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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (of UNESCO)

1. This summary is based on a strategic progress report by the IOC Executive Secretary to the 2023 IOC Assembly. It reviews key developments and also includes broader reflections on IOC development.
2. A key IOC deliverable is the United Nations Decade of Ocean Science for Sustainable Development (2021–2030)—the Ocean Decade. It suffices to state here that the Decade has already grown into the largest undertaking in the history of ocean sciences and is a co-designed transformative movement, uniting, in a transdisciplinary way, the natural, social, economic, and political sciences with unprecedented human drive towards more harmonious relations between people and the ocean. IOC not only coordinates the overall Ocean Decade but is also leader or a partner in several flagship Decade programmes and projects.
3. In 2017, IOC published its first *Global Ocean Science Report (GOSR)*. Its second edition was completed in 2020. IOC is now a custodian UN agency responsible for reporting on indicators for SDG 14 Targets 14.3 (on ocean acidification) and 14.a (on the capacity of ocean science). Online portals for assembling information on these indicators were established. The indicators for the two targets were developed by IOC Secretariat and progressed in their level of maturity from Tier III to Tier II. IOC is working to develop capacity of nations to report on the IOC-affiliated indicators and is also helping UNEP to report on indicators for Targets 14.1 and 14.2. In 2022, the pilot edition of the *IOC State of the Ocean Report* was published. Ocean Literacy is now an established IOC activity which is appreciated in UNESCO and around the world. IOC has developed an ocean literacy portal and a toolkit. Ocean Literacy is the IOC contribution to the UNESCO Intersectoral Programme 2 and a constituent in the major UNESCO initiative of “Education for Sustainable Development”. New perspectives in the ocean literacy are associated with cooperation with the European Commission (DG MARE) and private sector, especially Prada and Panerai.
4. International coordination of ocean research is the IOC’s «raison d’être». In the opinion of Executive Secretary, the present (positive) impact of IOC on the scope, direction and availability and sustainability of resources for global oceanography is stronger than previously. The research is increasingly focused on sustainable development. Very much this progress is achieved through the Ocean Decade and via effective cooperation with various organizations with similar mandate, such as the European Marine Board, ICES, PICES, and SCOR. In the UN, e.g. through UN-Oceans, a useful division of labour emerges among various UN agencies with an ocean mandate, and IOC has acquired a crosscutting position as an authoritative source (supporter, provider) of ocean science and knowledge for the UN system. In addition, IOC Secretariat supports a variety of working groups and projects spearheading modern ocean research, e.g. on ocean acidification, deoxygenation, harmful algal blooms, work on blue carbon ecosystems, non-indigenous species, coordination of research on the future of the ocean carbon sink—an issue of critical value for implementation of the Paris Agreement. IOC remains a devoted co-sponsor of the WMO/IOC/ISC World Climate Research Programme, a key source of climate knowledge, data, and predictions.
5. Steady progress has been achieved in ocean observations, data management and services. However, the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), which started to operate in 2001, was the main implementing arm of the Global Ocean Observing System (GOOS). Its dissolution in the result of the WMO constituent bodies restructuring led to creation of the WMO-IOC Joint Collaborative Board (JCB). GOOS is constructing its way forward in accordance with its 2030 Strategy adopted by IOC in 2019 at its 30th Assembly and the

Roadmap for the Implementation of the Global Ocean Observing System 2030 Strategy. GOOS is brought to life as a system through the work of its three Expert Panels (physics and climate, biogeochemistry, and biology and ecology), ocean observing and forecasting coordination groups, and ocean observing networks and systems. Both IOC and WMO are working together on monitoring the implementation of the ocean observing system through the OceanOPS operational centre.

6. The OBIS supports the BioEco portal for ocean biological and ecological observations, which ultimately will enable us to monitor the implementation of biological and ecological ocean observing components. The Covid-19 lockdown was highly detrimental to many ocean observing networks and left “a permanent scar” in the ocean climatic records. At present, the GOOS Steering committee is undertaking highly commendable efforts in reviewing positioning of the programme, its visibility, outreach and communications mechanisms. The Executive Secretary believes that there is indeed a need to consider the optimal GOOS governance and, particularly, to concentrate the thought on how to make sure that ocean observing networks acquire a proper place in the existing science-policy interface in ocean matters, including on national scale. Establishment of National Focal Points for GOOS is a positive step but they will have to have an entry point to governmental structures related to ocean matters. An early way forward for GOOS was suggested by the Framework for Ocean Observations (FOO), in which links between networks and climate, biodiversity and ocean services issues were projected. These links with policy manifest in 35 Essential Ocean Variables (EOVs). Inter alia, the EOVs support the global climate, biodiversity, and the emerging plastics agreements.

7. GOOS today delivers over 100,000 observations to weather and climate applications and is expanding steadily across the biogeochemistry, biological and ecological, and human pressures realms. However, the societal needs for ocean observations are growing even faster. The emerging notion of Sustainable Ocean Planning will likely be highly beneficial for developing ocean observations directly contributing to addressing key ocean matters. There is also an urgent need to re-establish close relations and coordination mechanisms with satellite agencies. GOOS is also evolving to become more user led as the GOOS 2030 Strategy is built around its value chain, from observations, through data, modelling and assessments, to user services. These connections are being actively developed through the work of the GOOS Expert Team on Operational Ocean Forecasting (ETOofs), the three GOOS Ocean Decade Programmes (CoastPredict, Ocean Observing Co-Design, and Observing Together), and WMO constituencies.

8. The time has arrived to start systematically expanding ocean data objective analysis, reanalysis, and forecasting, creating an ecosystem of digital twins of the ocean, of direct benefit for Sustainable Ocean Planning. The new intergovernmental organization, created in 2022, Mercator Ocean International, being built on the foundations of the Copernicus Marine Environment Monitoring Service (CMEMS), is a key contributor to this work. Similar activities exist in various leading oceanographic centres of the world.

9. Major developments are currently taking place in the ocean data sphere. The 2023 IOC Assembly reviewed the proposed innovative IOC Oceanographic Data Exchange Policy and the IOC Strategic Plan for Ocean Data and Information Management (2023–2029). The IOC Ocean Biodiversity Information System (OBIS), already the largest distributed database on marine life, is experiencing a major increase of data acquisition rate due to new eDNA observations. Capitalizing on the Ocean InfoHub project, the IODE has started the development of the Ocean Data and Information System (ODIS), to become the future global ocean data ecosystem. There is no doubt that the nearest future will see an explosion of ocean data work and its potential commercialization. IOC should remain not only competitive but also a leading organization in ocean data and information sharing. This is needed not so much for IOC’s wellbeing but to make sure that ocean data and information exchange develops as a coherent system, with necessary standards and interoperability. Again, a focus of the IOC data system on delivering towards Sustainable Ocean Planning will be a consolidating and strengthening factor in this work.

10. In 2015, IOC had to decide, in view of budgetary constraints, whether to continue to co-sponsor GEBCO, or not. Two years later, in 2017, the IOC Assembly at its 29th session unequivocally agreed to continue the joint IHO-IOC sponsorship of GEBCO. The progress since then has been most significant, especially due to the Nippon Foundation – GEBCO Seabed 2030 project, which mobilized significant resources and helped to acquire big volume of existed bathymetric data. In 2016, 113 years after His Serene Highness Prince Albert I of Monaco initiated GEBCO, the GEBCO grid covered roughly 5 percent of the ocean area. Today, only seven years later, the community added approximately 20% to the previous 5%, approaching the symbolic milestone of one quarter of the ocean area in the current GEBCO grid. This clearly demonstrates the enormous potential of international cooperation in ocean affairs.

11. The ocean should be managed sustainably. IOC has created building blocks for the new system and is upbringing a growing set of IOC activities in ocean area based management, which involves coastal zone management, marine spatial planning (MSP) and management of Large Marine Ecosystems. Close collaboration with the European Commission and its financial support to IOC were critical in developing the MSPGlobal programme and creating the MSPGlobal roadmap which will drive cooperation in the next five years to advance MSP in domains of climate change, ecosystem conservation and restoration, and sustainable ocean economy. IOC is tracking MSP progress globally and has reported over 300 initiatives in more than 100 countries. UNDP and GEF are now largest IOC sponsors through a growing portfolio of GEF International Water Projects executed by IOC (Sargasso Sea, IW:Learn, and Black Sea projects).

12. Capacity Development has been and will always remain a core activity of the IOC. The current composition of IOC work on CD is significant and includes:

- 2nd generation of the OceanTeacher Global Academy (OTGA), with 17 centres around the world;
- 6 Regional Training and Research Centres (5 active and 1 in making) of WESTPAC;
- 3 ocean related UNESCO category 2 centres (in the Islamic Republic of Iran, India, and Iceland);
- Capacity Development (CD) activities in environmental DNA, ocean acidification, harmful algal blooms, etc.;
- Ocean CD-Hub, now available as a central repository of ocean-related capacity development opportunities worldwide;
- UNESCO chairs in marine sciences, which decided, at a recent UNITWIN Conference, to establish a network; and
- starting Ocean Decade CD activities, supported and coordinated by the Ocean Decade CD facility, funded by the Government of Flanders in collaboration with IOC.

13. The 2023 IOC Assembly reviewed the IOC Capacity Development (CD) Strategy for 2023–2030, as well as the “Outreach and Communications Plan to Promote the Visibility and Reach of the IOC Capacity Development Strategy”. These two major documents will guide the future IOC CD work at the global as well as regional level. Additionally, the recently agreed High Seas Treaty makes explicit reference to IOC in terms of its needs in capacity development. CD is a key element of work of IOC regional subsidiary bodies.

Successes/progress

14. Successes of international organizations (agencies) are sometimes measured by increased budget, staff, seminal events and publications. In the opinion of Executive Secretary, the IOC success is more fundamental: the IOC’s mandated work in all Functions of its Medium-Term Strategy and through the Ocean Decade has taken us to a historic moment in our relations with the ocean. For the 1st time in history, science tells us that there is a real possibility to reverse the decline in ocean health and to start living in harmony with the ocean. The way forward is the climate-smart,

ecosystem-based, equitable and ethical ocean management on the basis of science-supported ocean planning for a sustainable ocean economy. But we still need to design it. This work will be guided by the IOC Medium-Term Strategy (MTS) 2022–2029 and the development of an IOC wide-strategy for Sustainable Ocean Planning and Management to be presented to the IOC Executive Council in 2024 for adoption. The MTS vision statement is *“to bring together governments and science community in achieving the ‘Ocean We Need for the Future We Want.’”*

Challenges

15. IOC does not have an underlying international convention that makes ocean observations and research mandatory for countries. Our work is moving forward because of understanding of its importance and the good will of Member States and other stakeholders. The Ocean Decade, a global movement, is a manifestation of this good will. However, even if a binding convention had existed, the immature ocean science-policy interface would still hamper effective action in many countries. In addition, there is still a need to learn, through national accounting, how ocean knowledge contributes to the development of ocean economy, de-risking of investments and how national policies could reflect mutual benefits of ocean science and economy. The weak ocean science-policy interface is a mere consequence of previous undervaluing the role of ocean for humanity. It is hoped that IOC leadership and success in turning science into a key element of coordinated decision-making system in ocean affairs will be instrumental in speeding up the growth and strengthening of the ocean science-policy interface in nations. Undervaluing the ocean and the role of science in its management is also a key reason for chronic shortage of human and financial resources of IOC Secretariat. Much in the future of IOC will depend on how committed will be Member States, both of UNESCO and IOC, to its purpose and whether their commitment will manifest in increased, more predictable, sustainable and less strictly earmarked contributions to the work of IOC Secretariat.

Interactions with SCOR

SCOR is historically a partner and strategic mechanism for the IOC to increase capacity to address critical ocean science issues for which the IOC secretariat does not have resources, mandate or human capacity to address alone and where, not the least, better and more valuable knowledge products can be delivered by joint activities. SCOR-IOC collaboration has both proven a valuable mechanism to address longer term research themes (programmes) as well as more targeted and time bound tasks (WG's). The most substantial collaboration currently is GlobalHAB which is coming to the end of its current ToRs. The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms (IPHAB) requested the IOC-SCOR GlobalHAB Scientific Steering Committee to:

- (i) review the GlobalHAB Science and Implementation Plan with a view to present to IPHAB-XVII (in 2025) what it recommends as the main elements of an international HAB research programme after 2025 focusing on understanding HABs in the context of global sustainability;
- (ii) assess the ideal organization of and partnerships for such an international research programme after 2025;
- (iii) recommend to IPHAB-XVII whether an international HAB research programme after 2025 should be as a continuation under the name GlobalHAB or under a new name.

GlobalHAB is currently engaged in the development and implementation of a co-designed UN Ocean Decade programme, the HAB Solutions Programme (HAB-S), to deliver solutions to sustainably provide safe seafood, drinking water and ensure healthy coastal socio-ecosystems. HAB-S would provide a wider context for a potential GlobalHAB or equivalent programme after 2025.