



2021 United Nations Decade  
2030 of Ocean Science  
for Sustainable Development

# Ocean Decade Data Coordination Platform

## Terms of Reference

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### 1. Context

The digitisation, sharing, and management of data, information and digital 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 system 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 digital ecosystem through multiple interfaces tailored to their needs and capacities.

No one system or central infrastructure will be able to implement the vision above; instead, **Ocean Decade stakeholders will need to contribute to the development of a distributed, robust, and collaborative “digital ecosystem” of interoperating parts, that leverages open, scalable, easily implementable, and responsive digital management frameworks.**

This distributed system must include resources to support a complete understanding of marine social-ecological systems drawing from historical data, contemporary data (including real-time data streams), and modelled data to help predict future ocean conditions. It must also be constructed to contribute to the identification of knowledge gaps that can then be used to trigger the generation of new knowledge. As it develops, the Ocean Decade’s digital commons must embrace non-quantifiable forms of knowledge and diverse knowledge paradigms—including indigenous and local knowledge, to contribute to the digitised evidence base. The design and development of the system must overcome existing barriers—including a lack of digitisation capacity, data fragmentation, siloing of data, lack of data sharing, and hidden or underexploited datasets.

This vision has been well received by Ocean Decade partners and aligns closely with vision of numerous other global initiatives. To this end, the Ocean Decade has the potential to be a central convening framework for coordination and ensuring overall complementarity of data initiatives over the next ten years. This coordination role has been recognised by the High Level Panel for a Sustainable Ocean Economy in its series of commissioned Blue Papers and its recently released report on the transformations that are needed for a sustainable ocean economy.

In order to coordinate the collaboration between the vast number of partners that will contribute data to, as well as use data and products from the “digital ecosystem” an **“Ocean Decade Data Coordination Platform”** will be established.

## 2. The Ocean Decade Data Coordination Platform

The Ocean Decade Data Coordination Platform will have two components :

- **The Ocean Decade Data Coordination Group:** this group will be focused on strategic exchange and coordination between key actors – including data generators, managers and users. It will provide guidance and instructions to the Ocean Decade Data Technical Implementation Coordination Group.
- **The Ocean Decade Data Technical Implementation Coordination Group:** this group will be focused on technical collaboration to develop the technical elements required to build the “digital data ecosystem” foreseen under the Ocean Decade.

### 2.1 The Ocean Decade Data Coordination Group

The Ocean Decade Data Coordination Group will provide a forum for ongoing strategic exchange and coordination between key actors – including data generators, managers and users (from both the public and private sectors)- in the ocean data and information domain needed to develop the “digital ecosystem” that will enable the development of a digital representation of the ocean as a flagship initiative of the Decade. This group will provide advice to the Decade coordination and governance structures on the implementation of the data, information and knowledge actions contained in the Ocean Decade Implementation Plan. It should provide advice and guidance calling for transformative action and innovation.

#### 2.1.1 Tasks

The Ocean Decade Data Coordination Group will:

- (i) Develop an Ocean Decade Data Strategic Plan focusing on data types, observing systems, data and information management and sharing agreements (policies) , data and information products and services that are identified by users, and capacity development needs that are required to address the ten Challenges as defined in the Ocean Decade Implementation Plan (attached as Annex I) which will be updated throughout the Decade as necessary to reflect evolving needs of stakeholders. This Plan should include indicators for measuring impact and progress of data initiatives under the Decade Challenges that can be integrated into the overall Decade monitoring and evaluation framework that is under development;
- (ii) Develop a gap/opportunity analysis identifying, based on inputs from science and societal actors, remaining relevant issues to be resolved in the development of the Decade digital ecosystem, including gaps in data types, observing systems, data and information management and sharing requirements, data and information products and services as identified by users, and capacity development needs as related to (i);
- (iii) Regularly document exchanges of information on existing and planned ocean data initiatives being carried out by or known of by group members, facilitating flow of information and exchange between user groups and generators and managers of data on the services, applications and products that are required by users and actively identify areas for coordination and collaboration.

- (iv) Provide input to the design of Calls for Decade Actions related to data, information and knowledge management (and the associated products, services, tools, applications, and user interfaces; capacity development initiatives and infrastructure), provide advice on the endorsement of Decade Actions related to data, information and knowledge management<sup>1</sup>, and explore options for the development of or provision of support to joint Decade programmes or projects to fulfill the Ocean Decade Challenges.
- (v) Identify and seek the collaboration of entities that can contribute to the “digital ecosystem” across data generators, managers and users, including information from local and indigenous sources;
- (vi) Provide instructions and guidance to Ocean Decade Data Technical Implementation Coordination Group on the requirements that should be addressed by the technical components of the “digital ecosystem”; and
- (vii) Provide recommendations for additional actions to close the gaps in data types, observing systems, data and information management requirements, data and information products and services as related to (ii).

## 2.1.2 Composition of Membership

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

- (i) representatives of international or regional entities with strategic planning and implementation responsibility for the generation or management of ocean data and information systems and services within their organization;
- (ii) representatives of user communities of data and information products and services that will be provided by the Decade;
- (iii) individual experts in areas relevant to the activities of the Group; and
- (iv) co-Chairs of the Decade Data Technical Implementation Coordination Group.

Membership will be for a period of two years (renewable).

Geographical, generational, sectoral and gender diversity will be taken into account in the composition of the Group.

All members of the platform must be committed to the data, information and knowledge management principles contained in the Ocean Decade Implementation Plan.

Two co-Chairs will be elected at the end of the first meeting (and thereafter annually) by the members of the Group.

A call for expressions of interest will be launched to allow interested parties to nominate to join the platform.

Membership would be on the basis of invitation from the Executive Secretary of the IOC-UNESCO.

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<sup>1</sup> Note that conflict of interest procedures will be adopted by the Platform to ensure that participants are not providing advice on activities that they are engaged in.

The size of the Group should preferably be limited to 20-25 members.

## 2.2 The Ocean Decade Data Technical Implementation Coordination Group

The Ocean Decade Data Technical Implementation Coordination Group will provide a technical collaboration forum to develop the technical elements required to build the “digital data ecosystem” foreseen in the Ocean Decade Implementation Plan. During two (April and October 2020) workshops on data sharing involving UN, non-UN IGOs, Global and Regional organisations and projects, NGOs and private sector it was revealed that a substantial number of organizations already manage and/or disseminate data relevant to their ocean related mandate but that there is currently no sharing or interoperability between these systems. In addition for multidisciplinary research (which will be another cornerstone of the Decade) researchers and other users currently need to consult too many separate and incompatible data and information systems.

### 2.2.1 Tasks

The main objective of the Group will be to “*contribute to the development of a distributed, robust, and collaborative “digital ecosystem” of interoperating parts, that leverages open, scalable, easily implementable, and responsive digital management frameworks.*” as detailed in the chapter “Data, Information and Digital Knowledge Management” of the decade implementation plan (see Annex I).

The Group will:

- 1- Create and maintain an approachable, robust, and extensible set of common and best practices across scales, sectors, and capacities, including methods that enable:
  - i. Continuous and transparent validation and quality control/assurance of digital products and streams.
  - ii. Exposure of stakeholders’ data, information, and knowledge in ways that meaningfully contribute to a global commons (both technically and substantively).
  - iii. Automated discoverability of data and information within and across independent systems.
  - iv. Access to data and information, while respecting controls where needed.
  - v. Interoperability, from datasets to infrastructure, allowing rapid integration, analysis, and synthesis.
  - vi. A modern and scalable digital stewardship culture.
- 2- Develop specifications for the “digital ecosystem” component systems and their guiding frameworks that will aim to promote and enable:
  - i. The use of standards, best practices and coordination across shared global frameworks.
  - ii. The implementation of, and adherence to, clear and fit-for-purpose data management plans, that are made publicly available when no credible restrictions exist.

- iii. The participation by diverse stakeholders through partnership at multiple levels, including through networks of interoperating platforms, communities of practice, and coordination solutions.
  - iv. More rapid and timely sharing of data, thus reducing time and cost from observation to utilisation.
  - v. Targeted capacity sharing and development—matching opportunities and needs to skills and resources—as well as technology transfer across networks to raise global capacity.
  - vi. New ways of ensuring data are accessible and useable in the science-policy and science- innovation interfaces co-created by stakeholders.
  - vii. The delivery of tailored digital products and services to users across stakeholder groups and geographies, through custom interfaces, dashboards, and other user experience solutions that allow users to tailor information to their geographical or thematic area of interest.
  - viii. Reusable, consistent, open, and widely shared data, software, and other relevant code.
  - ix. The creation of working groups and advisory boards to drive innovation, protect intellectual property rights, protect sensitive and proprietary information, and ensure equity and justice for data contributors at all levels, including indigenous and local groups and industry, following the FAIR and CARE principles (<http://www.gida-global.org/care>).
- 3- Develop, or contribute to existing, pilot activities related to interoperability networks of ocean data and information;
  - 4- Provide guidance and advice to the scoping, analysis and coordination of Ocean Decade Actions that focus on data and information, or those that generate data and/or have a data component;
  - 5- Provide guidance and advice to the Ocean Decade Data Coordination Group; and
  - 6- Carry out any other task assigned to it by the Ocean Decade Data Coordination Group.

## 2.2.2 Composition of Membership

Membership of the Ocean Decade Data Technical Implementation Coordination Group will be open to

- (v) individual experts in areas relevant to the activities of the Group participating in their personal capacity;
- (vi) data management experts from UN entities, governments, industry, philanthropic foundations, research institutes and other partners;

Membership will be for a period of two years (renewable).

Geographical, generational and gender diversity will be taken into account in the composition of the platform.

A Chair and Co-Chair will be elected at the end of the first meeting (and thereafter annually) by the members of the Group.

A call for expressions of interest will be launched to allow interested parties to nominate to join the platform. Membership would be on the basis of invitation from the Executive Secretary of the IOC-UNESCO.

### 2.2.3 Reporting

The Ocean Decade Data Technical Implementation Coordination Group will report to the Ocean Decade Data Coordination Group via the co-Chairs of the Ocean Decade Data Technical Implementation Coordination Group who will be members of the Ocean Decade Data Coordination Group.

## 3. Modalities of Meeting

Virtual meetings of the Ocean Decade Coordination Group and the Ocean Decade Data Technical Implementation Coordination Group will be held on a regular basis (approximately every 2 months). In-person meetings will be organized on an *ad hoc* basis. Participation will be self-funded for organizations and funded from Decade resources as funding is available.

The Ocean Decade Coordination Unit will act as the secretary for the platform and will provide guidance on and links to other relevant groups, processes and initiatives under the Ocean Decade. This will include the facilitation of active links to the Informal Working Group for Monitoring and Evaluation for the Ocean Decade.

The Platform will prepare a short annual report of its work and main activities.

## **ANNEX I – EXTRACT FROM OCEAN DECADE IMPLEMENTATION PLAN**

### **2.4 DATA, INFORMATION AND DIGITAL KNOWLEDGE MANAGEMENT**

This section describes the data, information and digital knowledge management framework that will be collectively developed throughout the Decade.

46. Data and information will be key enablers of the Decade outcomes. Digitizing, preserving, managing, exchanging and, most importantly, using a significantly increased volume and range of ocean-related data, information and knowledge will be cornerstones of the success of the Decade. The ambition of the Decade in relation to data, information and knowledge management includes significant enhancement of infrastructure, common approaches that enable interoperable data sharing and stewardship, and enhanced collaboration between data providers and users. Implementing a “digital ocean ecosystem” to support the Decade will be a dynamic and continuous process, incorporating established approaches and technologies as well as those that are only just emerging.

47. The ambitious challenge of representing the socio-ecological dimensions of the ocean through digital means will require a collective effort from a diverse, but closely coordinated community. Much of the required capability to build a coordinated digital ecosystem for the ocean is already available. The main challenges are to build required capacity where it is still lacking, and to coordinate across stakeholders, including the academic, philanthropic, industrial, and governmental sectors.

48. No single or central digital infrastructure or system will be sufficient to meet the needs of the Decade. Implementation of the digital ecosystem will require inclusive and outward-facing co- design and co-construction of a distributed, integrated and interoperable set of digital solutions that will form components of the overall ecosystem. Collectively these components will represent the socio-ecological dimensions of the ocean, including the numerous pathways to support sustainable development. Implementation will include concrete efforts to bridge efforts across global, regional and local scales.

49. Components developed as part of the Decade digital ecosystem will incorporate modularity, scalability, and continuous co-design to ensure robustness. Data, information and knowledge contributions from a wide variety of stakeholders will guide the modification of modules without compromising overall functionality. This will be essential as the ecosystem incorporates increasingly diverse forms of ocean data, including physical, geological, bathymetric, biogeochemical, biological, ecological, social, economic, cultural, and governance data. Components will be developed to ensure the sustainability of the overall ecosystem and its ongoing evolution and utility after 2030.

50. The digital ocean ecosystem will enable the understanding of the ocean from a social-ecological perspective using historical, contemporary (including real-time), and modelled data to describe past and current ocean conditions, while supporting forecasts and prediction of their future states. It will also contribute to the identification of knowledge gaps, helping to prioritize the use of existing data or the generation of new data, information and knowledge. As the Decade advances, the range of digital sources will expand to industry and citizen-science data, as well as sources of less-quantifiable insights, such as indigenous and local knowledge. Components that contribute to the digital ecosystem will include approaches to overcome a number of digital divides caused by different ways of knowing, differing levels of capacity (e.g. access to technology and computing power), data fragmentation, siloed activities, impediments to data sharing, and the undervaluing/underuse of data, information, and knowledge.

51. The Decade digital ecosystem will catalyse cooperation between data generators and users from diverse stakeholder groups including governments, UN entities, scientists,

planners, decision-makers, as well as industry and the public. The digital ecosystem and its component parts will support users in accessing, understanding, assessing, and providing impactful feedback on raw and processed data, information and knowledge so that these better meet their specific needs.

52. The Decade Coordination Unit, working with data management experts from UN entities, governments, industry, philanthropic Foundations, research institutes and other partners will coordinate and promote the development of the digital ecosystem. Throughout the Decade, Calls for Action will be launched, inviting stakeholders to develop components of the ecosystem. To align to the above guidance, the resulting local, regional, and global initiatives will need to consider how they:

- Create new opportunities for the participation of industry and local and indigenous groups in ocean science, including those that respect ownership and provenance of knowledge and accommodate forms of knowledge that may not align with scientific numeration or may require new ways of digital representation of evidence.
- Facilitate use by, and receive contributions from, a wide range of stakeholders, including those in low-technology environments.
- Are responsive to users' needs through proactive engagement and co-development and incorporate new ways of ensuring that data are accessible and useable at the science- policy, science-public, and science-innovation interfaces.
- Champion and promote demonstrated interoperability with diverse components of the digital ocean ecosystem as well as with external systems, with strategies to ensure scalable and extensible development to address unforeseen and emerging issues.
- Interlink resources that are grounded in peer-reviewed science or transparent, quality-controlled procedures and which deliver content that can be audited and is traceable.

53. The endorsement process for Decade Actions will require that, where relevant and in accordance with provisions of international and national requirements, data and knowledge are provided in an open-access, shared, discoverable manner and timely deposited in appropriate data repositories. Proponents of all Decade Actions will be expected to provide information on the management and sharing of data, information, and resulting knowledge that they produce. This will include, where relevant, sharing of data management plans that will cover raw data and all derived digital products (within the control of the plan's authors) and services, including, for example, software and code.

54. An open-membership working group has been established and tasked with developing a detailed strategy for data stewardship during the Decade. The strategy will be finalised and presented to the Decade Advisory Board in the early phases of Decade implementation. It will make reference to global data stewardship principles (including the Findable, Accessible, Interoperable, and Reusable (FAIR) principles, the Collective Benefit, Authority to Control, Responsibility, Ethics (CARE) principles, and the Transparency, Responsibility, User Focus, Sustainability, and Technology (TRUST) principles.) and take into account the data policies of relevant international organizations and networks (Such as the IOC, the Group of Earth Observations, the World Meteorological Organization, and the World Data System)

55. To ensure that all stakeholders have the skills and can access the technology needed to produce, interpret and use data, information and knowledge, data management initiatives of the Decade will be linked where relevant to capacity development and transfer of marine technology initiatives outlined in the following section. knowledge.



## **ANNEX II**

### **Ocean Decade Challenges**

#### **Knowledge and Solutions Challenges**

- 1- Challenge 1: Understand and map land and sea-based sources of pollutants and contaminants and their potential impacts on human health and ocean ecosystems, and develop solutions to remove or mitigate them.
- 2- 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.
- 3- Challenge 3: Generate knowledge, support innovation, and develop solutions to optimise the role of the ocean in sustainably feeding the world's population under changing environmental, social and climate conditions.
- 4- Challenge 4: Generate knowledge, support innovation, and develop solutions for equitable and sustainable development of the ocean economy under changing environmental, social and climate conditions.
- 5- Challenge 5: Enhance understanding of the ocean-climate nexus and generate knowledge and solutions to mitigate, adapt and build resilience to the effects of climate change across all geographies and at all scales, and to improve services including predictions for the ocean, climate and weather.

#### **Essential Infrastructure Challenges**

- 6- Challenge 6: Enhance multi-hazard early warning services for all geophysical, ecological, biological, weather, climate and anthropogenic related ocean and coastal hazards, and mainstream community preparedness and resilience.
- 7- Challenge 7: Ensure a sustainable ocean observing system across all ocean basins that delivers accessible, timely, and actionable data and information to all users.
- 8- Challenge 8: Through multi-stakeholder collaboration, develop a comprehensive digital representation of the ocean, including a dynamic ocean map, which provides free and open access for exploring, discovering, and visualizing past, current, and future ocean conditions in a manner relevant to diverse stakeholders.

#### **Foundational Challenges**

- 9- 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.
- 10- Challenge 10: Ensure that the multiple values and services of the ocean for human wellbeing, culture, and sustainable development are widely understood, and identify and overcome barriers to behaviour change required for a step change in humanity's relationship with the ocean.