Ocean Decade
Data Strategy Implementation Group
Terms of Reference

1 Context

The United Nations Decade of Ocean Science for Sustainable Development 2021-2030 ('the Ocean Decade') was launched on 1 January 2021. The Ocean Decade provides a common framework to ensure that ocean science can fully support actions to sustainably manage the ocean and contribute to the achievement of the 2030 Agenda for Sustainable Development.

The digitisation, sharing, and management of ocean data, information and knowledge are cornerstones for the Ocean Decade's success. In this domain, the Ocean Decade's vision is that the ocean community will rally their capacities to collectively co-design and construct a distributed digital ecosystem capable of: (i) holistically representing the complex socio-ecological ocean system at global, regional or local scales; and (ii) representing the ocean's role in sustainable development across scales. Stakeholders must be able to access, use, and contribute to this ocean digital ecosystem through multiple interfaces tailored to their needs and capacities.

In order to coordinate the collaboration between the vast number of partners that will share, as well as use, data and products from the digital data ecosystem an "**Ocean Decade Data & Information Strategy**" (the "Strategy") was developed. The vision of the Strategy is to establish a trusted, inclusive, and interconnected ocean data and information ecosystem that is actively used for decision-making to support sustainable management, by 2030.

The role of the present Data Strategy Implementation Group is to develop the detailed Action Plan required to implement the five identified strategic objectives detailed in the Strategy (see Annex 1 - Executive Summary).

2 The Data Strategy Implementation Group

2.1 Purpose & Goals

While the Data & Information Strategy defines the initial high-level strategy and required enablers, a detailed "Action Plan" must now be developed that provides the roadmap with clear actions and instructions for successfully achieving the strategic objectives, and by extension, the Ocean Decade vision for 2030.

The Action Plan must also establish a review mechanism to update the Strategy as the Ocean Decade evolves and as new scientific insights, new technologies and new requirements emerge. This plan will need to consider the following elements, among others:

- Steps to implement the strategic objectives, with timelines, responsibilities and key milestones;
- Resourcing and infrastructure needs and actions on how to fill gaps in resource needs;
- Monitoring and reporting progress, including mechanisms for review and updating;

2.2 Tasks of the Group

The Data Strategy Implementation Group will be responsible for developing a detailed Action Plan that will support the implementation of the Ocean Decade Data & Information Strategy. Tasks to achieve this may include, but are not necessarily limited to, the following:

i. ***Identify and leverage relevant existing initiatives and strategies to develop specifications for the "ocean digital ecosystem" component systems and the guiding frameworks***

Working in close collaboration with the Ocean Decade Coordination Offices (DCOs) and Collaborative Centres (DCCs) for Ocean Data Sharing, Ocean Observations and Ocean Prediction, the group will first identify relevant existing data and information strategies and initiatives – including the IOC, IODE and GOOS strategies, among others – and determine how to build on these to implement the present Strategy for the Ocean Decade. From this assessment, the group will develop specifications for a globally distributed ocean digital ecosystem and actions required to implement it, including among others: processes and protocols to connect existing platforms and repositories, metadata standards and FAIR and CARE principles to be applied. Similarly, systems and infrastructure to ensure the long-term and curated archival of data, information, software, digitised knowledge, or any other digital resource must be implemented.

ii. ***Establish actionable guidelines on common and best practices across scales, sectors, and capacities to increase data findability, usability and trust***

As expressed in the FAIR principles, data should be easily discoverable (findable) and readily usable (accessible, interoperable, reusable). To achieve this, the group will first identify existing common and best practices that are relevant to the Strategy implementation. The group will then provide actionable guidelines to Decade participants that promote or extend these existing practices - such as adopting clearly defined data management plans, policies, procedures - but also identify what is missing and actions to develop these. Actions will also be identified to ensure that the quality and provenance of the digital resources decision makers rely upon are known, as well as having clear data policies and terms of use. There should also be mechanisms in place to ensure proper attribution of data and information. Furthermore, the Action Plan should address incorporation of non-traditional data and data types, such as indigenous and traditional knowledge and citizen science.

iii. ***Assess resourcing and infrastructure needs and recommend actions to achieve the envisaged ocean digital ecosystem and a data-literate global community***

Working closely with the Decade Coordination Offices and Collaborative Centres for Ocean Data Sharing, Ocean Observations and Ocean Prediction, the group will identify data, infrastructure, resource and capacity gaps and recommend actions to address these, to achieve our vision of a globally distributed ocean digital ecosystem, while supporting a growing data-literate global community. For example, the Action Plan should provide guidance on how current gaps in terms of ocean data types, variables, as well as spatial and temporal coverage, could be addressed through both new acquisitions and by unlocking existing, inaccessible datasets. Existing mechanisms, such as targeted Calls for Decade Actions, should also be used to mobilise resources and partnerships to implement the Action Plan. For this task, the group will leverage recent needs assessments, gap analyses and related initiatives, as well as lessons learned from existing systems and services – including among many others, the Ocean Decade Vision 2030 initiative, ODIS, WOD, AODN, EMODnet, Copernicus Marine, etc.

iv. ***Establish a process to monitor and report progress of the strategy implementation***

The Action Plan will establish a set of specific, measurable, achievable, relevant and time-bound (SMART) goals and performance indicators (including methodologies and timelines for monitoring) that will be **integrated into the Ocean Decade Monitoring and Evaluation Framework** and allow the and Data Coordination Group to track and report progress objectively, advise the Ocean Decade Coordination Unit, and refine and update the Action Plan and Strategy accordingly.

2.3 Membership

Membership of the Ocean Decade Data Strategy Implementation Group will be open to:

- Individual data management experts from UN entities, governments, industry, philanthropic foundations, academia, research institutes, indigenous communities, and other parties;

- Individuals with experience in data collection, management and processing of diverse sources of ocean data and information, preferably including experience in integrating community and/or indigenous knowledge

Membership will be on the basis of invitation from the Executive Secretary of the IOC/UNESCO and will be for a period of two years (renewable). Participation will be self-funded or, in exceptional cases, funded from Decade resources as funding is made available. Geographical and gender diversity will be considered in the composition of the group.

Two co-chairs will be appointed at the end of the first meeting by the IOC Executive Secretariat (and thereafter annually).

2.4 Reporting

The Ocean Decade Data Strategy Implementation Group will provide a verbal or written update to the Ocean Decade Data Coordination Group during this group's monthly calls, while consulting and engaging regularly with other Ocean Decade entities for advice and expertise, including:

- The Decade Coordination Office for Ocean Observing
- The Decade Coordination Office for Ocean Data Sharing
- The Decade Collaborative Centre for Ocean Prediction
- The Corporate Data Group

The Ocean Decade Coordination Unit will act as the administrator and secretariat for the group, which will prepare short reports of the main outcomes of its meetings for sharing with the partners listed above, and a short annual report of its work and main activities.

3 Modalities of Meeting

The Ocean Decade Data Strategy Implementation Group will meet online on a regular basis (approximately every 6 to 8 weeks). In-person meetings will be organized on an ad-hoc basis.

ANNEX 1

Ocean Decade Data & Information Strategy

March 2023

Executive Summary

At a time of planetary crisis, we need relevant, timely, reliable, and accessible ocean data, information, and knowledge. The United Nations Decade of Ocean Science for Sustainable Development (the 'Ocean Decade') seeks to transform humanity's relationship with the ocean and apply the full range of ocean science to diagnose problems and generate solutions. Achieving the Ocean Decade's 2030 vision of "the science we need for the ocean we want" requires an enabling environment – including the frameworks, infrastructure, tools, capacity and resources – for a distributed ocean information ecosystem that connects across disciplines and geographic boundaries.

The Data Coordination Group has developed a strategy intended to guide the Ocean Decade partners, to collectively address data, information and knowledge challenges, which hinder our ability to meet the Decade Challenges as a global community; today these include limited accessibility and interoperability of digital resources, major gaps in ocean data types, lack of resourcing and capacity, and lack of awareness of the benefits of data sharing.

The vision of the Data & Information Strategy for the Ocean Decade (see Fig. 1) is to develop by 2030: **A trusted, inclusive, and interconnected ocean data and information system that is actively used for decision-making to support sustainable management** - and that also allows for new data sources, information networks and solutions to be integrated as the Ocean Decade needs evolve.

This digital ecosystem builds on what already exists, including ongoing data strategies and existing infrastructures, while supporting new digital sources of data and information focused on the Ocean Decade's Challenges. It will guide Decade contributors towards co-developing the global digital capacity needed, interlinking their systems, pooling their assets and resources, and coordinating their capacity development efforts to form a globally distributed ocean digital ecosystem.

Together with the Decade's coordination bodies – including Decade Coordination Offices, Collaborative Centres and Implementing Partners – contributors of the ocean digital ecosystem will create lasting change, providing technical and human capacity for the benefit of sustainable ocean management beyond the Decade's 2030 timeline.

To achieve this, we have defined the following five strategic objectives within the Decade:

Objective #1 - Develop an ocean digital ecosystem that encourages and facilitates the sharing of and equitable access to multidisciplinary data, information and knowledge by all.

Identify and apply the specifications and resources needed to develop a federated ocean digital ecosystem that allows users to easily find, access, use, and contribute ocean data,

information and knowledge openly through interfaces tailored to their needs and capacities. Major gaps in many ocean data types, variables and in spatial and temporal coverage must be addressed through both new acquisitions and by unlocking existing, inaccessible datasets. Investments in digital infrastructure, human capacity, and data policy will support a more complete, robust and equitable digital ecosystem.

Objective #2 - Improve data and information discovery and usability across the ocean digital ecosystem.

Within the growing number of data and information sources available today, it remains difficult to discover and use them to develop solutions and inform decision-making. As expressed in the FAIR principles, once data are available and accessible online, steps must be taken to make them easily discoverable (findable) and readily usable (accessible, interoperable, reusable). Prior to sharing ocean data, information, and knowledge, participants in the digital ecosystem should have clearly defined internal data management plans, policies, procedures, and architectures for the generation, management, licensing, and sharing of data.

Objective #3 - Build trust in data and information shared across the ocean digital ecosystem

Unless there is trust in the data and information they share, as well as trust in the entire data value chain and its related infrastructure, neither providers nor users will fully engage in any collective digital ecosystem. Practices must be implemented to ensure the quality and provenance of the digital resources users rely upon are known, as well as mechanisms to ensure proper attribution. Similarly, systems and infrastructure to ensure the long-term and curated archival of data, information, software, digitised knowledge, or any other digital resource must be implemented, as well as clear data policies and terms of use.

Objective #4 - Prioritise digital solutions that support decisions for sustainable ocean management

Valuable ocean data and derived insights often do not reach those that need them in a form that they can understand and act upon. Through co-design of digital solutions, a core principle of the Ocean Decade, we increase the likelihood that insights from data products and services will be relied on and acted on. The ocean digital ecosystem should be developed with the objective to support digital solutions (including meta-data standards, software, models, analytics, artificial intelligence solutions, user experiences) that can be effectively used by decision makers at all levels.

Objective #5 - Expand, empower, and mobilise global communities to advance and maintain the ocean digital ecosystem

The successful implementation of this strategy depends on a thriving human community that is digitally literate and committed to sharing data, information, and knowledge to co-design ocean solutions and ocean discoveries. The purpose of this objective in the short term is to build awareness, skills, capacities and drive alignment with the strategy as we roll it out. Furthermore, this objective aims to build bridges to, and relationships with non-traditional groups and data sources that may link to the ocean digital ecosystem. The long-term ambition

is to affect an enduring behavioural change towards a digitally fluent ocean community, who readily and openly share their data, insights and understandings.

Key **enablers** that must be proactively advanced and expanded as vital building blocks to successfully implement the strategy include technological innovation, partnerships, sustained resourcing, and policy and regulatory frameworks.

A detailed **Action Plan** to implement this strategy - including specifications for a federated ocean digital ecosystem, guidelines to increase data findability, usability and trust, actions to address resourcing and infrastructure needs - will be developed by the Data Strategy Implementation Group in 2023 with particular focus on the ten Ocean Decade Challenges, to ensure the Action Plan is mission driven.
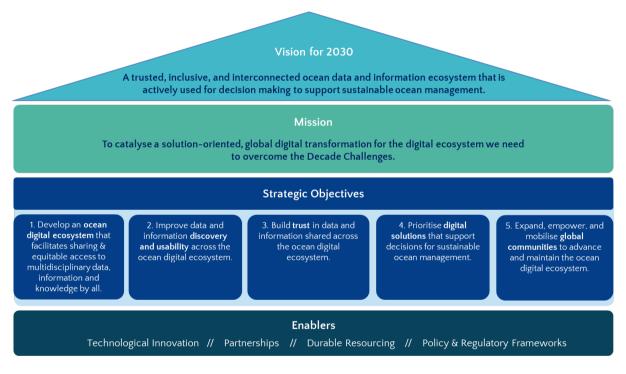

Figure 1: At-a-glance depiction of the Data & Information Strategy for the Ocean Decade.