences)
- Funding and sponsorship opportunities, alerts

- Participation in the hybrid virtual / in-person Decade international and regional conference series
- Traditional community ambassadors, contact, and specific forums for knowledge exchange and contributions
- Participation using the Global Stakeholder Forum virtual platform
- Communication training (bootcamp)
- Capacity exchange activities: Workshops, Short Courses, Sessions at Professional Meetings, etc.
- Outreach Materials for Trade and News Media
- Contribution to the Decade evaluation process conducted by the Decade Coordination Unit, and reporting as appropriate to the Regular Process for Global Reporting and Assessment of the World Ocean Assessment, reporting on progress to achieve the SDGs, the Global Ocean Science Report, and other UN bodies
- Annual Report and other reporting as needed
- Early Career and other engagement actions, opportunities, news
- Represent Programme at Research, Education, Policy, and Stakeholder Conferences and Outreach Events (NGO, Government Agencies, Prof. Societies)

**\* 39. Have you developed a communications strategy or plan as part of your proposed Decade Programme? If so, please attach it as part of the supporting documentation.**

No

**40. If yes, please attach the communications documents requested.**

## 5. Supporting Documentation

**41. Please attach any relevant supporting documents to your submission that will aid in its evaluation e.g. project log frame, research proposal, high-level budget, data management plan, communications strategy, or letters of support.**

*Supplemental Documentation (Data Management Plan)*

**\* 42. Please confirm that you have completed your form submission:**

I have completed my form submission.

## **Marine Life 2030:**

# **A Global Integrated Marine Biodiversity Information Management and Forecasting System for Sustainable Development and Conservation**

### **Data Management Plan**

Marine Life 2030 is a process of networking and community building to collect and share interoperable, fit-for-purpose data. All data collected through ML2030 will be shared with the UNESCO Ocean Biodiversity Information System (OBIS), the Global Ocean Observing System (GOOS), the UN Environment WCMC Ocean Data Viewer, and other platforms as requested.

**Stakeholder-driven:** Marine Life 2030 will collaborate with GEO Blue Planet and other user-oriented ocean data initiatives to work with stakeholders to co-develop a common strategy for how data can best be collected, curated, and distributed with an eye towards matching approaches to local culture, capacity, and need and will following best practices and with an emphasis on interoperability. This includes a focus on data description and formatting standards so that data are easily understood, electronically accessible and well organized, to allow researchers around the world to make use of the observations. We will use our existing close collaborations with the Intergovernmental Oceanographic Commission (IOC) and the Group on Earth Observations (GEO), and several of their programs to accomplish this. Specifically, we will engage the network in working with the Global Ocean Observing System and its various panels to refine the requirements for Essential Ocean Variables (EOVs), including the Bio-Eco panel and the complementary Deep Ocean Observing Strategy (DOOS) group. Further, we will engage the GEO BON Marine Biodiversity Observation Network (MBON) to continue to develop the community of practice. The IOC's International Ocean Biodiversity Information System (OBIS) with distributed international nodes, and the independent Global Biodiversity Information Facility (GBIF), will serve as networks to promote use of the flexible data archival schema called DarwinCore. DarwinCore has extensions for events including rich biological data and environmental observations (OBIS-ENV-DATA). Working with OBIS and GBIF, we will continue to promote use of metadata standards and documentation using the Ecological Metadata Language (EML).

**A Network to Promote Best Practices:** To guarantee the smooth and efficient of marine life data sharing ML 2030 will work to facilitate a convergence of standardized protocols for biological, biodiversity, and environmental observations across a global network of observing systems, and of wise policies for sustainable development, capacity exchange, and conservation of ecosystem benefits. The Programme will use and contribute significantly to the IOC's Ocean Best Practices System. It will make significant progress in the incorporation of biological data into the Ocean Biodiversity Information System (OBIS). Requirements for integrating biology into the Global Ocean Observing System (GOOS) will be defined through a community of practice, building on efforts of the Marine Biodiversity Observation Network (MBON) and other partners, to realize the outcomes of the UN Decade of Ocean Science for Sustainable Development.

Marine Life 2030 will itself not be a data manager or repository other than for data derived from evaluation assessments and analyses. All other data relevant to the network objectives will be retained and managed by relevant Programme participants and their institutions. The goal of Marine Life 2030 is to encourage use of best practices and convergence in data collection, formatting, curation, and management, to promote interoperability and dissemination through open global databases such as OBIS and GBIF. The points of contact will be listed in the Marine Life 2030 website for public reference. Information, technology, and capacity exchange will be a requirement for participants. Decisions on intellectual property resulting from collaborations will be in the hands of the collaborating organizations.

**Open Data:** As a network, a major goal of Marine Life 2030 will be to broaden the collection, use and open dissemination of biological and biodiversity data needed to address the overarching science and policy goals of a global society. Marine Life 2030 will foster a broader community that focuses on co-developing an international strategy for identifying the data needed for sustainable development goals and ensuring a culture of data best practices. The project will use emerging best techniques for networking and team communications to solidify the linkages between network elements and focus the energy of different groups on the goals of the overall Ocean Decade effort, on converging on specific language, and on a philosophy of sharing data and information required to advance the science about life in the sea.

**Monitoring Progress:** Network performance will be gathered through inputs from an Evaluation team, a Steering Committee, meetings, and workshops, analysed, and shared regularly with the UN Decade community.

A Capacity Exchange Working Group will assess data about the network characteristics and progress including success in linking communities, efficiencies of communication, numbers of early career and under-represented minority researchers engaged, publications generated as a result of network activities, and impact of public outreach and related Ocean Literacy campaigns.

**Coordinating with Existing Networks:** The Group on Earth Observations Biodiversity Observation Network (GEO BON) serves as a global network for integrating biodiversity and climate observations from around the world with the purpose of making readily available taxonomic and biological information for research scientists, policymakers, experts and managers. GEO BON is recognized by the Convention of Biological Diversity (CBD) and acts as the biodiversity branch of the Global Earth Observation System of Systems (GEOSS). We will engage with GEO BON's network of scientific biodiversity experts, including MBON, to promote strategies for members of the network to disseminate results and observations. UNEP-WCMC is also a member of the "GEO BON Implementation Committee" and "GEO BON Advisory Board". UNEP-WCMC is also co-leading the GEO BON Working Group on Biodiversity Indicators and this information will be readily available to this group.

While the deep ocean is under-observed, there are data products accessible through deep-ocean networks such as the Deep Ocean Observing Strategy and Deep Ocean Stewardship Initiative (DOSI); many of these data are not yet in OBIS but could contribute to Marine Life 2030 objectives and will be identified to the extent possible through engagement with DOOS and DOSI.

We will take full advantage of the GEO BON infrastructure, regional and International-OBIS, GBIF, UNEP-WCMC and others. These networks are part of the core Marine Life 2030 effort.

Any products deployed through the Marine Life 2030 website or websites of associated networks will be identified as related to this network of networks. Regional scientific assessments will be made jointly by members of relevant networks in terms of spatial maps of indices that combine multiple and multidisciplinary satellite data with genomic and other in situ observations.