Implementation Plan

The United Nations
Decade of Ocean Science
for Sustainable Development
(2021-2030)

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

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Implementation Plan

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Foreword

In 2016, the first World Ocean Assessment of the United Nations stated that humankind was running out of time to start managing the ocean sustainably. This alarming conclusion poses a question to our civilization: is there a way to reverse the decline in ocean health while continuing to rely on the ocean for our ever-increasing needs, particularly under a changing climate? The proclamation by the United Nations General Assembly in December 2017 of the **UN Decade of Ocean Science for Sustainable Development, 2021–2030** (hereafter, the '**Ocean Decade**') is based on the informed conviction of UN Member States that indeed, this opportunity still exists, and that, furthermore, ocean science needs to play a central role in this process.

Ocean science is broad: it encompasses natural and social science disciplines, local and indigenous knowledge; it includes the science-policy and science-innovation interfaces, as well as technology and infrastructure. At the beginning of the third millennium, ocean science is largely competent for diagnosing problems. However, its ability to offer solutions of direct relevance to sustainable development requires a massive upgrade. This need is particularly urgent against the current backdrop of the global COVID-19 pandemic and accelerating climate change. The pandemic has, once again, highlighted the importance of science and knowledge for decision-making and policy. As the world adjusts to a new normal, the ocean will need to play a central role in post-pandemic recovery efforts. However, for this to occur, there needs to be a nothing short of a revolution in ocean science. The Ocean Decade will create a paradigm shift in the generation of qualitative and quantitative ocean knowledge – including from currently data-poor regions, such as the deep ocean, coastal areas where much of the human interaction with the ocean is concentrated, and the polar regions – to inform the development of solutions that contribute to the 2030 Agenda for Sustainable Development.

The Ocean Decade aims to catalyse the human behaviour change required for the successful implementation of these solutions. Guided by the United Nations Convention on the Law of the Sea (UNCLOS), the Ocean Decade will generate the data, information and knowledge needed for more robust science-informed policies and stronger science-policy interfaces at global, regional, national and even local levels, leading to improved integrated ocean management and development of a sustainable ocean economy. The Ocean Decade will support numerous UN entities to fulfil their ocean-related mandates. In our information-centred, internet-linked society, the Ocean Decade will support ocean data, information and knowledge systems to evolve into a much higher level of readiness, accessibility, and interoperability. The scale of such efforts will need to be exponentially greater than anything seen to date.

An equally transformational part of the Ocean Decade is about humanity and our relationship with the ocean. Understanding of the value of the ocean can be nurtured through ocean literacy efforts among diverse stakeholder groups. Holders of indigenous and local knowledge will work as essential partners of the Ocean Decade and will contribute to highlighting the multitude of cultural values of the ocean. Equity, inclusiveness, respect, fairness and scientific integrity are core principles of the Ocean Decade.

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The Ocean Decade will systematically identify and dismantle barriers to achieving gender, geographic and generational balance so that no one is left behind. Everyone should be able to benefit from ocean science, including Small Island Developing States, Least Developed Countries and Landlocked Developing Countries.

Designing and delivering ocean science that focuses on user needs and adopts relevant mechanisms for uptake will be a key metamorphosis to be achieved between 2021 and 2030. Its scale will be unprecedented. Multiple stakeholders are expected to engage and start collaborating outside their traditional communities. Knowledge generators and users will engage in an iterative process of co-design and co-delivery of ocean science. This will create new groupings of actors from natural, social science and humanity disciplines, business and industry, governments, UN entities, intergovernmental organizations (IGOs), NGOs and civil society, educators, early career ocean professionals, ocean sports and recreation organizations, arts and cultural communities, and indigenous and local knowledge holders. Partnerships and active communication will be at the heart of the Ocean Decade.

This Decade is not the first to take on the challenge of ocean science. In 1971–1980, earlier generations embarked on the International Decade of Ocean Exploration. As part of that Decade, groundbreaking collaborative research projects occurred. Many of which, such as the World Ocean Circulation Experiment, permanently changed the face of ocean exploration. However, one crucial difference remains between the two Decades: in the 1970s, the aim was to generate the 'science we *want*'. In today's world, we no longer have that luxury, and the current Decade is resolutely focused on the 'science we *need*'.

The Implementation Plan for such a major undertaking as the Ocean Decade cannot be, and is not, prescriptive. Rather, it provides a framework for transformational action that will build on existing achievements and deliver action across geographies, sectors, disciplines and generations. I hope you, as a reader and an Ocean Decade stakeholder, will share the overall strategic vision and approach of the Ocean Decade as described in the Implementation Plan. With your engagement and your support, the impact of the Ocean Decade will be much bigger than the sum of its parts and together we will be able to create the science we need for the ocean we want.

Vladimir Ryabinin
Executive Secretary of the IOC

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Table of contents

Part 1/
Why an Ocean Decade? **11**

1.1. Rationale for the Ocean Decade 11
1.2. Vision, mission and outcomes 16

Part 2/
The Ocean Decade Action Framework **21**

2.1. Designing the science we need 21
2.2. Ocean Decade Challenges 22
2.3. Ocean Decade Objectives 23
2.4. Ocean Decade Action hierarchy and endorsement process 26
2.5. Data, information and digital knowledge management 28
2.6. Capacity development 30
2.7. How to engage in the Ocean Decade 33

Part 3/
Enabling the Ocean Decade **39**

3.1. Governance and coordination framework 39
3.2. Resource mobilization 44
3.3. Measuring progress 49

Appendix 1/
Glossary **50**

List of figures

Figure 1. Interactions with the 2030 Agenda and relevant policy frameworks. 13
Figure 2. Ocean Decade Action Framework. 21
Figure 3. Moving from the ocean we have to the ocean we want. 24
Figure 4. Endorsement process for Ocean Decade Actions. 27
Figure 5. Ocean Decade voluntary stakeholder engagement networks. 35
Figure 6. Governance and coordination framework for the Decade. 40
Figure 7. Financing mechanisms for the Ocean Decade. 46
Figure 8. Ocean Decade review processes. 50

List of tables

Table 1. Strategic framework for capacity development initiatives during the Ocean Decade 31
Table 2. Roles in resource mobilization throughout the Ocean Decade 47

List of boxes

Box 1. Scope of ocean science in the context of the Ocean Decade 11
Box 2. Transformative ocean science 16

List of acronyms

ECOP	Early Career Ocean Professional
EPG	Executive Planning Group
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GOSR	Global Ocean Science Report
IOC	Intergovernmental Oceanographic Commission of UNESCO
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IWG	Informal working group
LDC	Least Developed Country
LLDC	Landlocked Developing Country
MHEWS	Multi-hazard Early Warning Services
OECD	Organisation for Economic Cooperation and Development
OL	Ocean literacy
SDG	Sustainable Development Goal
SIDS	Small Island Developing State
TMT	Transfer of marine technology
UNCLOS	United Nations Convention on the Law of the Sea
UN DOALOS	Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs, United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly

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The Intergovernmental Oceanographic Commission (IOC) of UNESCO, under the leadership of Ariel Troisi, IOC Chair and Vladimir Ryabinin, IOC Executive Secretary, gratefully acknowledges the many individual and institutional contributors to the Implementation Plan over the last three years.

The idea of the Ocean Decade was born out of a meeting of IOC officers and senior secretariat staff in early January 2016 in Gilleleje, Denmark. The meeting was chaired by the then IOC Chair, Peter Haugan, and supported by the former IOC Executive Secretary, Gunnar Kullenberg. The first version of the Ocean Decade Roadmap was drafted by the IOC Secretariat with the help of Neville Smith.

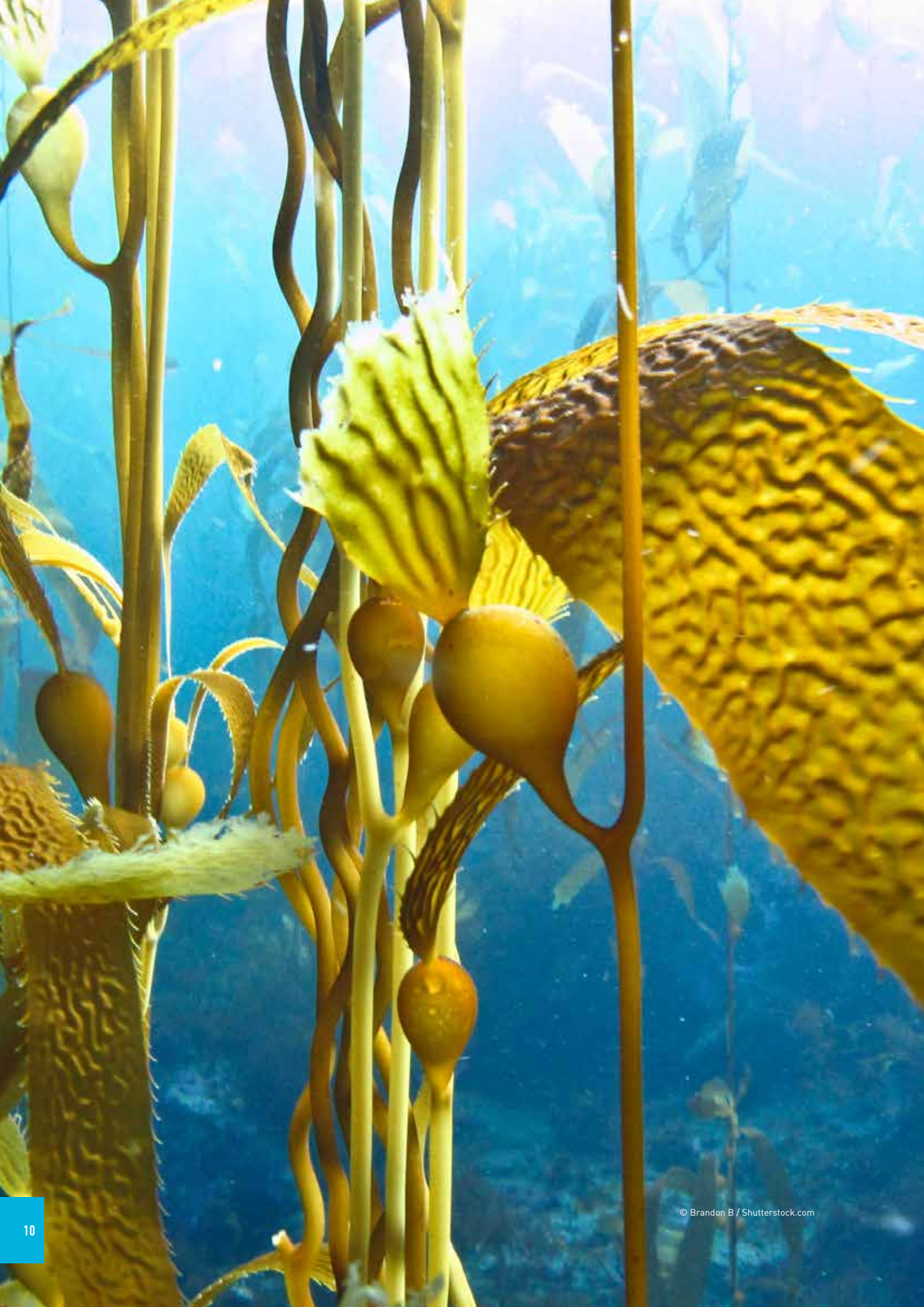
The Implementation Plan had its genesis in the discussions of an interim planning group in early 2018 that comprised: Sue Barrell (Australian Bureau of Meteorology), Julius Francis (Western Indian Ocean Marine Science Association – WIOMSA), Kristina Gjerde (IUCN), Gabriele Goettsche-Wanli (UN DOALOS and representative of the UN-Oceans focal point), Sieglinde Gruber (European Commission), Craig McLean (NOAA) and Martin Visbeck (GEOMAR), together with staff from the IOC Secretariat.

The Executive Planning Group (EPG) comprising 19 global leaders in ocean science was established in 2018 and made significant contributions to the Plan. The EPG members[1] are Francisco Armando Arias-Isaza, Elva Escobar Briones, Karen Evans, Kristina Gjerde, Anna Jöborn, Youn-Ho Lee, Suzan Kholeif, Jens Krüger, Margaret Leinen, Atmanand Malayath, Craig McLean, Linwood Pendleton, Fangli Qiao, Ricardo Serrão Santos, Sergey Shapovalov, Dismore Gilbert Siko, Martin Visbeck, Christa von Hillebrandt-Andrade and Mitsuo Uematsu. The EPG was chaired by the IOC Executive Secretary and benefited from the wisdom of two IOC Chairpersons, Peter Haugan and Ariel Troisi, and from input and support of the IOC Secretariat. Early career ocean professionals, including Harriet Harden-Davies, Alfredo Giron, Evgeniia Kostianaia, Guillermo Ortuño Crespo and Erin Satterthwaite, actively contributed to EPG discussions and the preparation of the Implementation Plan.

Between June 2019 and May 2020, global, thematic and regional planning meetings convened over 1,900 participants from the scientific community, governments, UN entities, NGOs, private sector and donors across ten ocean basins. These meetings provided important input to the Implementation Plan on scientific priorities and capacity development needs, as well as information on existing and future partnerships to implement Ocean Decade Actions. The Governments of Brazil, Canada, Denmark, India, Italy, Japan, Kenya, Norway, Sweden, Republic of Korea and Mexico, as well as the Secretariats of the UN Environment Programme (Nairobi Convention, Mediterranean Action Plan, Caribbean Environment Programme), the European Commission, the Ocean Frontier Institute (Canada), the North Pacific Marine Science Organization (PICES), the National Institute of Ocean Technology (NIOT) India, the International Council for the Exploration of the Sea (ICES), the Permanent Commission for the South Pacific (CPPS), the Mediterranean Science Commission (CIESM), the Danish Centre for Marine Research, the Autonomous National University of Mexico (UNAM), the Research Council of Norway, Arctic Frontiers, the Pacific Community (SPC), the American Geophysical Union (AGU), the UN Global Compact, the Western Indian Ocean Science Association (WIOMSA), Velux Foundations, Fundação Grupo Boticario and the Carlsberg Foundation provided invaluable support to the organization of these workshops.

In late 2019, over 50 leading ocean institutions provided written submissions to inform the development of the scientific priorities of the Ocean Decade and over 230 written submissions were received in response to the peer review of the zero draft of the Implementation Plan in March and April 2020. The current version of the Implementation Plan benefited from a comprehensive review by the Member States of the IOC and members of UN-Oceans in June and July 2020.

1. The affiliation and background of EPG members is provided on the Decade website: https://www.oceandecade.org



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Part 1/
Why an Ocean Decade?

Part 1 of the Implementation Plan explains the rationale for the Ocean Decade, discusses the process required to move from the 'ocean we have' to the 'ocean we want' and describes the desired state of the ocean at the end of the Ocean Decade.

1.1. Rationale for the Ocean Decade

There is increasing recognition and understanding of the reliance of humankind on the vital life-supporting services provided by the ocean. The High-Level Panel for a Sustainable Ocean Economy[2] considers the ocean a source of solutions for climate change mitigation and for many dimensions of a sustainable ocean economy, including the future of food and energy. The ocean also furnishes unquantifiable aesthetic, cultural and recreational services that are essential to human well-being. According to conservative estimates by the OECD, the ocean economy generated $US1.5 trillion in 2010 and has the potential to outperform the growth rate of the global economy both in terms of generated value and employment.[3] It could potentially reach an output of US$3 trillion in 2030 and this development could include contributions from new or less developed services, for example minerals and marine genetic resources.

BOX 1. SCOPE OF OCEAN SCIENCE IN THE CONTEXT OF THE OCEAN DECADE

In the context of the Ocean Decade, the ocean is considered as a part of the larger Earth system stretching from the coast to the open sea and from the ocean surface to the deep ocean seabed. The term 'ocean science' encompasses natural and social science disciplines, including interdisciplinary topics; the technology and infrastructure that supports ocean science; the application of ocean science for societal benefit, including knowledge transfer and applications in regions that are lacking science capacity; and the science-policy and science-innovation interfaces. It considers the land-sea, ocean-atmosphere and ocean cryosphere interactions. Ocean science recognizes, respects and embraces local and indigenous knowledge.

The ocean is a complex and dynamic socio-ecological system that is influenced by land-based activities, as well as ocean-atmosphere and ocean-cryosphere interactions. Presently, the ocean system is changing at an accelerated pace. Over 40% of the ocean's surface is strongly affected by multiple drivers and 66% is estimated to be experiencing increasing cumulative impacts.[4] Global ocean warming has continued unabated since the 1970s, with a doubling of the rate of warming since the early 1990s and a rise in the frequency of marine heatwaves.[5] Exacerbated by ocean acidification and other factors, continued warming on this scale is projected to lead to large-scale disappearance of corals and other highly productive ecosystems that are a cornerstone of the world's

2. https://www.oceanpanel.org/
3. OECD. 2016. The Ocean Economy in 2030. OECD Publishing, Paris
4. IPBES. 2019. Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, J. Settele, E. S. Brondízio, H. T. Ngo, M. Guèze, J. Agard, A. Arneth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razzaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis and C. N. Zayas (eds). Bonn (Germany), IPBES Secretariat.
5. IPCC. 2019. Summary for policymakers. H.-O. Pörtner, D. C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N. M. Weyer (eds), IPCC special report on the ocean and cryosphere in a changing climate. In press.

biodiversity and a source of food and livelihoods for hundreds of millions of people. Deoxygenation resulting from the combined effects of increased nutrient loads and ocean warming is creating 'dead zones' and low oxygen zones throughout the ocean. Harmful algal blooms caused by nutrient pollution are devastating marine biodiversity and generating significant risks for human health. Very little is known about vast swathes of the ocean; for example, the enormous surface and volume of the ocean mean that understanding of marine biodiversity and the seabed in areas beyond national jurisdiction is limited, and knowledge of polar regions and the Southern Ocean lags behind that of many other areas of the global ocean.

Today, the most pressing need is to collectively find transformative solutions to the existing and future challenges that face the ocean and thus humankind. The solutions will be many and varied, and will differ in their form and scale to best respond to regional, national and local contexts. These will need to evolve and adapt to respond to a changing climate and will include, *inter alia*, knowledge to inform policy and decision-making, management and governance frameworks, and technological innovation. All of these solutions will require a clear understanding of the barriers to large-scale human behaviour change: if such barriers are not overcome, then the solutions developed through improved ocean science will be of limited impact. Development of the required transformative solutions will also require better equipped and more sustainably funded science. Target 14.a of Sustainable Development Goal (SDG) 14 – Life below Water, is to increase scientific knowledge, develop research capacity and transfer marine technology, but national investment in ocean science around the world remains low, with an average of 1% of national research budgets attributed to ocean science between 2013 and 2017.[6]

The only possibility to move from the 'ocean we have' to the 'ocean we want' is to convince governments, decision-makers, funders, scientists from natural and social science disciplines including humanities, and society at large, that the world requires a transformational, large-scale, adequately resourced, innovative campaign to mainstream ocean science. This campaign needs to cut across geographies – including across the land-sea interface – and include a focus on least developed countries (LDCs), Small Island Developing States (SIDS) and landlocked developing countries (LLDCs). It needs to be inter-generational, recognize and redress gender disparities in ocean science and be of sufficiently long duration to deliver lasting change.

In 2016, the Intergovernmental Oceanographic Commission of UNESCO (IOC) initiated a concept for such a campaign and consulted IOC Member States and numerous other interested parties in its development. On 5 December 2017, this preparatory work culminated in the proclamation by the 72nd Session of UN General Assembly (UNGA) of the **UN Decade of Ocean Science for Sustainable Development 2021–2030** (referred to as the '**Ocean Decade**'). The UNGA called on the IOC to prepare an Implementation Plan for the Ocean Decade in consultation with Member States, specialized agencies, funds, programmes and bodies of the United Nations, as well as other intergovernmental organizations, non-governmental organizations and relevant stakeholders. This resulting Implementation Plan, which is the result of a highly inclusive three-year preparation process involving thousands of stakeholders, will guide the ambitious endeavour represented by the Ocean Decade and will evolve with time, reflecting new possibilities, opportunities and challenges.

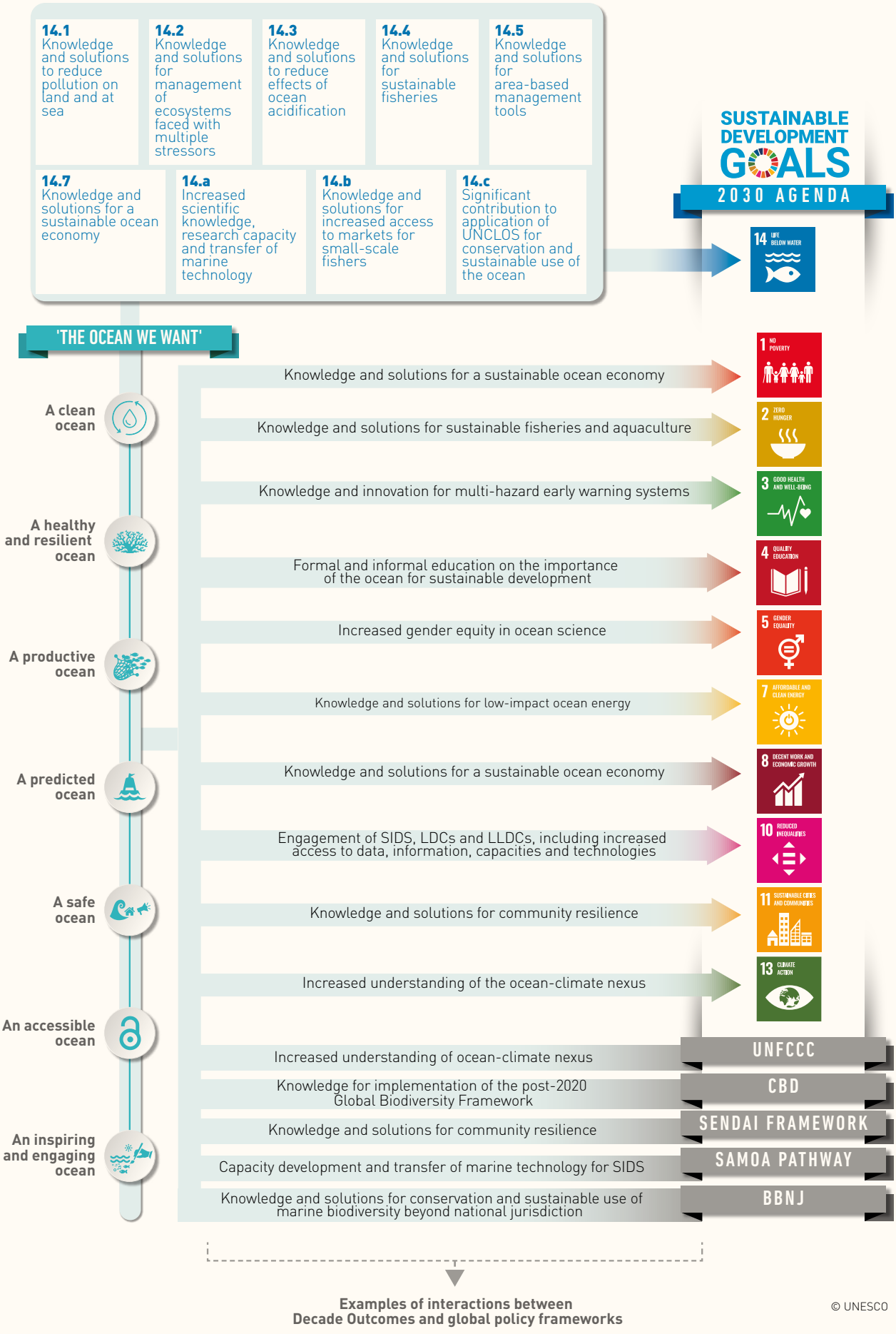
The Ocean Decade will be implemented on a voluntary basis within the legal framework of the United Nations Convention on the Law of the Sea (UNCLOS). It represents an opportunity to build scientific capacity and knowledge to contribute to the goals of the 2030 Agenda for Sustainable Development. There are numerous potential interactions between the knowledge and solutions that will be generated during the Ocean Decade and SDG 14 related to the conservation and sustainable use of the ocean, seas and marine resources, as well as many other SDGs[7] (see Figure 1). Such interactions will aid governments to achieve the aspirations contained in the 2030 Agenda at the national level, as well as contributing to global efforts for sustainable development. For example, increased knowledge could help realize projections for the ocean to supply up to six times more food than it does today[8] (SDG 2 – Zero hunger). Development and application of renewable energy technologies, actions to maintain and strengthen ocean carbon uptake and low-emission ocean-based transport and food production could reduce greenhouse gas forcing and mitigate the effects of climate change (SDG 7 – Affordable and clean energy; SDG 13 – Climate action).

6. IOC-UNESCO. 2017. Global Ocean Science Report – The Current Status of Ocean Science around the World. L. Valdés et al. (eds). Paris, UNESCO Publishing.

7. International Council for Science (ICSU). 2017. A Guide to SDG *Interactions: From Science to Implementation*. D. J. Griggs, M. Nilsson, A. Stevance and D. McCollum (eds). Paris, International Council for Science.

8. Costello, C., Cao, L., Gelcich, S. et al. 2019. The Future of Food from the Sea. Washington, DC, World Resources Institute.

Figure 1. Interactions with the 2030 Agenda and relevant policy frameworks.



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Improved training of educators and access to resources that support the inclusion of ocean science in school curricula could improve the quality of education (SDG 4 – Education). Improved investments in ocean science could redress gender disparity in science, including in developing countries (SDG 5 – Gender equality). New knowledge and tools for coastal nature-based solutions to increase climate resilience could increase the adaptive capacity of hundreds of millions of the most vulnerable people (SDG 3 – Good health and well-being; SDG 10 – Reduced inequalities; SDG 11– Sustainable cities and communities). Support to sustainable ocean-based industries will increase employment opportunities across the globe (SDG 1 – No poverty; SDG 8 – Decent work and sustainable economic growth). Overall, the Ocean Decade will support SDG 17 – Partnerships for the goals that seeks to strengthen global partnerships to achieve the ambitious targets of the 2030 Agenda.

The Ocean Decade will contribute data, information, knowledge and increased capacity relevant to achieving aspirations contained in other global legal and policy frameworks, including the UN Framework Convention on Climate Change (UNFCCC) including the Paris Agreement on Climate Change, the Convention on Biological Diversity (CBD) including the post-2020 Global Biodiversity Framework, the Sendai Framework for Disaster Risk Reduction, the Small Island Developing States Accelerated Modalities of Action (SAMOA) Pathway, the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage, the 1972 World Heritage Convention, the Convention on Migratory Species (CMS) and emerging agreements such as a legally binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ). The Ocean Decade will strongly contribute to complementary UN initiatives, including the UN Decade of Ecosystem Restoration and the Decade of Action to deliver the SDGs, both of which will run in parallel to the Ocean Decade, as well as the UN Water Action Decade that will end in 2028 and the UN Decade of Action on Nutrition, which includes an Action Network on Sustainable Food from the Ocean for Food Security and Nutrition and which will end in 2025. Bridging these decades and activities will provide unique opportunities for a holistic approach to ocean science, action and solutions for sustainable development.

United Nations entities and intergovernmental organizations, including the Food and Agriculture Organization (FAO), the International Hydrographic Organization (IHO), the International Maritime Organization (IMO), the IOC, the International Seabed Authority (ISA), the United Nations Development Program (UNDP), the United Nations Office for Disaster Risk Reduction (UNDRR), the UN Environment Programme (UNEP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Health Organization (WHO), the World Meteorological Organization (WMO), as well as United Nations regional programmes including Regional Seas Conventions, will contribute to the success of the Ocean Decade by building on existing efforts and increasing collaboration to pursue scientific pathways that fall under the purview of their respective missions.

The preparation of the Implementation Plan has been undertaken in a precarious and uncertain period created by the global COVID-19 pandemic. This pandemic has already had direct, real-time effects on ocean science. Observations and data collection have been severely disrupted resulting in data voids that will threaten the quality of predictions and forecasts essential for the management of climatic and ocean risks. Institutions and individuals working on ocean science around the world, particularly in SIDS and LDCs, have lost access to critical resources or infrastructure as priorities have shifted to meeting essential day-to-day needs during the crisis.

Looking forward, the world will remain preoccupied by the looming social and economic crisis. Unless governments and resource providers can be convinced otherwise, funding for ocean science could be perceived as a non-essential activity and could suffer a significant downturn at the expense of other demands. Countries, including SIDS and LDCs, that were already struggling to build capacity for ocean science are expected to be amongst the hardest hit by the global economic downturn. If proactive measures are not taken, this could translate into a widening gap in ocean science capacity, including access to data and technology. The pandemic and the post-pandemic recovery are occurring against a backdrop of accelerating climate impacts and thus at a moment where integrated ocean management is arguably required more than ever to ensure that the ocean can continue to provide the ecosystem services – including climate regulation – that are essential for human well-being.

The start of the Ocean Decade will occur at a vulnerable moment for humanity and will need to deploy strategies to ensure that no one is left behind. It is also occurring at an essential moment in the history of ocean science and presents opportunities that must be seized by all Ocean Decade partners. The High Level

Panel for a Sustainable Ocean Economy recently concluded that in a post-COVID-19 world, sustainable ocean-based investments could yield benefits at least five times greater than the costs, confirming their importance as part of a holistic approach to ensuring equitable and inclusive post-COVID-19 recovery and development.[9] Such solutions will deliver optimal benefits if they build upon robust ocean science that is co-designed and co-delivered by a diverse range of stakeholders. The Ocean Decade – with its vision of the science we need for the ocean we want – thus has the potential to contribute in significant and diverse ways to post-COVID-19 recovery efforts.

The Ocean Decade can spotlight the heretofore mostly invisible role of sustained ocean data, observations and knowledge for future sustainable development solutions and climate action. It can provide a global forum to identify the most urgent needs in ocean knowledge to contribute to a post-COVD-19 recovery in the context of a changing climate. It can highlight the inequalities that exist in ocean science capacity between countries and stakeholders and thus galvanize and amplify resources to bridge the widening divide. It can spark connections and collaborations between diverse groups such as industry and science to develop solutions that meet environmental, social and economic imperatives. It can accelerate the development of technology, including, for example, autonomous research equipment to collect ocean data or enhanced platforms for online collaboration and data sharing. It can also speak to a broad global audience about the crucial role that the ocean, and enhanced ocean knowledge, must play as the world adapts to a new normal.

The scope of the work envisaged during the Ocean Decade is beyond the capacity of any single nation, any single stakeholder group, any single generation or any single scientific discipline. The ocean is offering us an opportunity to work together for the common good in a true spirit of multilateralism and interdisciplinarity. Co-design, engagement and partnerships will be central to the success of the Ocean Decade. The Ocean Decade represents a framework to convene a wide range of stakeholders to collectively align their research, investments and initiatives around a set of common challenges and thus ensure that the result of the collective effort will be exponentially greater than the sum of its parts. The framework provided by the Ocean Decade will allow initiatives to grow and flourish at the local, national or regional scales in a form that best responds to specific contexts and priorities.

Engaging in the Ocean Decade will bring a wide range of benefits. Partners will have the opportunity to join a highly visible, shared, global effort that builds on decades of achievements in ocean science. There will be opportunities to create new collaborations across disciplines, geographies and generations. Opportunities will also be created to access new sources of support or to invest in innovative and audacious ocean science, and to raise the visibility and reach of actions and initiatives.

The Ocean Decade is everyone's Decade and it aims to leave no one behind. It is a once-in-a-lifetime opportunity to transform the way ocean science is conducted and used. The Ocean Decade invites all partners to build on existing efforts and combine future action at all scales of engagement to find science-driven solutions to improve the state of the ocean and advance the welfare of humanity.

9. Konar, M. and Ding, H. 2020. *A Sustainable Ocean Economy for 2050: Approximating its Costs and Benefits.* Washington, DC, World Resources Institute.

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1.2. Vision, mission and outcomes

The vision of the Ocean Decade is **'the science we need for the ocean we want'**.

The mission of the Ocean Decade is **'to catalyse transformative ocean science solutions for sustainable development, connecting people and our ocean'**.

The Ocean Decade will harness, stimulate and empower interdisciplinary ocean research at all levels to support the timely delivery of the data, information and knowledge needed to achieve a well-functioning ocean in support of all SDGs of the 2030 Agenda. The Ocean Decade will not set ocean policy but will provide a framework to motivate ocean science and research that can increase understanding and inform policy and decision-making. In order to achieve this, the Ocean Decade will mobilize resources and technological innovation to build capacity, develop scientific knowledge, build and share infrastructure and foster partnerships for a sustainable and healthy ocean. In doing so, the Ocean Decade will facilitate a transition from the **'ocean we have'** to the **'ocean we want'** that supports a sustainable, equitable and healthy future for all.

Achieving the shift to the ocean we want requires a multi-step, iterative process that will embrace innovation, creativity and leaps in capability and ocean literacy. Throughout the Ocean Decade, natural and social scientists and ocean stakeholders will work together to **co-design and co-deliver solution-oriented research** that spans all aspects of the ocean, including human interactions, ocean-atmosphere interactions and the land-sea interface.

Existing and new knowledge will underpin the co-development and deployment of relevant and accessible **decision support systems, services and tools** that will be used by decision-makers, policy developers, innovators and managers at local, national, regional and global scales. **Capacity development, enhancement of ocean literacy** and the systematic identification and removal of barriers to full **gender, generational and geographic diversity, including a focus on stakeholders and partners in LDCs, SIDS and LLDCs,** will be essential elements of each stage of this process.

The Ocean Decade will **stimulate innovation and amplify access to existing and new technology** to increase the diversity and scope of ocean exploration, integrate data management systems and deliver ocean knowledge to guide sustainable pathways. To enhance predictive capability, the Ocean Decade will **shore up the sustainability of existing research infrastructure,** maximize the discovery and **use of observations of the ocean, including local and indigenous knowledge**, and deliver next generation forecasting systems, ocean models and

BOX 2. TRANSFORMATIVE OCEAN SCIENCE

The notion of transformation is central to the Ocean Decade. The Decade, both in terms of action and outcomes, needs to move beyond business as usual to a true revolution in ocean science. The different ways in which the transformative nature of the Ocean Decade will manifest include the promotion and facilitation of ocean science that:

- uses the 2030 Agenda as a central framework to identify and address the most pressing societal questions related to SDG 14 and related SDGs;
- is co-designed and co-delivered in a multi-stakeholder environment to be relevant and responsive across the entire value-chain, from knowledge generation to applications and services to use of science for solutions;
- is solutions-focused and contributes to a wide variety of potential solutions including policy, decision-making, management or governance frameworks, or technology development and innovation;
- where needed, is big, audacious, forward-looking and spans geographies;
- reaches across disciplines and actively integrates natural and social science disciplines;
- embraces local and indigenous knowledge as a key knowledge source;
- is transformative because of who is doing it or where it is being done, including in both less developed and developed countries;
- strives for generational, gender and geographic diversity in all its manifestations;
- is communicated in forms that are widely understood across society and that trigger excitement about the ocean and behaviour change; and
- is shared openly and available for re-use.

assessment frameworks. It will facilitate the exchange of ocean knowledge between generators and diverse users of ocean knowledge – including governments, business and industry, UN entities, NGOs, local communities, managers or innovators, through **new data, information and knowledge platforms.** These platforms will enable adaptive and science-informed policy responses to global change and hazards, thus avoiding ecological or societal tipping points and ensuring that risks from ocean disasters are reduced. Action will be required at **global, regional, national and local levels** and will need to reflect priorities and needs of stakeholders. The engagement of a **wide variety of stakeholders** from global research institutes to local communities will be essential.

The following seven Outcomes describe the 'ocean we want' at the end of the Ocean Decade. They describe both the desired state of the ocean (Outcomes 1 and 2) and the desired state of society's use of, and interaction with, the ocean (Outcomes 3 to 7).

Outcome 1: A clean ocean where sources of pollution are identified and reduced or removed.
Society generates a vast range of pollutants and contaminants, including marine debris, plastic, excess nutrients, anthropogenic underwater noise, hazardous chemicals, organic toxins and heavy metals. These pollutants and contaminants derive from a wide variety of land- and sea based sources, including point and non-point sources. The resulting pollution is unsustainable for the ocean and jeopardizes ecosystems, human health and livelihoods. It will be critical to fill urgent knowledge gaps and generate priority interdisciplinary and co-produced knowledge on the causes and sources of pollution and its effects on ecosystems and human health. This knowledge will underpin solutions co-designed by multiple stakeholders to eliminate pollution at the source, mitigate harmful activities, remove pollutants from the ocean and support the transition of society into a circular economy.

Outcome 2: A healthy and resilient ocean where marine ecosystems are understood, protected, restored and managed.
Degradation of marine ecosystems is accelerating due to unsustainable activities on land and in the ocean. To sustainably manage, protect or restore marine and coastal ecosystems, priority knowledge gaps of ecosystems, and their reactions to multiple stressors, need to be filled. This is particularly true where multiple human stressors interact with climate change, including acidification and temperature increase. Such knowledge is important to develop tools to implement management frameworks that build resilience, recognize thresholds and avoid ecological tipping points, and thus ensure ecosystem functioning and continued delivery of ecosystem services for the health and well-being of society and the planet as a whole.

Outcome 3: A productive ocean supporting sustainable food supply and a sustainable ocean economy.
The ocean is the foundation for future global economic development and human health and well-being, including food security and secure livelihoods for hundreds of millions of the world's poorest people. Knowledge and tools to support the recovery of wild fish stocks, deploy sustainable fisheries management practices and support the sustainable expansion of aquaculture, while protecting essential biodiversity and ecosystems, will be essential. The ocean also provides essential goods and services to a wide range of established and emerging industries, including extractive industries, energy, tourism, transport and pharmaceutical industries. Each of these sectors has specific, priority needs in terms of increased knowledge and support to innovation, technological development and decision support tools to minimize risk, avoid lasting harm and optimize their contribution to the development of a sustainable ocean economy. Governments also require information and tools, for example via national accounts that incorporate ocean indicators, to guide development of sustainable ocean economies and promote marine sectors.

Outcome 4: A predicted ocean where society understands and can respond to changing ocean conditions.
The vast volume of the ocean is neither adequately mapped nor observed, nor is it fully understood. Exploration and understanding of key elements of the changing ocean, including its physical, chemical and biological components and interactions with the atmosphere and cryosphere, are essential, particularly under a changing climate. Such knowledge is required from the land-sea interface along the world's coasts to the open ocean and from the surface to the deep ocean seabed. It needs to include past, current and future ocean conditions. More relevant and integrated understanding and accurate prediction of ocean ecosystems and their responses and interactions will underpin the implementation of ocean management that is dynamic and adaptive to a changing environment and changing uses of the ocean.

Outcome 5: A safe ocean where life and livelihoods are protected from ocean-related hazards.
Hydro-meteorological, geophysical, biological and human-induced hazards create devastating, cascading and unsustainable impacts for coastal communities, ocean users, ecosystems and economies. The changing frequency and/or intensity of weather- and climate- related hazards is exacerbating these risks. Mechanisms and processes for assessing priority risks, mitigating, forecasting and warning of these hazards and formulating adaptive responses are required to reduce short- and longer-term risks on land and at sea. Higher density ocean data and improved forecast systems – including those related to sea level, marine weather and climate – are needed from near real time through to decadal scales. When these enhancements are linked to education, outreach and communication, they will empower policy and decision-making and they will mainstream individual and community resilience.

Outcome 6: An accessible ocean with open and equitable access to data, information and technology and innovation.
Inequalities in ocean science capacity and capabilities need to be eradicated through simultaneously improving access to and quality control of data, knowledge and technology. This needs to be coupled with increased skills and opportunities to engage in data collection, knowledge generation and technological development, particularly in LDCs, SIDS and LLDCs. Increased dissemination of quality controlled and relevant ocean knowledge to the scientific community, governments, educators, business and industry and the public, through relevant and accessible products, will improve management, innovation and decision-making, contributing to societal goals of sustainable development.

Outcome 7: An inspiring and engaging ocean where society understands and values the ocean in relation to human well-being and sustainable development.
In order to incite behaviour change and ensure the effectiveness of solutions developed under the Ocean Decade, there needs to be a step change in society's relationship with the ocean. This can be achieved through ocean literacy approaches, formal and informal educational and awareness-raising tools, and through measures to ensure equitable physical access to the ocean. Together, these approaches will build a significantly broader understanding of the economic, social and cultural values of the ocean by society and the plurality of roles that it plays to underpin health, well-being and sustainable development. This Outcome will highlight the ocean as a place of wonder and inspiration, thus also influencing the next generation of scientists, policy-makers, government officials, managers and innovators.

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Part 2/
The Ocean Decade Action Framework

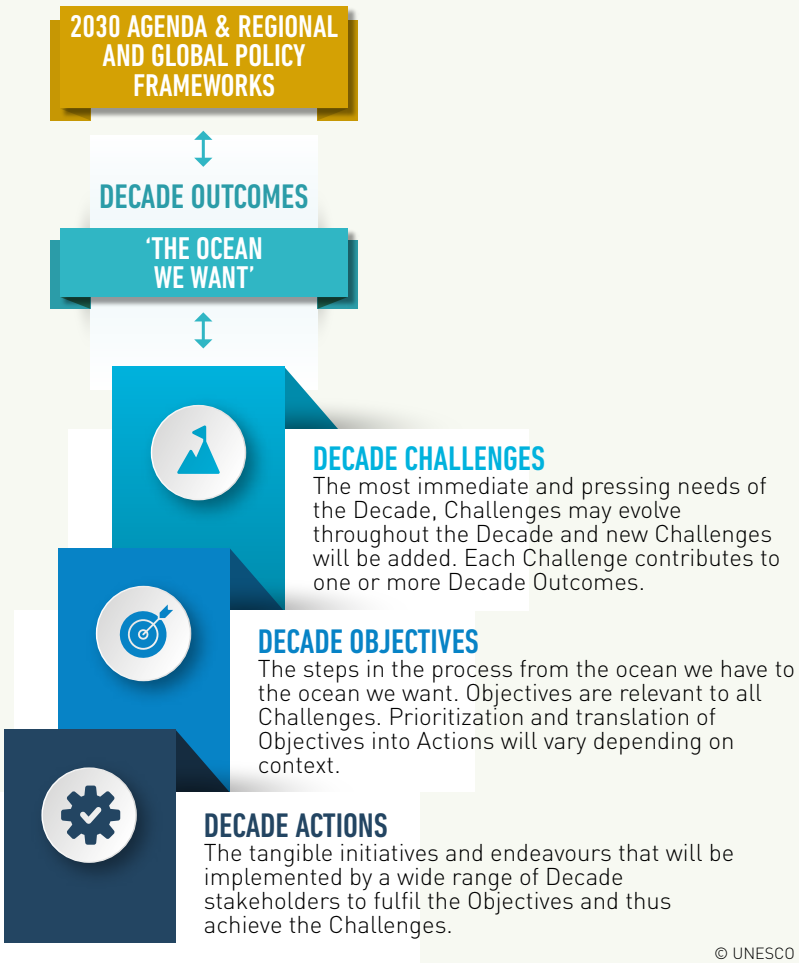
Part 2 of the Implementation Plan describes the operational framework that will guide the design and implementation of Actions throughout the Ocean Decade. It starts by presenting a series of high-level Ocean Decade Challenges and the Ocean Decade process Objectives. This sets the stage for introducing a hierarchy of Ocean Decade Actions, including the criteria and process for their endorsement. The section also describes the ambition of the Ocean Decade in terms of data and knowledge management and capacity development. It concludes with a description of how stakeholders can engage in the Ocean Decade.

2.1. Designing the science we need

This section outlines the framework to guide the design of the 'science we need' throughout the Ocean Decade.

The operational framework that will guide the design and implementation of Actions throughout the Ocean Decade comprises several levels that are illustrated in Figure 2 and described in the following sections.

Figure 2. Ocean Decade Action Framework.



2.2. Ocean Decade Challenges

The Ocean Decade Challenges represent the highest level of the Ocean Decade Action Framework. They articulate the most immediate priorities for the Ocean Decade. They aim to unite Ocean Decade partners in collective action, thus ensuring that the whole of the Ocean Decade is greater than the sum of its parts and shaping the overall contribution of the Ocean Decade to the 2030 Agenda and other policy frameworks.

Throughout the Ocean Decade, communities of practice comprising diverse stakeholders will be convened around the Ocean Decade Challenges via the stakeholder engagement mechanisms described in Section 2.7. A wide range of stakeholders will translate the Challenges into relevant Ocean Decade Actions at the global, regional, national and local scales. The priority, form and scope of related Ocean Decade Actions will be different across the globe depending on the prevailing context. For example, they may align with priorities contained in national ocean policies or focus efforts in areas of particular significance such as marine World Heritage sites or underwater cultural heritage sites.

The Challenges have been distilled from discussions with stakeholders throughout the preparation phase of the Ocean Decade, including the regional consultation workshops. They include 'Knowledge and Solutions Challenges' that focus on scientific research priorities and which encompass social, economic and political science disciplines as well as indigenous and local knowledge; 'Essential Infrastructure Challenges' that focus on the infrastructure needed to underpin the ambitions of the Ocean Decade; and 'Foundational Challenges' that focus on essential, cross-cutting elements of the enabling environment for the Ocean Decade.

The Challenges may evolve and change as issues are resolved over the course of the Ocean Decade. New Challenges may be added as issues emerge. Stakeholders will be involved in the process of revising and updating the Challenges via the engagement and review mechanisms outlined in Section 2.7 and Section 3.3.

The present set of ten Ocean Decade Challenges are as follows:

Knowledge and Solutions Challenges

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.

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 3: Generate knowledge, support innovation and develop solutions to optimize the role of the ocean in sustainably feeding the world's population under changing environmental, social and climate conditions.

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.

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

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.

Challenge 7: Ensure a sustainable ocean observing system across all ocean basins that delivers accessible, timely and actionable data and information to all users.

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

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.

Challenge 10: Ensure that the multiple values and services of the ocean for human well-being, 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.

2.3. Ocean Decade Objectives

This section presents the process Objectives to guide the development and delivery of Actions towards the fulfilment of the Ocean Decade Challenges.

A multi-step, iterative and cyclical process is required to fulfil the Ocean Decade Challenges and thus move from the 'ocean we have' to the 'ocean we want'. This process involves three non-linear, overlapping steps: (i) the identification of knowledge that is required for sustainable development; (ii) the generation of the data, information and knowledge for the development of a comprehensive understanding of the ocean, its components and its interactions; and (iii) the use of the generated knowledge and understanding of the ocean to deploy solutions for sustainable development (see Figure 3).

The above process requires a substantial expansion in ocean science capacity as an integral part of every step to ensure that no one is left behind during the Ocean Decade implementation. Increased capacity will fill current gaps in understanding of the ocean, including future conditions. It is also necessary to facilitate co-design of ocean science, co-production of knowledge and to co-deliver solutions in support of decision-making, policy, management and innovation. Expanded and equitable access to ocean knowledge, technology and services, in a form that responds to user needs, will complement capacity development efforts. Common understanding of the value of the ocean for human well-being and sustainable development is needed to achieve a step change in human behaviour and humanity's relationship with the ocean.

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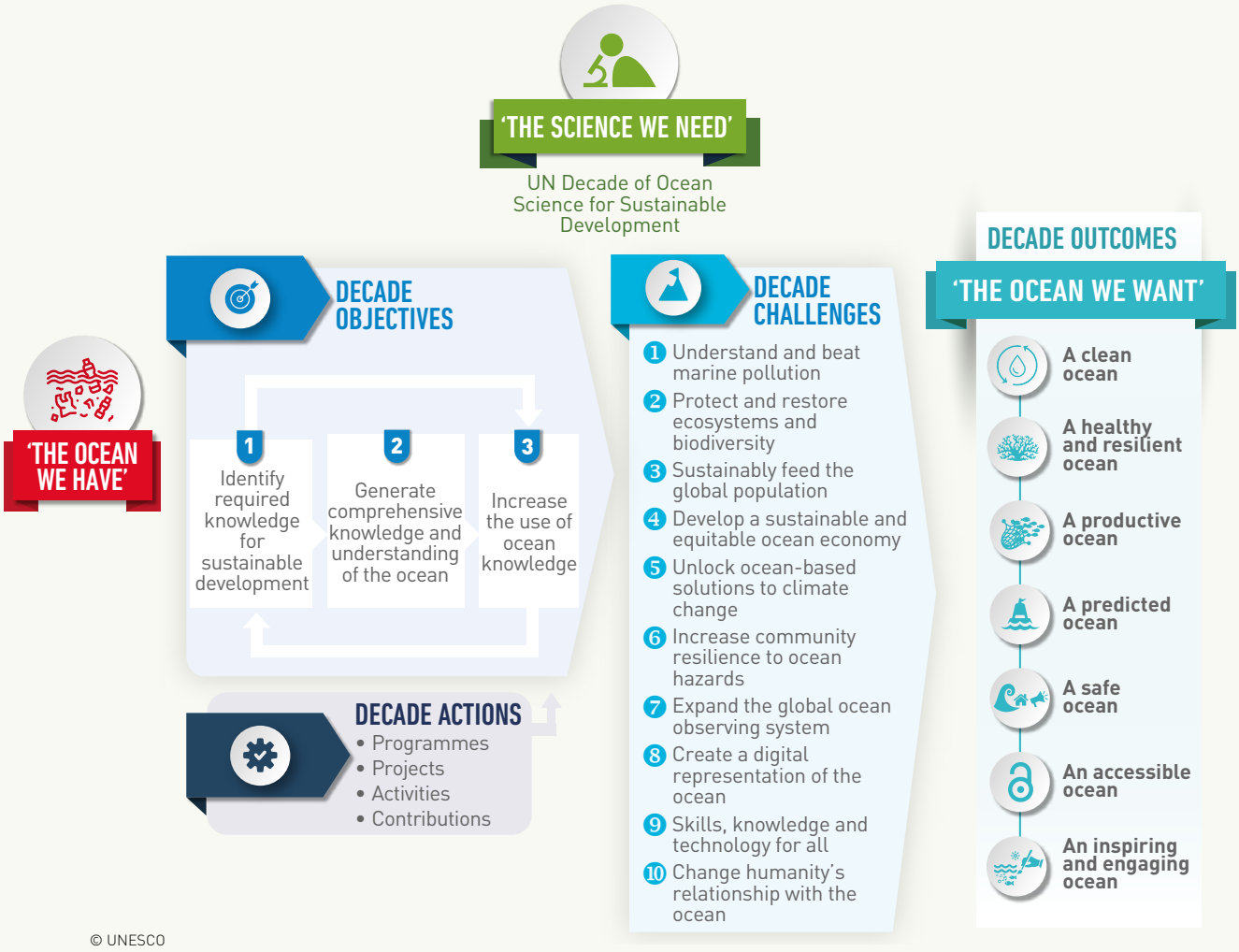
Figure 3. Moving from the ocean we have to the ocean we want.



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The three Ocean Decade process Objectives are outlined below. For each Objective, a non-exhaustive list of sub-objectives is suggested that will be instrumental in the formulation, structuring and clustering of Ocean Decade Actions. The sub-objectives will be reviewed and updated regularly throughout the Ocean Decade implementation to ensure their ongoing relevance and reflect emerging issues or changes to the Ocean Decade Challenges.

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

Sub-Objectives:

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.

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.

Sub-Objectives:

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.

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

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

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

Sub-Objectives:

3.1. Broadly communicate and promote the role of ocean science for sustainable development across diverse stakeholder groups, including through formal and informal 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, multistakeholder 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.

2.4. Ocean Decade Action hierarchy and endorsement process

This section presents the different types of Ocean Decade Actions and discusses the criteria and process for endorsement of Actions as part of the Decade.

Ocean Decade Actions are the tangible initiatives that will be carried out across the globe over the next ten years to fulfil the Decade vision. These are focused on the advancement and application of knowledge to support the development of solutions and are not policy-prescriptive by nature. Ocean Decade Actions will be proposed and carried out by a wide range of proponents including, but not limited to, research institutes, governments, UN entities, intergovernmental organizations, other international and regional organizations, business and industry, philanthropic and corporate foundations, NGOs, educators, community groups or individuals (e.g. via community-led science initiatives).

Different levels of Ocean Decade Actions will be implemented, including programmes, projects, activities and/or contributions.

A Decade programme is typically global or regional in scale and will contribute to the achievement of one or more of the Ocean Decade Challenges. It is long-term (multi-year), interdisciplinary and will consist of component projects and potentially enabling activities.

A Decade project is a discrete and focused undertaking. It may be regional, national or subnational and it will typically contribute to an identified Ocean Decade programme.

A Decade activity is a one-off standalone initiative (such as an awareness-raising event, a scientific workshop or a training opportunity). It will enable a programme or project or directly contribute to an Ocean Decade Challenge.

A Decade contribution supports the Ocean Decade through provision of a necessary resource (e.g. funding or an in-kind contribution). A contribution can support either the implementation of an Ocean Decade Action or the coordination costs of the Ocean Decade.

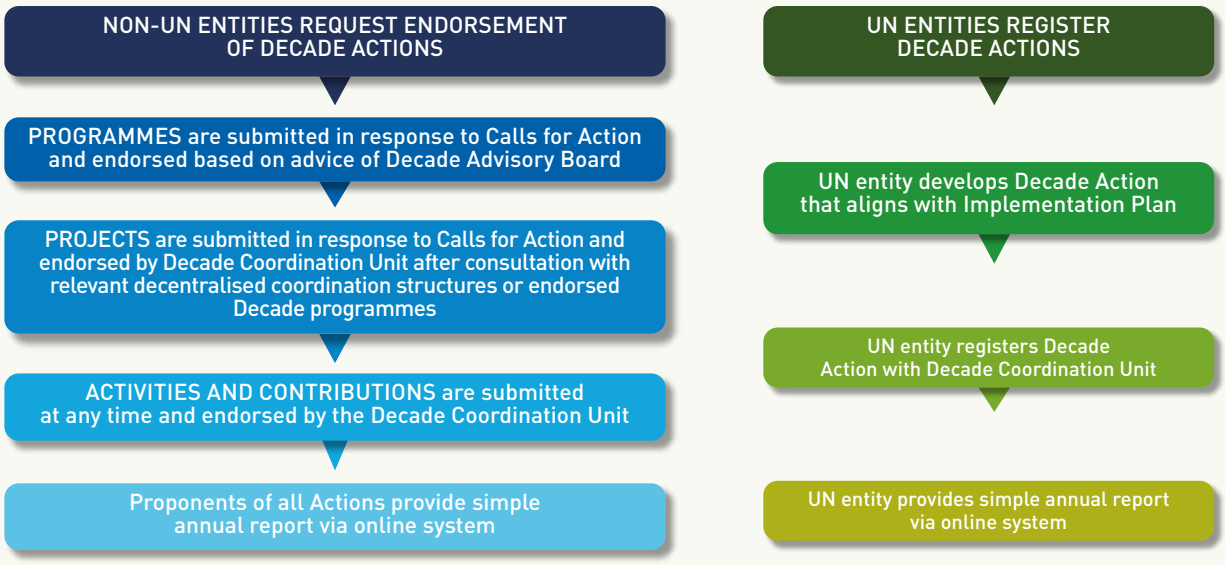
Ocean Decade Actions will be resourced by a diversity of partners, including national governments, regional organizations, philanthropic and corporate foundations, multilateral and bilateral funding agencies, business and industry, and individuals (e.g. via crowdfunding). Section 3.2 provides further discussion of financing and resource mobilization for the Decade.

Ocean Decade Actions will include both initiatives to generate and use data and knowledge, and initiatives to create a robust enabling environment for ocean science, including capacity development, ocean literacy and data and knowledge management initiatives.

UN entities proposing to carry out Ocean Decade Actions will register their Action at any time via the Decade website. Non-UN entities proposing to carry out Ocean Decade Actions will request endorsement of their proposed Decade Actions through the process described below and illustrated in Figure 4**.** This process involves the governance and coordination structures of the Ocean Decade, including: the **Decade Advisory Board** – a strategic advisory group; the **Decade Coordination Unit** – the centralized coordination structure; and regional or programmatic decentralized coordination structures. Section 3.1 provides a detailed description of these structures.

Requests for endorsement of Ocean Decade Actions at the programme and project level will be via periodic Calls for Action. These will typically be launched twice per year by the Decade Coordination Unit via an online platform. Calls for Action will not specify programmes or projects to be carried out as part of the Decade but will target priority geographic areas or themes linked to the Ocean Decade Challenges. Priority areas and themes will be identified through the review processes described in Section 3.3. Proponents can submit Actions in the form of activities or contributions at any time via an online platform. The process for requesting endorsement will be as simple as possible while ensuring that adequate information is available to ensure alignment of the proposed Action with the Ocean Decade vision. Different levels of detail will need to be submitted for different types of Ocean Decade Actions.

Figure 4. Endorsement process for Ocean Decade Actions.



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The Decade Advisory Board will review and make recommendations for endorsement of Ocean Decade programmes, while the Decade Coordination Unit will review and decide requests for endorsement of Ocean Decade projects in consultation with any relevant decentralized coordination structures or related Ocean Decade programmes. As part of its report to the IOC Governing Bodies and the UNGA, the Decade Coordination Unit will regularly inform Member States of the recommended Actions to receive endorsement. The Decade Coordination Unit will review and decide requests for endorsement of activities and contributions.

When requesting endorsement or registering their Actions, proponents will provide information on how they meet the criteria below. The criteria are not weighted and proponents need to demonstrate alignment with those criteria that are relevant to their proposed Actions:

- Contribute to fulfilling the Ocean Decade Challenges and to achieving the Decade Objectives and the associated sub-objectives.
- 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.
- Are co-designed or co-delivered by knowledge generators and users, and thus facilitate the uptake of science and ocean knowledge for policy, decision-making, management and/or innovation.
- Ensure that all data and resulting knowledge are provided in an open access, shared, discoverable manner in accordance with the provisions of UNCLOS and are appropriately deposited in recognized data repositories consistent with the IOC Oceanographic Data Exchange Policy[10] or the relevant UN subordinate body data policy.
- 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 SIDS, LDCs and LLDCs.
- Overcome barriers to diversity and equity, including gender, generational and geographic diversity.
- Collaborate with and engage local and indigenous knowledge holders.

Additional criteria may be developed for specific Calls for Action to meet geographic or thematic priorities, e.g. for Calls for Action for data, information or knowledge management products.

10. See https://www.iode.org/index.php?option=com_content&view=article&id=51:ioc-oceanographic-data-exchange-policy&catid=24&Itemid=100040

Potential Actions can already have secured all of their required financial and in-kind resources when they request endorsement or they can make the request without having secured the full resources needed for implementation. In this latter case, the Decade Coordination Unit may facilitate connections between proponents of Actions and resource providers (see Section 3.2).

Both ongoing and new initiatives can be considered for endorsement as Ocean Decade Actions.

Once endorsed, Actions will be reported on the Ocean Decade website. Proponents of endorsed Actions will be able to use the Ocean Decade logo during the implementation of the Action according to guidance provided by the Decade Coordination Unit. Proponents will be required to provide a brief annual report on the implementation of the Action. These reports will inform the review processes described in Section 3.3. Endorsement will be valid for the duration of the Action.

If a request for endorsement is denied, proponents will be provided, where possible, with advice on ways to improve the alignment of their proposed Action with the Ocean Decade. Proponents will be able to resubmit Actions after revision.

Detailed operational guidance will be prepared for the endorsement process by the Decade Coordination Unit in the early stages of Ocean Decade implementation.

2.5. Data, information and digital knowledge management

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

Data and information will be key enablers of the Ocean 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 Ocean Decade. The ambition of the Ocean 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 Ocean Decade will be a dynamic and continuous process, incorporating established approaches and technologies as well as those that are only just emerging.

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.

No single or central digital infrastructure or system will be sufficient to meet the needs of the Ocean 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 activities to bridge efforts across global, regional and local scales.

Components developed as part of the Ocean 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.

The digital ocean ecosystem will enable the understanding of the ocean from a socio-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 Ocean 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.

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

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 Ocean Decade, Calls for Action will be launched, inviting stakeholders to develop components of the ecosystem. To align with 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 user 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.

The endorsement process for Ocean 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 deposited in appropriate data repositories in a timely manner. Proponents of all Ocean 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.

An open-membership working group has been established and tasked with developing a detailed strategy for data stewardship during the Ocean Decade.[11] The strategy will be finalized and presented to the Decade Advisory Board in the early phases of Ocean Decade implementation. It will make reference to global data stewardship principles[12] and take into account the data policies of relevant international organizations and networks.[13]

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 Ocean Decade will be linked, where relevant, to capacity development and transfer of marine technology initiatives, outlined in the following section.

11. https://www.iode.org/index.php?option=com_content&view=article&id=598&Itemid=100017
12. 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.
13. Such as the IOC, the Group of Earth Observations, the World Meteorological Organization and the World Data System

2.6. Capacity development

This section describes the principles, expected outcomes and priority activities for capacity development initiatives undertaken during the Ocean Decade.

Capacity development framework for the Ocean Decade

Human capacity to carry out ocean science is unequally distributed across the world, across generations and across genders. The *2020 Global Ocean Science Report* (GOSR) highlights the predominance of ocean scientists in developed countries when compared to many SIDS and LDCs. It also reveals a generational bias in many countries towards domination of ocean science by older generations, although many LDCs have a relatively young ocean researcher community. Female scientists comprise on average 38% of the researchers in ocean science, with significant variations across disciplines, levels of seniority and between countries.

Capacity development is an essential tenet of the Ocean Decade. It has the ultimate aim of achieving evenly distributed capacity across the globe, across generations and across genders, thus reversing asymmetry in knowledge, skills and access to technology. The combined impact of capacity development efforts under the Ocean Decade must be exponentially greater than the sum of past and current individual efforts and thus accelerate a fundamental shift in the way the ocean is perceived and managed. This increase will result both from a greater number of efforts and from enhanced coordination and focus of efforts.

Capacity development efforts must focus on capacity to do the science, as well as on the capacity to influence the design of the science and participate in co-design efforts. It must address capacity to understand the science and to use the science to develop solutions for sustainable development. This also implies increased capacity to understand why ocean science is important for achieving the SDGs, as well as capacity development targeting a wide range of sustainable development solutions (for example, evidence based policy-making, management, innovation or technology). In this sense, capacity development targets include not only scientists but also the users of knowledge, such as governments, policy-makers, managers or innovators.

As all parts of the ocean are interconnected, the improved scientific knowledge and capacity to understand, observe and manage the ocean needs to be available equitably to all countries. The challenges and potential barriers to effective capacity development include fragmentation, a lack of coordination of efforts and insufficient investments by donors, including governments. The vast scale of ocean science can exacerbate these challenges.

Ocean Decade capacity development efforts will focus on, but will not be limited to, LDCs, SIDS and LLDCs. Specific approaches for these beneficiaries will be required, including the use of low-bandwidth/low-technology tools in areas where access to digital telecommunications is limited. The resource needs for SIDS, LDCs and LLDCs to participate in capacity development efforts will be addressed as part of resource mobilization efforts.

To meet the challenge presented by the Ocean Decade, capacity development carried out as part of the Decade needs to:

- Be an integral part of each Ocean Decade Action. In this sense, the endorsement criteria of the Decade include a consideration of contributions toward capacity development, including in SIDS, LDCs and LLDCs.
- Be needs-driven, with investment in tools that can match the demand for capacity development to different opportunities.
- Optimize opportunities for exchange of knowledge, information and learning through the adoption of a capacity development exchange approach, where relevant.
- Be developed to respond to regional and national priorities, including, where relevant, through the use of capacity needs assessments for specific groups or geographies.

- Respect cultural and geographical diversity, for example in terms of language, technology adopted (including digital technologies), remote learning and methods of learning.
- Privilege long-term partnerships that build on existing resources and networks and avoid ad-hoc, short-term efforts that are not part of a coordinated approach.
- Include a focus on mechanisms to accelerate the use of knowledge for societal well-being.
- Target both knowledge generators and knowledge users, including scientists, industry, managers (for example, protected area or fisheries managers), policy-makers, decision-makers, innovators and society.
- Address all facets of ocean science, i.e. all relevant natural and social science disciplines including a focus on inter- and transdisciplinary approaches, the infrastructure and technology that supports ocean science, the application of science for societal benefit, and the science-policy and science-innovation interfaces.
- Recognize, respect and engage local and indigenous knowledge holders as both beneficiaries and providers of capacity development.
- Build on and strengthen existing national and regional networks and resources.
- Identify and overcome barriers to gender, geographical and generational balance and mainstream accessibility to foster a full and effective participation by persons with disabilities.

The strategic framework to guide capacity development efforts throughout the Ocean Decade is documented in Table 1 and reflects the key elements of a wide range of approaches across the UN system.

Table 1. Strategic framework for capacity development initiatives during the Ocean Decade

Desired result	Priority activities
1. Human resources developed at individual and institutional levels	■ Academic and higher education opportunities, including through online and distance learning ■ Continuous professional development ■ Sharing of knowledge and expertise, including through community building ■ Training, including training of trainers ■ Integration of ocean science in curricula in primary and secondary schools, including information on ocean science careers ■ Actively improving gender, generational and geographic diversity
2. Access to technology and physical infrastructure established or improved	■ Facilitating access to technology and infrastructure (e.g. research facilities, instruments, research vessels, high-power computing, digital telecommunications) ■ Developing skills to lead and participate in technology and infrastructure development ■ Promoting technical and technological cooperation and peer-to-peer exchange between stakeholders
3. Global, regional and subregional mechanisms strengthened	■ Identifying specific national and regional capacity development needs through needs assessments ■ Strengthening existing national and regional resources and networks for capacity development ■ Supporting regional and subregional organizations to be leaders in, and amplifiers of, capacity development
4. Development of ocean research policies in support of sustainable development promoted	■ Supporting identification of ocean research priorities ■ Supporting development of national marine science management procedures and national policies
5. Awareness and understanding increased and exchanges facilitated on role and values of ocean	■ Ocean literacy initiatives (see below for more detail) ■ Informal education, including through museums, zoos or aquariums ■ Public information and communication (see Section 2.7 for more detail)
6. Sustained, long-term resource mobilization reinforced	■ Mobilizing in-kind and financial support for capacity development initiatives as part of the Ocean Decade (see Section 3.2 for more detail)

Partnership and cooperation will be essential pillars of all capacity development during the Ocean Decade. Collaboration between governments, United Nations entities, research organizations, NGOs, private sector and others that leverage partner capabilities, expertise, platforms, data, best practice methods or joint funding opportunities will lead to optimal efficiencies, effectiveness and impact of capacity development initiatives. The role of the private sector will be particularly important to identify needed skills for the next generation of ocean science professionals. As specific capacity development initiatives are defined for the Ocean Decade, reference will also be made to the strategies and frameworks of other competent international organizations.

In addition to the integration of capacity development actions in many types of Ocean Decade Actions, Calls for Action will be launched to identify capacity development initiatives that align with the above strategic framework. The Decade Coordination Unit will play an important role in ensuring that Ocean Decade capacity development initiatives create synergies and avoid duplication.

Advances in capacity throughout the Ocean Decade will be measured as part of the monitoring and evaluation process described in Section 3.3. This will ensure that the impact of the Ocean Decade can be tracked and broad trends and priority needs can be identified. In addition to collection of data from individual Ocean Decade Actions (see Section 3.3), the GOSR will provide a tool to measure global trends in ocean science capacity. The second edition of the GOSR,[14] released in 2020, provided baseline information against which progress in capacity development will be measured over the course of the Ocean Decade.

Ocean literacy

Ocean literacy contributes to capacity development and is defined as the understanding of human influence on the ocean and the ocean's influence on people. Ocean literacy initiatives aim to increase awareness on the state of the ocean, provide tools for exchange of knowledge and perspectives on the values of the ocean and provide approaches that can transform ocean knowledge into actions to promote ocean sustainability. Ocean literacy as a concept and approach is rapidly evolving from being an instrument applied in formal education and training contexts to a tool and an approach for society as a whole. A broad range of stakeholders can learn and benefit from Ocean literacy.

The vision for ocean literacy during the Ocean Decade will be to enable and scale up action in all sectors of society regarding ocean sustainability, in order to accelerate a fundamental shift in the way our ocean is valued, understood and managed. Throughout the Decade, ocean literacy will play a key role in promoting sound public marine policy, fostering more responsible behaviours, encouraging more ocean-aware corporate practices and stimulating young people to start a career in the sustainable ocean economy, ocean science, marine policy or ocean conservation and management.

During the Ocean Decade, ocean literacy activities will focus on four priority areas: mainstreaming ocean literacy in policy formulation; formal education; corporate action; and community engagement. Throughout the Ocean Decade, stakeholders around the world will develop and propose Ocean Decade Actions under each of these areas. Ocean literacy efforts during the Ocean Decade will also support governments and other stakeholders to develop the skills and tools needed to effectively implement activities that are the most relevant in their particular context. This will include the development of national ocean literacy strategies; developing collaborations, partnerships and networks; showcasing and endorsing ocean literacy efforts; and increasing research, monitoring and evaluation of the impacts of ocean literacy.

14. UNESCO. 2020. *Global Ocean Science Report – Charting Ocean Capacity for Sustainability.* Paris, UNESCO Publishing.

2.7. How to engage in the Ocean Decade

This section provides information on the different engagement structures and mechanisms for the Ocean Decade.

Stakeholder engagement in the Ocean Decade

The Ocean Decade is everyone's Decade and inclusivity across geographies, generations, genders and disciplines will be essential. The Ocean Decade will be implemented for and by a diverse range of stakeholders, whose active and sustained engagement will determine its success. Engagement in the Ocean Decade will take many forms that will evolve as the Decade rolls out. The overall goals of engagement include catalysing: (i) co-design and co-delivery of ocean science; (ii) sharing of knowledge in formats that will be proactively adopted and used, for example in policy, decision-making or innovation for sustainable development; and (iii) innovative multi-actor, multi- and interdisciplinary partnerships.

Key stakeholder groups of the Ocean Decade are described below and others will be identified during implementation. The boundaries between these groups are fluid; for example, an individual could be a private sector scientist who is a holder of local and indigenous knowledge. This fluidity emphasizes the need for a flexible and broad approach to engagement with multiple entry points for multiple interests.

- **Scientists, research institutions and universities** will benefit from opportunities provided by the Ocean Decade for increased collaboration with a diverse range of partners for inter- and transdisciplinary co-design and co-delivery of ocean science – including social science components of ocean science, increased recognition of the contribution of ocean science to sustainable development and access to resources to support their work.
- **Local and indigenous knowledge holders** will make a crucial contribution to the Ocean Decade by contributing knowledge through the co-development, co-design and co-delivery of Ocean Decade Actions. Through this engagement, they can benefit from increased access to partnerships with Ocean Decade contributors in areas of common interest. Targeted engagement strategies will be co-developed with this stakeholder group to ensure that they can fully engage as equal partners in the Ocean Decade.
- **Early career ocean professionals (ECOPs)** are a significant focus of the Ocean Decade. ECOPs can make crucial contributions to the Decade by actively participating in Ocean Decade Actions and governance and coordination structures, acting as Ocean Decade advocates and continuing the post-2030 legacy of the Decade. They will benefit from professional development and networking opportunities catalysed through the Ocean Decade, and opportunities to join and lead scientific collaborations and partnerships.
- **UN entities and intergovernmental organizations (IGOs)** are essential actors at numerous points throughout the ocean science value chain from co-design to co-delivery, to use of generated knowledge and the provision of resources. Engagement in the Ocean Decade will support these partners to fill their respective mandates. Major contributions in the form of Ocean Decade Actions and provision of resources are expected and will be welcomed from UN entities and IGOs throughout the Decade.
- **Regional organizations, including regional seas conventions,** have an essential role to play in the Ocean Decade through the translation of global priorities to actionable initiatives. These organizations will convene stakeholders across national boundaries and promote transboundary cooperation on priority ocean science issues. They will be essential in coordinating actions, promoting or leading programmes to contribute to the Ocean Decade Challenges and leading regional capacity development or data management initiatives.
- **National governments** will continue to be essential funders and coordinators of ocean science – both as Member States of UN entities and via national funding agencies – and will benefit from the Ocean Decade through increased interaction with ocean scientists, innovators and other actors in the co-design and co-delivery of science, services and technology relevant to policy, management and decision-making.
- **Subnational governments** are at the interface between local communities and policy development, management and decision-making related to sustainable development. This group is an essential part of the user community that will contribute to and benefit from increased interaction with scientists to co-design and co-deliver relevant knowledge and services.

- **Local coastal communities** are an essential stakeholder of the Ocean Decade. They hold vital ocean knowledge, are most vulnerable to changing conditions and will be the beneficiaries of the fulfilment of the Ocean Decade vision. Their engagement is key at all stages of Ocean Decade Actions.
- **Business and private sector stakeholders**, including emerging maritime industries and ocean information service providers, are primary commercial users of the ocean and can contribute significantly to the Ocean Decade in terms of resources and partnerships, as a driver of technological innovation to enhance ocean science and as an employer of the next generation of ocean science professionals. Benefits to the private sector include enhanced scientific knowledge that can contribute to reducing business risks and creating opportunities for sustainable economic development. Ocean Decade engagement strategies will also target private sector stakeholders with an indirect relationship to the ocean, including land-based industries.
- **Technology and innovation hubs**, including those in emerging and developing countries, regroup businesses and individuals that can identify, develop, pilot and test new and emerging technologies to improve the way in which ocean science is done and the way in which it is used to contribute to sustainable development. These hubs are often more nimble and less risk-averse than more traditional business and industry stakeholders, and have a key role to play in advocating for and co-designing and co-delivering audacious ocean science.
- **Professional societies** are an excellent mechanism to engage and reach large numbers of individuals with a potential interest in the Ocean Decade, including the scientific community or business and industry.
- **Philanthropic foundations and science funding agencies** will play a role in the Ocean Decade through provision of resources, as well as outreach, advocacy and development of an enabling environment to catalyse broad support for Ocean Decade priorities. The Ocean Decade will provide these organizations with a common set of priorities to assist resource allocation decisions and increased opportunities for engagement with a broad range of ocean actors.
- **NGOs and civil society** are a diverse group that can play a multitude of roles in the Ocean Decade, ranging from generation of science to advocacy with governments and policy-makers, and education and outreach with local communities. Benefits to NGOs and civil society from engagement in the Ocean Decade are also wide and varied, ranging from increased access to resources and innovative partnerships, and improved access to data and knowledge.
- **Aquarium, zoo and museum operators** are ideal platforms for communicating the importance of the ocean and its role in sustainable development to the millions of visitors that they receive each year. The Ocean Decade will work with this group to develop innovative and targeted communications campaigns as part of outreach and ocean literacy activities.
- **Children, youth, school students and educators** are an essential target group for the Ocean Decade, which aims to increase the attractiveness of ocean-related careers for the next generation. Youth are the next generation of ocean scientists and decision-makers, and increasingly play a role in influencing public opinion on issues of global concern. Ocean literacy initiatives will be a key mechanism to target this group.
- **The general public** – including poor and marginalized communities – will be targeted through communications and ocean literacy activities that are adapted to cultural, linguistic and geographical contexts, including access to technology. The general public will contribute to the Ocean Decade potentially via crowdfunding and community-led science initiatives. Communities worldwide will benefit from improved management of coastal resources and a healthier ocean.

The Decade Coordination Unit will develop targeted engagement strategies for key stakeholder groups to guide specific initiatives throughout the Ocean Decade.

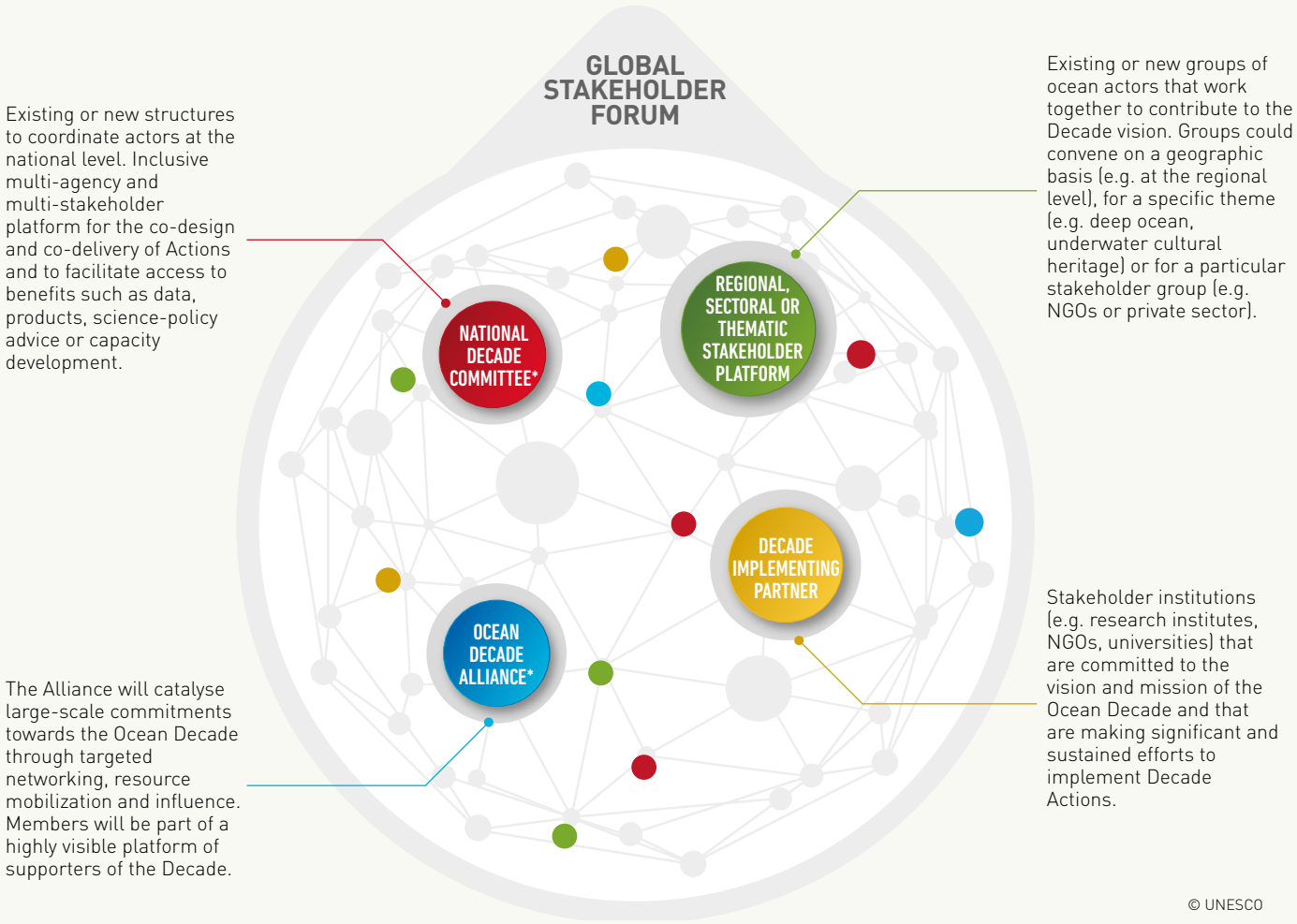
In recognition of the diversity of stakeholders and the wide range of potential types of engagement, the Ocean Decade does not promote a prescriptive, top-down framework for stakeholder engagement. Rather, the Ocean Decade will promote a stakeholder ecosystem that builds on existing stakeholder groups and platforms, and that will develop and evolve organically over the next ten years and beyond. To provide a broad outline for this ecosystem, different types of voluntary stakeholder engagement networks have been identified, as illustrated in Figure 5.

These voluntary stakeholder networks will be self-organized and will determine their own processes for membership and participation. They can be global in nature or focused on a specific region, country or local community. The Decade Coordination Unit will provide high-level guidance on the roles and membership of the stakeholder networks, including diversity considerations. The Decade Coordination Unit will also facilitate connections between networks with fewer resources and capacity, and partners who may be able to provide resources, mentorship or in-kind support.

While benefits related to collaboration and partnerships will result from participation in stakeholder networks, individuals or institutions do not need to be a member of a voluntary network to propose an Action for endorsement under the Ocean Decade or to contribute resources to the Ocean Decade. Similarly, participation in one or more of these networks does not avoid the need to follow the endorsement processes for a proposed Action under the Ocean Decade.

There is no limit to the number of ways that an individual or an institution can participate in the different stakeholder networks. For example, an individual scientist may be part of an ECOP stakeholder platform, a collaborator in an Ocean Decade Action and a member of a National Decade Committee. Stakeholder networks will be self-funded and can register to become recognized Ocean Decade partners via a simple online interface. Once recognized, they will be able to use the Ocean Decade logo in communications and awareness-raising materials in accordance with guidance provided by the Decade Coordination Unit. All recognized networks will provide simple annual reports on their activities and achievements for inclusion in Ocean Decade annual reporting.

Figure 5. Ocean Decade voluntary stakeholder engagement networks.



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* See Section 3.1 and Section 3.2 respectively for further discussion of the National Decade Committees and the Ocean Decade Alliance.

A **Global Stakeholder Forum** will provide a convening and exchange mechanism for all stakeholder engagement networks. This Forum will have both virtual and physical elements. The Forum will include an online interactive platform for all Decade Implementing Partners, Stakeholder Platforms, National Decade Committees, Alliance members and proponents of Ocean Decade Actions. It will allow members to post collaboration ideas and opportunities, invite membership or participation according to their defined processes, raise awareness and seek partners for national or regional Ocean Decade programmes or projects, hold virtual meetings or webinars to share knowledge and collaborate, and use visibility and communications tools to raise awareness regarding their activities.

The virtual platform of the Forum will serve as a facilitated interface between stakeholders, the Decade Coordination Unit and the Decade Advisory Board. The Decade Coordination Unit and decentralized coordination structures (see section 3.1 and Figure 6) will use the Forum to create communities of practice around the Ocean Decade Challenges. This will involve initiatives to stimulate discussion, generate ideas and virtually convene interested parties for co-design and collaboration around the Challenges, including through dedicated sessions at international and regional conferences and by creating opportunities for different communities of practice to contribute to the Ocean Decade reporting mechanisms that are described in Section 3.3.

The Decade Coordination Unit and decentralized coordination structures will also actively work to promote exchange and cooperation between stakeholder groups with common interests, for example National Decade Committees. They will connect stakeholders who are looking for collaboration opportunities and will share examples of successful co-design and co-delivery activities to inspire action in others. Throughout the implementation phase, they will use the Forum to develop and communicate specific initiatives to support co-design and collaboration initiatives, including technical working groups, co-design workshops or training initiatives for co-design approaches. The outcomes of co-design processes that are initiated through the Global Stakeholder Forum will be able to request endorsement as Ocean Decade Actions following the process described in Section 2.4.

Members of the Global Stakeholder Forum will be able to engage with the Decade Advisory Board via the virtual platform, for example in response to requests for inputs to Ocean Decade review processes or calls for nominations for experts in working groups.

Members of the Global Stakeholder Forum will meet through a hybrid virtual/in-person Ocean Decade international and regional conference series that will be organized to convene stakeholders, share information on progress towards the Ocean Decade vision and catalyse new initiatives and partnerships. Sessions within the conferences will be dedicated to the development of co-design collaborations, training on co-design approaches and the showcasing of successful initiatives. Starting in 2021, international in-person conferences will take place at least every three years, typically in conjunction with other major events within the ocean community. Regional in-person events will also commence in 2021 and will subsequently be organized as the opportunity arises in conjunction with major regional meetings. Regional and international virtual conferences and events will be organized more regularly throughout the Ocean Decade as one-off events or as part of other meetings. Governments, regional organizations, universities and other actors will be asked to express interest in hosting these in-person and virtual conferences, with the aim of ensuring diversity in the location of the events throughout the Ocean Decade. Ocean Decade decentralized coordination structures will also play a key role in supporting the convening of these meetings.

Communicating the Ocean Decade

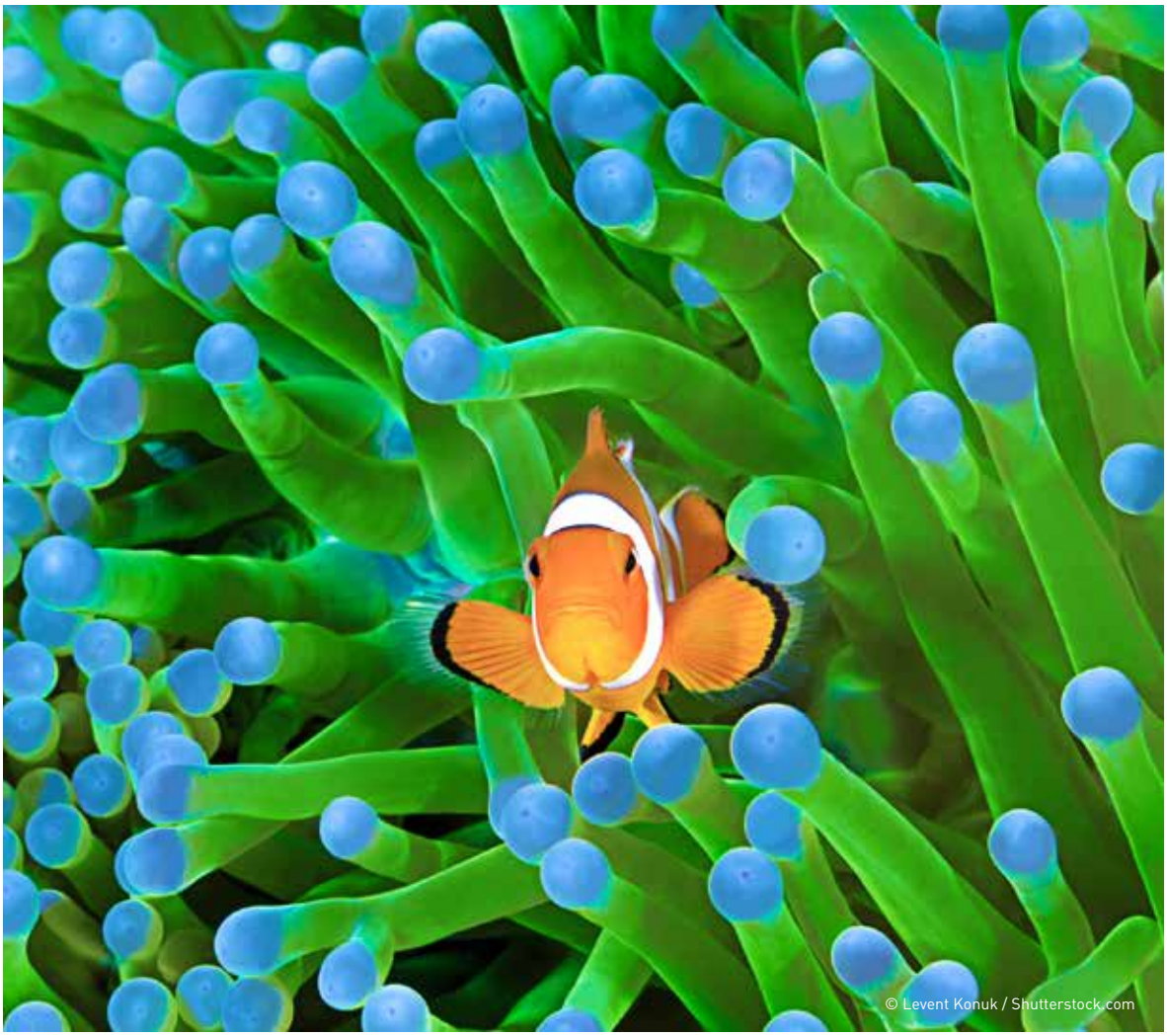
Communication of the Ocean Decade and its achievements will be key to engaging stakeholders, catalysing actions and mobilizing resources. The Decade Coordination Unit will coordinate communication activities and will encourage Ocean Decade stakeholders at all levels and in all locations to become advocates of the Ocean Decade, who will in turn inspire action for the Decade. An Ocean Decade communications strategy will provide a framework for communication efforts and will itself evolve throughout the Decade. Communications will aim to enhance global understanding of the importance of a healthy global ocean to underpin a healthy society and a sustainable global economy, and to provide mechanisms to communicate and exchange on the importance of the ecological, physical, social, economic and cultural characteristics of the ocean. This will in turn generate excitement around the global ocean as an adventurous and largely unexplored frontier. The strategy will establish principles and messaging that are tailored to the local and regional contexts of different stakeholders, including cultural, technological and linguistic specificities.

Finally, communications efforts will provide information on what the Decade will achieve; why stakeholders should get involved; and how they can provide their support.

The Ocean Decade communications campaign will invite all stakeholders to become part of **'Generation Ocean'** (or **'GenO'**) to deliver the Ocean Decade vision. The Generation Ocean brand will be a central pillar of Ocean Decade communications and will provide a clear call to action for everyone who wants to become part of efforts during the Decade to understand the ocean and to take the actions needed to protect it for present and future generations. The vision is that 'Generation Ocean' will convene all generations to build a new kind of society by 2030, one in which all of humanity will use the best available science and knowledge to deliver the ocean we need for the future we want. The inclusive nature of the brand will be highlighted as it is developed across digital and print media, and takes the shape of a full communications campaign with key messages and means of communication that are tailored to different regions and countries.

The campaign will feature testimonials of citizens of all ages and walks of life about how they interact with the ocean. It will spotlight a series of highly visible **'Ocean Decade Champions'**, including celebrities, sportspeople, politicians or scientists who are acclaimed at the global, regional or local levels. These Champions will have a prominent place in the Generation Ocean communications campaign, including during international and regional Ocean Decade events. They will translate the global messages of the Decade into messages that speak to targeted global, regional and local audiences, thus inspiring action among communities around the world.

The global scope of the Ocean Decade ensures a large number of partners across numerous geographies which will need to carry out communications activities using common messaging and branding. As part of the Generation Ocean campaign, toolkits, digital products and guidelines will be produced and shared with Ocean Decade partners, including media partners, so that they can broadcast and amplify Ocean Decade messages and information across scales and in diverse formats.



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Part 3/
Enabling the Ocean Decade

Part 3 describes the implementation of the Ocean Decade. It presents the governance and coordination framework of the Decade, the mechanisms for financing of Ocean Decade Actions and coordination costs, and the framework to measure progress and adaptively manage the Decade.

3.1. Governance and coordination framework

This section describes the intergovernmental process required to guide and report on the progress of the Ocean Decade implementation and the role and functions of various implementing and coordinating entities.

Achieving the ambition of the Ocean Decade and delivering transformative ocean science through a high-level strategic framework requires coordination at multiple scales and a lean and flexible decision-making process. Ocean Decade Actions contributing to the Decade vision will be proposed and undertaken by national, subnational and local governments and a wide range of stakeholders, including research institutes, UN entities, intergovernmental organizations, business and industry, philanthropic and corporate foundations, NGOs, educators, community groups and individuals. Therefore, governance and coordination arrangements for the Ocean Decade need to be flexible, agile, facilitate collaboration across groups of actors and optimize the use of existing structures wherever possible. The governance framework for the Ocean Decade takes into consideration the relevant provisions of UNCLOS that set out the rights, obligations and responsibilities of various States and competent international organizations with respect to marine scientific research.

The purpose of the Ocean Decade governance and coordination framework is to:

- Provide an enabling environment for the implementation of the Ocean Decade through enhanced dialogue, partnership and financing.
- Empower stakeholders to engage, plan and implement Ocean Decade Actions through a coordinated science-based framework, in a spirit of co-design and co-delivery.
- Facilitate review by Member States of Decade implementation.
- Coordinate and promote the Ocean Decade globally and in all regions, leaving no one behind.
- Facilitate sharing of knowledge, tools and lessons learned.
- Report on the progress of the Ocean Decade, including regional and national commitments under one common global umbrella, thereby underscoring its contribution to the SDGs.

To respond to this complexity, the Ocean Decade governance and coordination framework is built on a set of centralized and decentralized structures that are described in the following sections and shown in Figure 6.

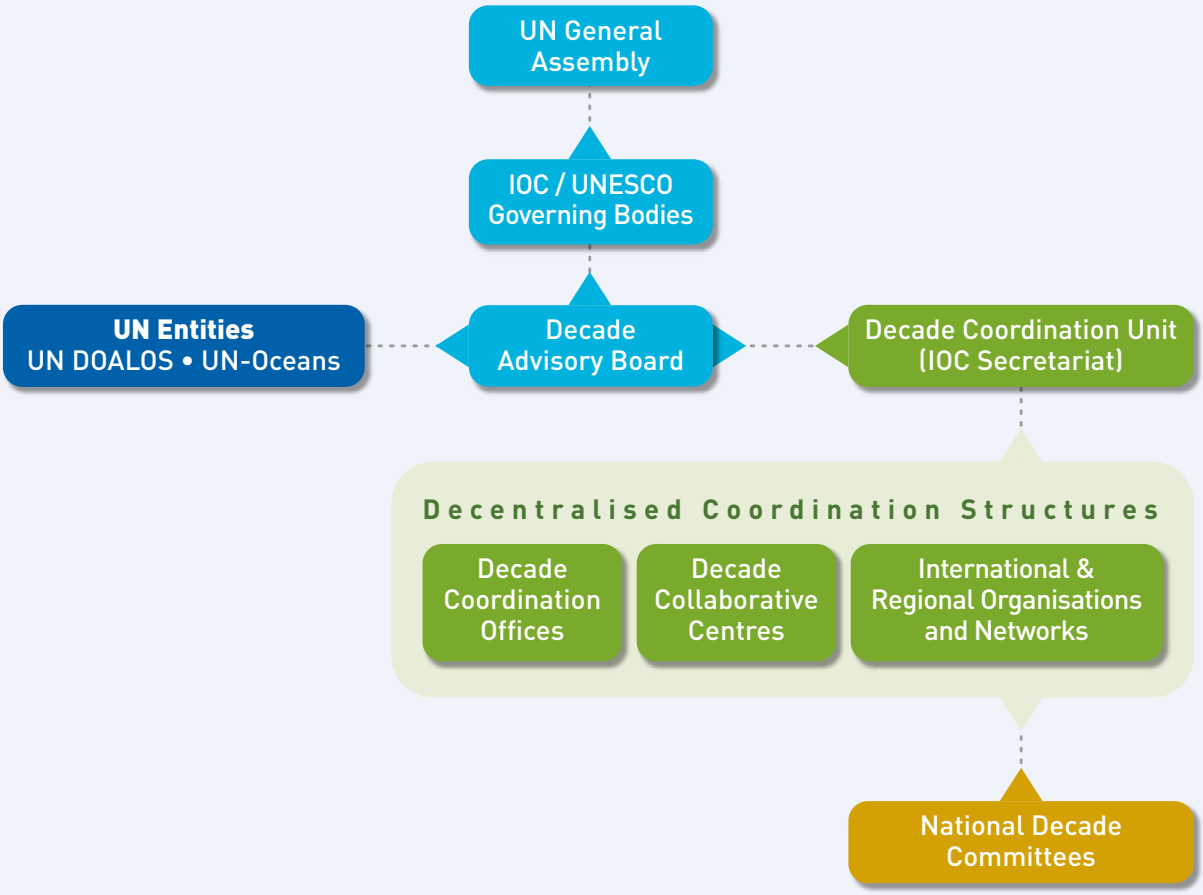
Governance framework

UN General Assembly and IOC Governing Bodies

The Decade is a UN-wide initiative endorsed by the UN General Assembly (UNGA). UNGA Resolutions 72/73 and 74/19 (A/RES/72/73 and A/RES/74/19) invite *inter alia* the Secretary-General to inform UNGA of the implementation of the Decade, based on information to be provided by the IOC.

In accordance with paragraph 303 of the UNGA Resolution 74/19 (A/RES/74/19), IOC will regularly consult with, and report to, United Nations Member States on the Decade and its implementation. The IOC Governing Bodies will consider regular reports on the Decade prior to their submission to UNGA.

Figure 6. Governance and coordination framework for the Decade.



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Decade Advisory Board

The Decade Advisory Board is an advisory body to the IOC that does not exercise policy-making functions. The Board will provide strategic advice on Decade implementation, for example by commenting on the Ocean Decade monitoring and evaluation framework or data stewardship strategies. It will provide recommendations on the endorsement of programmes and Decade Collaborative Centres and comment on the consolidated performance of Ocean Decade Actions throughout the review processes described in Section 3.3. Board members will also contribute to the assessment of resource requirements for Ocean Decade Actions and raise awareness about the Ocean Decade, including with potential resource providers. The Terms of Reference of the Decade Advisory Board will be proposed and presented to the IOC Governing Body meeting in 2021.

The Board will comprise up to 20 members, including representatives of UN entities and a balance of experts from relevant scientific disciplines, as well as from stakeholders from socio-economic and policy

sectors. Open calls for nominations will be used to identify candidates for the Board and members will be selected in consultation with Member States. Expertise, geographic, generational and gender balance will be taken into account in the selection of members. Membership will be on a rotational basis with members to serve two-year terms that are renewable for a second mandate, with processes to ensure staggered turnover of Board members. To ensure optimal participation, the Board will work through hybrid virtual -in-person meetings. The Board may establish task groups and/or invite external experts as needed to address specific issues or tasks. Reports of the Decade Advisory Board meetings will be made publicly available through the Ocean Decade website. The Decade Advisory Board will report to the IOC Governing Bodies via existing processes, i.e. the regular meetings of the IOC Assembly and IOC Executive Council.

Engagement and coordination across the UN system

UN-Oceans, the UN system-wide inter-agency coordination mechanism focusing on ocean and coastal issues,[15] and its members are invited by the UNGA resolution 74/19 to collaborate with IOC on the Decade. New forms of cooperation and, potentially, stronger formal links between the Decade Coordination Unit and UN organizations will be explored based on the understanding that ocean science represents a cross-cutting theme that underpins the mandates of several UN entities. Collaboration across UN entities will be promoted through the dedicated UN-Oceans Decade contact group established in 2019 during the 19th Meeting of UN-Oceans. Bilateral cooperation agreements that exist amongst UN entities focusing on science-policy aspects, technical, scientific and capacity development cooperation will be leveraged.

Regional implementation, including via Regional Seas Conventions, will also be an important focus of the coordination amongst UN structures and programmes. The Ocean Decade coordination structures described below will proactively seek partnerships and synergies with UN and non-UN regional intergovernmental organizations, to guide the development of regionally driven science-based applications.

To facilitate the required level of engagement, United Nations Legal Counsel/DOALOS (as the focal point of UN-Oceans) will be represented on the Decade Advisory Board. Four other seats on the Decade Advisory Board will be reserved for UN entities based on their contribution to the Decade. UN entities will be invited to report their respective contributions to the Decade through the annual UN Secretary-General's report on the ocean, as well as the anticipated triennial 'State of the Ocean Decade' report (see Section 3.3).

Coordination framework

Decade Coordination Unit

The Decade Coordination Unit will be located within the IOC Secretariat. Its three main functions are to act as: (i) the primary coordination office for the implementation of Ocean Decade Actions; (ii) Secretariat for the Decade Advisory Board; and (iii) Secretariat for the Ocean Decade Alliance. The Coordination Unit will work in close collaboration with the secretariats of other UN entities and may include seconded staff from UN entities and programmes to ensure a well-coordinated inter-agency approach. In addition, a more decentralized approach may be explored by appointing personnel within UN entity secretariats to support the coordinating functions of the Decade.

The Unit will develop biennial action plans and resource needs assessments to inform Calls for Action and facilitate connections between resource providers and proponents of Actions; coordinate and consolidate information from the decentralized structures to facilitate monitoring and reporting; coordinate communications and outreach, including targeted engagement with funding and resource providers; endorse Ocean Decade projects, activities and contributions; and provide secretariat support to the Board and the Ocean Decade Alliance (see Section 3.2). In terms of the Alliance, the Decade Coordination Unit will perform the following tasks:

- Promote the development of the Alliance membership by proactively seeking engagement of high-level supporters.

15. www.unoceans.org

- Facilitate the process of membership with the Alliance in accordance with the eligibility criteria and, where relevant, conduct due diligence process for membership of companies and private entities in line with UNESCO/UN rules.
- Identify and communicate resource needs for priority areas of the Ocean Decade and assist in linking needs to potential resource providers.
- Keep track of financial commitments provided by Alliance members, through the annual Ocean Decade reporting process.
- Facilitate the convening of Alliance events and related outreach/communication activities.

The Decade Coordination Unit will also facilitate liaison between the Ocean Decade stakeholder engagement structures and the Decade Advisory Board via the Global Stakeholder Forum, as discussed in Section 2.7.

The Decade Coordination Unit will work with UN entities, programmes and conventions to ensure high visibility and representation of the Ocean Decade in UN conferences, events and forums, such as the Regular Process for Global Reporting and Assessment of the State of the Marine Environment including Socioeconomic Aspects. The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) may be activated at the request of UN entities to address relevant priorities identified during the Ocean Decade.

Decentralized coordination structures

The governance framework includes different types of decentralized coordination structures at the programmatic or regional level as described below. These structures would have well defined, documented mandates that would be developed in collaboration with the Decade Coordination Unit. Regular virtual meetings between the Decade Coordination Unit and decentralized coordination structures would avoid duplication of efforts or conflicts between the mandates of different structures.

Decade Coordination Offices may be hosted by UN Member States and will require the establishment of a Seat Agreement with the host Member State and the provision of financial resources through IOC/UNESCO or other UN frameworks.[16] These Offices will act as 'decentralized' Decade Coordination Units, being organically attached to the central Decade Coordinating Unit (i.e. tasked by and reporting to the central Unit) and will be responsible for a regional portfolio of Ocean Decade Actions and/or specific thematic initiatives (e.g. observations, ocean literacy, ocean mapping, capacity development etc.). Decade Coordination Offices may also be located in existing UN Offices. The main functions of Decade Coordination Offices include, but are not limited to:

1. Coordinate, monitor and report on specific Ocean Decade programmes or regional portfolios of actions.
2. Review requests for endorsement of Ocean Decade Actions falling under their mandate and provide recommendations to the Decade Coordination Unit.
3. Organize and participate in Ocean Decade implementation review meetings and other relevant meetings and discussions linked to the Decade implementation.
4. Promote cooperation with relevant IOC programmes, related projects, other relevant UN entities and stakeholder groups in order to advance the implementation of the Ocean Decade.
5. Raise awareness and visibility of the Ocean Decade amongst diverse stakeholder groups and coordinate targeted communications activities in line with branding and messaging guidelines provided by the Decade Coordination Unit.
6. Seek partnerships and potential voluntary commitments to strengthen implementation and impact of the Ocean Decade.
7. Initial guidance for the establishment of IOC/UNESCO-based Decade Coordination Offices is provided through IOC Circular Letter 2785 of 2019.

16. Individual UN Bodies and Conventions have their own procedures to establish decentralized structures that will need to be adhered to.

Decade Collaborative Centres will be hosted by one or more countries in an existing or newly established centre or by an international or regional organization engaged in Decade activities. They will not require the establishment of a dedicated IOC/UNESCO office. Financing for these centres may be provided by the host country or organization or via a third party, for instance to facilitate the operation of these centres in countries or regions with fewer available financial resources. These Centres will be legally separate from the IOC and operated under the complete responsibility of the establishing entity(ies). They will catalyse Ocean Decade Actions at the regional or thematic level by providing technical, logistical and financial support for: (i) scientific coordination and planning; (ii) the identification of collaboration opportunities; (iii) communications, awareness raising and stakeholder engagement; and (iv) technical and scientific capacities to support Ocean Decade Actions. They will provide advice to the Decade Coordination Unit on requests for endorsement of Ocean Decade Actions that fall within their purview.

These Centres will also assist the Decade Coordination Unit and Offices to track the implementation of endorsed Ocean Decade Actions in their respective domain, thus contributing to the overall monitoring and evaluation effort. Proposals for the establishment of Decade Collaborative Centres will be reviewed by the Decade Advisory Board based on a proposal demonstrating international expertise and capacities and financial sustainability. Proposals for establishing Decade Collaborative Centres emanating from non-UN entities will be considered by IOC Governing Bodies at their regular meetings. Once approved, the Decade Coordination Unit will establish a partnership agreement with the hosting institution to frame the collaboration. Operational guidelines, including details of the selection process and eligibility criteria, will be developed for Decade Collaborative Centres prior to the start of the Decade.

Existing international and regional organizations and networks with a focus on marine research, ocean management or scientific cooperation will have an opportunity to actively engage in coordination of the Ocean Decade. This will be particularly important in areas not well covered by the other elements of the Ocean Decade coordination framework. At the regional level, several of these organizations were engaged actively during the planning phase, acting as Decade 'conveners' for planning workshops in specific ocean basins or for specific themes. The ongoing role of these organizations during Ocean Decade implementation will be crucial to the translation of global priorities to regional actions. Specifically, these organizations can play a role in convening and engaging stakeholders, identifying regional and thematic science and capacity development priorities, and ensuring alignment with ongoing and planned regional initiatives. They may also lead or coordinate development of regional Ocean Decade programmes or projects. The role of these organizations can be enhanced through registration as regional stakeholder engagement networks (see Section 2.7) or through formal recognition as Decade Collaborative Centres.

National Decade Committees

Given the scope and breadth of the Ocean Decade, national coordination of Decade activities will in many cases be essential. The creation of National Decade Committees will be encouraged to facilitate national contributions to the Decade, engage national stakeholders and enhance their access to Decade benefits, such as data, forecasts, science-based decision support tools or capacity development opportunities. The Decade Coordination Unit will use the Global Stakeholder Forum to promote exchange and cooperation between National Decade Committees. Ideally, these National Decade Committees should be multi-agency and multi-stakeholder platforms, involving the political and scientific institutions and actors concerned by the ocean and its management. Existing national coordinating mechanisms may provide the basis for performing such functions. The mandate and role of National Decade Committees will be tailored to the local context but could include those who:

- Act as an information conduit from the Ocean Decade structure to the national science and sustainable development community to promote awareness and interests.
- Provide national inputs for the formulation of Ocean Decade Actions, including the facilitation of co-design initiatives across groups of stakeholders and/or nations.
- Facilitate the planning and implementation of national priorities and activities, including the development of national Ocean Decade programmes or projects that can be endorsed as Ocean Decade Actions and which can engage a wide variety of local and subnational stakeholders.
- Implement or coordinate national outreach and communications activities in line with the guidance on branding and messaging provided by the Decade Coordination Unit.

- Ensure that outputs of activities implemented under the Ocean Decade are available to the community.
- Encourage and facilitate the provision of necessary national funds and logistical support for the implementation of activities contributing to the Ocean Decade.
- Encourage voluntary national contributions to cover the costs of international coordination.
- Assist the Ocean Decade coordination structures in planning, implementation and delivery of activities at the national level, including providing, where relevant, demonstration of their support for requests for endorsement for Ocean Decade Actions.
- Provide annual reporting to the Decade Coordination Unit on the Committee's activities.
- Facilitate hosting of regional or international meetings related to the Ocean Decade.

National Decade Committees will interact with the Decade Advisory Board via Member State participation in the IOC Governing Bodies or less formally through the Global Stakeholder Forum. Operational guidance for the establishment and operation of National Decade Committees will be developed prior to the start of the Decade.

3.2. Resource mobilization

This section describes the different financing mechanisms that exist for the Ocean Decade for coordination and Action costs.

How will Ocean Decade Actions be resourced?

Currently, resources for ocean science come from several main sources. National governments are key sources of financing for ocean science; however, on average only 1% of national research budgets support ocean science.[17] Philanthropic and corporate foundations are also important sources of financing for ocean science and can play complementary roles in awareness raising and education. Finally, business and industry are key players, particularly in terms of in-kind resource provision or investment in research and innovation.

If the ambitions of the Ocean Decade are to be realized, funding for ocean science from existing partners will need to increase significantly. In addition, new sources of funding or support will need to be nurtured, including emerging financing models such as blue bonds or ocean business impact investments, public-private partnerships, multilateral or bilateral development banks and innovative in-kind contributions. There will also need to be increased engagement with funding and resource providers who may not directly support ocean science but who support initiatives or activities inextricably linked to, or reliant upon, ocean science. This includes funders who traditionally focus on social sciences or who are more strongly focused on supporting users in the ocean science value-chain. Successful engagement of this latter group will require exchange and dialogue on the broad nature of ocean science and the foundational role that ocean science plays in many other sectors and domains of activity.

A wide range of existing and new partners will fund Ocean Decade Actions and the resource base for the Decade will need to be broad and flexible. No single agency or actor will manage all Ocean Decade resources. The Ocean Decade itself is not a funding mechanism and the Decade is not structured to collect contributions from partners that would be amassed in a common pool of financial resources. The approach of the Ocean Decade will be to continue existing engagement efforts to encourage partners to align their funding and support strategies with identified Decade priorities.

To mobilize resources at a level that meets its ambition, the Ocean Decade needs to present a clear and robust value proposition to attract funding and resource partners and generate interest to become part of the ocean science revolution throughout the Ocean Decade and beyond. The value proposition for funding and resource providers is that they will be part of a global, highly visible and long-term collective effort that will allow them to create greater impact than if they were working alone. It will allow them to collaborate

17. Data for the period 2013–2017 taken from GOSR2020.

and establish new partnerships both with fellow funders and resource providers, and with new recipients of funding and resources. The Ocean Decade allows them to join this common effort while maintaining a focus on their own geographical or thematic priorities and continuing to adopt their own processes and procedures for the identification and administration of their support.

The value proposition for proponents of Ocean Decade Actions in terms of funding and resource provision is structured around three elements. Firstly, in many cases, proponents of Ocean Decade Actions will take the lead in securing their own resources: in these cases, the endorsement of an initiative as an Ocean Decade Action will increase its attractiveness to funders and resource providers that are supportive of the Decade. Secondly, there will be funding and support opportunities that are exclusively available to Ocean Decade Actions and for which the Decade Coordination Unit will play a coordination role between priority needs and the commitments of funding and resource partners via the Ocean Decade Alliance and the Global Stakeholder Forum. Finally, through planned engagement efforts and outreach to funders and resource providers, the Ocean Decade aims to raise awareness and understanding of the need for an increased volume of funding for ocean science globally as well as changes in the structure of that funding, including the need for longer-term funding.

Both financial and in-kind support will be mobilized for the Ocean Decade. Support will be required for the implementation of programmes, projects and activities under the decade ('**Action costs**'). The volume of Action costs mobilized through the Ocean Decade will only be limited by the scope and ambition of the Decade itself.

Support will also be needed for recurrent operational activities, including the functioning of the Decade Coordination Unit, the costs of regular meetings and review processes, communications activities and other related operational costs ('coordination costs'). Ensuring adequate resources for coordination costs will be essential to the success of the Ocean Decade. Specific resource mobilization efforts will target partners with a predisposition to provide this type of support. The volume of resourcing needed for coordination costs will be skewed to the start-up phase. Post-start up, the coordination costs should be relatively predictable, thus allowing medium- to long-term resource mobilization planning. Resources will be mobilized to support the coordination and administration functions of the Decade Coordination Unit: this cost will be in the order of US$1.5–2 million per year. Costs for communications activities implemented by the Decade Coordination Unit will depend on the scale and scope of such activities. The coordination costs associated with decentralized coordination structures will depend on the type of structure (i.e. coordination office or collaborative centre), the role and location, and whether it is an existing or new structure.

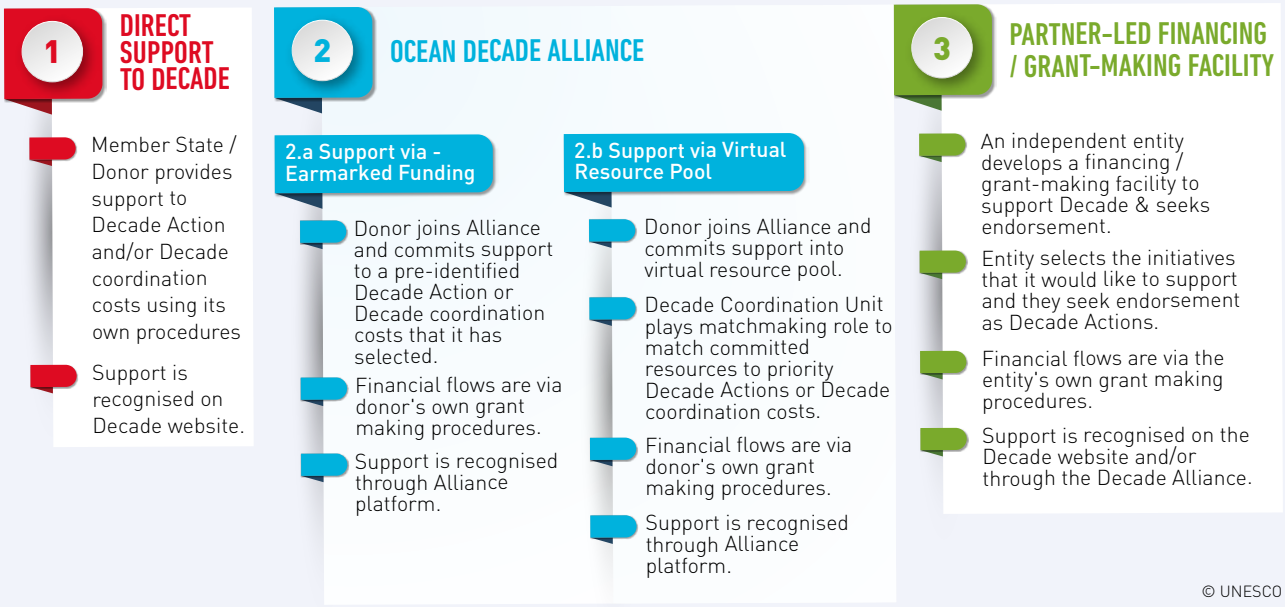
Biennial resource needs assessments will be prepared by the Decade Coordination Unit and will include information on coordination and Action costs. Information on secured resources and resource gaps will be used to match needs with available resources.

The focus of resource mobilization will be on catalysing new and additional resources and support for ocean science. To monitor this effort, all financial or in-kind support will be continuously tracked throughout the Ocean Decade using common metrics, regardless of mobilization mechanisms, and compared to baseline data. This will ensure that there is robust and consolidated information on the resources invested in the Ocean Decade and will allow the impact of the Decade to be analysed and communicated.

Mechanisms for mobilizing resources

Figure 7 and the following text describe the different ways in which a partner can contribute financial or in-kind resources to the Ocean Decade to support Actions or coordination costs. All resource providers – regardless of the mechanism adopted and the volume of their contribution – will be recognized for their support to the Decade, either through the Ocean Decade Alliance or on a regularly updated 'honour roll' of contributions to the Decade that will be included on the website.

Figure 7. Financing mechanisms for the Ocean Decade.



Mechanism 1: Direct support for Ocean Decade Actions and coordination costs

Under this mechanism, donors will use their existing processes to provide direct support to Ocean Decade Actions and coordination costs. Much of this support is likely to come in the form of Member State government funding via UN entities. Nationally funded research projects or nationally determined voluntary contributions, such as research cruises, research and sustained measurement networks, technical training or data systems, will also be essential forms of support. Multilateral or regional funders or philanthropic foundations could also fund Actions and will be important partners throughout the Ocean Decade.

The mechanisms for direct support to coordination costs are likely to vary depending on the level of the governance structure. At the level of the Decade Coordination Unit, the predominant form of funding is expected to be through direct financial and in-kind support for operations (e.g. through the secondment or loan of staff). Such support will be in the form of extra budgetary resources from Member States or external financial partners. Further in-kind resources at the central level could include hosting and organization of an event of the Ocean Decade international and regional conference series, scientific meetings or workshops (e.g. stakeholder conferences or Decade Advisory Board meetings), communications or outreach campaigns, technical assistance or consultancy projects, or support for participation in global events linked to the Decade.

At the decentralized level, hosting of an Decade Coordination Office or Decade Collaborative Centre by a Member State will be one of the major mechanisms to provide in-kind support. Contributions from Member States may also include extension of existing support mechanisms to cover relevant Decade administration

and coordination functions, or secondment and loan of staff to support Decade Coordination Offices or Decade Collaborative Centres.

Mechanism 2: Support via the Ocean Decade Alliance

The Ocean Decade Alliance will be a key component of the resource mobilization efforts for the Ocean Decade, focusing on significant voluntary resource commitments. The Alliance is not a funding or grant-making facility; rather, it is an engagement platform to connect large-scale resource providers with proponents of Ocean Decade Actions. The Alliance will provide a mechanism to organize members' commitments and resources via a 'virtual resource pool' into which members of the Alliance can commit in-kind or financial resources to implement priority Ocean Decade Actions. Alliance members will include governments, industry, civil society, scientific institutions, philanthropic organizations and United Nations entities. The following criteria will guide decisions on Alliance membership: (i) demonstrated sustained commitment to supporting ocean science through research, capacity development, innovation and technological development and/or communications and awareness raising; (ii) demonstrated willingness to act as a high-level ambassador for the Ocean Decade and to lead by example, thus motivating action in other stakeholders; and (iii) significant financial or in-kind support to Ocean Decade Actions.

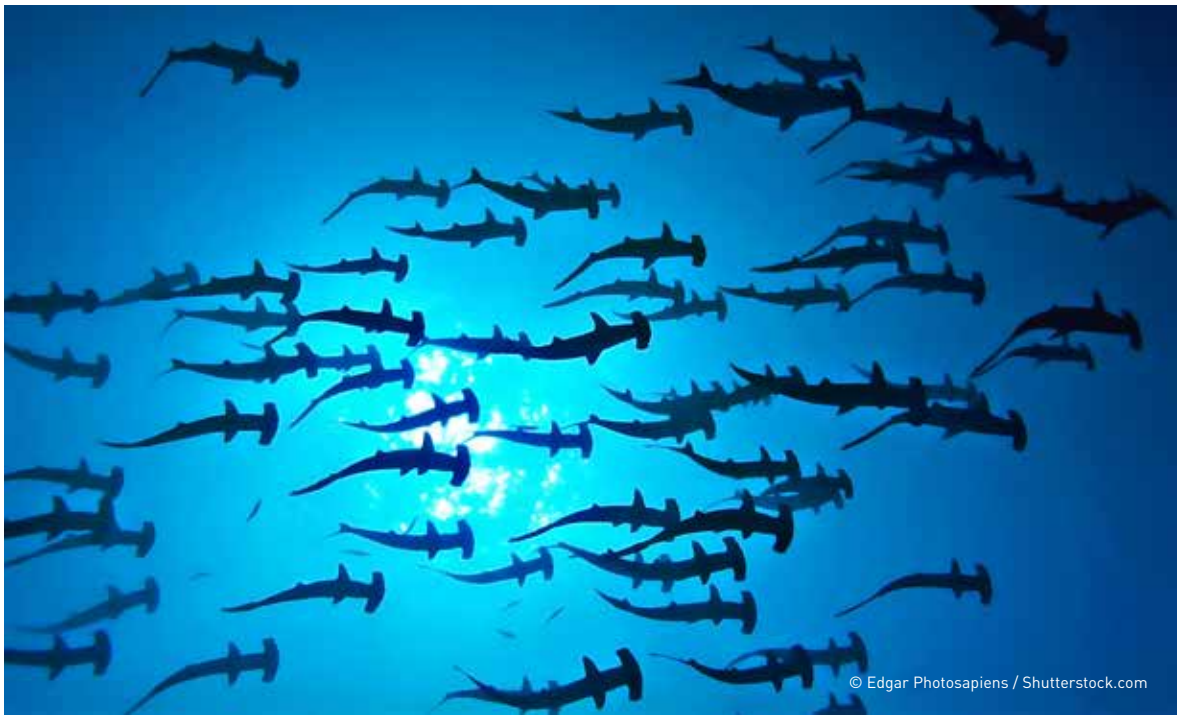
Membership of the Alliance will initially be for a period of three years that will be renewable based on the continuing commitments. Different levels of membership will be available, depending on the scale of resources committed to the Alliance.

There are two options for support through the Alliance. Under the first option, members of the Alliance earmark their commitments to Actions or coordination costs that they have pre-identified as wishing to support. Under the second option, Alliance members would commit resources to a 'virtual resource pool' and the Decade Coordination Unit would assist in linking commitments to proponents of Ocean Decade Actions that need resources or for priority coordination costs. In both cases, financing would be directly from the Alliance member to the proponent of the Ocean Decade Action.

Detailed operational guidelines will be developed for the Alliance prior to the start of the Ocean Decade.

Mechanism 3: Partner-led financing/Grant-making facility

Under this mechanism, an independent entity with its own grant-making capacity (e.g. a philanthropic foundation, an NGO or a government entity) will express the desire to mobilize resources to support Ocean Decade Actions and offer to act as a hub for mobilizing financial contributions from other donors. Individual initiatives funded by the facility will follow the endorsement processes set out in Section 2.4. Such a facility may focus on a specific theme, geography or type of Action (e.g. provision of support to LDC, SIDS or LLDC partners) or may have a broader mandate.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The mobilization of resources for the Ocean Decade will take a variety of forms and all actors need to be advocates for identifying and securing support. Specific roles of Ocean Decade governance and coordination entities in relation to resource mobilization are summarized in Table 2.

Table 2. Roles in resource mobilization throughout the Ocean Decade

Entity	Role in resource mobilization
Decade Advisory Board	■ Define and recommend strategies for resource mobilization. ■ Raise high-level awareness of the Ocean Decade, including with funding partners and resource providers.
Decade Coordination Unit	■ Develop Biennial Resource Needs Assessment to identify upcoming priorities and funding needs to inform Calls for Action and facilitate connections between funders and resource providers, and proponents of Ocean Decade Actions. ■ Track financial and in-kind support and report on additional investment generated by the Ocean Decade. ■ Continue to build structured and targeted engagement with traditional and non-traditional funding and resource providers.
Decentralized Coordination Structures and National Decade Committees	■ Facilitate and coordinate national, regional and programmatic contributions to Ocean Decade Actions and coordination costs.

Importantly, the value propositions for both funders and those seeking funding and support are inextricably linked to the value of the Ocean Decade brand. Ensuring the rigour and visibility of this brand will be one of the key objectives of the engagement and communications efforts that are described throughout the Implementation Plan.

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3.3. Measuring progress

This section outlines the key elements of the framework to track Ocean Decade impact and progress and describes the process to transform this framework into a detailed monitoring and evaluation strategy. It also describes the major review processes embedded in the Ocean Decade.

The Ocean Decade will unfold in a dynamic political, ecological, economic, social and cultural landscape, that has been irrevocably changed by the COVID-19 pandemic. To remain relevant, the Ocean Decade will incorporate mechanisms to allow rapid identification of, and response to, change. A robust monitoring and reporting framework will feed information into a structured process of regular reviews to underpin adaptive management of the Ocean Decade and to provide stakeholders with information on the benefits generated by the Decade and thus to inspire action and engagement (see Figure 8).

Key elements of the series of regular review actions include a biennial priority-setting process and resource needs assessment that will be carried out by the Decade Coordination Unit and presented to the Decade Advisory Board for comment prior to submission to the IOC Governing Bodies. The results will shape the Calls for Action for Ocean Decade programmes and projects and inform resource mobilization efforts. The Ocean Decade Action Framework, including the Challenges, Objectives and sub-objectives, will be updated via a participatory process every two years. A flagship publication, 'The State of the Decade' report, will be prepared every three years concurrent with the international and regional conference series to document achievements, trends and emerging needs for the Ocean Decade. A mid-term review, to be coordinated by the Decade Coordination Unit and presented to the Decade Advisory Board for comment prior to submission to the IOC Governing Bodies, will allow a comprehensive stocktaking of progress at the global and regional levels to inform an eventual revision of the Implementation Plan.

The detailed monitoring and evaluation framework for the Ocean Decade will be developed during the initial stages of Decade implementation and will be presented to the Decade Advisory Board for comment. It will contain monitoring and evaluation actions at two levels as described below.

Impact-level monitoring and evaluation: In order to fully measure the impact of the Ocean Decade, measurement of ocean science success needs to move beyond peer-reviewed publications as the primary measure of performance and focus on the benefits and impacts created through the uptake and use of science. The monitoring and evaluation framework for the Ocean Decade will include indicators that measure contributions to global policy frameworks and the progress against Decade Outcomes, Challenges and Objectives. It will also include indicators to evaluate progress in the development of a robust enabling environment for ocean science, for example through enhanced systems for tracking progress in scientific and technical capacity and ocean literacy. Wherever possible, indicators selected for the Ocean Decade will align with indicators already developed for other global policy frameworks such as the 2030 Agenda or the post-2030 global biodiversity framework.

Operational-level monitoring and evaluation: Operational indicators will collect information on the number and type of Ocean Decade Actions, including information on their geographic location, their alignment with Decade Outcomes and Objectives, and the diversity of key stakeholders engaged in the Actions. Information on the reach of engagement, communications and outreach activities will also be collected. Information on annual spending of Ocean Decade Actions, secured and unsecured resources and data on the commitments made through the Alliance will be collected to track investments.

At each level of analysis, indicators and methodologies will be defined and a baseline value determined where relevant. Development of certain indicators or methodologies may themselves be the subject of research under the Ocean Decade – for example, tools to measure uptake of science for policy, decision-making or innovation; behaviour change triggered by increased understanding of ocean science; or approaches to include indigenous and local perspectives into the evaluation of the impact of the Decade.

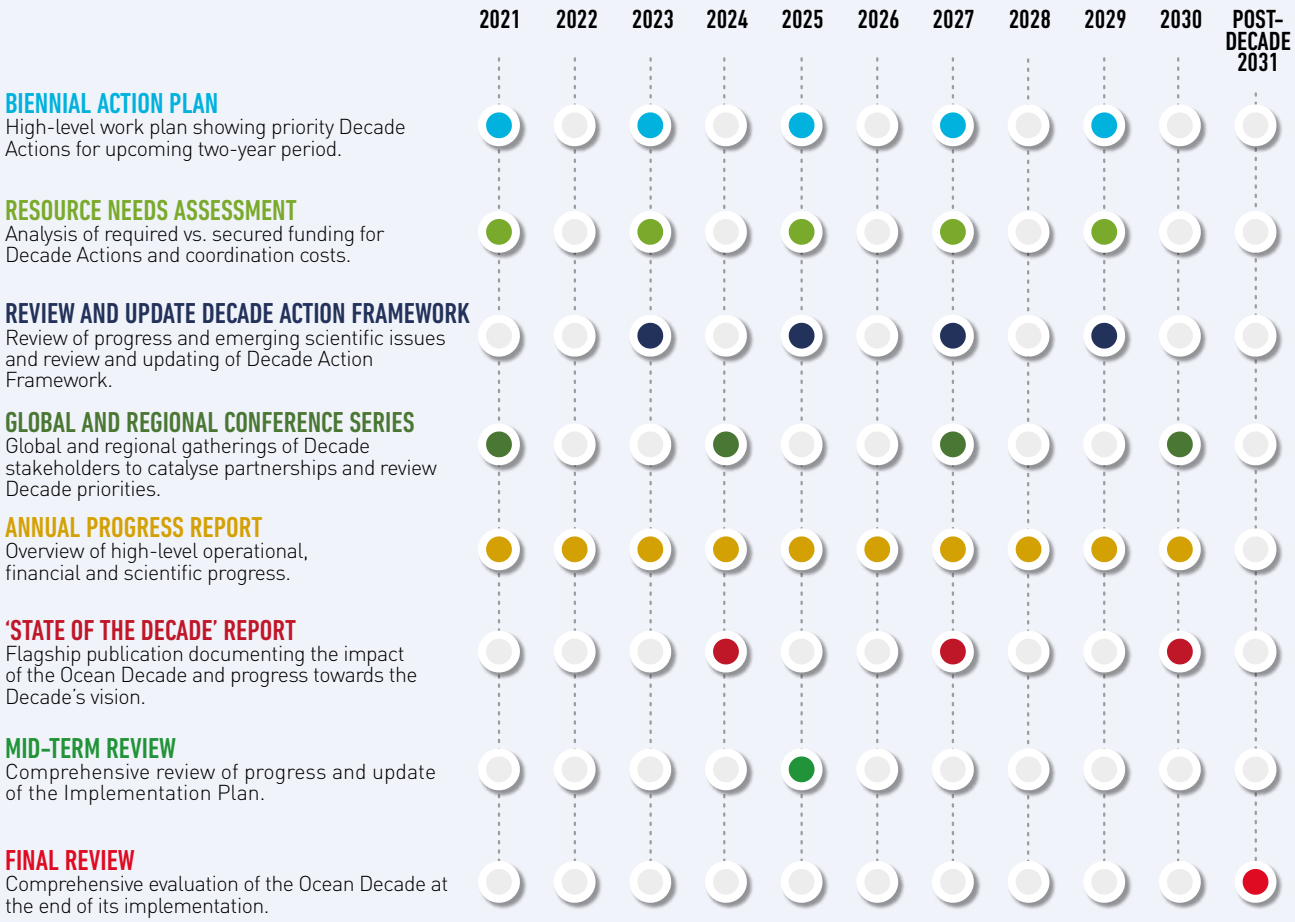
As part of the monitoring and evaluation system, proponents of endorsed Ocean Decade Actions will be required to report annually on a streamlined series of indicators via online templates that will facilitate reporting and allow for disaggregation of data. Reporting requirements and processes will be kept simple and light to avoid an excessive administrative burden. Decentralized coordination structures will

be responsible for collecting data for indicators for projects and activities included within their remit. The Decade Coordination Unit will collate information on indicators from the decentralized coordination structures and will prepare an Annual Progress Report that analyses these indicators.

Data and information developed via the implementation of the monitoring and evaluation framework will benefit from, and contribute to, regular evaluation and reporting processes within the UN system, including the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-economic Aspects (the World Ocean Assessment), reporting on progress to achieve the SDGs, the Global Ocean Science Report and the Global Assessment Report on Disaster Risk Reduction (GAR), as well as regular reports on the implementation of the Sendai Framework.

The monitoring and evaluation framework will define the methodologies to measure progress of indicators, as well as a further description of responsibilities and required resources.

Figure 8. Ocean Decade review processes.



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Appendix 1/ Glossary

The following glossary provides definitions in the context of the Ocean Decade for a number of common terms used throughout the Implementation Plan.

Action	The different types tangible initiatives that will be carried out across the globe over the next ten years to fulfil the Decade vision. Actions can include programmes, projects, activities or contributions.
Activity	A one-off standalone activity (such as an awareness-raising event, a scientific workshop, or a training opportunity). It enables a programme or project or directly contributes to an Ocean Decade Challenge.
Contribution	Supports the Ocean Decade through provision of a necessary resource (e.g. funding, resource mobilization, data or an in-kind contribution, including staff, provision of infrastructure or equipment). A contribution can support either the implementation of an Ocean Decade Action or the coordination functions of the Ocean Decade
Data	A set of values, symbols or signs (recorded on any type of medium) that represent one or more properties of an entity. For example, the numbers generated by a sensor, values derived from a model or analysis, text entered into a survey or the raw text of a document.
Decade Advisory Board	A multi-stakeholder advisory body to the IOC that will provide strategic advice on Ocean Decade implementation.
Decade Collaborative Centre	Centre hosted by one or more countries or an international organization engaged in Decade activities that will catalyse Ocean Decade Actions at the regional or thematic level by providing technical, logistical and financial support for: (i) scientific coordination and planning; (ii) identification of collaboration opportunities; (iii) awareness raising and stakeholder engagement; and (iv) technical and scientific capacities to support the design and delivery of Decade Actions. Decade Collaborative Centres will be legally separate from the IOC and operated under the complete responsibility of the establishing entity(ies).
Decade Coordination Office	Offices hosted by UN Member States and requiring the establishment of a Seat Agreement with the host Member State and the provision of financial resources through IOC-UNESCO or other UN frameworks. Offices will act as 'decentralized' Decade Coordination Units, being organically attached to the central Decade Coordinating Unit, and will be responsible for a regional portfolio of Ocean Decade Actions and/or specific thematic initiatives.
Decade Coordination Unit	Central coordination unit for the implementation of the Ocean Decade that will be housed within the IOC Secretariat.
Decade Implementing Partner	Stakeholder institutions (e.g. research institutes, NGOs, universities) that are committed to the vision and mission of the Ocean Decade and that are making significant and sustained efforts to implement Ocean Decade Actions.
Decade Stakeholder Platform	Existing or new groups of ocean actors that work together to contribute to the Ocean Decade vision. Groups could convene on a geographic basis (e.g. at the regional level), for a specific theme (e.g. deep ocean, underwater cultural heritage) or for a particular stakeholder group (e.g. NGOs or private sector).

Decentralized coordination structure	Decade Coordination Offices and/or Decade Collaborative Centres.
Digital knowledge	Knowledge that has been encoded in a machine-readable and actionable form.
Enabling environment	A set of interrelated elements of the legal, political, financial, socio-cultural and institutional environment that provide transparency, stability and long-term security to facilitate the Ocean Decade implementation.
Global Stakeholder Forum	A convening mechanism for all Ocean Decade stakeholder engagement structures. The Forum will have both virtual and physical elements.
Indigenous and local knowledge	Refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings. For rural and indigenous peoples, local knowledge informs decision-making about fundamental aspects of day-to-day life. This knowledge is integral to a cultural complex that also encompasses language, systems of classification, resource use practices, social interactions, ritual and spirituality.
Information	Products derived from data that lead to a greater understanding of an entity. For example, (i) the interpretation of a range of data from an array of conductivity sensors across the Arctic Ocean that informs us about that ocean's salinity range; or (ii) the narrative text of a report on harmful algal blooms that informs the reader on the timing of these blooms.
Interdisciplinary	An approach involving stakeholders from two or more distinct scientific disciplines or stakeholder groups that integrates different knowledge and methods using a synthesis of approaches. Under interdisciplinary approaches, boundaries between disciplines and groups start to break down with the recognition that each discipline can affect the output of the other.
Knowledge	An abstract representation (i.e. a mental model) of an entity which: (i) is constructed from a substantial collection of information; (ii) grants its bearer reliable familiarity with that entity; and (iii) can be used to reason and take action about that entity. For example, an expert with knowledge about the salinity range of the Arctic Ocean (constructed from large amounts of information on the topic) would be able to reason that a salinity value of 43% is a likely error, rather than a real measurement.
National Decade Committee	Existing or new structures that coordinate actors at the national level. Committees are inclusive multi-agency and multi-stakeholder platform for the co-design and co-delivery of Actions and facilitate access to benefits such as data, products, science-policy advice or capacity development.
Objective	Process Objectives that describe the steps in the science value chain that are needed to meet the Ocean Decade Challenges and thus contribute to achieving the Ocean Decade Outcomes.
Ocean Decade Alliance	Resource mobilization mechanism focused on voluntary, large-scale commitments from governments, UN entities, private sector, foundations or other Ocean Decade supporters.
Ocean Decade Challenge	The most pressing and immediate priorities of the Ocean Decade. Used to unite stakeholders around common action. May evolve throughout the Ocean Decade. Achievement of the Challenges will contribute to fulfilment of the Outcomes.

Ocean science	Encompasses natural and social science disciplines, including interdisciplinary approaches; the technology and infrastructure that supports ocean science; the application of ocean science for societal benefit, including knowledge transfer and applications in regions that are lacking science capacity; and the science-policy and science-innovation interfaces. Ocean science embraces local and indigenous knowledge as a fundamental source of knowledge. It recognizes the central role of the ocean in the earth system and includes consideration of the land-sea interface and ocean-atmosphere and ocean-cryosphere interactions.
Outcome	Describes the 'ocean we want' at the end of the Ocean Decade. Outcomes describe both the desired state of the ocean and the desired state of society's use of, and interaction with, the ocean.
Programme	An Ocean Decade Action that is typically global or regional in scale and will contribute to the achievement of one or more of the Ocean Decade Challenges. It is long-term (multi-year), interdisciplinary and multi-national. A programme will consist of component projects and potentially enabling activities.
Project	An Ocean Decade Action is a discrete and focused undertaking that is typically of a shorter duration. It may be regional, national or subnational and it will typically contribute to an identified Ocean Decade programme.
Proponent	An individual or institution who proposes and implements an Ocean Decade Action.
Science-innovation interface	Process which encompasses relations between scientists, stakeholders and actors in innovation and technological development, and which allows for exchanges, co-design and joint construction of knowledge with the aim of enriching innovation and the development and deployment of technological solutions.
Science-policy interface	Process which encompasses relations between scientists and other actors in the policy process, and which allows for exchanges, co-evolution and joint construction of knowledge with the aim of enriching decision-making.
Transdisciplinary	Stakeholders from different disciplines or different groups work together to create new solutions and innovations that integrate and move beyond discipline-specific approaches to address a common problem. Transdisciplinarity occurs when two or more discipline perspectives are combined to form a new holistic approach with the expectation that the outcome will be completely different from an addition of the parts.
UN entity	United Nations agencies, funds and programmes.
UN-Oceans	Inter-agency coordination mechanism with 29 members that seeks to enhance the coordination, coherence and effectiveness of competent organizations of the United Nations system and the International Seabed Authority working on ocean- and coastal-related issues.

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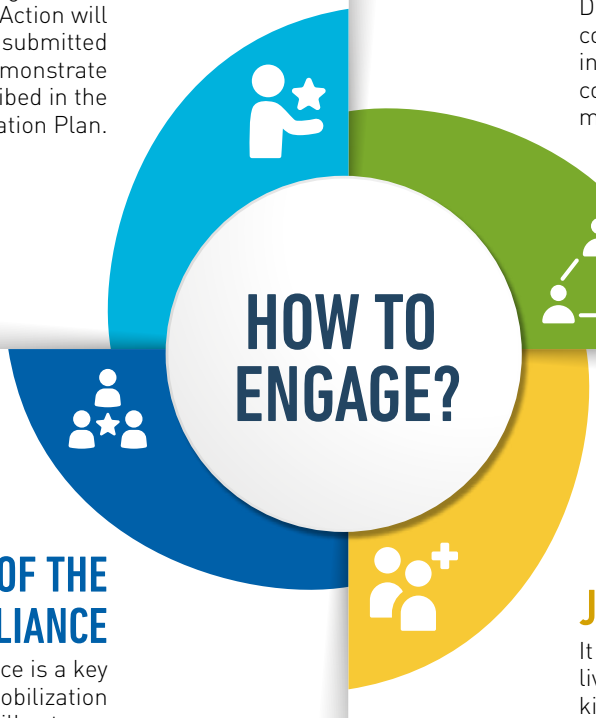
HOW TO ENGAGE?

LEAD OR PARTICIPATE IN A DECADE ACTION

Decade Actions will be implemented by a wide range of proponents throughout the Ocean Decade. Regular Calls for Action will be issued and Actions that are submitted for endorsement will need to demonstrate how they meet the criteria described in the Implementation Plan.

ESTABLISH OR JOIN A VOLUNTARY STAKEHOLDER NETWORK

Decade stakeholder engagement networks convene ocean actors with common interests to facilitate connections and collaboration. All registered networks are members of the Global Stakeholder Forum.



BECOME A MEMBER OF THE OCEAN DECADE ALLIANCE

The Ocean Decade Alliance is a key mechanism for resource mobilization during the Decade and will act as a matchmaker between resource providers and proponents of Decade Actions – in line with the priorities of the Decade.

JOIN GENERATION OCEAN

It is everyone's Decade! 'GenO' convenes all living and future generations to build a new kind of society by 2030, one in which all of humanity will use the best available science and knowledge to deliver the ocean we need for the future we want.

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Learn more about engaging in the Ocean Decade on **oceandecade.org**

UNOceanDecade unoceandecade OceanDecade UN-Ocean-Decade