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(of UNESCO)

INFORMATION DOCUMENT

**IOC CONTRIBUTIONS TO THE UN DECADE OF OCEAN SCIENCE
FOR SUSTAINABLE DEVELOPMENT (2021 – 2030)
INCLUDING RESOURCES NEEDS**

Summary

This document complements the information and analyses presented in [IOC/INF-1383](#) presented to the 53rd Executive Council. It updates the status of IOC-led initiatives that have been registered as Decade Actions, and identifies other endorsed Decade Actions where IOC is playing a key role. It identifies other IOC-led Decade Actions that are currently being developed, and identifies future perspectives and the process for future contributions.

1. Introduction

This document has been prepared to provide updated information on the IOC contribution to the UN Decade of Ocean Science for Sustainable Development ('the Ocean Decade'). It builds on and complements the information and analyses provided in IOC/INF-1383 presented to the 53rd Executive Council in February 2021.

The previous analysis mapped existing IOC programmes and activities to the Ocean Decade Challenges and identified numerous points of intersection (refer Table 1). It concluded that the current set of IOC activities make a significant direct contribution to almost all initial Decade challenges. It also identified an opportunity for IOC to use the Decade as an unifying framework to deliver on its mandate, simultaneously contributing to the achievement of Decade outcomes. The previous analysis also identified a number of existing, planned or potential specific IOC Decade initiatives that could be registered as Decade Actions. This document provides an update on progress on those initiatives, identified the endorsed Decade Actions where IOC is a key partner, and identifies several future perspectives for the IOC's contribution to the Decade.

Table 1: Mapping of Ocean Decade Challenges and Existing IOC Programmes and Activity

Ocean Decade Challenge	Existing IOC programme/activity
<p>Ocean Decade 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 mitigate or remove them.</p>	<ul style="list-style-type: none"> → IOC-UNEP Nutrients and Coastal Impacts Research Programme (N-CIRP), SDG 14.1.1a → GESAMP WG 40 on Plastics and Microplastics in the Ocean: Marine Plastics (SDG 14.1.1b)
<p>Ocean Decade Challenge 2: Understand the effects of multiple stressors on ocean ecosystems, and develop solutions to protect, monitor, manage and restore ecosystems and their biodiversity under changing environmental conditions, including climate.</p>	<ul style="list-style-type: none"> → Ecosystem based management-related work → WG on Multiple Ocean Stressors → GOA-ON and IOC work on ocean acidification, SDG 14.3.1 → Marine Spatial Planning, Coastal Zone Management, Large Marine Ecosystems, decision-support tools → Global Ocean Oxygen Network (GO2NE) → IOC International Group for Marine Ecological Time Series (IGMETS) → IOC WG on Climate Change and Global Trends of Phytoplankton in the Ocean (TrendsPO) → GOOS → OBIS → GEBCO

Ocean Decade Challenge	Existing IOC programme/activity
<p>Ocean Decade 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.</p>	<p>→ Contributions from the Harmful Algal Blooms portfolio of activities, ecosystem based management-related work, Marine Spatial Planning, Coastal Zone Management, Bio-Eco module of GOOS</p>
<p>Ocean Decade Challenge 4: Generate knowledge, support innovation, and develop solutions to contribute to equitable and sustainable development of the ocean economy under changing environmental and social conditions.</p>	<p>→ IOC Marine Spatial Planning, coastal zone management, and ecosystem based management-related work, decision-support tools</p>
<p>Ocean Decade Challenge 5: Enhance understanding of the ocean-climate nexus and use this understanding to generate solutions to mitigate, adapt and build resilience to the effects of climate change, and to improve services including improved predictions and forecasts for weather, climate, and the ocean.</p>	<p>→ Integrated Ocean Carbon Research Group (IOC-R)</p> <p>→ GESAMP WG 41 on Ocean Interventions for Climate Change Mitigation</p> <p>→ Blue Carbon Initiative (BCI) and International Blue Carbon Partnership (IBCP)</p> <p>→ IOC-WMO-ISC World Climate Research Programme (WCRP)</p> <p>→ GOOS</p> <p>→ GLOSS</p> <p>→ Coastal Adaptation through coastal zone management (ICAM)</p>
<p>Ocean Decade Challenge 6: Expand multi-hazard warning systems for all biological, geophysical, and weather and climate related ocean hazards, and mainstream community preparedness and resilience.</p>	<p>→ IOC Tsunami Programme</p> <p>→ The Harmful Algal Blooms portfolio of activities and emerging work on ocean and human health</p>
<p>Ocean Decade Challenge 7: Ensure a sustainable ocean observing system that delivers timely data and information accessible to all users on the state of the ocean across all ocean basins.</p>	<p>→ GOOS</p> <p>→ GLOSS</p> <p>→ Joint IOC-WMO Collaborative Board</p>

Ocean Decade Challenge	Existing IOC programme/activity
<p>Ocean Decade 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.</p>	<ul style="list-style-type: none"> → IOC International Oceanographic Data and Information Exchange Programme (IODE) → IOC Ocean Data and Information System (ODIS) → GEBCO → WCRP CMIP → Ocean Prediction activities → GOOS → GLOSS → OBIS (Ocean Biodiversity Information System)
<p>Ocean Decade 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 regardless of geography, gender, culture, or age.</p>	<ul style="list-style-type: none"> → IOC Capacity Development activities (implementing the IOC Capacity Development Strategy) → Transfer of Marine Technology (TMT) → A key focus of work of IOC Regional Subsidiary Bodies and their Secretariats → IOC Intergovernmental Oceanographic Data and Information Exchange Programme (IODE) → OceanTeacher Global Academy and its Regional/Specialized Training Centres → Regional Training and Research Centres (WESTPAC) → UNESCO Category 2 Centres associated with IOC → UNESCO Chairs in Marine Sciences
<p>Ocean Decade 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.</p>	<ul style="list-style-type: none"> → IOC Ocean Literacy activity → IOC communication work

2. Registered IOC Decade Actions

The following Decade Actions have been registered as IOC-led contributions to the Ocean Decade.

- **Ocean Observing Co-Design : Evolving Ocean Observing for a Sustainable Future**

IOC Lead Programme: The Global Ocean Observing System (GOOS) through lead sponsor of the Intergovernmental Oceanographic Commission of UNESCO

Readily available ocean information is a foundational element needed to achieve the ocean we want by 2030. With fit-for-purpose and timely observations, we can track the current state of the ocean, enable skilful predictions and warnings, manage ocean resources, empower society to adapt to change, and ultimately, assess the impact of action towards a sustainable ocean. Our aim is to build the process, infrastructure and tools for co-design, creating an international capacity to evolve a truly integrated ocean observing system, matching agile observing and modelling capability with requirements. This will provide the largest possible impact for investment.

- **Observing Together: Meeting Stakeholder Needs and Making Every Observation Count**

IOC Lead Programme: The Global Ocean Observing System (GOOS) through lead sponsor of the Intergovernmental Oceanographic Commission of UNESCO

We aim to transform ocean data access and availability by connecting ocean observers and the communities they serve, through enhanced support to both new and existing community-scale projects. Globally, many communities are unable to access ocean data in decision-ready formats and so cannot see the value of investment in ocean observations. Co-design will broaden equitable access to and relevant application of ocean knowledge by a myriad of stakeholders. We will leverage the Global Ocean Observing System's network of expertise to bring needed observations and forecasts to community users and into global data streams, making every observation count.

- **Ocean Practices for the Decade**

IOC Lead Programme: International Oceanographic Data and Information Exchange (IODE) & the Global Ocean Observing System (GOOS) of UNESCO

Humanity's connection to the ocean is based on how we act and react to its multifaceted wonder. Our "ocean practices" are an essential bridge between humanity's cultural and natural heritage. The Ocean Practices for the Decade Programme ("OceanPractices") will support all ocean stakeholders in securing, equitably sharing, and collectively advancing this methodological heritage. By engaging diverse communities of practice and interlinking them through FAIR digital technologies, OceanPractices will transform how science and other stakeholders align their interests/capacities, creating ever-better practices, promoting sustainable human and ocean well-being. These practices improve interoperability and facilitate training so broader global participation naturally evolves.

- **Ocean Literacy With All (OLWA): the change we need for the ocean we want**

IOC Lead Programme: Ocean literacy

OLWA advances Ocean Literacy (OL) through international partnerships and networks by designing and implementing transformative locally, globally relevant research-based activities, and projects by and for diverse stakeholders. This programme builds capacity and behaviour

change to achieve an ocean literate society to help ensure sustainable development of the global ocean.

3. IOC involvement in endorsed Decade Actions

IOC programmes are closely involved in the following Decade Actions that have been endorsed following the analysis of submissions received under Call for Decade Actions No. 01/2020. The full list of Endorsed Programmes is presented in document [IOC/INF-1417](#).

- **CoastPredict - Observing and Predicting the Global Coastal Ocean**

Lead institution(s): Alma Mater Studiorum, University of Bologna

CoastPredict will transform the science of observing and predicting the Global Coastal Ocean, from river catchments, including urban scales, to the oceanic slope waters. It will integrate observations with numerical models to produce predictions with uncertainties from extreme events to climate, for the coastal marine ecosystems (their services), biodiversity, co-designing transformative response to science and societal needs. CoastPredict will re-define the concept of the Global Coastal Ocean, focusing on the many common worldwide features, to produce observations and predictions of natural variability and human-induced changes in the coastal areas and upgrade the infrastructure for exchange of data with standard protocols.

- **Ocean Acidification Research for Sustainability**

Lead institution(s): Global Ocean Acidification Observing Network (GOA-ON)

OARS will foster the development of the science of ocean acidification including the impacts on marine life and sustainability of marine ecosystems in estuarine-coastal-open ocean environments. The programme will address the SDG target 14.3 'Minimize and address the impacts of Ocean Acidification (OA), including through enhanced scientific cooperation at all levels'. Key components include: 1) enhancing regional collaborative efforts, 2) coordination of capacity building in science, 3) co-design and implement observation and research to address the threat of ocean acidification, and 4) communication and delivery of the outputs to policy makers and communities.

- **Global Ocean Oxygen Decade**

Lead institution(s): GEOMAR Helmholtz Centre for Ocean Research Kiel, on behalf of the Global Ocean Oxygen Network (GO2NE)

Oxygen dissolved in seawater supports the largest ecosystems on the planet. It is alarming that the ocean is losing oxygen, termed ocean deoxygenation, at a rapid rate, primarily due to global warming by anthropogenic greenhouse gas emissions, and pollution by nutrients and organic wastes particularly in coastal waters. The Decade Programme will raise global awareness about ocean deoxygenation, provide knowledge for action and develop mitigation and adaptation strategies and solutions to ensure continued provision of ecosystem services, and minimize impacts on the ocean economy through local, regional, and global efforts, including transdisciplinary research, innovative outreach, and ocean education and literacy.

4. IOC-led Decade Actions in the Planning Phase

An Ocean Decade Tsunami Programme is currently being developed for registration as a Decade Action and is described in Document IOC/A-31/3.4.1.Doc(1). This programme aims to achieve transformational advances in tsunami detection, observing and warning, including tsunamis generated by non-seismic sources, making 100% of communities at risk of tsunami

prepared for and resilient to tsunamis by 2030 through the implementation of the UNESCO/IOC Tsunami Ready Programme.

The registration of the following IOC-led initiatives as Decade Actions is also planned: Ocean Data Information System (ODIS), Ocean Biodiversity Information System (OBIS), Ocean Teacher Global Academy (OTGA), World Ocean Database (WOD) and PacMAN.

5. Future Perspectives

As the mandated coordinating agency of the Ocean Decade, the IOC occupies a unique position to make a substantive contribution to the Decade through the implementation of the High-Level Objectives contained in the Draft IOC Medium Term Strategy for 2022-2029 (41C/4) and the Draft Programme and Budget for 2022 – 2026 (41C/5). Perspectives for future IOC contributions to the Decade include:

- **Ocean research initiatives** focused on identification of main ocean stressors and their interaction with a view to informing ecosystem-based management; coordination of the ocean carbon research and observation agenda for the next decade; and ocean and human health.
- The advancement of **knowledge-based ocean management tools** such as marine spatial planning, coastal zone management, marine protected areas, and transboundary management of Large Marine Ecosystems (LMEs) based on science innovation and new technologies.
- Scientific and technical information, services, and management tools for the responsible growth of a **sustainable ocean economy**.
- Initiatives to implement the Decade strategic framework for **capacity development** (CD), focusing on the six desired results (human resources, access to infrastructure, institutional mechanisms, ocean research policies, increased visibility and awareness, and resource mobilization).
- Development of an **Ocean Decade ‘digital ecosystem’** that will follow the ODIS concept based on 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.
- Decade Actions led by IOC Regional Subsidiary Bodies to **respond to regional priorities**. Extrabudgetary support provided by Norway in 2021 and 2022 will support IOC Regional Subsidiary Bodies to identify and catalyse the development of priority regional Decade Actions, including those that could be led by IOC.

Planning of future IOC contributions to the Decade will follow the process that was presented in IOC/INF-1383 to the 53rd Executive Council, namely:

- (i) **Consideration of programmatic contributions to the Decade:** Governance structures of IOC programmes will consider programmatic contributions to the Decade through the addition of a corresponding standing item on their meeting agendas. Programmatic governance structures are encouraged to consider creating Decade specific task teams or working groups to lead inter-sessional discussions and development of proposals for future Decade contributions.
- (ii) **Engagement of IOC Member States and experts in Decade structures:** A number of national, regional and thematic stakeholder initiatives are emerging in the framework of the Decade. Broad discussions take place between different actors on proposed Decade

Actions, across themes or geographies. Participation by IOC Member States and IOC – affiliated experts in these initiatives (or leading the establishment of related structures or bodies where they do not yet exist, including, for example, regional and national committees) will provide an important pathway to ensuring that IOC's future contributions to the Decade are developed in keeping with principles of co-design and co-delivery and thus contribute to a shared, collective effort.

- (iii) Reporting of IOC Decade activities:** Annual reporting of the progress of IOC's contributions to the Decade will be provided to the Governing Bodies; proposals for future contributions will also be communicated. To avoid duplication of efforts in collecting and analysing data on progress of Decade Actions that involve IOC, information on progress will be collated from the annual reports that each Decade Action will prepare and submit to the DCU.