Intergovernmental Oceanographic Commission

Ocean Affairs and the Law of the Sea

Contribution of the Intergovernmental Oceanographic Commission of UNESCO to the Report of the Secretary-General

June 2024

DEVELOPMENTS IN THE FIELD OF OCEAN AFFAIRS AND THE LAW OF THE SEA

Pursuant to United Nations General Assembly Resolution 76/72: Oceans and the law of the sea as of 9 December 2021, entitled "Oceans and the law of the sea" the information below represents the contribution of the Intergovernmental Oceanographic Commission of UNESCO (IOC) to the report of the Secretary-General. The work of the Commission of UNESCO is structured around the following functions, each of which is reported on in this submission:

- Function A – Ocean Research
- Function B – Observing Systems and Data Management
- Function C – Early Warning and Services
- Function D – Assessment and Information for Policy
- Function E – Sustainable Management and Governance
- Function F – Capacity Development

SUMMARY OF KEY ACHIEVEMENTS

- Coordinated by IOC since 2021, the United Nations Decade of Ocean Science for Sustainable Development (2021–2030), the largest global ocean science initiative ever undertaken, currently counts 52 endorsed global Decade programmes and over 300 Decade projects led by partners in over 60 countries, and close to 100 in-kind and financial contributions. Twelve regional and thematic decentralised coordination structures are hosted by partners, and 39 countries have established National Decade Committees. Over 150 experts were involved in the Working Groups that led development of the Vision 2030 White Papers and which formed the basis of the *Vision 2030 Outcomes Report* that was central to the discussions at the 2024 Ocean Decade Conference.
- The IOC *State of the Ocean Report* 2024, was published in June 2024. The StOR presents the results of ocean-related scientific activities and analyses to describe the current and future state of the ocean, addressing physical, chemical, ecological, socioeconomic and governance aspects, focusing on the seven Outcomes of the UN Decade of Ocean Science for Sustainable Development.
- IOC's data submission towards SDG 14.3.1 'Average marine acidity (pH) measured at agreed suite of representative sampling stations' collected inputs from an increased number of countries and stations (178 stations in 2021; 308 stations in 2022; 539 stations in 2023; 638 in 2024). The

IOC-coordinated global expert network on ocean acidification now counts more than 1,150 members from 115 countries (22 in Africa, 23 SIDS) and continues to grow.

- The International Partnership for Blue Carbon (IPBC) grew to 57 Partners, of which 18 are IOC Member States. Together with Australia and France, IOC co-hosted the 2023 IPBC Dialogue at UNESCO HQ.
- The Global Ocean Observing System (GOOS) now has more than 8,700 ocean observing platforms across 13 global ocean observing networks, run by 84 Member States (10 in Africa, 9 SIDS). Over 100,000 ocean observations are tracked every day through the IOC-WMO Operational Centre (OceanOPS). This information is presented in the annual GOOS *Ocean Observing System Report Card*.
- Recognizing that Joint programmes between IOC, United Nations and other international organizations are important ways to leverage and enhance IOC activities to best serve society and that these programmes must be underpinned by timely and relevant agreements, a revised four-year Memorandum of Understanding for the Global Climate Observing System (GCOS) was negotiated with the World Meteorological Organization (WMO), United Nations Environment Programme (UNEP) and the International Science Council (ISC). The Joint WMO-IOC Collaborative Board self-review of performance was completed.
- OBIS continued to grow, receiving more than one new dataset per day and over a million records per month. As a joint effort between the Global Ocean Observing System (GOOS) and the IODE/Ocean Biodiversity Information System (OBIS) information was collected from 638 long-term active biological monitoring programmes and integrated into an online metadata platform (BioEco portal) which will be connected to ODIS, and become the infrastructure to monitor the status of the marine biological component of GOOS. OBIS continues to play a key role in this by also hosting and providing an integrated, standardised and quality controlled access point to the actual biological and ecosystem observations required to feed into ecosystem models, early-warning systems and indicator and assessment frameworks.
- The Flanders-funded Environmental DNA Expeditions project in Marine World Heritage Sites, implemented jointly by IOC and the World Heritage Centre, is now concluding with the analysis of over 400 samples from 20 sites. A summary for policymakers will be published in June 2024. It will illustrate the biodiversity richness and unique discoveries witnessed through eDNA sampling involving over 200 school children (citizen scientists) and highlight its vulnerability to global warming under climate change and the need to upscale observations and data sharing to support conservation efforts.
- Tsunami programme kept its strong capacity development focus in all ocean basins. With active support by Member States as indicated by the renewal of agreements with:
    - the Agency for Meteorology, Climatology, and Geophysics of the Republic of Indonesia hosting the Indian Ocean Tsunami Information Centre (IOTIC) 2023–2027,
    - the Coastal Zone Management Unit (CZMU) of Barbados hosting the Caribbean Tsunami Information Centre (CTIC) 2024–2029, and
    - the Bureau of Meteorology (Bureau) of Australia hosting the Indian Ocean Tsunami Warning and Mitigation (IOTWMS) Office in Perth, Australia 2023–2027.
- IOC Technical Series No. 183 was published on *Monitoring and Warning for Tsunamis Generated by Volcanoes*. The Tsunami Ready Recognition Programme continued to expand, with over 50 communities now recognized in 24 Member States.
- As joint effort by GlobalHAB and GESAMP a whitepaper on *Sargassum* was published in June 2023. A Memorandum of Understanding was signed April 2024 between IOC-UNESCO and FAO to formalise close ongoing cooperation on early warning systems for HAB's and on global data compilation and sharing. A collaborative global effort under the lead of IPHAB entitled HAB Solutions (HAB-S) was endorsed as a Decade programme early 2024.

- In June 2023, IOC adopted its 2023–2030 Capacity Development Strategy. The Ocean Teacher Global Academy continued to grow, with now 17 Training Centres established. With its ISO 29990 certification, IOC certifies hundreds of training participants every year. The Ocean CD-Hub has been further developed as a component of the CHM/TMT (Clearing-House mechanism for the Transfer of Marine Technology).
- Five capacity development activities were launched in 2024, co-designed with regional and technical subsidiary bodies: (i) Establishing Early Warning Systems for Harmful Algae Blooms in Africa; (ii) GLOSS Africa (Phase 1–North Africa); (iii) Support for strategic planning and capacity development for ocean observations under the auspices of GOOS-Africa; (iv) Biodiversity Data Hub for the High Seas; and (v) OceanTraining internships to enhance global human capacity related to the IOC mandate.
- In the WESTPAC region, a milestone was achieved with organization of the 2nd UN Ocean Decade Regional Conference and 11th WESTPAC International Marine Science Conference (22–25 April 2024) which brought together over 1,000 stakeholders to discuss the current status of ocean knowledge, take stock of the first three years' achievements of the Ocean Decade Actions in the region and identify future priorities, building on the outputs of the Vision 2030 process.
- As a contribution to the UNESCO operational strategy on SIDS, IOC is leading one of six intersectoral Accelerator programme–ACE#2: Strengthen Sustainable Ocean Knowledge, Spatial Planning and Water Management capacities of SIDS in support of the growth of their blue economies. Increased engagement with SIDS in the Ocean Decade was supported through the establishment of a decentralized coordination hub for the Pacific Islands Region, hosted by The Pacific Community, and the establishment of a taskforce for the Tropical Americas and Caribbean Region to oversee implementation of the Ocean Decade in the region.
- IOC stepped up its efforts in Marine Spatial Planning (MSP) and launched in 2022 an updated joint MSProadmap with the European Commission, then resumed the MSPglobal project in July 2023 with regional focus on building technical capacities in West and Central Africa as well as the Western Pacific region. Besides, the project is developing further knowledge, tools and a new online training on OceanTeacher Global Academy to support all Member States to advance their MSP processes. In total, the activities of the MSPglobal 2.0 involved 867 participants from 100 countries (32 Africa, 12 SIDS) by mid-April 2024. These included mainly and MSPforum for Africa, trainings for representatives of national authorities and global workshops to co-develop MSP tools with experts from all continents and oceans. IOC experience on MSP has inspired and provided inputs to establish a new Decade Programme on Sustainable Ocean Planning supported by a set of international partners, which was launched at the Barcelona Conference.
- In the content of the IOC Sea Beyond project, funded by Prada Group, over 600 students from 20 countries have been trained on ocean literacy, with training resources available in English, French and Spanish. Different stakeholder groups—journalists, architects and urban planners, and finance experts—were trained on ocean literacy through Ocean Teacher Global Academy e-learning courses. the development of e-learning courses in collaboration with Ocean Teacher Global Academy.

FUNCTION A: OCEAN RESEARCH

Foster ocean research to strengthen knowledge of ocean and coastal processes and human impact upon them

Understanding climate change and its effects on the world ocean

1. The World Climate Research Programme (WCRP) underpins the work of the Intergovernmental Panel on Climate Change (IPCC), which in turn supports decision-making by the UN Framework Convention on Climate Change (UNFCCC). IOC brings the oceanographic constituency to WCRP, as the ocean is an integral part of the climate system. IOC's co-sponsoring of WCRP, therefore, represents an example of climate change science in action, through a value-chain approach, going from research to decision-making. IOC invested considerable effort in the WCRP Open Science Conference (OSC) 2023 'Advancing climate science for a sustainable future' in October 2023 in Kigali, Rwanda.

2. Through decision EC-LI/4.2, the IOC convened the current main players in ocean carbon research and systematic observations under the umbrella of an expert Integrated Ocean Carbon Research (IOC-R) initiative. This initiative federates: the IOC; the International Ocean Carbon Coordinating Project (IOCCP); the Surface Ocean-Lower Atmosphere Study (SOLAS); the Integrated Marine Biosphere Research Project (IMBeR); the Climate and Ocean Variability, Predictability and Change (CLIVAR) core project of the WCRP; and the Global Carbon Project (GCP). The goal of this initiative is to design an integrated research and observation agenda in the next decade in support of relevant efforts by the G7, GOOS, the UNFCCC and its SBSTA (Subsidiary Body for Scientific and Technological Advice) and of course the Ocean Decade. Since the delivery of the first Summary of Ocean Carbon Research and Vision of Coordinated Ocean Carbon Research and Observations for the Next Decade, published as IOC Technical Series, 158, new science and observation technologies have been developed, important to provide guidance to national and international research efforts and funders. A new document 'Integrated Ocean Carbon Research – a vision primied for implementation' will be published in 2024. The focus will be on knowledge gaps and ways to close them.

3. Over the course of the reporting period IOC coordinated the preparation of the document and highlighted IOC-R together with other ocean carbon efforts supported by IOC (OARS and GO-BC) at the 2024 Ocean Decade Conference in Barcelona in a Satellite event on 12 April 2024.

4. IOC continued to provide active support to Member States in developing capacity to act towards, and to report on, SDG Indicator 14.3.1, which focuses on ocean acidification (cf. Function D). As the custodian agency for the indicator, the Commission developed the methodology providing guidance to scientists and countries on how to carry out measurements following the best practices established by the ocean acidification (OA) community. In this way, IOC and its networks, including the Global Ocean Acidification Observing Network (GOA-ON), directly contribute to the achievement of SDG Target 14.3. Since the launch of the SDG 14.3.1 data portal in December 2019 an increasing number of ocean acidification observations have been reported to IOC and are included in the annual 14.3.1 assessment (308 stations in 35 countries reported in 2022 to , 638 stations in 42 countries in 2024). There are, however, still strong inequalities in the distribution of these global ocean acidification observations: gaps in observations and data remain in many areas, especially in coastal Asia and Africa and the open waters of the South Atlantic, Pacific and Indian Ocean as well as the Southern Ocean. In the absence of data on ocean acidification permitting predictions of future scenarios and impacts, these regions remain particularly vulnerable.The latest results from the IOC SDG 14.3.1 reporting will be published on the UN Department of Economic and Social Affairs (DESA) website in July 2024.

5. In order to further advance SDG 14.3.1 related measurements and data reporting, IOC is working with experts to improve methodology and data collection. IOC convened expert working groups consisting of data managers and representatives of global ocean carbon data products and databases, including EMODNET, ICOS, GLODAP, NCEI, and SOCAT as well as several National

Oceanographic Data Centres (NODCs) to develop an automated exchange of data towards the SDG 14.3.1 Indicator from other databases already hosting and collecting relevant datasets. These expert working groups are contributing to the the automated and regular exchange of relevant datasets through the implementation of a federated data system.

6. GOA-ON has now more than 1,100 members, from 103 countries (2015 comparative: 150 scientists, 31 countries) and is constantly growing. 24% of the members are from SIDS. Currently 19 SIDS and 22 African countries are represented in the network, owing to IOC's engagement in projects in the Pacific Islands, Caribbean, the Middle East and East Africa. GOA-ON continues to host a webinar series providing a platform for presenting on scientific findings and new developments to ocean acidification researchers from around the world.

7. In order to ensure the engagement of the OA community throughout the year, IOC supported the organization of a third GOA-ON Ocean Acidification week in 2023.

8. IOC was invited to contribute with Ocean Acidification data to the *WMO Statement on the state of the Global Climate* published in April 2024.

9. The Ocean Teacher Global Academy (OTGA) online curriculum on ocean acidification is now undergoing the translation to French, to facilitate broader application. The OTGA Ocean Acidification course will next be used in trainings in Africa as part of IOC capacity development efforts in the region, bolstered by NORAD funding. IOC further works with partners to align and further advance ocean acification capacity development activities and participates in a new effort to define a ocean acification capacity development strategy with indicators of success, such as number of countries contributing to SDG 14.3.1. The product is expected be available end of 2024.

10. Since 2021, IOC, together with the GOA-ON, co-chairs the Ocean Decade Programme "Ocean Acidification Research for Sustainability" (OARS). The programme is structured around seven transformative outcomes and aims at providing systematic evidence of the impacts of ocean acidification on the sustainability of marine ecosystems, enhance research capacity, increase observations of ocean chemistry changes, improve communication to policymakers and communities by providing the information needed to mitigate and adapt to ocean acidification and to facilitate the development and evaluation of strategies to offset future impacts. Over the reporting period IOC co-coordinated the preparation of seven 'Outcomes' white papers, outlining the implementation strategy for OARS. These papers were published as IOC Technical Series, 185 in April 2024.

11. Together with partners from GOA-ON and OARS, IOC co-organized one of the discussion tables during the Earth Information Day World café, focusing on ocean acidification and deoxygenation. and four events during the UNFCCC COP28. The events helped to increase awareness of the impacts of ocean acidification on ocean and human health and to engage with new partners to advance the mission of OARS.

12. IOC continues to co-sponsor the Blue Carbon Initiative (BCI) with Conservation International and IUCN. The 15th annual meeting of the Scientific Working Group of the BCI was organized and held on 3–6 October 2023. A total of 105 people from 20 countries attended the meeting throughout the week (74% participants from the region and 52% women). Discussion topics included current scientific issues related to the blue carbon's role in climate action and what new information is needed to integrate blue carbon science in policymaking processes worldwide. The next meeting is scheduled on 2–6 September 2024 and will be held in Cape Town, South Africa. In July 2023, the BCI released an update of the Guidelines for Blue Carbon and Nationally Determined Contributions (Second Edition).

13. Together with Australia, IOC co-hosts the secretariat for the coordination of the International Partnership for Blue Carbon (IPBC). Partner and stakeholder engagement activities resulted in the growth of the partnership, which now has 57 Partners, of which 18 are Member States. Based on a

needs assessment and bilateral consultations with IPBC Partners carried out by IOC, an online knowledge exchange session on blue carbon in NDCs was planned and held in 2023, and at least three more are expected to be held in 2024. Additional learning and guidance materials were developed in collaboration with Partners and made available through a new online catalogue of resources, including a policy brief on actionable blue carbon ecosystems for climate mitigation and adaptation and an updated overview report on coastal blue carbon ecosystems in international frameworks and conventions. Collaboration among the IPBC and the secretariat of the High Level Panel for a Sustainable Ocean Economy resulted in the co-branding of the Ocean Panel Blue Carbon Handbook, released in June 2023. The next IPBC Partners Dialogue will take place on 1–4 October 2024 in Cairns, Australia. A key outcome of the last Dialogue in 2023 was the establishment of a High-Level Ambition Group (HILAG). The HILAG was initially conceived as an initiative of France and Conservation International at the One Ocean Summit in Brest in 2022, and will now be an integral part of the IPBC and jointly coordinated by France, Australia and IOC.

14. IOC is also part of the Steering Committee of the newly established Global Decade for Blue Carbon, which aims at connecting global blue carbon experts, deepening understanding of the ocean-climate relationship to mitigate the impacts of climate change, acknowledging broader ecosystem roles to address climate responses while supporting both people and biodiversity, producing innovative outcomes across estuarine, coastal, and open ocean environment, promoting nature-based solutions and effectively communicating and delivering outputs to policymakers and communities.

15. Several blue carbon events were organized at UNFCCC COP28 (30 November 2023–13 December 2024, Dubai, UAE raising the profile of blue carbon for climate action.

16. IOC continues to co-sponsor GESAMP Working Group 41 on Ocean Interventions for Climate Change Mitigations (formerly Geo-engineering in the Marine Environment), which provides for a continued interagency focus on the challenges and possibilities in marine geo-engineering (also referred to as ‘carbon dioxide removal and negative emissions techniques’). In its current phase, GESAMP WG 41 is focusing on wider societal implications of different marine geo-engineering approaches for the marine environment. This will include the development of an assessment framework that covers social, political, economic, ecological, ethical and other societal dimensions. IOC continues to facilitate the contribution of GESAMP WG 41 to the work of the UNFCCC related to ‘negative emissions’ (carbon removal and other similar techniques), as part of the mitigation element of the Convention’s programme of work. GESAMP WG 41 met in Copenhagen, Denmark, on 9–12 May 2023, hosted by IMO and the IOC Science and Communication Centre on Harmful Algae Blooms at University of Copenhagen.

Research on multiple ocean stressors and their effects on the world ocean

17. As reflected in the IPCC *Special Report on the Ocean and Cryosphere in a Changing Climate* and the Sixth IPCC Assessment Report (AR6), de-oxygenation is an emerging problem exemplifying the effects of climate change-induced ocean warming, and also related to eutrophication along coastal areas. IOC leads scientific and capacity development efforts related to deoxygenation, for the benefit of its Member States, through its working group on Global Ocean Oxygen NEtwork (GO_2NE). The GO_2NE series of regular webinars (28 webinars in total at April 2024) continues to be a huge success with on average 100 participants. Since November 2020 year scientists and other stakeholders from more than 90 countries joined the network.

18. Following the call for international programmes contributing to the United Nations Decade of Ocean Science for Sustainable Development (2021–2030), GO_2NE and its partners submitted the “Global Ocean Oxygen Decade” (GOOD) proposal. Actions and activities include raising global awareness about ocean deoxygenation, provide knowledge for action and develop mitigation and adaptation measures through local, regional and global efforts, including intensified monitoring, transdisciplinary research, bi-directional knowledge transfer among stakeholders and scientists, innovative outreach and ocean education and literacy. The high-level objective of the Ocean Decade

Programme is to provide data, knowledge and best practices to enable society, stakeholders, and scientists to co-design and develop measures that can mitigate the drivers and impacts of ocean deoxygenation and provide appropriate adaptation measures where mitigation is not possible.

19. In order to improve data availability and quality, GO_2NE continues to contribute to the planning of an ocean oxygen data portal is the GO_2DAT (Global Ocean Oxygen Database and Atlas).

20. Another activity in the framework of GOOD and GO_2NE including OARS was the support of IOC to the organization of a summer school, which took place in November 2023 in Chile. The Chile summer school provided a great opportunity for 33 young researchers from 17 countries to meet more than 15 world experts in their respective fields. The days were filled with presentations on different aspects of ocean acidification and deoxygenation as well as practical sessions on modelling, laboratory experiments, shipboard measurements and analysis, communication training (mostly scientific) and an introduction to ethics in science. The planning for the next edition in 2025, in Malaysia started.

21. The annual GO_2NE meeting took place just before the 2024 Ocean Decade Conference in Barcelona (8–9 April 2024). Together with the experts involved in GO2NE and partners, involved in a new joint GEF project 'Clean and Healthy Ocean Integrated Program', IOC also organized a satellite event, highlighting new approaches to combat eutrophication and hypoxia).

22. IOC finalized the implementation of a project aimed at furthering the scientific knowledge and capacity basis in the Canary Current Large Marine Ecosystem (CCLME) by focusing on invasive alien species and their connection with other ocean stressors. The project was funded by the Spanish Agency for International Development Cooperation (AECID) and implemented in partnership with the Spanish Institute of Oceanography (IEO-CSIC). Deliverables include a CCLME Alien Species Database, made available in a reviewed and upgraded CCLME Eco-GIS Viewer (http://www.ideo-cclme.ieo.es), as well as a regional training portal for the CCLME (http://cclme.training.ieo.es). Two virtual workshops were held to facilitate the scientific discussions during the reported period.

FUNCTION B: OBSERVING SYSTEM/DATA MANAGEMENT

Maintain, strengthen and integrate global ocean observing, data and information systems

23. The Global Ocean Observing System now numbers more than 8,600 *in situ* ocean observing platforms across 13 global ocean observing networks. GOOS networks are supported by 84 Member States, including 10 African States and nine Small Island Developing States, plus the European Union. In addition, there are over 600 biological/ecological observing programmes, operated by 71 countries as identified through the GOOS BioEco Portal.

24. However much of GOOS still remains a network of the willing, primarily driven from the scientific research community, relying often on short-term funding horizons and driven by inflation related pressures.

25. The Ocean Decade Vision 2030 Paper: Expanding the global ocean observing system called for new economic thinking around ocean observations, as it is clear that neither ocean science research budgets or the GDP to EEZ ratio of many countries, such as SIDS, will support the provision of the needed ocean data. Observations, data and co-design will be central to the successful implementation of global policy aspirations and national sustainable ocean-based economic development. GOOS must evolve to an operational and government-supported critical observing infrastructure, responsive to national needs, that includes public and private sector investment and collaboration.

26. The GOOS 2030 Strategy identifies 11 strategic objectives under three strategic goals: (i) deepening engagement and impact; (ii) System integration and delivery; and (iii) Building for the Future, with brief updates provided below. The GOOS management team, led by the Ocean Observations and Services Section of the IOC secretariat, Paris, with distributed team including at OceanOPS, IOCCP, WMO, NOAA and individual consultants, coordinates, integrates and advocates the work of GOOS in response to its mandate Resolution XXVI-8 (2011). The team is supported through contributions from UNESCO-IOC, WMO, the Scientific Committee on Oceanic Research (SCOR), USA, France, Australia, China, Canada, European Commission, United Kingdom, Japan, Germany, Italy, India, New Zealand, South Africa, and Monaco. The UNESCO-IOC secretariat staffing currently consists of: 3 professional (1 currently under recruitment as the post was created under the new 42C/5 budget) and 1 general service staff, as well as two further professional posts – a secondment supported by the Ministry of Natural Resources, China and a loan supported by NOAA (USA).

GOOS Strategic Goal 1: Deepening engagement and impact

27. The GOOS BioEco Portal has been expanded and now has metadata on some 600+ sustained Essential Ocean Variable (EOV) observing programmes. Additional funding has been secured to connect the BioEco Portal to IODE's ODIS architecture and provide helpdesk and community support, through the EU Projects Marco-Bolo and BioEcoOcean.

28. The Essential Ocean Variable (EOV) list has been extended and now identifies 35 EOVs. New variables include Marine Debris, Ocean Sound, and Bottom Pressure, with Turbulent Diapycnal Fluxes recently adopted as a pilot EOV. An authoritative paper on the GOOS EOV framework is currently in progress and will be published in 2024. Following the 2022 paper on the impacts of climate change on zooplankton, a paper detailing the 100 crucial questions to advance seagrass conservation and restoration efforts in Europe was published in early 2024, linked to work on the EOVs.

29. The 13th Session of the GOOS Steering Committee (SC-13, April 14–17, 2024, Barcelona, Spain) discussed progress across the GOOS Strategic Objectives provided in the *2030 Strategy*, the priority activities to focus on under these strategic objectives, as well as challenges and opportunities moving forward. The GOOS SC adopted the revised Terms of Reference (TOR) for the BioEco expert panel and the TOR of an Arctic Task Team which will engage with stakeholders including Indigenous communities towards developing a GOOS Regional Alliance for the Arctic region. Key outcomes of the GOOS SC included the decision to develop a global Ocean Carbon Observing plan (that takes into account the mandate to GOOS from the GCOS implementation plan, work of the Integrated Ocean Carbon Research working group and the Global Greenhouse Gas Watch Implementation plan); a biology and ecology observing plan; communications toolkit in line with the recommendation under agenda item 4.1; evolving a FAIR and technologically advanced GOOS digital ecosystem that connects the observations data and metadata across physical, bioggeochemical and biological realms. The SC also discussed how the GOOS Decade programmes Co-Design, CoastPredict and other initiatives within the Ocean Decade can transform GOOS and bring the value of ocean observations to the fore as part of the decade.

30. In April 2024 the Executive Secretary gave a keynote speech at a high-level session of the OECD's Committee for Science and Technology Policy Ministerial 'Protecting the future with science and technology': the ocean we want by 2030, the role of ocean observation data for research, growth, and wellbeing action and biodiversity calling for a critical national and global infrastructure to provide States with the information needed for ocean risk management, operational forecasting and a sustainable ocean economy. Furthermore, GOOS management team and the OECD collaborated on a paper outlining the value of Ocean Observations: *Socio-economic valuation of ocean observations: A new approach in modelling their value in decision-making* with colleagues at the University of New Mexico. The paper is now in final revision and will be published as an OECD Technical Report.

31. Advocacy for ocean observing has continued by the GOOS management team. This includes on observation and data needs for climate through the UNFCCC, biodiversity through the CBD and BBNJ, as well as within the Ocean Decade. The GOOS Steering Committee co-chairs presenting at the Earth Information Day organized under the UNFCCC Subsidiary Body for Scientific and Technological Advice to advise negotiations on research and systematic observation at COP27 in November 2022 and COP28 in December 2023. The IOC/GOOS team raised the profile of the ocean and the critical need for observations and advancing observing technology by contributing, with its partners, to the 2023 Informal Consultative Process on Oceans and the Law of the Sea, on the topic of Marine Technology, highlighting the GOOS-MTS-NOAA Dialogues with Industry as well as presenting at a number of international events and conferences, including Ocean Business 2023 and Oceanology International 2024. In November 2023, the GOOS management team presented an update of GOOS to the G7 Future of the Seas and Oceans Initiative Working Group, whose efforts to "sustain and enhance the Global Ocean Observing System (GOOS)" were endorsed by the G7 Science and Technology Ministers' Communique Sendai, May 12–14, 2023.

32. Drawing on the internal GOOS Communications Plan, which currently aims to both connect with the ocean observing community and to advocate for the critical need for ocean observing to government, policy, science, private sector, and coastal communities, in 2023 a total of 16 original GOOS articles were published and shared by GOOS and UNESCO-IOC news, 10 of which were published in external media (*Meteorological Technology International*, *ECO Magazine*) and resulted in follow-up interviews with journalists (*Marine Technology Reporter/New Wave Media, Meteorological Technology International*), or were published on partner/sponsor websites (World Meteorological Organization, Marine Technology Society). On social media channels, GOOS has 1,200 new followers on LinkedIn in 2024 and 717 new followers on X. Furthermore, The Ocean Observing System Report Card 2023 continues to be recognized as a key source of information on the status of the Global Ocean Observing System.

GOOS Strategic Goal 2: System integration and delivery

33. The Observations Coordination Group (OCG) is expanding to support three new 'emerging' networks: Smart Cables, the Fishing Vessel Observing Network (FVON) and SOCONET (Surface Ocean CO_2 Reference Observing Network). It is interesting to note that these new networks are taking advantage of existing infrastructure to expand ocean observing capacity. The USV (Unmanned Surface Vehicles) network is also developing towards 'emerging' status with support from the Ocean Decade OASIS Programme. Coordination and expansion of SOCONET, which provides the measurements used to produce ocean carbon flux estimates. The latter is also a key component of the WMO Global Greenhouse Gas Watch (G3W) Implementation Plan under consideration by the WMO Executive Council.

34. The GOOS (OCG) Cross Network Data Implementation Strategy (GOOS-296) was released in March 2024. The strategy aims to improve data and metadata flows towards ensuring that all ocean data under the Global Ocean Observing System is findable, accessible, interoperable and reusable (FAIR) across all 13 global ocean observing networks, and to ensure that all networks have clear data endpoints that can be harvested in future federated systems and for digital twins. The Implementation Strategy is in line with the IODE ODIS Architecture and the Ocean Decade Data, the Information Strategy from the Decade Data Coordination Group, the the WMO Global Telecommunications System (GTS) and the WMO Information System (WIS) 2.0.

35. The Expert Team on Operational Ocean Forecasting Systems (ETOOFS) is collaborating with the (UN Ocean) Decade Collaboration Centre (DCC) for Ocean Prediction in the creation of an Operational Readiness Level (ORL) for ocean forecasting. The ORL is a tool that serves system developers and users to assess the operational development status of an ocean forecasting system. It supports system managers in understanding the operational capabilities and pinpoint gaps that should be addressed to further mature a system. They are also collaborating on the preparation of an online atlas to map the ocean forecasting community and its assets. The *Guide on Implementing Operational Ocean Monitoring and Forecasting Systems* was published in September 2023.

GOOS Strategic Goal 3: Building for the future

36. The GOOS National Focal Point (NFP) community continues to develop with 76 GOOS NFPs now engaged. Two dedicated events were organized in 2023, an in person European NFP meeting taking advantage of the EuroSea Final Symposium September 2023 at UNESCO Paris, and the first GOOS National Focal Point (NFP) Forum, a virtual meeting in October 2023, attended by more than 60 NFPs. A number of NFPs are now exploring how to develop a national ocean observing committee and appropriate guidance needs to be explored to support NFPs in their role. As a start, GOOS has developed a package of NFP specific messaging. The second NFP Forum is scheduled to take place in October 2024.

37. A partnership with IMOCA sailing class and Vendee Globe Race (world class single-handed race) was signed at UNESCO-IOC in February 2024 with the objective to equip the 40 skippers of the 2024 'Vendée Globe Race' with on-board observing systems (weather stations as a standard minimal package) and increase this ambition in 2028 to ocean underway systems. Instruments and coordination (by GOOS/OceanOPS) will be funded by the race foundation and skippers.

38. February 2024 saw the release of the Dialogues with Industry Roadmap, a result of the groundbreaking collaboration involving GOOS, the Marine Technology Society (MTS), the National Ocean and Atmospheric Administration (NOAA), and industry representatives. GOOS and the Marine Technology Society (MTS) initiated the Dialogues with Industry—as forum for compact and meaningful dialogue with new and established companies, academia, and governments. The dialogues aim to highlight opportunities for the public and private sectors to work in partnership towards achieving a mature, vibrant ocean observing enterprise that will help accelerate the development of a thriving blue economy. The Roadmap identifies 26 high-priority action pathways across three key areas: Improving the Marketplace; Collaboration for Societal/Governmental Change; and Shaping the Future. MTS has received $4 million in funding from NOAA to contine to develop this joint initiative.

39. GOOS governance is discussed under Agenda item 4.1, including review of progress against the 2021 Neville Smith '*Report of the Study on Support Provided to Global and Regional Ocean Observing Systems*' and proposed actions moving forward.

OceanOPS – the GOOS Operations Centre

40. Supporting GOOS and the global networks, OceanOPS (formerly JCOMMOPS) located at Institut Français de Recherche pour l'Exploitation de la Mer (INFREMER), Brest, is pursuing the vision of its five-year Strategic Plan (GOOS-250 Report). The GOOS Observations Coordination Group (OCG) provides oversight and approval of OceanOPS work plan and budget and supports OceanOPS strategic planning and oversight of implementation. OceanOPS aims to become the international hub and centre of excellence that provides vital services in monitoring, coordinating, and integrating data and metadata, across an expanding network of global oceanographic and marine meteorological observing communities.

41. Financial trends in OceanOPS sustained stable income over the last five years show a downward trend in national contributions (for OceanOPS core and for network support services), this has been mitigated to some extent by an increase in OceanOPS integrated contributions from WMO and IOC. The OceanOPS income has been further supplemented by limited-lifetime projects and pilots, and a number of one-off contributions that have filled budget gaps in recent years. However, the core OceanOPS staff cost has grown in the past five years associated with IT support and to a much lesser extent with growing staff seniority and inflation. The cost of the staff exceeded the amount of stable income. The OceanOPS management board in December 2023 decided to seek enhanced contributions from sponsors and key supporters to mitigate this situation, but did not identify sufficient funding to prevent restructuring.

42. In early 2024, the OceanOPS management board began a restructuring of OceanOPS to match income trends and to better position it for the future. This decision has implications for the services that OceanOPS supports and for the organization itself. The aim is that the restructuring, although necessary, will position OceanOPS for a digital ecosystem future and for future growth. As part of the restructuring, the network technical expert staff has been reduced from three to two positions. This was discussed with the OCG networks at an OCG Roundtable call in March 2024.

43. OceanOPS intends to keep building its integrated team, including entraining in-kind remotely located technical/observing, and IT expertise. This strategy will be further reinforced through the establishment of Service Level Agreements (SLAs) with each network, which will be discussed at the OCG session in May 2024.

44. A fund-raising strategy is in development, which will consider the different sources, the messaging for OceanOPS, and the vital nature of its continued services for OCG networks and the global ocean observing system. OceanOPS needs a stable resource base from which to provide its services. Once the OceanOPS restructuring is complete, anticipated by September 2024, a request will be made to the IOC Assembly regarding direct funding and other models of contributions.

GOOS at the heart of the UN Ocean Decade

45. Expanding and sustaining the global ocean observing system is fundamental to achieving the ambition of the UN Decade of Ocean Science for Sustainable Development. The *Ocean Decade Vision 2030 Paper: Expanding the global ocean observing system*, referred to above, was presented at the Ocean Decade Conference in Barcelona in March 2024 and will be finalised in May 2024 in the IOC Ocean Decade issue, 50.

46. One third of decade programmes and projects encompass ocean observing. The Data Coordination Office (DCO) for Ocean Observing, based within the GOOS Management Team, unites a community of 11 Programmes and 91 Projects working collaboratively to expand, revolutionise and operationalize a truly inclusive ocean observing system, where both public and private sector entities collaborate to deliver tangible societal benefits. The three GOOS programmes *Observing Together*, *CoastPredict*, *Ocean Observing Co-Design* share a vision for a co-designed and integrated ocean observing and forecasting system.

47. The Ocean Observing Co-Design Programme is working with modelling and user stakeholders to co-design integrated observing system and information delivery. Co-Design has been advancing the six initial Exemplar Projects, the most mature of these are Tropical Cyclones, with 3 pilot areas, experiments underway, and engagement with WMO, Carribbean, Pacific Islands and China, and Boundary Currents which will host a first workshop in September 2024 in South Africa, hosted by and supported by the DCC Ocean Climate Nexus. The Carbon Exemplar is focused on defining what observations are required for climate projections, and for the baseline carbon observations that governments and industry need if mCDR is to be considered.

48. The CoastPredict Programme is focused on advancing observing and forecasting in global coastal regions around the world to meet climate, weather and ocean risks, and to provide coastal communities with the information services they need to adapt. The GlobalCoast Initiative, the framework for the implementation of CoastPredict, has 125 pilot sites identified and plans for a GlobalCoast digital infrastructure, and a core collaboration with Fugro to support future public and private service delivery.

GOOS Regional Alliances

49. The GOOS Regional Alliances (GRAs) serve as the focal points for ocean observing system needs. The GRAs deliver the benefits of GOOS's strategy, structure, and programmes at a regional, national and finally global level.

50. The GRA Forum, held 8–9 April 2024, gathered the leadership of the GRAs from across the world, and other experts gathered for the Ocean Decade conference, to share experiences, best practices, discuss regional collaboration and strengthening the role of GRAs within GOOS. A new Vice Chair was elected, Alvaro Scardilli from Argentina was unanimously voted in.

51. In order to optimise delivery of the UNESCO-IOC 42 C/5 Approved budget contributions to revitalise GRAs in the Pacific Islands, Africa, Indian Ocean, and the Caribbean, project plans are being developed for these GRAs. NORAD funding has also been secured as additional support for GOOS-Africa.

The IODE/GOOS Ocean Best Practices System (OBPS)

52. The IODE-GOOS Ocean Best Practices System (http://www.oceanbestpractices.org) (OBPS) are a fundamental element for system integration, efficiency, and interoperability. OBPS has significantly increased the visibility of best practices in the last years and there are now over 2020 best practices archived, with 9 GOOS Endorsed Best Practices. The OBPS held its annual Workshop in November 2023 to focus on the next frontiers in best practices.

53. The OBPS continued gaining support across ocean disciplines and users as it moved further in its strategy of providing visibility and discovery of known methods (including best practices and standards), facilitating transparency and trust of information and improved global level interoperability. To further global interoperability, OBPS established a Task Team to adapt best practices to regions of limited infrastructure, initially focused in Africa. A second phase has begun in the Caribbean, supported by NORAD funding through IOC, to deliver trainings and build capacity on developing and implementing best practices jointly with OTGA. The global user base brings the need for access to best practices in multiple languages; automated translations are being tested to expand OBPS services. The growth in repository records means users ask what practice to choose in various situations. Supplementing the OBPS/GOOS Endorsement process, a new Task Team on Decision Trees is looking to provide guidance on how to design a tree to be effective in selecting applicable best practices.

54. OBPS is engaging with multiple Ocean Decade initiatives and programmes, for example, the Ocean Prediction Decade Collaborative Centre and programmes such as Coast Predict and MarineLife 2030. As the Ocean Decade has affirmed, ‘best practices are essential for moving towards managing the ocean sustainably on the basis of capable ocean science.’ Participation in international projects EUROSEA; JERICO-S3 and ILIAD (a Digital Twin of the Ocean project), and the NSF Research Coordination Network has supported technology growth in the OBPS in areas such as the federated network, language support as well as engaging traditional knowledge holders

55. Focusing on diversity and inclusion, OBPS introduced a global ECOP Ambassador programme as well as expansion of the geographic representation in the OBPS governance. Success stories are emerging with one of the ambassadors receiving international recognition and the implementation of national level best practices in Australia and elsewhere.

Ocean observing in areas under national jurisdiction

56. The Working Group on Ocean Observations under Areas of National Jurisdiction was established in December 2023 after nominations were received following requests through circular letter, 2971. The Working Group has met monthly for the past six months and have a report. As requested by IOC Decision A-32/4.8.2, the working group has provided a progress report of progress, discussed under agenda item 4.2 at EC-57.

Joint WMO-IOC Collaborative Board

57. In 2019, IOC Resolution XXX-2 mandated the creation of a Joint WMO-IOC Collaborative Board (JCB) and provides the terms of reference. IOC Decision A-32/4.9 requested the Executive

Secretary to oversee the Joint WMO-IOC Collaborative Board self-evaluation review of performance, and report back with the findings to IOC Executive Council in 2024. Current and former members of the JCB met virtually in February 2024 to complete a self-review, guided by an online survey, as well as consider joint priorities moving forward. The review of performance is available in IOC/INF-1536.

The IODE Network

58. The IODE network now includes 102 ocean data centres: 60 are National Oceanographic Data Centres (NODCs) (of which 11 are IODE accredited) and 42 Associated Data Units (ADUs) (2 are IODE accredited). Twenty (20) of the data centres are in Africa, 11 in Latin America/Caribbean and 10 in the WESTPAC region. Five (5) are in SIDS. In addition, there are Associated Information Units (AIU). Overall, 65 Member States have one or more NODCs or ADUs. There are 91 IODE national coordinators for data management and 42 IODE national coordinators for marine information management.

IODE Contribution to the UN Ocean Decade

59. IODE currently leads six Decade Actions:

- environmental-DNA expeditions in marine World Heritage sites;
- Ocean Best Practices for the Decade;
- OceanTeacher Global Academy: Building Capacity and Accelerated Technology Transfer for the Ocean Decade;
- Pacific Islands Marine Bioinvasions Alert Network (PacMAN);
- OceanData 2030; and
- OBIS 2030.

60. In addition, several projects were submitted by partners in cooperation with IODE: (i) the World Ocean Database Programme (WODP): Openly discoverable, accessible, adaptable, and comprehensive digital global profile oceanographic data of known quality (USA); (ii) CoastPredict – Observing and Predicting the Global Coastal Ocean (Italy); (iii) Ocean Observing Co-Design: evolving ocean observing for a sustainable future (GOOS); and (iv) Marine Life 2030 (USA).

61. The IOC Project Office for IODE, Ostend (Belgium) hosts the Decade Coordination Office for Data Sharing (DCO Ocean Data Sharing) since 1 June 2023. The DCO Ocean Data Sharing acts as sub-unit of the central Decade Coordination Unit to catalyse and coordinate Decade Actions falling under its scope to develop and maintain the data sharing component of the Decade, assist Decade actors with data and information challenges and opportunities, promote cooperation amongst UN and Member State partners in relation to data-sharing, monitor progress, communicate on achievements and mobilise resources to advance data-sharing and data-management practices in the Decade. In its first year of operation, the DCO has, among others, developed a website (https://oceandatasharing-dco.org) with resources to assist Decade Actions including a Data Resources Toolkit and a virtual Data Helpdesk. The DCO also supported Working Group 8 of the Ocean Decade Vision 2030 process which culminated in White Paper 8 ('Creating a digital representation of the Ocean'). The DCO has worked closely with the IODE team and its programme components to strengthen the capacity and digital literacy of the Decade community to work towards FAIR data sharing accross its data and information ecosystem. Together with the DCU, the DCO mobilized funding for a period of 24 months from ENGIE Foundation for the further development and continuation of the DCO beyond the initial 11 months which ends on 30 April 2024.

62. Together with Seabed 2030, the Ocean Data Sharing DCO co-organised an Ocean Data Helpdesk at the 2024 Ocean Decade Conference in Barcelona, Spain from 10 to 12 April 2024. The data-sharing help desk ran throughout the duration of the 3-day conference focusing on showcasing existing data management and sharing initiatives and developments, and providing expert support

and guidance on access to resources on ocean data sharing. The Data Helpdesk and demonstrations attracted a continuous stream of interested participants both looking for support on how to share their data and information as well as guidance on where to find existing open data in the currently very fragmented ecosystem of local and thematic ocean data repositories. Direct connections were made between a number of Decade Actions seeking support with data management and IODE Actions mentioned above, including OGTA, OBIS, and Ocean Data 2030.

63. IODE Secretariat staff and Member State experts have also contributed to the Vision 2030 process and more particularly to White Papers 2 and 8. The resulting paper entitled 'Challenge 2: Protect and Restore Ecosystems and Biodiversity – 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' proposes the volume of data in IODE/OBIS as a Decade indicator and calling on every National Decade Committee or regional group to identify a process or strategy for collecting and publishing data on core marine life and ecosystem variables through existing, interoperable, international information systems, such as the IODE/OBIS. The resulting paper entitled 'Challenge 8: Creating a Digital Representation of the Ocean – 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'. It refers specifically to the Ocean InfoHub (OIH) and Ocean Data and Information System (ODIS) and for coordination with the IODE network of ocean data centres.

64. IODE continued to support the GOOS BioEco panel (BioEco portal), GOOS/IODE Ocean Best Practices System (OBPS), GOSR, StoR, HAB (HAEDAT, Toxin DB, HAIS, GHSR), GO_2DAT and SDG Indicator 14.3.1 (OA portal); as well as more broadly the implementation of the *IOC Capacity Development Strategy* through its OceanTeacher Global Academy (OTGA) project (see also below and under Function F). Cooperation has also been enhanced with the regional sub-commissions with the co-design and implementation of activities that respond to the regions' work plans.

The Ocean Biodiversity Information System (OBIS)

65. The IODE/OBIS database has continued to grow, now incorporating one new dataset daily and 1 million new marine species observations each month. OBIS presently integrates over 5,000 datasets, encompassing more than 125 million observations representing 180,000 marine species (constituting 75% of all described species). Of these, 23 million records are based on DNA sequences. These data have been provided from over 1,000 institutions across 99 countries, including 16 from Africa and 21 Small Island Developing States (SIDS) with SIDS alone contributing 1 million records in 2023. The OBIS network comprises 33 national, regional, and thematic nodes, as either IODE NODCs or ADUs.

66. The Republic of Korea OBIS node was reactivated in 2023 and is now hosted by the National Marine Biodiversity Institute of Korea, which also hosted the 12th session of the IODE Steering Group for OBIS, 25–29 March, 2024. During this session, the SG-OBIS agreed on a new priority strategy and management structure to align with the new Rules of Procedure for IODE Programme Components, Programme Activities, or Projects. Accordingly, OBIS has decided to concentrate on two thematic areas: a) data mobilization; and b) data application, establishing a data coordination group and a product coordination group to address these priorities, respectively. For data application (Area B), OBIS is developing a data products portal comprising an online virtual laboratory and a products catalogue. Additionally, a nodes coordination group has been formed to facilitate discussion among OBIS nodes on ongoing activities, priorities, and challenges, while the OBIS steering group will concentrate on business and strategy. OBIS nodes have been given a broader mandate extending beyond data publication, encompassing a mentoring role for data holders in their respective areas, enabling them to directly publish biodiversity data into OBIS and GBIF but potentially needing support in adhering to marine-specific data requirements. An OBIS All Hands meeting will convene biennially to unite the extensive OBIS community of practice. These

coordination and community engagement activities will be reinforced by the employment of a part-time staff member (consultant), made possible by the increased regular programme funds. The SG-OBIS has also crafted a communication plan and allocated a budget to develop and disseminate branding materials. Furthermore, the SG-OBIS has revised and adopted new guidelines on data sharing and usage in OBIS to align with the new IOC Data Policy and Terms of Use (https://manual.obis.org/policy.html).

67. The two global biodiversity data networks, OBIS and the Global Biodiversity Information Facility (GBIF) have had an ongoing cooperation agreement since 2014. However, to effect tangible progress, they have formulated (February 2024) and endorsed a joint marine strategy and action plan to achieve the following objectives by 2030:

- The best available marine biodiversity data, respecting FAIR and CARE principles, is available to meet the needs of relevant users, supporting the goals and targets of the UN Ocean Decade, including the OBIS 2030 UN decade project, the Kunming-Montreal Global Biodiversity Framework, the 2030 Agenda for Sustainable Development, the future UN High Seas Treaty, global assessments (e.g., IPBES, UN World Ocean Assessment) and other international policy objectives.
- Marine biodiversity data is securely archived, and our respective networks persist and can operate sustainably into the future.

68. 32.With the increased 2024–2025 regular budget, OBIS has secured an additional $2 million in project funding (for 5 Horizon Europe projects and 2 FUST projects), allowing to recruit 6 new staff members (3 project appointments and 3 consultants), of which two eDNA experts, a modeller, a stakeholder engagement officer, a training officer, and a data manager.

The Ocean Data and Information System (ODIS) and Ocean InfoHub (OIH)

69. The ODIS Catalogue of Sources (ODISCat) (http://catalogue.odis.org) is an online browsable and searchable catalogue of existing ocean related web-based sources/systems of data and information as well as products and services. The content of the catalogue has continuously been growing andcontains now 3,105 entries of on-line content sources covering 16 content types. 2,179 of those entries have already been quality controlled and this quality control process will continue in the future. ODISCat is the starting point for discovering sources that are compliant with the ODIS-Architecture that is defined in the Ocean InfoHub project.

70. The Ocean Data and Information System (ODIS) is a federation of independent data systems coordinated by the International Oceanographic Data and Information Exchange (IODE) of UNESCO-IOC. This federation includes continental-scale data systems as well as those of small organisations. ODIS partners use web architectural approaches to share metadata describing their holdings, services, and other capacities. While ODIS has initially focussed on ‘partners associated with IOC’ this has been expanded, considering the partnership established under the UN Decade of Ocean Science for Sustainable Development. As such ODIS will become a key contribution to the data chapter of the Ocean Decade implementation plan.

71. The Ocean InfoHub (OIH) Project (https://oceaninfohub.org/) is a four-year project (ending June 2024), funded by the Government of Flanders (Kingdom of Belgium). The aim of the project is to support the initial development of the Ocean Data and Information System architecture (ODIS-Arch), as well as develop communities of practice (information systems and their end users) in three pilot regions: Africa; the Latin America and Caribbean region; and the Pacific Island Developing States. Thus, it aims to improve access to global ocean information, data and knowledge products for management and sustainable development.

72. Since June 2020, three regional communities of practice (Africa, Latin America and the Caribbean, and the Pacific Small Island Developing States) have been established, and Steering Group meetings have been held over three sessions. An expert technical working group has grown,

now with over 120 technical experts from partner projects and pilot regions, with technical working platforms on Slack and Github. The global ODIS-architecture has been established, and proof-of-concept achieved with over 20 partner organisations. The documentation for the ODIS-architecture is openly available online https://book.oceaninfohub.org/index.html.

73. Many partner organizations (working spreadsheet available here) are working with the project to demonstrate proof-of-concept of the ODIS architecture. Twenty-five (25) Project partners are fully operational nodes in ODIS and are contributing openly discoverable content to the Ocean InfoHub knowledge graph. An Ocean InfoHub Global Search portal was developed as a demonstration of ODIS (https://oceaninfohub.org) to improve and refine services offered. The portal currently contains over 130,000 content items in eight content categories: (i) Experts (27,000); (ii) Institutions (13,000; (iii) Documents (42,000); (iv) Training (1,500); (v) Vessels (113); (vi) Projects (3,600); (vii) Datasets (49,000); and (viii) Spatial data (42,000). 1-1 Training was provided to new partners joining ODIS.

74. Other UN agencies, global data systems, and initiatives in other domains and sectors have expressed an interest in adopting the ODIS technology. Interoperability solutions are discussed with the Group on Earth Observations Biodiversity Observation Network (GEO BON), the Helmholtz Metadata Collaboration (HMC), the Earth Science Information Partners (ESIP), and the Polar Data Discovery Enhancement Research (POLDER) project). OIH/ODIS is also a case study in the ongoing WorldFAIR project representing the ocean domain in a constellation of 11 case studies.

FUNCTION C: EARLY WARNING AND SERVICES
Develop early warning systems and preparedness to mitigate the risks of tsunamis and ocean-related hazards

75. Function C centres around four main programmatic components: (i) the global Tsunami Warning System; (ii) the Global Sea Level Observing System (GLOSS); (iii) Operational Ocean Forecast Systems services under the Joint WMO-IOC Collaborative Board; and (iv) the Harmful Algal Bloom programme.

76. The Tsunami programme kept its strong capacity development focus in all ocean basins with active support by Member States. A relevant cooperation fact for this biennium is the renewal (2023–2027) of the Partnership Agreement with the Agency for Meteorology, Climatology, and Geophysics of Indonesia hosting the Indian Ocean Tsunami Information Centre (IOTIC), with the Coastal Zone Management Unit (CZMU) of Barbados to host the Caribbean Tsunami Information Centre (CTIC) 2024–2029 and with the Bureau of Meteorology (Bureau) of Australia, hosting the Indian Ocean Tsunami Warning and Mitigation (IOTWMS) Office in Perth, Australia 2023–2027. On operational aspects the programme published the UNESCO-IOC Technical Series, 183, *Monitoring and Warning for Tsunamis Generated by Volcanoes*. On community preparedness the Tsunami Ready Recognition Programme also continued to expand, with over 50 communities now recognized in 24 Member States.

Tsunami Warning Systems

77. The main elements of the Tsunami Programme focus on: (i) secretariat support to the four regional Intergovernmental Coordination Groups (ICGs) and respective technical working groups and task teams under the four regional Tsunami Warning and Mitigation Systems in the Caribbean (CARIBE-EWS), Indian Ocean (IOTWMS), Pacific (PTWS) and North-Eastern Atlantic, Mediterranean and Connected Seas (NEAMTWS), as well as the Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG) which addresses inter-ICG and cross-cutting coordination and harmonization; (ii) preparedness and awareness courses and workshops; and (iii) enabling research and policy development. The 17th meeting of the TOWS-WG was held on February 2024 (Cf. IOC/TOWS-WG-XVII/3).

78. In the Caribbean, the seventeenth Session of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS XVII) took place in Managua, Nicaragua on 6–9 May 2024.

79. In the Indian Ocean region, the ICG/IOTWMS Steering Group held an intersessional meeting in Hyderabad, India during 5–6 February 2024. The Steering Group reviewed the workplan activities and actions including contributions to the UN Ocean Decade Tsunami Programme and planned for the upcoming Global Symposium for the twentieth Commemoration of the Indian Ocean tsunami (Banda Aceh, 11–14 November 2024) and fourteenth session of the ICG/IOTWMS (tbc on 16–19 November 2024).

80. In the NEAMTWS region the Eighteenth Session of the ICG for the Tsunami Early Warning and Mitigation System in the NEAMS was held at Headquarters, Paris, France on 6–8 February 2024. The hybrid session was attended by 68 participants from 15 Member States and by 4 observers including a representative of EU DG ECHO, DG DEFIS and the chairperson of ICG/CARIBE EWS and PTWS. This was the first in-person meeting of the ICG/NEAMTWS since 2019 due to the COVID-19 pandemic and other unforeseen reasons from regional conflicts. New ICG/NEAMTWS Chairperson and vice Chairpersons were elected for the period 2024–2025. A new Task Team on Non-Seismic Tsunamis was also established.

81. Several other intersessional working group and CoastWAVE project (EU DG ECHO funded) related meetings have been organized by the Secretariat for the ICG/NEAMTWS including: Tsunami Ready Recognition Programme (TRRP) online training workshop, February 2023 attended by 48 experts; ICG/NEAMTWS Steering Committee April 2023; ceremony side event to launch NEAMTWS 2030 Strategy at UNESCO Headquarters, Paris, April 2023;J oint meeting of Task Team on Operations and Task Team on Documentation, October 2023; side event on Building Coastal Resilience to Sea Level related hazards at COP28, Dubai, 5 December 2023 co-organized with the National Institute of Oceanography and Fisheries (NIOF), Egypt and other international partners. Several other workshops and trainings have also been carried out in the CoastWAVE project countries on tsunami Standard Operating Procedures, the development and validation of tsunami evacuation maps and the Tsunami Ready Recognition Programme in 2023.

82. A satellite event on “Coastal Cities and Communities Joining Tsunami Ready” was also recently organized at the 2024 Ocean Conference in Barcelona on 11 April 2024, convening 13 experts and key community stakeholders from the Northeastern Atlantic and Mediterranean, Caribbean, Pacific, and the Indian Ocean regions to share experiences and insights on enhancing community resilience and call for other countries and communities to join the initiative to address Ocean Decade challenge 6 on Increase Communities Resilience to Ocean hazards.

83. In the Pacific Ocean, the 30th Session of Intergovernmental Coordinating Group for the Pacific Tsunami Warning System (ICG/PTWS-XXX) was organized in Nuku’alofa, Tonga on 11–15 September 2021 (81 participants, 25 Member States). At this session, the ICG/PTWS established a Working Group-2 (WG2) Tsunami Detection, Warning and Dissemination Task Team on Tsunami Generated by Volcanoes (TGV), a WG2 Task Team on Forecasting from Ocean Observations (TT-FOO), and a Working Group-3 Disaster Risk Management and Preparedness (WG3) Task Team on Tsunami Ready.

84. The Eleventh Meeting of the ICG/PTWS Regional Working Group on Tsunami Warning and Mitigation System in the South China Sea Region (ICG/PTWS-WG/SCS-XI) took place in Guanzhou China on 25–26 September 2023 (13 participants, 4 Member States).

85. The Ninth Meeting of the ICG/PTWS Pacific Island Countries and Territories Regional Working Group on Tsunami Warning and Mitigation System – Task Team Seismic Data Sharing in the Southwest Pacific was conducted on December 2023 following the meeting of the 8th Meeting of the Oceania Regional Seismic Network (ORSNET).

86. An online ICG/PTWS Steering Committee meeting took place in March 2024, and two ICG/PTWS Officers Meeting were organized in December 2023 and April 2024, respectively.

87. The seventh Meeting of the Regional Working Group for Central America of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS) was held in Managua, Nicaragua, on 10 May 2024.

88. Both in the Pacific and the Caribbean, Member States were invited through Circular Letters to nominate experts to the Working Groups and Task Teams of both ICGs, with the principal aim of better facilitation of Technical Secretarial support to them by the IOC Tsunami Resilience Section.

Tsunami Preparedness Exercises

89. Tsunami exercises and drills help to increase tsunami preparedness and awareness of coastal communities. Regular exercises are essential to maintain operational readiness of response agencies and exercises test communications, review agency standard operating procedures, and promote emergency preparedness.

90. The CARIBE WAVE 2024 regional Exercise for the Caribbean and adjacent regions was conducted on 21 March 2024. Two hypothetical scenarios were simulated for CARIBE WAVE 23, a tsunami generated by a magnitude Mw 8.7 earthquake located in the Puerto Rico Trench, and a tsunami generated by a magnitude Mw 8.47 earthquake located in the North Panama Deformed Belt. It was up for each of the 48 Member States and Territories to choose between the two scenarios and decide the level of participation and activity for their country. Almost 700.000 people registered in the TsunamiZone, including citizens, experts and government officials participating across 32 Caribbean countries and 16 territories. Most participants from across the region were from K-12 schools, local/federal/national government agencies and preparedness organizations. This annual exercise has been improving and validating tsunami readiness since 2011.

91. Exercise Indian Ocean Wave 2023 (IOWave23) was conducted during 4–25 October 2023 with participation of at least 19 Member States. While all involved National Tsunami Warning Centres (NTWCs) and Disaster Management Organisations (DMOs), it was encouraging also to see exercising down to community level in 8 Member States, including specific testing of the UNESCO-IOC Tsunami Ready indicators in at least seven Member States. Around a total of 45,000 people participated in evacuation drills, including all genders, children, elderly, and people with disabilities. The webinar on ‘Lessons Learnt during Exercise Indian Ocean Wave 23’ was held during 12–13 December 2023.

92. In the NEAM region, NEAMWave23 exercise was conducted on 6–7 November 2023. Exercises were conducted for the first time within NEAMWave23 at the local community level in Cyprus, Egypt, France, Greece, Italy, Malta, Morocco, Portugal, Spain and Türkiye. NEAMWave23 simulated two exercise scenarios. The Emergency Response Coordination Centre (ERCC) of the European Commissions of Civil Protection Mechanism also supported the exercise playing the role of providing International Assistance to countries that requested assistance.

Significant Tsunami Events

93. In the Pacific, on 1 January 2024 at 07:10 UTC an earthquake with Mw 7.5 occurred 42 km NE of Anamizu, western part of Japan, at a depth of 10 km. Tsunami messages were issued by the PTWC, starting with a first message 11 minutes after the earthquake origin time indicating the possibility of hazardous tsunami waves from this earthquake within 300 km of the epicenter along the coasts of Japan. Following this, less than 1 metre tsunami observations at various sea-level stations were reported by the PTWC, whereas Japan Meteorological Agency (JMA) reported greater than 1.2 metres wave heights at Wajimako sea-level station. While this event was located very closely to the presumed epicenter of the 26 November 1614 Mw 7.7 earthquake which is associated with 100-1000 casualties from both earthquake and tsunami, no tsunami related casualties were

reported. Additionally, there appears to be a coastal landslide triggered by the earthquake but their possible contribution to the observed tsunami requires further scientific investigation. According to the central government, tsunami waves swept across some 190 hectares of land in three municipalities. Chief Cabinet Secretary Yoshimasa Hayashi said at a press conference that breakwaters were damaged at least in seven beaches hit by tsunami waves. A Team of Kyoto University's Disaster Prevention Research Institute estimated tsunami at least 4.7 metres high hit the Misakimachijike district of Suzu, which is close to the tip of the Noto Peninsula. Almost all homes in that district were damaged, some totally. But while a tsunami as high as 5.1 metres reached the Akasaki and Shishizu districts of Shika on the west coast of the Noto Peninsula, the damage was limited because seawater only flowed within a very narrow band. According to an on-site survey conducted by the Japan Meteorological Agency, the maximum run-up height was preliminary measured to be 5.8 metres in Joetsu, Niigata Prefecture.

94. In the Pacific, on 2 April 2024 at 23:58 UTC, an earthquake of magnitude 7.4 occurred in the Taiwan Province of China at a depth of 35 km. This is an inland event at less than 2 km from the nearest coast. PTWC issued tsunami information messages, starting with a first message 11 minutes after the earthquake origin time indicating that hazardous tsunami waves are possible for coasts located within 300 km of the earthquake epicenter. Tsunami waves were observed at Taiwan, China coasts near the earthquake epicenter and Okinawa Islands, Japan. The largest tsunami was observed at Hualien, Taiwan, China 10 minutes after the earthquake with 1 metre wave height. 30 centimeters wave heights observed at Okinawa Islands, Japan.

Tsunami Ready Recognition Programme

95. In the Caribbean, there are 17 recognized Tsunami Ready (TR) communities. Christ Church West (Barbados) and St. George (St. Vincent and the Grenadines) were recognized as Tsunami Ready in 2023, and St. George's (Grenada) and Porters, St. James to Lazaretto, St. Michael (Barbados) significantly advanced towards becoming Tsunami Ready. Further Tsunami Ready recognition related efforts are in place for six other communities within Dominica, Dominican Republic, Jamaica, Saint Lucia, and Trinidad and Tobago. The Tsunami Ready renewal process has been launched in Anguilla in March 2024. Expression of interests for TRR were received from Belize and Porters to St. Michael Northwest in Barbados.

96. In the Indian Ocean, the programme continues to gain momentum with two communities in India and 10 communities in Indonesia receiving Tsunami Ready recognition from UNESCO-IOC. In addition, up to a further 100 communities are in the process to become Tsunami Ready recognized in Indonesia and India. Maldives, Seychelles, Sri Lanka, and Thailand have also expressed interest in implementing TRRP. The Indian Ocean Tsunami Information Center (IOTIC) in conjunction with Working Group 3 conducted national Tsunami Ready training in Timor Leste (July 2023) and Seychelles (November 2023). The ICG/IOTWMS Working Group 3 on Tsunami Ready Implementation met online (24 August 2023) and in-person in Hyderabad, India (7 February 2024). Indian Ocean Member States have been requested through Circular Letter, 2978 (18 December 2023) to establish a National Tsunami Ready Focal Point for the ICG/IOTWMS. To date, nominations have been received from 9 Member States.

97. In the Pacific, Fiji, Republic of Marshall Islands (RMI), Federated States of Micronesia (FSM) and Palau developed in 2023 capacities for tsunami hazard assessment with support from USAID, ITIC. Sila and Navuevu communities in Fiji are officially recognized Tsunami Ready in 2023 and work is in progress towards Tsunami Ready Recognition of seven communities in Solomon Islands. Chuuk and Pohnpei communities of the FMI have been recognized as Tsunami Ready in April 2024 and expression of interests for Kosrae and Yap communities were received in March 2024. Under the guidance of Tonga 2021 DRM Act, the establishment of the National Tsunami Ready Board (NTRB) was submitted to the Minister and Cabinet for endorsement via the National Disaster Risk Management Committee in April 2024. A National Stakeholder Workshop on UNESCO/IOC Tsunami Ready Programme will be held in Vanuatu on 20th May 2024.

98. Cannes Municipality (Alpes Maritimes, France) and the Municipality of Büyükçekmece, (Türkiye) have emerged as the first two communities to have been awarded the Tsunami Ready Recognition on 19th January and 15 March 2024 in NEAM region. Several other communities are progressing towards establishing UNESCO-IOC Tsunami Ready communities in Cyprus (Larnaca), Egypt (Alexandria), Greece (Samos), Italy (Minturno, Palmi, Marzamemi, Otranto and Stromboli), Malta (Marsaxlokk), Morocco (El Jadida), Portugal (Loulé), and Spain (Chipiona). Israel has also submitted their application to be recognized as UNESCO-IOC Tsunami Ready (entire coast).

99. In the NEAM region, a new two-years DG-ECHO funded CoastWAVE Project–Phase II (CoastWAVE 2.0) project targeting eight countries was approved in December 2023. The new project will officially start on 1 July 2024 on 'Scaling-Up and Strengthening the Resilience of Coastal Communities in the North-Eastern Atlantic and Mediterranean Regions to the Impact of Tsunamis and Other Sea Level-Related Coastal Hazards'. The new project aims to build collective and common capacities in tsunami hazard assessment and evacuation mapping using probabilistic and or deterministic approaches. It will track changes in the level of tsunami awareness and risk perceptions. The project will install additional tsunami detection, monitoring, and alerting systems. It will scale up UNESCO-IOC Tsunami Ready Recognized communities in existing and new countries, as well as synergies actions, where possible within existing coastal resilient initiatives (e.g. Making Cities Resilient 2030, Ocean Decade Challenge 6 on increase resilience to ocean hazards). A key outcome is to engage and create dialogues with multi-stakeholders and users involved in coastal resilience in a multi-hazard/risk context with the aim to create shared prevention and resilient preparedness for ocean related hazards to reduce their impact through better understanding and integration of tools, strategies and polices.

Targeted capacity development and technical assistance

100. The UNESCAP-funded project 'Strengthening Tsunami Warning in the North-West Indian Ocean through regional Cooperation – Phase 2c' was launched on 15 November 2023 through an online webinar. The project involves India, Iran and Pakistan with Oman and United Arab Emirates participating on a self-funded basis. The new phase focuses on capacity building through the development of tsunami inundation and evacuation maps for pilot communities of the North-West Indian Ocean Member States. The project serves as a platform for the UNESCO-IOC Tsunami Ready Recognition Programme and the United Nations initiative of 'Early Warning for All' by 2027. Joint training workshops on inundation mapping and evacuation planning took placed 21–25 April 2024 in Muscat, Oman.

101. The 8th Joint IOC ICG/PTWS – IUGG Joint Tsunami Commission (JTC) Technical Workshop on Understanding and Lessons Learned from Tsunami Generated by the Hunga Tonga – Hunga Ha'apai Volcano Eruption on 15 January 2022 took place on 11 September 2023 in the fringes of ICG/PTWS-XXX.

102. PTWC Procedures and PTWS Products for Hunga Tonga – Hunga Ha`apai (HTH) Volcanic Tsunami Hazard Response were published (IOC Technical Series, 188) in 2024. Noting that the HTHH event in 2022 which generated a tsunami causing widespread damage locally, regionally and throughout the Pacific was an unprecedented event not only for the PTWC but also for all Tsunami Warning Centers whose warning procedures and products were designed for earthquake-generated tsunamis, accounting for almost 90% of past tsunami events worldwide, these procedures and products will allow the PTWC and its stakeholders to improve their response capabilities to address the possibility of future tsunamis originating from volcanic eruptions or associated processes at the HTHH.

103. In March 2024, Tonga Meteorological Service, Geohazards Management Unit of Natural Resources Division and the National Disaster Risk Management Office (NDRMO) reviewed, aligned and updated their tsunami warning and response SOP involving over 20 government officials.

104. A Tsunami Evacuation Workshop was organized in San José, Costa Rica, 22–25 April 2024 bringing together some key actors from Latin American countries with a Pacific coast to exchange advances associated with tsunami evacuation in areas such as technology, modeling, communication, warning systems, community organization, associations/partnerships, and training needs at different levels. Around 30 experts from 12 Member States in Central and South America representing their functions in the national tsunami warning systems and disaster/emergency operations. The workshop, organized by the Florida International University Extreme Events Institute (FIU-EEI) Disaster Risk Reduction and Resilience program and the United States Development Agency's Bureau of Humanitarian Affairs (USAID/BHA), in close coordination with the National Tsunami Monitoring System of Costa Rica (SINAMOT) and Tsunami Resilience Section of IOC-UNESCO (IOC/TSR), emphasized areas with greater development and challenges that remain, focusing on the promotion of cooperation between the participating countries.

105. An Expert Meeting on Tsunami Sources, Hazards, Risk and Uncertainties Associated with Vanuatu, San Cristobal and New Britain Subduction Zones was organized (in a hybrid mode) in Port Vila, Vanuatu, on 14–17 May 2024, bringing 18 Experts and 8 observers from 10 Member States together to quantify earthquake sources that can generate dangerous tsunamis and to directly support community hazard assessments and evacuation planning that are part of the implementation of the Tsunami Ready Recognition Programme in the Pacific Island countries and territories.

106. An online training for seismic and tsunami warning operators in the South China Sea region on theories, applications and operations of tsunami numerical models has been conducted in Zhenjiang, China on 22 May 2024.

107. Vanuatu Tsunami Warning and Response SOP was finalized in May 2024 along with the establishment of a workplan to review and update Vanuatu National Tsunami Response Plan.

World Tsunami Awareness Day (WTAD)

108. As part of World Tsunami Awareness Day 2023 observations a national one-day workshop was convened in Barbados on 9 March 2024 which targeted community-level stakeholders. Jointly convened by the United Nations Office for Disaster Risk Reduction (UNDRR) Regional Office for the Americas and the Caribbean, the UNESCO-IOC CTIC, and the Department of Emergency Management (Barbados). This workshop was attended by over 40 participants from the District Emergency Organisations (DEOs) and focused on reviewing the implementation and progress towards achieving a well-functioning and resourced community volunteer programme which supports the national emergency management programme. The workshop also built capacity through a review of the history of the UNESCO-IOC Tsunami Ready Programme, its indicators and the application process. Workshop participants also benefited from lessons learnt shared from the DEOs with experience in implementing the Tsunami Ready programme

109. To commemorate the World Tsunami Awareness Day 2023 in the Indian Ocean, the webinar on Fighting Inequality for a Resilient Future was jointly organised by IOTIC, ICG/IOTWMS Working Groups 1 and 3, and BMKG (Indonesia). Experts from the Indian Ocean region shared their experiences on: (i) How to create accessible tsunami early warning for all; (ii) Research, development, and implementation plan for the Ocean Decade Tsunami Programme; (iii) Early warning for remote populations from Maldives; and (iv) Early warning for people with disabilities from Indonesia. The event attracted over 100 participants with many from the Indian Ocean region.

110. For the WTAD 2023 Campaign in the NEAM region, the main contribution was that several countries carried out exercise at the local level for the first time within the NEAMWave23 exercise, 5–7 November 2023. Several schools participated in the exercise. The Secretariat/NEAMTIC prepared three brochures on *Tsunami What to Do*, *Tsunami Fact Sheet*, and *Tsunami Ready Recognition Programme,* which were disseminated to Member States. Educational activities were organised in the Town Hall of Samos (Greece) with general presentations on earthquakes and tsunamis including self-protection measures. In Chipiona (Spain), a Tsunami Walk exercise, and

several awareness activities for students were organized. Italy conducted tsunami risk perception studies in coastal regions (peninsular and main islands) and in the Stromboli volcano area. The National Institute for Earth Physics (Romania) focused on educational projects and activities related to earthquake and tsunami which were highlighted in the publication of an article at the 16th annual International Conference of Education, Research and Innovation (ICERI) conference.

111. In November 2023, Fiji and Tonga World Tsunami Day and IDRR 2023 event coincided with the official visit of the UNDRR SRSG Ms Mami Mizutaki. She joined targeted school's tsunami drill Exercises. Approximately, 8,000 people participated including students, teachers, first responders. These events were also viewed live on Facebook engaging around 5,000 online viewers.

112. In Fiji, the WTAD23 programme included the official recognition of the first two UNESCO-IOC Tsunami Ready Communities and tsunami drills exercise at Sila and Navuevu community in collaboration with the Nadroga/Navosa Province EOC team and first responders.

Harmful Algal Blooms

113. The Harmful Algal Bloom Programme continued to provide systematic and demand driven training with certification to member state institutions on HAB species monitoring including inter-calibration of phytoplankton identification.

114. A Memorandum of Understanding was signed April 2024 between UNESCO-IOC and FAO on the co-sponsorship of the Intergovernmental Panel on Harmful Algal Blooms (IOC-FAO IPHAB) and formalises close ongoing cooperation on e.g. early warning systems for HAB's and on global data compilation and sharing. IPHAB comprises: 16 different sub-groups; 7 IPHAB Task Teams; 4 Regional HAB networks and groups; 3 Expert Working Groups; 1 Steering Committee; and 1 Project group. The programme is implemented via the IOC Science and Communication Centre on HAB, at the University of Copenhagen (Denmark).

115. In 2023 FAO, IOC and the IAEA published '*Joint technical guidance for the implementation of early warning systems for harmful algal blooms'* as FAO Fisheries and Aquaculture Technical Paper No. 690.

116. A preparatory-project on 'Early Warning Systems for HAB' was concluded in 2023 in Namibia and Morocco with stakeholder workshops and identification of needs to upgrade existing HAB monitoring programmes to actual early warning systems. The second phase with pilot testing was initiated April 2024.

117. The research programme GlobalHAB, co-sponsored with SCOR, continued to address knowledge gaps in understanding HAB dynamics and modelling. As joint effort by GlobalHAB and GESAMP a whitepaper on Sargassum was published in June. Also GlobalHAB published a white paper on state-of-knowledge and scientific gaps to develop strategies for technological and scientific approaches to mitigate impacts of fish killing algal blooms.

118. GlobalHAB jointly with PICES organized a Workshop at the PICES Annual Conference 2023 on Solutions to Control HABs in Marine and Eustarine Waters. Focus was on control efforts on the organisms themselves (either killing them or removing cells) and/or toxins from the water, not in prevention or mitigation. The participants had expertise in research, development, and implementation of promising estuarine and marine HAB control approaches. Participants discussed technical, environmental compliance and public perception challenges and explored solutions to these common barriers. The outcome is a summary of the worldwide approaches in HAB control as a scientific report or as a collection of papers in a special issue of the journal *Harmful Algae News*.

119. An ongoing GlobalHAB Activity is on quantitative PCR (qPCR) and a Workshop was held in conjunction with the 20th International Conference on Harmful Algae in Hiroshima, Japan, 3–5 November 2023. The workshop had been prepared online during 2 years. The in-person workshop

had 22 participants and included a session at the conference on how to integrate the qPCR method into HAB monitoring. The workshop outcome will provide the basis of a peer-reviewed white paper on how to integrate the qPCR method into HAB monitoring.

120. A Harmful Algal Bloom Solutions (HAB-S) Programme was endorsed as a UN Decade of Ocean Science for Sustainable Development programme early 2024. Lead agencies are UNESCO-IOC and the FAO. HAB-S was presented at the Thirty-second Session of the Assembly of IOC, in Paris, June 22, 2023. The HAB Solutions Programme will conduct the following four initiatives to advance collaborative global initiatives for preventing, controlling, and observing HABs, mitigating HAB impacts, making HAB data equitable and accessible for all, and increasing HAB literacy

121. Close collaboration with ICES and PICES continued in compiling and sharing global data on HAB events in the IODE Harmful Algae Event Database (HAEDAT).

FUNCTION D: ASSESSMENT & INFORMATION FOR POLICY

Support assessment and information to improve the science-policy interface

Sustainable Development Goals (SDG)

122. In the context of the 2030 Agenda for Sustainable Development, several targets of SDG 14 are directly relevant to the work of IOC, particularly in the areas of marine pollution, ocean acidification, ecosystem-based management, as well as marine research capacity and transfer of marine technology. UNESCO-IOC is identified as the UN custodian by the Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs) for SDG indicators 14.3.1 (ocean acidification) and 14.a.1 (scientific knowledge and ocean research capacity). IOC has recently provided reporting on these indicators for inclusion in the UN Secretary General's Progress Report towards the SDGs in 2024.

123. Significant progress was made in the collection of new data provided by Member States to IOC towards the SDG Indicators 14.3.1.In February 2024, IOC reported to the IAEG Indicator 14.3.1 Several activities were undertaken to advance the methodology of indicators for Targets 14.3 and 14.a, as well as in relation to Target 14.1 on marine pollution (nutrients).

124. Concern over the impacts of altered nutrient inputs, N, P and Si, to coastal waters led the UN to include an 'Index for Coastal Eutrophication Potential' (ICEP) as indicator for SDG Indicator 14.1.1 on eutrophication: *By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution*. UN Environment is the custodian agency for Indicator 14.1.1, and UNESCO-IOC is responsible to develop ICEP as the indicator. To implement ICEP, it is required to develop a component on a dissolved silica model and evaluate the effectiveness of ICEP in predicting coastal impacts at the global scale. To promote and increase the understanding of the potential of ICEP as indicator, the IOC in 2019 produced an animation for YouTube: https://youtu.be/qW2nV2bsyCs. The detailed plan of work was elaborated by the IOC N-CIRP Group of Experts in 2017. The work required funding for two postdoctoral scholars and an expert workshop to validate models. Identifying funding proved a hard challenge but was solved late 2021 as a combination of funds from UNEP via a UN agreement as well as Norwegian (NORAD) funding. The work is ongoing and will be completed second quarter 2024.

UN World Ocean Assessment (WOA)

125. IOC continues to provide scientific and technical support to the World Ocean Assessment process established under the UNGA. A third cycle of assessment (2021–2025) was initiated under the UN Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects. In accordance with the programme of work for the third cycle, one of the outputs of the third cycle will be the production of one or more assessments of the marine environment, including socioeconomic aspects. In addition, the Regular Process will provide support for other ocean-related intergovernmental processes which may include a series of policy briefs for policymakers tailored to each process.

126. On 12–13 December 2023, UNESCO-IOC and UN DOALOS organized a joint Symposium at UNESCO, aimed at strengthening the ocean science-policy interface at national, regional and global levels. The Symposium covered the following oceanic regions of the Regular Process: the North Pacific; the South Pacific, the Indian Ocean (including the Arabian Sea and the Bay of Bengal); the Red Sea and the Gulf of Aden, and the Regional Organization for the Protection of the Marine Environment (ROPME)/Regional Commission for Fisheries (RECOFI) area; the North Atlantic, the Baltic Sea, the Mediterranean Sea, and the Black Sea; and the South Atlantic (between the African and American coasts) and the wider Caribbean. To further advance the strengthening of the science-policy interface to support integrated action for the conservation and sustainable use of the oceans and marine resources, the Symposium focused on the following elements:(i) Overview of global ocean governance and importance of the science-policy interface with theories and practice; (ii) Background on the Regular Process/World Ocean Assessment and presentation on the process of nomination to the Pool of Experts and opportunities for contributing to the third World Ocean

Assessment; (iii) Regional deep dives on capacity-building needs (including in the science-policy interface) and lessons learned in all regions; (iv) the importance of science communication and Ocean Literacy as a key element of the science-policy interface; and (v) Ocean Decade: support of the World Ocean Assessments (WOAs) on the Ocean Decade's mission to generate and use knowledge for the transformational action needed to achieve a healthy, safe and resilient ocean for sustainable development by 2030 and beyond.

127. A joint side event was organised with DOALOS during the 2024 Ocean Decade Conference (Barcelona, 10–12 April 2024) to further articulate the science/policy interface and identify cooperation amongst Decade actions and the Regular Process structural elements.

The IOC *State of the Ocean Report* (StOR)

128. At its 53rd session in February 2021, the IOC Executive Council (EC) considered the proposal to prepare a periodic 'IOC State of the Ocean Report (StOR)' as a response to the previously mentioned increased demand for the key information on the state of the ocean (see IOC/INF-1393). Following the 53rd session of the Executive Council, the IOC Secretariat invited Member States to express their views on the spatial and temporal scope of the report, focus areas, and style of presentation (cf. IOC Circular Letter, 2843). In parallel the IOC Secretariat convened an informal expert consultation on the StOR to further discuss its main features. The results of the Member States and expert consultation are synthesized in the IOC/INF-1393 Rev. The IOC Assembly at its 31st session in June 2021 endorsed the production of a Pilot StOR, which was presented to the IOC Executive Council at the 55th session in 2022.

129. Following the presentation of *State of the Ocean Report 2022 – Pilot edition* to the IOC Executive Council in June 2022, the related concept note went through a 1.5 year review process. Further guidance by Member States was received at the 32nd session of the IOC Assembly (IOC/A-32/Dec.4.2).

130. The StOR Advisory Board played a central role of the StOR Advisory Board in the scoping, reviewing and editing of the report since the IOC Assembly session in June 2023. The StOR Advisory Board consists of representatives from nine countries. The Secretariat with the support of the Advisory Board updated the concept note based on comments received during the IOC Assembly.

131. The results of the consultations were presented in IOC Circular Letter, 2963, which included an updated StOR concept note and a template for contributions. As requested by the Assembly, the IOC Secretariat conducted two online workshops allowing Member States to provide additional comments. Member States welcomed the concept note and the publication in 2024 (as IOC Technical Series, 189).

General Bathymetric Chart of the Oceans (GEBCO)

132. The GEBCO symposium: Map the Gaps Symposium was held from 30 November to 3 December 2023, with approximately 70 panelists addressing several topics such as Regional Mapping Initiatives, Crowdsourced Bathymetry, Technology Innovations, the Nippon Foundation-GEBCO Seabed2030, Africa and Ocean Mapping, Economic Equity in Ocean Mapping, Building an Inclusive Ocean Mapping Community.

133. On 7–8 November 2023, the International Hydrographic Organization, co-sponsor of the General Bathymetric Chart of the Oceans (GEBCO) with the IOC, hosted the 'Map the Gaps' Symposium as part of the 2023 GEBCO week. The symposium was generously supported by the Nippon Foundation-GEBCO Seabed 2030 Project and organized in partnership with the Oceanographic Institute, Prince Albert 1er Foundation. This two-day event brought together experts in seabed mapping from across the public, private, academic,and civil society sectors. It will also include a special showcase day on the latest developments in Crowd Sourced Bathymetry, with the aim of exploring novel approaches to completing the last great mapping endeavour on our planet, a

complete map of the oceans.The GEBCO grid is widely accepted as being the base-layer to support Challenge 8 of the UN Decade of Ocean Science for Sustainable Development: create a digital representation of the ocean. Taking place during the 120th year of GEBCO, this event was the pinnacle of the anniversary celebrations.

134. The 36th meeting of the GEBCO Sub-Committee on Undersea Features Names (SCFUN) took place on 6–10 November 2023 in Wollongong, Australia, whilst the 40th meeting of the GEBCO Guiding Committee took place in Monaco at the IHO on 9–10 November 2023. The GGC finalized the new GEBCO Strategy (IOC/INF-1538) and discuss the preliminary findings of the GEBCO Governance review. The Review provides an in-depth analysis of the entity's governance structures and practices, aimed at enhancing its operational efficiency and alignment with the strategic objectives of its parent organizations, the International Hydrographic Organization (IHO) and the IOC. The review was motivated by the recognition of the rapidly changing ocean science and seabed mapping landscape, necessitating a more robust programme management and continuous improvement approach. Key components of the review include an examination of the organizational and governance arrangements within GEBCO, its committees, and its interactions with external bodies. The review also highlights the importance of GEBCO's work considering the UN Ocean Decade and the need for increased international coordination in ocean data collection. Findings and recommendations address the need for clearer governance structures, enhanced stakeholder engagement, risk management practices, and the establishment of a continuous improvement culture.

FUNCTION E: SUSTAINABLE MANAGEMENT & GOVERNANCE
Enhance ocean governance through a shared knowledge base and improved regional cooperation

Sustainable Development Goals – Preparation for the UN Ocean Conference, 2025

135. The 2025 UN Ocean Conference (UNOC) on SDG 14 will be co-chaired by France and Costa Rica and will take place in Nice (France) from 9 to 13 June 2025. It will be preceded by three special events, namely: (i) the One Ocean Science Conference; (ii) Blue Finance Summit to be hosted by Monaco; and (iii) the Ocean Rise & Resilience Summit.

136. In terms of preparations, IOC is participating in the inter-agency group supporting the conference and is leading the preparation of concept papers relevant to its mandate for the interactive policy dialogues that will structure the core programme of the conference. The President of the UNGA will convene a preparatory meeting for the Third UN Ocean Conference on 2 July 2024. The meeting will decide on the themes for the Ocean Action panels to be held at the conference and elements for a declaration.

137. On 7–8 June 2024, Costa Rica hosted the High Level Event on Ocean Action: *Immersed in Change* within the framework of UNOC. The conference was designed as a platform for the exchange of best practices and successful experiences related to ocean governance and health. It aimed to highlight topics of global significance on the ocean agenda and drive specific implementation actions to address the severe environmental crisis it faces. During the conference, IOC led a plenary session to present the outcomes of the Barcelona Ocean Decade Conference, and in particular key priority areas emerging from the Vision 2030 process and how these should be considered and acted upon in the framework of UNOC.

UN SIDS Conference

138. The fourth International Conference on Small Island Developing States (SIDS4) was held from 27 to 30 May 2024 in St John's, Antigua and Barbuda, under the overarching theme of 'Charting the course toward resilient prosperity.' The Conference sought to assess the ability of SIDS to achieve sustainable development, including the 2030 Agenda and the Sustainable Development Goals. It resulted in an intergovernmentally-agreed, focused, forward-looking, and action-oriented political outcome document. The IOC Executive Secretary led the UNESCO-IOC Delegation at the conference, and took part in one

the interactive dialogue entitle *Leveraging data and digital technologies and building effective institutions for a resilient future in small island developing States*. IOC organised five side events focusing on the Ocean Decade and SIDS, Ocean Literacy, regional collaboration in ocean science, distaster risk reduction and preparedness.

Biodiversity in Areas beyond National Jurisdiction (BBNJ)

139. Following the adoption of the International Legally Binding Instrument (ILBI) on the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction (BBNJ) in March 2023, IOC has supported a number of side events organized by UN DOALOS (acting Secretariat) in order to promote the ratification of the Agreement as well as specific science and capacity development issues relevant to the Commission's mandate.

140. In March 2024, the IOC Executive Secretary attended the Blue Leaders' Summit organized by the Belgium Government in the context of their EU presidency. This event was therefore organised with the objective of increasing momentum towards BBNJ ratification and implementation. The event provided an opportunity to present IOC's work relevant to BBNJ and network with other ocean professionals, engage in high-level roundtable discussions involving government, NGO, youth and scientific representatives. The Event, which gathered about 120 participants, was closed by Prince Albert II and the Prime Minister of Belgium, Alexander De Croo. The IOC Executive Secretary was invited to deliver a keynote talk on the Ocean Decade and its contribution to the advancement of the BBNJ agreement.

141. Given that IOC possesses recognized technical expertise in several areas of relevance to the BBNJ agreement, further discussion will be required with Member States and the future Secretariat of the Treaty (undefined at this stage) to identify and develop further collaborative approach so that the IOC can contribute scientific and technical inputs in the operationalization and implementation of the Agreement, in accordance with its mandate.

142. On 24–26 June 2024, the UNGA will convene in New York, the organisational meeting of the Preparatory Commission ("the Commission") established to prepare for the entry into force of the BBNJ *Agreement* and to prepare for the convening of the first meeting of the Conference of the Parties to the Agreement.

Integrated Coastal Area Management, including Marine Spatial Planning

143. For almost 20 years IOC has been the leading international organization promoting marine spatial planning (MSP). Within the context of the *'Joint Roadmap to accelerate Marine/Maritime Spatial Planning processes worldwide'* (MSProadmap), updated in 2022, IOC has implemented the MSPglobal Initiative, co-funded by the European Commission. The second phase of MSPglobal started in July 2023 and will run until December 2024. The project has contributed to develop guidance on MSP and related topics, strengthen capacities and increase awareness among governmental authorities and stakeholders about the importance of MSP.

144. One of the objectives of the MSProadmap and the MSPglobal Initiative is the promotion of transboundary MSP, i.e., to improve the dialogue on MSP among Member States that share the same sea-basin so they can develop marine spatial plans coherent across borders, taking into consideration transboundary issues. Currently, the initiative is focusing on two pilot projects: West and Central Africa and Western Pacific. The activities in the beneficiary countries include also national trainings, workshops and the implementation of the new MSPglobal Rapid Asssessment Methodology (RAM). The RAM has as its final goal the co-development of an Action Plan to guide the beneficiary country in a clear pathway to advance its MSP process.

145. MSPglobal is also developing further knowledge, tools and a new multilingual online training on OceanTeacher Global Academy to support Member States. The new tools are related to topics such as engagement of indigenous peoples and local communities, spatial data infrastructure, ocean

observation, marine protection and restoration, climate change, etc. All tools are planned to be co-developed through participatory processes, engaging experts from around the world.

146. Also within the context of the MSProadmap, the Government of Sweden has provided additional support to the IOC Secretariat since 2018. The funds have been used to organize meetings, workshops and trainings, as well as develop technical reports on MSP and sustainable blue economy. In November 2023, IOC and its Sub-Commission IOCAFRICA led the organization of the 2nd Regional MSPforum for Africa. An Organizing Committee was established with the African Union and UNEP Regional Seas, allowing to pull in additional human and financial resources from different initiatives in Africa. The event was attended by 74 people from 24 countries.

147. From June 2023 to mid-April 2024, MSPglobal activities involved 867 participants from 100 countries (32 Africa, 12 SIDS). These included mainly the 2nd MSPforum for Africa, trainings for representatives of national authorities and global workshops to co-develop MSP tools with experts from all continents and oceans.

148. The MSPglobal website remains the IOC's knowledge platform on MSP www.mspglobal2030.org. The website is a multilingual repository (English, Spanish, French and Arabic) where all IOC products on MSP can be found, as well as an assessment about *'MSP around the world"*. Country profiles will be updated soon with the information to be shared by Member States when answering the 2024 IOC survey on the status of MSP, which is including for the first time an MSP typology criteria to help IOC to assess whether there are commonalities, differences and/or trends in the adoption of MSP worldwide. The results of this survey will be also used to developed an assessment of global capacity needs on MSP that will inform specific tailored capacity development activities by IOC and other interested institutions.

149. UNESCO-IOC and the European Commission's Directorate-General for Maritime Affairs and Fisheries (DG MARE) are planning to jointly organize the 6th International MSPforum in October 2024, in Bali (Indonesia), together with national and local authorities.

150. Within the context of the 5th Phase of the GEF IW:LEARN project (International Waters Learning Exchange and Resource Network: Strengthening transboundary water management of the GEF International Waters portfolio), IOC will lead regional capacity building activities on MSP for the GEF portfolio of LME projects. In addition, IOC will assist GRID Arendal in the development of a practical approach to integrate MSP into the GEF Transboundary Diagnostic Analysis and Strategic Action Program (TDA-SAP) methodology.

151. There is an increasing number of countries committed to sustainably manage the ocean area under their jurisdictions, such as members of the High Level Panel for a Sustainable Ocean Economy (Ocean Panel), which aims to do that through Sustainable Ocean Plans (SOP). SOP is a umbrella policy to integrates sectors and concepts, and that has 9 key attributes: place-based; ecosystem-based; knowledge-based; inclusive; integrative; iterative; endorsed; financed; and capacitated. Thus, SOP includes approaches such as Marine Spatial Planning (MSP), Integrated Coastal Zone Management (ICZM), Marine Protected Areas (MPAs), sectoral policies, etc. IOC is a member of the global coalition Ocean Action 2030, which was established to support the Ocean Panel in the development and implementation of Sustainable Ocean Plans (SOP). IOC experience on MSP has inspired and provided inputs to establish a new Ocean Decade Programme on Sustainable Ocean Planning, which was launched during a satellite event of the 2024 Ocean Decade Conference in Barcelona (Spain). This Decade Programme has been co-designed through a participatory process with key users and UNESCO-IOC partners. It aims to provide a resource and technical platform for all countries, not only member of the panel. An interim advisory committee led by IOC was established; it is composed of partners from different institutions engaged in the topic. This new programme will use the Ocean Decade ecosystem (e.g., other Decade Actions, calls for actions, task forces, communities of practice, etc.) to develop capacity and leverage actions at all levels. In parallel, the IOC Assembly at its 32nd session initiated the development on an IOC-wide Strategy on

Sustainable Ocean Planning and Management, which will be discussed under agenda item 4.3 of the Executive Council at its 57th session.

152. Over the period June 2023 to May 2024, IOC participated in several national, regional and international events of initiatives related to MSP, such as those of the Ocean Panel, DOALOS, OECD and the G20 Environment and Climate Sustainability Working Group under the presidency of Brazil.

Sargasso Sea Transboundary Cooperation

153. IOC, working in close collaboration with UNDP and the Sargasso Sea Commission, finalized is executing a GEF project aimed at strengthening the stewardship of an economically and biologically significant high sea area—the Sargasso Sea. The project was successfully submitted to the GEF and started its implementation in August 2022. The overall objective of this 4-year GEF-funded project, with nearly $3 million of funding, is to facilitate a collaborative, cross-sectoral, and sustainable stewardship approach for the Sargasso Sea through improvement of the knowledge base and strengthened frameworks for collaborative management and governance. In 2024, the development of an Ecosystem Diagnostic Analysis (EDA) for a high seas ecosystem was initiated. This EDA will form the technical basis for a stakeholder-endorsed Strategic Action Programme (SAP) for future stewardship of the Sargasso Sea and is therefore a major output of the project.

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

154. The period from June 2023 to May 2024 was a period of intense activity on numerous fronts. Building on past efforts, significant achievements were realized in terms of engagement and visibility, building of a strong and diverse portfolio of Decade Actions, and operationalization and growth of the central and decentralized architecture for the governance and coordination of the Decade. The 2024 Ocean Decade Conference was the focal point of activity during this period and was a watershed moment for the future of the Ocean Decade.

155. Two additional Calls for Decade Actions were launched during this period. Call for Decade Actions No. 06/2023 was launched in October 2023 and closed on 31 January 2024. This Call had a focus on engagement of partners in Africa and Caribbean SIDS and solicited ideas from partners in these regions who require support and mentoring to develop co-designed Decade Actions. Over 50 submissions were received to this Call and training and mentoring for these groups will commence in June 2024. Call for Decade Actions No. 07/2024 was opened on 15 April 2024 and will close on 31 August 2024. It is focusing on the solicitation of contributions of in-kind and financial resources to reinforce existing Decade Actions and coordination structures, and to identify initiatives to be included as part of the Ocean Decade Capacity Development Facility. All Calls for Decade Actions also solicited projects to attach to already endorsed Decade Programmes.

156. As of May 2024, the Calls for Decade Actions have resulted in the endorsement of 52 programmes, 363 projects and 99 contributions. The portfolio of Decade Actions covers all ocean basins and all 10 Decade Challenges. It represents the collective work of thousands of individuals, and hundreds of institutions and is an indication of the continued significant and global interest in the Ocean Decade. The second iteration of the Ocean Decade Monitoring and Evaluation Framework was launched in November 2023 and the initial results from reporting by Decade Actions are included in document IOC/EC-57/4.7.Doc(1).

157. Twelve decentralized coordination structures (Decade Collaborative Centres and Decade Coordination Offices) have been established and have an essential role to play in supporting the Decade Coordination Unit to coordinate Decade Actions, catalyze new initiatives, build stakeholder engagement, mobilize resources and communicate on the Decade. Several of these structures, including those led by IOC in Africa and the Tropical Americas and Caribbean Region, require additional resources to become fully operational and further efforts are required to fully optimize the impact and collaboration of the existing network of structures.

158. Thirty-eight (38) National Decade Committees have been created and are implementing diverse initiatives to catalyze national interest and resources for the Decade, as well as provide a platform for the discussion of national priorities aligned to the Decade. The rate of establishment of new National Decade Committees has slowed in this period and additional efforts are required to support the creation and impact of new National Decade Committees. Notable gaps exist in the global coverage of NDCs, particularly in SIDS and LDCs.

159. IOC is leading 16 Decade programmes and projects across a range of themes and is substantively involved in several others. It is also hosting Decade Coordination Offices across several themes and geographies including ocean observations, data sharing, ocean literacy and in Africa, Western Pacific, and the Tropical Americas and Caribbean region. There is a significant potential for the IOC contribution to the Decade to reinforce IOC's core programmatic work and human resources. However, additional resources are required to ensure full operationalization of IOC-led Decade Actions and coordination structures. IOC/INF-1539 provides additional information on the IOC contribution to the Decade as well as a summary of resource needs.

160. Despite the significant level of activity in this period, notable geographic gaps persist in the portfolio of Decade Actions in terms of leadership of Decade Actions by partners in Least Developed Countries and Small Island Developing States. In addition to the targeted support to partners identified through Call for Decade Actions No. 06/2023 further concerted and targeted efforts have continued to increase engagement in SIDS and Africa. The Africa Ocean Decade Taskforce met in January 2024 and oversaw development of an Africa-wide programme for sustainable ocean management as a central contribution to the implementation of the Africa Ocean Decade Roadmap. The Tropical Americas and Caribbean Taskforce was established in November 2023 and will hold its first in-person meeting in June 2024 in the sidelines of the 'Immersed in Change' high level event in Costa Rica. This meeting will result in the development of the framework for a regional roadmap for the Ocean Decade. The Pacific Islands Ocean Decade Roadmap was developed under the leadership of the Pacific Islands region Decade Collaborative Centre (DCC) and was launched at the 2024 Ocean Decade Conference.

161. During this period, four meetings of the Decade Advisory Board were held. The first two-year term of the initial cohort of the expert members of the Decade Advisory Board came to an end in December 2023. Following an open nomination process that resulted in over 300 applications, expert membership of the Decade Advisory Board was renewed in January 2024. The 2024 in-person meeting of the Board was held in May 2024. Document IOC/EC-57/4.7.Doc(1) presents a summary of the work of the Board over this period.

162. The Ocean Decade Capacity Development Facility was formally launched in December 2023 and will build on and complement IOC's programmatic activities in capacity development. Aligned with the *IOC Capacity Development Strategy (2023–2030)*, this Facility, which is being established with funding from the Government of Flanders (Kingdom of Belgium), is a mechanism to match priority capacity development needs in the Ocean Decade with existing or new capacity development initiatives. The first initiative to be developed as part of the Facility focuses on co-design of Decade Actions and will be launched at the United Nations Fourth International SID Conference (Antigua, May 2024). Analysis of needs of under-represented groups including SIDS, LDCs and Early Career Ocean Professionals has been undertaken and work is continuing through the Facility to identify existing initiatives to meet these needs and mobilize resources to develop new initiatives.

163. A Data Strategy Implementation Group was established to support development and operationalization of the data, information, and knowledge strategy for the Decade. The Corporate Data Group continues to develop actions to facilitate sharing of data between private sector and the scientific community. The Strategic Communications Group has been renewed and comprises 25 communications experts who provide advice to the Decade Coordination Unit on communications tools and approaches. The Ocean Decade Expert Roster has been established to create a pool of experts to assist the IOC Secretariat with the identification of strategic targets for Ocean Decade

Challenges, in the review of Decade programme submissions, and in regular review processes of the Decade.

164. Hosted by Spain, the 2024 Ocean Decade Conference (Barcelona, 10–12 April 2024) convened over 1,500 in-person participants and over three thousand online participants. Held as the culmination of a full 'Ocean Decade Week' the Conference discussed the outcomes of the year-long Vision 2030 process that aimed to identify priorities for the implementation of each of the Ocean Decade Challenges. Structured around four thematic sessions, the Conference discussed the ten Vision 2030 White Papers that were prepared by expert working groups, and the Vision 2030 Outcomes Report. Over 120 satellite events were held throughout the week to complement the main Conference programme. The core outcomes of the Conference were synthesized in *The Barcelona Statement*, which sets out priorities for science and knowledge, ocean science infrastructure, and cross-cutting recommendations that will be critical to achieving the vision of the Ocean Decade by 2030. The priorities identified in *The Barcelona Statement* will guide the work of the Ocean Decade in coming years and will be translated to regional and national contexts.

165. In addition to the 2024, Ocean Decade Conference, there were intensive stakeholder engagement and outreach efforts during this period. In-person or hybrid events focusing on different aspects of the Ocean Decade were held at or in the sidelines of the SDG Summit (New York, September 2023) and UNFCCC COP28 (Dubai, December 2023). Engagement in key events will continue in the coming period including the United Nations Fourth International SIDS Conference (Antigua and Barbuda, May 2024), the 'Immersed in Change' High Level Event (Costa Rica, June 2024), Convention on Biological Diversity COP16 (Colombia, November 2024) and the 2025 UN Ocean Conference (Nice, June 2025). These events will be used to widely share the outcomes of the 2024 Ocean Decade Conference and catalyze partnerships to transform the Conference recommendations to actions.

166. The Ocean Decade Alliance has grown during this period and now numbers 11 Patrons and 19 institutional members. Alliance members have been engaged in high-level events and in raising visibility of the Ocean Decade amongst their constituencies. Efforts continue to work with Alliance members to develop joint funding or support initiatives for the Decade. An in-person meeting of the Alliance was held in the sidelines of the 2024 Ocean Decade Conference and identified future joint priorities for Alliance members related to seabed mapping, ocean data sharing, and sustainable ocean planning, with cross-cutting themes of support to engagement of SIDS and ocean literacy. The first three-year term of the initial Alliance members is ending and a review process will be implemented in coming months to evaluate and renew membership.

167. There have been significant efforts to engage philanthropic Foundations during this period. The third edition of the Foundations Dialogue was held in June 2023 in Monaco hosted by the Prince Albert II of Monaco Foundation. The meeting led to the development of the *2023 Monaco Statement* that identified four priority areas for action and led to the development of the OceanMatcher Funders Matchmaking Tool and the Funders Collaborative to support the Ocean Decade. The next edition of the Foundations Dialogue will convene over 30 philanthropic Foundations in Brazil in September 2024, hosted by the Boticario Foundation.

168. Mobilization of resources remains a key challenge for the Decade and was an important focus of discussions at the 2024 Ocean Decade Conference. To maintain the current momentum and level of activity, additional financial or in-kind resources are urgently required to allow the full resourcing and operation of the Decade Coordination Unit, decentralized coordination structures and Decade Actions; an updated resource needs assessment for Decade Actions is reported in IOC/INF-1539.

169. The next period will lead to the mid-way point of implementation of the Ocean Decade. A mid-term evaluation will be initiated before the end of 2024, with the results to be reported to IOC Assembly at its 33rd Session in 2025. The concept note for the evaluation is contained in IOC/EC-57/4.7.Doc(2). Planning for the 2027 Ocean Decade Conference will also commence in the next period. A call for Expressions of Interest for Member States to host the 2027 Ocean Decade

Conference will be launched in late 2024, in anticipation of an announcement of the host country at the 33rd Session of the IOC Assembly.

UN Framework Convention on Climate Change

170. IOC was present at COP28 hosting various side events and discussion panels, participated in a large coalition of partners committed to making the ocean more central to climate negotiations and informing delegates about the potential of the ocean to support climate action.

171. The Ocean Decade teamed up with OceanX to host a pavilion for the entire duration of COP28, providing opportunities for in-depth discussions about the role of science in protecting the ocean, strengthening ocean-climate action, and increasing commitment to developing the knowledge necessary to limit warming to 1.5°C and stabilize the Earth's climate. With curated roundtables focused on the Ocean Decade Challenges and engaging visual media, the pavilion was a hotspot for discussion on ocean-climate solutions.

172. Several flagship Ocean Decade Programmes that are focusing on the generation of ocean-climate solutions were showcased during a half-day event in the Ocean Pavilion. This event also featured high-level keynote presentations on the critical science and knowledge gaps that the Ocean Decade is filling, including via the Vision 2030 process, the links between ocean science and the UNFCCC process, and the importance of multi-stakeholder partnerships to achieve the vision of the Ocean Decade for a healthy and resilient ocean by 2030.

173. Marine and coastal nature-based solutions were widely recognised in the global stocktake outcome for their vital role for effective and sustainable climate action.

174. Eight countries (Australia, Costa Rica, Fiji, France, Papua New Guinea, Seychelles, the United Kingdom and the United States of America) showcased their efforts in progressively integrating blue carbon into national climate action during an official side event on 'Blue Carbon Coastal Wetlands in Climate Action: Taking Stock of Nature-based Solutions in Practice', co-organised by the International Partnership for Blue Carbon (IPBC), the Ocean and Climate Platform and the Pew Charitable Trusts.

175. The IPBC is an initiative of the Australian Government jointly coordinated with UNESCO-IOC, which brings together over 50 governments, IGOs, NGOs and research institutions from around the world. At COP28, Japan announced they joined the IPBC as the latest Partner, bringing the total number of countries in this global effort to 18.

176. The UNESCO-IOC-supported Global Ocean Observing Network and the UNESCO-IOC co-led Decade programme Ocean Acidification Research for Sustainability (OARS) explained the impacts of ocean acidification and ocean health during the Earth Information Day World Cafe and explored together with the audience possible ways how ocean observation can support innovative mitigation and adaptation strategies.

177. Deoxygenation remains overlooked at many discussions addressing the impacts of climate on the ocean during UNFCCC events. To counter this perennial trend, UNESCO-IOC, together with the Global Ocean Oxygen Network, the Ocean Decade programme Global Ocean Oxygen Decade, and other partners organized an event at the Ocean Pavilion entitled 'Climate Change, Deoxygenation and Biodiversity in the High Seas and Deep Sea: Interactions and Policy Opportunities' to showcase the importance of ocean oxygen observations.

178. The UNESCO-IOC-led Global Ocean Observing System participated in the high-level plenary and World Café elements of Earth Information Day 2023, highlighting the need for sustained and strengthened global ocean observing to support understanding of the climate system and as the scientific basis for action on adaptation, mitigation and early warning systems.

179. EID 2023 was attended by over 250 participants and fed directly into negotiations on systematic observation under the Subsidiary Body for Scientific and Technological Advice (SBSTA). Parties' conclusionshighlighted the importance of sustained, long-term observations of the Earth system and the need to address data gaps including for the ocean and coastal regions.

180. A targeted dialogue event was held at the OceanX + Ocean Decade pavilion, promoted by UNESCO-IOC, Communications Inc. and the Federal University of Sao Paulo, discussed how we can leverage the power of strategic communication to convey messages related to the importance of the ocean as the centre of the climate solutions discourse. Journalists, activists and influencers from Africa, from Brazil and from the MENA regions discussed how to develop capacity development initiatives to ensure that the information provided by the traditional and non-traditional media are based on scientifically sound information.

181. At COP28, UNESCO-IOC and the Federal University of Sao Paulo, and in the context of the Ocean Decade Ocean Literacy With All Programme, organised three side events on how the blue school programme can become a testing group for the UNESCO Blue Curriculum proposal, advocating for the inclusion of ocean literacy in curriculum frameworks.

IOC Sub-Commission for Africa and the Adjacent Island States (IOCAFRICA)

182. The Africa Ocean Decade Task Force, comprising 14 experts and representatives of 6 organizations was established and commenced its assignment of supporting the development of regional Ocean Decade Actions in 2023.

183. At the Marine Regional Forum held in Dar es Salaam (Tanzania) in November 2023, IOCAFRICA in collaboration with the GIZ, co-chaired a session, 'From Science to Policy and Society: Co-designing a sustainable blue economic development in the framework of the Ocean Decade.' The session provided a space for dialogue and learning on the importance of working across the science–policy–society interface for sustainable blue economic development. The session identified the potential roles, challenges and synergies of researchers, policy- and decision-makers as well as social actors, such as indigenous peoples and local communities, in advancing sustainable ocean development. Challenges and opportunities to increase the use of ocean science in the Western Indian Ocean region to contribute to the Sustainable Development Goals, the Africa Roadmap for the Ocean Decade, and the Global Biodiversity Framework were also highlighted. The potential role of the UN Decade of Ocean Science for Sustainable Development as a framework to increase the generation and use of co-designed ocean science for sustainable blue economic development was presented.

184. The Task Force is in the final stages of developing a major Decade programme for the region, focussing on 'Science and Knowledge for a Resilient and Sustainable Ocean Economy in Africa (SEAWARD Africa)'. The programme is built on four pillars: (i) sustainable management of marine resources; (ii) climate change and marine biodiversity; (iii) tackling ocean pollution for enhanced human health; and (iv) extreme events and disaster risk reduction. The envisioned enablers for these pillars are capacity development, technology and innovation, knowledge generation and dissemination, Ocean Literacy, and financing mechanisms and instruments. Ocean observations including data and information will be the foundation of the programme. The Programme will catalyze Decade actions in Africa and will be a used as a resource mobilization tool for the various actions in Africa. The Taskforce organized a successful satellite event on the margins of the 2024 Ocean Decade Conference in Barcelona (Spain). The satellite event brought together partners with the aim of collaborating in the implementation of the new Africa Programme (SEAWARD Africa).

185. Progress has been made in relation to the objectives of UNESCO Africa Flagship Programme 5 that are led by UNESCO-IOC and in terms of increased engagement of African stakeholders in the Ocean Decade. In terms of the first objective of Flagship Programme 5, related to harnessing science to inform management of natural resources & development of sustainable ocean economy, ocean and coastal observations have been enhanced and strengthened for example through regional

oceanographic expeditions with participation of more than 50 experts from the region, installation of tide gauges at selected locations in the framework of GLOSS and ODINAFRICA, a survey of status of ocean observations along the African coastal and development of a proposal for a comprehensive African Ocean Observing System. In addition, a regional MSP Forum was held in November 2023.

186. The regional node for the Ocean Info Hub (www.odinafrica.org) was developed with information on experts and institutions / organizations, policy documents and legislation, spatial data and maps, research vessels, education and training opportunities, and projects. Case studies on gender and poverty perspectives were carried out in Madagascar, Kenya and Tanzania and the African Coastal and Marine Atlas is under redevelopment using new software. Two Science-Policy interface engagements in partnership with other stakeholders were also held to encourage Member States to develop guidelines and capacity measures to support the integration of Ocean Science and ocean-climate nexus in African Union Maritime Strategy and climate strategies. These were held in September and November 2023 respectively.

187. In terms of the Africa Flagship related to preventing risks, enhancing resilience and adaptive capacity to climate change ans disasters, capacity development initiatives were carried out in relation to ocean acidification and detection and early warning systems for harmful algal blooms. Morocco and Egypt are partners of the IOC-EU CoastWAVE project. The project supports sea level risk understanding, improved tsunami alerting system and implementation of Tsunami Ready community recognition pilots in El Jadida (Morocco) and Alexandria (Egypt). The University of Chouaib Doukkali (UCD) in Morocco organized a meeting on Tsunami Ready with high-level stakeholders in El Jadida, Morocco on March 11, 2023. A tsunami walk exercise was also organized. The two respective communities participated for the first time in the regional-to-local end-to-end tsunami exercise (NEAMWave23) on the 6th and 7th November 2023, as a contribution to the World Tsunami Awareness Day 5th November 2023.

IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE)

188. IOCARIBE has the overall responsibility for coordination of regional implementation of UNESCO-IOC policies, principles and strategies on ocean science, ocean services and early warning systems for ocean hazards, and for coordination of the UN Decade of Ocean Science for Sustainable Development 2021–2030 in the Tropical Americas and the Caribbean Region (TAC). In the year since the IOCARIBE IGM XVII meeting, the Board agreed that, in the context of co-design of the Ocean Decade, the Subcommission should conduct a review and revision of the IOCARIBE technical and governance working groups, as well as the establishment of new working groups, as appropriate. the Board of Officers agreed to a comprehensive review of the Sub-Commission's portfolio, with an emphasis on prioritization. The new working groups aimed to augment the severely limited technical capacity of the Sub-Commission and to accelerate the use and application of ocean science across the region, ensuring participation by Member States, partners and communities.

189. During the June 2023–May 2024 period, the following governance and coordination activities were completed, led by the IOCARIBE Board and implemented by the Sub-Commission and its many partners. The Sargassum Working Group has now established six (6) Task Teams on:

- An observing system for Sargassum,
- Remote sensing advancement,
- Modelling advancement,
- A Regional Sargassum Forum in 2025,
- The Sargassum Information HUB; and
- Community-led decision support tools.

190. The governance and technical arrangements for IOCARIBE-GOOS are ongoing, with the establishment of a Technical Advisory Group, with experts who have already been engaged in the

development of observing systems. During May 2024, the Sub-Commission is inviting Member States to join the IOCARIBE-GOOS Steering Group.

191. The Harmful Algal Blooms (HAB) working group has been consistent in delivering good science and knowledge. However, the Sub-Commission advised that there was a necessity for the expansion of the group to include the users and key sectors with specific interest in their work. A regional meeting held in October 2023 resulted in some expansion of the Group, with key tourism and fisheries sectors requesting information.

192. With respect to governance for capacity development, the Board agreed to the establishment of a new governance arrangement—a regional working group on capacity development, to reduce fragmentation of training, avoid duplication of activities, and ensure that trained persons have expertise to participate fully in the work of UNESCO-IOC. Within this group, a Task Team on Ocean Literacy is being established following the launch of the Programme 'Ocean Literacy Caribbean – The Ocean and Me' at the fourth International Conference on Small Island Developing States (SIDS4) in May 2024.

193. Procaribe+ is the new Caribbean large marine ecosystem (LME) project that was approved for implementation by the GEF. Through this LME process, an interim Ocean Governance Coordination Mechanism (OCM) was established via a signed Memorandum of Understanding (MoU), a consortium of nine (9) intergovernmental organizations operating regionally, with some ocean-related functions and UNESCO-IOC was included. In October 2023, the permanent OCM MoU opened for signature at the High-Level session of the Cartagena Convention and its Protocols, and former IOC Executive Secretary Ryabinin declared the intention of UNESCO-IOC to sign once the Executive Board of UNESCO gave its approval to do so. Since then, six (6) of the nine agencies and eight (8) Member States have submitted their signatures, and IOCARIBE has been working with the Board to prepare the submission to the new Executive Secretary.

194. According to IOCARIBE-XVII recommendation, an open-ended working group was convened to finalize the *IOCARIBE Medium-Term Strategic Science Plan 2023–2030*. Member States were given the opportunity to comment, and the final document was shared in March 2024. The Science Plan aligns the IOCARIBE programmes with the Ocean Decade Challenges, and provides a roadmap for maximum benefits to be derived from the Ocean Decade for the region.

195. To address the regional need to streamline data and information flow for decision making, IOCARIBE is working closely with the IODE global programmes to establish a regional Ocean Data and Information Working Group, focused on building an adequate framework, provide appropriate training and give technical advice to Member States on open data, as well as FAIR and CARE principles.

196. During June 2023–May 2024, the following Ocean Decade governance activities were completed.

- IOCARIBE Sub-Commission, and recruitment is ongoing for the Head of the DCO. Interns are also being invited to join the DCO, to participate in the work of the Ocean Decade. After a comprehensive and transparent process, the TAC Ocean Decade Task Force was established, with Terms of Reference and a multi-stakeholder constituency comprising 15 representatives of academia, the private sector, civil society, communities and ECOP, and 9 representatives of regional organizations. The third meeting of the Task Force will be the first in-person meeting to be held in June 2024. The main focus of this meeting is to finalize the draft Ocean Decade Roadmap for the TAC region, facilitating the region's implementation of the Ocean Decade up to 2030.
- In line with the SIDS priority focus of UNESCO, the IOCARIBE Board prioritized the Call for Decade Actions #6 focused on Small Island Developing States (SIDS), and IOCARIBE held meetings with Caribbean SIDS. 11 projects were submitted and all of them were endorsed. Some have been selected already for funding and training in co-

design.The joint governance teams of IOCARIBE and the ICG/CARIBE-EWS are implementing the Decade-endorsed project Integrating Coastal Hazards Early Warning Systems (iCHEWS) seeks to incorporate a multi-hazard approach into the mature Tsunamis Early Warning System. This project, collaborating with the IOCARIBE-GOOS group and CoastPredict has designated four (4) pilot sites in the region to implement observing, forecasting and prediction, and will strengthen the joint governance arrangements.

IOC Sub-Commission for the Western Pacific (WESTPAC)

197. Since the 14th Intergovernmental Session of the Sub-Commission (April 2023, Jakarta, Indonesia) and the last Assembly of IOC (June 2023, Paris), WESTPAC continues to foster ocean science-policy-society interface, advance ocean knowledge and cooperation, and co-design and co-implement with its Member States a diverse array of programmes and activities, including those for the UN Ocean Decade, addressing ocean management and sustainability challenges.

198. Meanwhile, the Sub-Commission has been taking the lead in the region, motivating and engaging experts, institutions, and countries in the Ocean Decade. In pursuance of the IOC Executive Council Resolution EC-55.1, the WESTPAC Office started to assume a new function in June 2022 as a Decade Coordination Office for the region.

199. In addition to providing technical and strategic support to Member States, the Sub-Commission develops, coordinates, mobilizes, and implements the Ocean Decade related Actions and activities, including the 2nd UN Ocean Decade Conference for the Western Pacific & 11th WESTPAC International Marine Science Conference (22–25 April 2024, Bangkok).

200. Under the banner, 'We commit to accelerating ocean science solutions for sustainable development!', the resolute voice of 1,200 participants resonated throughout the 2nd UN Ocean Decade Conference for the Western Pacific & 11th WESTPAC International Marine Science Conference, held in Bangkok from April 22 to 25, 2024.

201. This significant gathering, orchestrated by the IOC Sub-Commission for the Western Pacific (WESTPAC) and hosted by the Government of Thailand, brought together a diverse array of ocean stakeholders from over 40 countries. Together, they presented the latest ocean knowledge, examined the progress of the Ocean Decade Actions over the past three years, outlined future priorities, forged partnerships, and catalyzed concrete actions for transformative ocean-based solutions to sustainability challenges in the region.

202. The remarkable turnout set a new benchmark in the history of the Sub-Commission. Unfolded with a prestigious opening attended by the Deputy Prime Minister of Thailand, the Conference featured 25 Scientific Sessions dedicated to sharing and disseminating the latest knowledge about ocean priority issues in the region, 13 Decade Action Workshops to examine development progress and formulate action plans for endorsed Decade programmes and projects (Decade Actions), and 12 Decade Action Incubators established to transform ideas into concrete Decade Actions.

203. Additionally, a Special Forum on the South China Sea, held in collaboration with UNEP/GEF SCS SAP project, reviewed the project scientific findings and their applications to local management in the South China Sea and Gulf of Thailand. A Townhall discussion centered on the outcomes of the Barcelona Conference and the Decade Vision 2030, offering insights and actional recommendations to tackle ocean priority issues in the region towards sustainable development. Several side events were arranged on the sidelines of the Conference, showcasing the latest development in ocean science and technology, such as marine ecological ranching and the ocean satellite GOCI-II.

204. The Outstanding Scientist Awards 2024, presented on 23 April, honored five ocean scientists for their science achievement, and great contribution to international ocean science development

and cooperation in the region. In a bid to ignite youth enthusiasm for ocean science and cooperation, the Conference spotlighted 6 Best Young Scientist Oral and 2 Poster Presentations meticulously selected from a pool of 300 applications.

205. The Conference culminated in the issuance of the Early Career and Mid-Career Ocean Professionals Statement (ECOPs and MCOPs), and the Bangkok Declaration. These collective commitments from all participants aimed at accelerating the development of ocean science solutions, empowering diverse stakeholders as co-architects of ocean stewardship, nurturing ocean leaders through widespread literacy and education, harnessing technical and technological innovations, supporting early career ocean professionals, and advancing international ocean science development and cooperation in the region for a sustainable ocean.

206. While mobilizing actions from various stakeholders in the region, the IOC Sub-Commission for the Western Pacific (WESTPAC) has also been stepping up efforts to implement its initiated Decade Actions. Positive progress since June 2023 could be demonstrated by:

- UN 21: Accelerating marine spatial planning in the Western Pacific, with the Group of MSP Experts formed and its first meeting organized on 14–15 November 2023, marking the beginning of the implementation of the UN Ocean Decade Action 21: Accelerating MSP in the Western Pacific and adjacent areas;
- Kick-off the UN Ocean Decade Action – UN22: 'Stem the Tide of Asia's Riverine Plastic Emission into the Ocean', with its international workshop held on 20–22 November 2023, hosted by the East China Normal University (ECNU), a leading institution in plastic research and also the host of the Regional Training and Research Center on Marine Plastic Debris.
- The implementation of UN 23: Accelerating transformations in capacity development-Regional Network of Training and Research Centers (RTRCs) on Marine Science, with the 6th Regional Training and Research Center established at the City University of Hong Kong, focusing on Coastal Contaminant Monitoring and Marine Innovative Technologies (RTRC-Coastal COMMIT).
- The implementation of UN 24: the 2nd Cooperative Study of Kuroshio and its Adjacent regions, which is underpinned by more than 10 projects covering various scientific, ecological, social and economic aspects of the Kuroshio, with its fourth meeting of International Steering Committee held on 4–6 December 2023, Qingdao (China), hosted by the Laoshan Laboratory.

207. Moreover, to harness the potential of environmental DNA for marine biodiversity conservation, On 27–29 November 2023, the IOC Sub-Commission for the Western Pacific (WESTPAC) in partnership with the Marine and Coastal Resources Research and Development Institute (Thailand) and the Nanjing University (China), organized a training workshop at the Phuket Marine Biological Centre (Thailand) to introduce about the Environmental DNA (eDNA) method, and explore how it could be used for researching and monitoring marine biodiversity in coastal habitats.

IOC Regional Committee for the Central Indian Ocean (IOCINDIO)

208. The IOC Assembly at its Thirty-second Session (UNESCO, Paris, 21–30 June 2023) adopted Resolution A-32/1, by which it elevated the former IOC Regional Committee for the central Indian Ocean (IOCINDIO) to an IOC Sub-Commission and requested the Executive Secretary to issue, within four (4) months following the adoption of the present Resolution, a Circular Letter inviting Member States to submit a Letter of Adhesion to the IOCINDIO Sub-Commission. Subsequently, the Executive Secretary issued the IOC Circular Letter, 2956, dated 24 August 2023 which invited Member States to submit a letter of adhesion to the newly adopted IOC Sub-Commission for the central Indian Ocean (IOCINDIO). Eleven (11) Member States sent a letter of Adhesion to the IOC Sub-Commission for the central Indian Ocean as follows: Bangladesh, France, India, Indonesia, Islamic Republic of Iran, Kuwait, Oman, Russian Federation, Saudi Arabia, Sri Lanka, and the United

Arab Emirates. The United States of America expressed an interest to be an Observer to the IOCINDIO Sub-Commission. The IOCINDIO Sub-Commission should maintain the current geographic coverage of the Regional Committee limited to the central Indian Ocean[1]; based on the clear understanding, with a consensual agreement, that the IOCINDIO Sub-Commission should not overlap and/or interfere with the geographic coverage, undermine, diminish, or weaken the work and/or responsibilities of existing neighboring IOC Sub-commissions. Adequate coordination mechanisms with adjacent sub-commissions help to avoid overlaps, focusing on cooperation, collaboration, and integration of IOC activities for the benefit of all regions. The IOC Secretariat in consultation with the current IOCINDIO Officers will convene the First Session of the newly established Sub-Commission in the first quarter of 2025 prior to the 33rd Session of the IOC Assembly. The Sub-Commission will elect its Officers at that session.

209. IOCINDIO co-organized with Decade Collaborative Centre for the Indian Ocean Region (DCC-IOR) and the Indian National Centre for Ocean Information Services (INCOIS) of India, the Indian Ocean Regional Decade Conference 2024: Bridging Billions to Barcelona' as an Official Prelude to the Ocean Decade Conference-2024', INCOIS, Hyderabad, 1–3 February 2024. IOCINDIO supported, contributed, and participated in the Conference and organized a dedicated Session on the IOCINDIO.

210. IOCINDIO contributed to the UN Decade 2024 Conference in Barcelona and organized a dedicated Satellite Events: ‘Enhancing coastal resilience in the Indian Ocean Key contributions of ocean and climate sciences to institutional capacity development as a vital solution to coastal vulnerability and climate change’ on the 9 April 2024. The hybrid event was well attended with about 100 participants (50 online and 50 in presence). IOCINDIO also contributed to the onsite event organised by India during the UN Decade 2024 Conference, on 10 April, providing the report on the Indian Ocean Regional Decade Conference 2024: Bridging Billions to Barcelona' as an Official Prelude to the 2024 Ocean Decade Conference. It is worth noting that all three IOCINDIO Officers together with several senior scientists, managers and ECOPs participated actively in the 2024 Ocean Decade Conference.

211. IOCINDIO reinforced cooperation with the IIOE-2 and co-organised the Second Indian Ocean Expedition (IIOE-2) meeting on Future Road Map for International Indian Ocean Expedition in Hyderabad on 28–30 November 2023. Seventeen (17) participants from seven countries (India, UK, USA, South Africa, France, Australia, Kuwait) participated in and contributed to the meeting which helped to align the IIOE-2 with the UN Decade and reinforced cooperation with the IOCINDIO Member States. IOCINDIO also co-organised the International Indian Ocean Science Conference 2024 in Lombok (Indonesia), with a dedicated session on IOCINDIO.

212. IOCINDIO, in collaboration with the Environmental Protection and Development Authority of the United Arab Emirates, co-organized the 6th International Conference on Global Warming: ‘The Critical Role of Oceans’, under the auspices of the Supreme Council and Ruler of Ras Al-Khaimah as a parallel event of the COP28 hosted by the United Arab Emirates in Ras Al Khaima on 4–7 December 2023. The IOC Executive Secretary participated in the Conference with a keynote address on the important role of the IOC in term of capacity development through international cooperation to support for ocean observations which are vital for understanding climate systems on the earth. The IOCINDIO Technical Secretary led a dedicated session on IOCINDIO and presented the progress on the work of IOCINDIO including the status of membership of the newly adopted Sub-Commission. The Conference brought together international multidisciplinary, multi-ethnic, and multi-generational experts, scientists, conservationists, policymakers in the fields of oceanography, ecosystem restoration, climate science, ocean and environmental policy and governance from around the world. The participation of a non-scientific public, the youth and

[1] For the purposes of this document, “central Indian Ocean" refers to the area of the Indian Ocean adjacent, to the West, with that of IOCAFRICA, and to the East, with that of WESTPAC.

schools' kids ensured a wide public awareness in inclusive manner. Along with keynote and panels discussions, the conference through interactive, dynamic and innovative workshops explored and presented latest research and innovations solutions to help reduce greenhouse gas emissions and promote climate resilience. The Conference also offered networking opportunities, exhibitions, and poster sessions promoting collaboration and knowledge-sharing. A full day immersion was organized in Dubai on 6 December at the COP28 venue in Dubai to share knowledge on the current Ocean-related patterns, trends, and innovations in climate change mitigation, and resilience.

FUNCTION F: CAPACITY DEVELOPMENT
Develop the institutional capacity in all of the functions above, as a cross-cutting function

IOC Capacity Development Strategy

213. In June 2023, the IOC Assembly, through Decision A-32/4.3, adopted the *IOC Capacity Development Strategy 2023–2030* (IOC/INF-1433) and its Outreach and Communications Plan.

214. Shortly after the adoption of the IOC CD Strategy, the CD Secretariat, highlighting the need for close collaboration with the regional subsidiaries bodies in implementing the new strategy, co-organized with IOCARIBE Secretariat in November 2023 a regional capacity development webinar series to reach out to the regional stakeholder groups in identifying the capacity development priorities and existing expertise and resources in the region.

215. The fifth meeting of the IOC Group of Experts on Capacity Development (IOC/GE-CD-V/3), held from 27 to 29 February 2024, provided an opportunity to assess the work of the group and its results in support of the IOC Capacity Development Secretariat. The group proposed revised Terms of Reference in accordance with the requirements of the new IOC Capacity Development Strategy 2023–2030, taking into account consultations with the global programmes and regional subsidiary bodies for their regional CD workplans. The revised Terms of Reference of the GE-CD are presented to the Executive Council in draft decision EC-57/4.6 of the Action Paper for the session.

216. As part of the UN Decade of Ocean Science for Sustainable Development (2021–2030), the GE-CD is consulted in the implementation of the UN Decade of Ocean Capacity Development Facility (CDF), which develops a community of practice among LDCs, SIDS and ECOPs in the Caribbean and African region. In addition, the GE-CD contributed to the public review of the White Paper on the Ocean Decade Challenge 9: Skills, knowledge and technologies for all, presented at the 2024 Ocean Decade Conference (Barcelona, Spain, 10–12 April 2024).

217. The CD workplans of the global programmes and regional sub-commissions were prepared at joint meetings with the global programmes and regional subsidiary bodies in the first semester of 2024. The CD elements of their workplans are being mapped in a matrix to the outputs of the IOC CD Strategy 2023–2030. The matrix exercise will help identify gaps where an output, activity or action is currently not being addressed, and identify the associated efforts and resource needs to fill these gaps. This will identify where assistance and guidance will be most needed and useful, which can then guide the development of project proposals and other new initiatives with the assistance of the IOC CD Secretariat for submission to interested donors.

218. In April 2024, the implementation of the IOC Ocean Training Internships to enhance global human capacity related to the IOC mandate, which was one of the five activities under the support for IOC capacity development provided by NORAD, started with a call for potential host institutions and mentors. The actual internship is scheduled from September to November 2024.

IODE's OceanTeacher Global Academy

219. Funded by the Government of Flanders (Kingdom of Belgium), the IODE OceanTeacher Global Academy programme component has established a global network of Regional Training Centres (RTCs) and Specialized Training Centres (STCs) to deliver customized training for the global ocean community, including experts, practitioners, decision-makers, and young scientists, and to increase national and regional capacity in coastal and marine knowledge, services, and management. OTGA currently has 17 RTCs/STCs (Argentina, Belgium, China, Colombia, Ecuador, Denmark, Fiji, Ghana, India, Indonesia, Kenya, Malaysia, Mozambique, Norway, Portugal, Uruguay/Brazil, and USA). In addition, the IOC Science and Communication Centre on Harmful Algae, University of Copenhagen (Denmark) serves as a Specialized Training Centre for HAB. During the reporting period, OTGA organized 59 online, face-to-face, and blended training courses focussing on a range of topics in ocean science, observations, and services, such as data management and sharing, marine spatial planning, satellite remote sensing, blue carbon, ocean literacy, weather forecast, and many more. OTGA training courses have successfully supported the implementation of the *IOC Capacity Development Strategy* by building equitable capacity and delivering high-quality training addressing the priority areas of all IOC Programmes, the UN Decade of Ocean Science for Sustainable Development, and the 2030 Agenda and its SDGs, contributing to the sustainable management of oceans and coastal areas worldwide, and relevant to Member States in the regions. Four different languages (English, Spanish, Portuguese, and French) were used to deliver training courses depending on audience. All training resources were hosted by the OceanTeacher e-Learning Platform (www.oceanteacher.org). Nearly 11,500 users are registered on the OTGA e-Learning Platform.

220. The OTGA network is delivering training contributing to the sustainable management of the ocean comprising ocean sciences, services, and marine data management (including marine biodiversity data and ocean best practices) relevant to the IOC Programmes and Regions. OTGA is an endorsed action under the UN Decade of Ocean Science for Sustainable Development and is contributing primarily to the Challenge 9 of the Decade contributing to the implementation of capacity development through the transfer of marine technology, ocean literacy, education, and training. OTGA also contributes to the UN Sustainable Development Goals to conserve and sustainably manage ocean and marine resources by 2030 and to build the scientific and institutional capacity needed to achieve the SDGs. Additionally, OTGA fully supports the implementation of the *IOC Capacity Development Strategy (2023–2030)*, by enabling knowledge exchange in a standardized and coordinated way, promoting student and teacher mobility, and leading regional and inter-regional collaboration through community building.

221. Additionally, during the reporting period, OTGA also worked with partner organizations, including POGO, Early Career Ocean Professional (ECOP) Programme, Marine Environmental Data and Information Network (MEDIN), Flanders Marine Institute (VLIZ), European Marine Observation and Data Network (EMODnet) Alfred Wegener Institute for Polar and Marine Research (AWI), Marine Biodiversity Observation Network (MBON), United Nations Development Programme (UNDP) Cape Verde, and Ocean Decade Capacity Development Facility (CDF) to organize and deliver 16 training courses.

222. It is important to recall that in 2018, the IOC Project Office for IODE, host of the OceanTeacher Global Academy, achieved ISO 29990 certification as a Learning Services Provider for non-formal education and training and was accredited by the Belgian Accreditation Body (BELAC) having satisfied the requirements of the International Standard. This certification is a recognition of the quality of learning opportunities offered by OTGA, through the IOC Project Office for IODE, and the high standard of quality learning services delivered that can support all IOC programmes in providing specialized training. This certification was renewed in 2023 against the new ISO standard (ISO 29993:2017 Learning services outside formal education—Service requirements).

223. The third meeting of the Steering Group for OTGA will be held in June 2024 to assess the achievements of the network and co-design a workplan for future years, including funding strategy. OTGA has already received more than 65 requests for training courses in 2024, reflecting its value to the ocean community and IOC capacity development. OTGA foresees a significant increase in

staff demand in the next years, which will require planning, collaboration, and extra-budgetary funds to sustain high-quality operations and incorporate new developments.

224. OTGA has been working closely with IOC CD secretariat to ensure that the trainings delivered and the new courses created address global and regional needs, and requests from IOC Member States and IOC Regional Sub-Commissions. OTGA-secretariat participated in the Fifth meeting of the IOC Group of Experts on Capacity Development (GE-CD) was held in Paris from 27 to 29 February 2024.

Ocean Literacy

225. Recognizing that sustainable development cannot be achieved without ocean literate societies, the Ocean Decade Ocean Literacy With All (OLWA) Programme is being implemented by a group of international partners under the leadership of the UNESCO-IOC. A major initiative of the programme is the Ocean Literacy Dialogues (OLD)—a series of public events organized with the aim of enabling knowledge exchange across different geographical and socio-cultural context. The latest editions were held in Tanzania (November 2023), with the support of the Government of Sweden, and in Spain, in the context of the UN Ocean Decade Conference (April 2024).

226. The second edition of the 'Kindergarten of the Lagoon' project supported by the PRADA group in the context of the Sea Beyond initiative, was launched in September 2023. The project already engaged 200 pre-school students since its creation and supports innovative educational practices towards the ocean based in the outdoor education approach. Sea Beyond also includes an online course for secondary school students, with the third edition launched in January 2024, engaging 34.000 students from 56 countries.

227. The interactive exhibition 'Ocean&Climate Village' continued to travel to Qingdao in October 2023, Brussels in March 2024 and Barcelona in April 2024, enriched with the 'Feel the change' installation for visually impaired and blind people. This project was developed with the support of the Government of Sweden, which also allowed the organization of the first Ocean Literacy Training for urban planners, architects and designers, in partnership with the OTGA e-platform.

228. As a contribution to the EU4Ocean coalition and under the three-year partnership signed with the European Commission Directorate-General for Maritime Affairs, UNESCO-IOC organized a training on ocean science communication for youth. Summer and winter schools in Italy (with a focus on the Mediterranean) and Portugal (with a focus on the Atlantic) were organized to promote soft-skills, collaboration and empathy towards the ocean. The next edition is planned to take place in Malmö (Sweden) in July 2024. Collaboration with DG MARE also strengthened the Global Blue Schools Network (composed of approximately 8,400 students, 2,240 teachers and 1,261 schools), allowing individual meetings with national coordinators and the creation of a common platform.

229. In October 2023, the Decade Coordination Office 'Connecting People and Ocean' was established. Hosted at the UNESCO-IOC Project Office of the Regional Bureau for Science and Culture in Europe (Venice), it will coordinate the implementation of Ocean Decade Challenge 10. A scientific advisory board, composed of international and multidisciplinary experts was established to promote diversity, equity and inclusion to achieve the collective impact of Challenge 10.

230. An ocean literacy World Conference will take place in Venice on 7–8 June 2024 to highlight the importance of Ocean Literacy for achieving SDG 14 and the objectives of the Ocean Decade. Developed in collaboration with the Government of Italy, the Municipality of Venice, and the Prada Group, it will bring together global stakeholders to discuss challenges, opportunities, and best practices in ocean education and conservation. It is expected that the conference will produce the Venice Declaration advocating for a more prominent role for ocean literacy in the context of the United Nations Ocean Conference 2025 in Nice.

231. In the context of the increased 2024–2025 regular budget for Intersectoral Programme 2 (IP2), new ocean literacy activities are being developed in UNESCO sites in collaboration with the IOC regional sub-commissions.

IOC Sub-Commission for Africa and the Adjacent Island States (IOCAFRICA)

232. Capacity development continues to be a main area of focus, with three Regional Training Centres for the new phase of the Ocean Teacher Academy programme designated at the University of Ghana (Accra, Ghana), the Eduardo Mondlane University (Maputo, Mozambique) and the Kenya Marine and Fisheries Research Institute (Mombasa, Kenya).

233. While over 30% of existing Decade Actions report that they were working in Africa, or planned to work there in the next 12 months, few of these Decade Actions are led by African partners. To contribute to redressing this situation, Call for Decade Actions No. 06/2023 is focusing on identifying partners in Africa who will benefit from tailored support and mentoring in co-design of Decade Actions that align with the priorities of the Roadmap. In parallel, consultations are underway with donors to increase access of African partners to new funding sources and sharing of in-kind resources. The Ocean Decade Capacity Development Facility which was launched in December 2023 is focusing on Africa as a priority geography.

234. The development of the regional node of the Ocean Information Hub has progressed well in Africa, with webinars held annually and regular biweekly meetings held since 2022. Within the framework of this initiative IOCAFRICA has collected information on Marine policies and legislations, Ocean observations platforms, and marine related projects, experts and institutions which have been used to develop and update databases that have now been linked to the Ocean InfoHub (https://oceaninfohub.org/). The development of a regional portal on training opportunities was completed and is now available at https://africa.marinetraining.org as well as being linked through the Ocean InfoHub. IOCAFRICA is working with partners, including IUCN, CORDIO, UNEP (Abidjan and Nairobi Convention secretariats), and WIOMSA on developing interoperability with existing information sources. IOCAFRICA has worked with several regional databases, such as the spatial database of CORDIO, the Benguela Current Convention and WIOSymphony, in order to make their information discoverable via the Africa node of the Ocean InfoHub.

235. Policy briefs were prepared and published, in collaboration with the African Group of Negotiators Experts Support (AGNES) on climate change adaptation in coastal zones of Africa focusing on: (i) Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities; (ii) Changing Oceans, Marine Ecosystems and Dependent Communities; (iii) Extremes, Abrupt Changes and Managing Risks; and (iv) Climate Change & Ocean Economy.

236. The implementation of two initiatives: ‘Detection and Early Warning Systems for Harmful Algal Blooms’, and ‘Ocean Acidification research and observation in Africa’ was launched with funding from the NORAD.

IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE)

237. Following the approval of the *IOC Capacity Development Strategy (2023–2030)*, the Sub-Commission convened four regional webinars on its regional implementation, with the IOCARIBE Board and programme Coordinators, Member States, regional universities, research institutions and ECOPs, and with the private sector and NGOs. This broad level of regional engagement led to the plan for a working group on capacity development, and also facilitated the involvement of new researchers in regional programmes. The outcomes also informed the drafting of new proposals to be implemented within the Ocean Decade framework.

238. The Sub-Commission convened a virtual meeting of the HAB-ANCA Working Group in October 2023, with simultaneous translation in three languages, focused on widening the scope and capturing the interest of other regional HAB researchers, ECOPs, other Member States not

participating, and users. This meeting resulted in increased participation from several new researchers and ECOPs joining the group. Members of the tourism sector who participated, have requested further information about the sector's vulnerability to HABs.

239. The Sub-Commission jointly convened, with UNEP, a training workshop on Marine Spatial Planning (MSP) and discussion on the Caribbean digital twin for the ocean. This workshop was targeted towards ECOPs and involved the use of the MSP Challenge Board Game to enhance decision-making in the use of ocean and coastal natural assets. As the Sub-Commission prepares for its second regional MSP Forum and provides national support to countries, further training in the use of machine learning has been requested. IOCARIBE is a Procaribe+ Implementing Partner for the regional MSP activities, with national projects in Colombia and the Dominican Republic.

240. IOCARIBE is implementing the Ocean Best Practices Caribbean Pilot, co-designing a training course on observing systems in English and Spanish. The course is being tested in two regional training workshops and will contribute to the ocean Teacher Global Academy suite of courses.

241. The Pollutants Observatory and Multiple Stressors projects have been accelerated through the IAEA-funded Red de Investigación de Estresores Marinos—Costeros en Latinoamérica y el Caribe (REMARCO) project building capacity in 18 Latin American countries to addres communication, ocean acidification, microplastics, harmful algal blooms, and pollution.

242. IOCARIBE will support the Government of Ireland as they fund co-design training for Decade-endorsed SIDS projects, by maintaining communications with country representatives, and by establishing a Coordinators' roundtable, to encourage interaction as implementation advances.

243. The TAC Ocean Observing and Forecasting System Decade project (TAC-OOFS) objective is to accelerate the governance and technical inputs to IOCARIBE-GOOS. Through this project, the technical group is working on a turn-key basic observing toolkit for SIDS. The Sub-Commission is preparing a small meeting in Miami during May 2024, to add some glider systems to improve hurricane forecasting in the Caribbean.

244. The OceanTeacher Global Academy Centre at INVEMAR (Colombia) continued to provide training and capacity development activities to LAC countries and 554 persons were trained during the period July–December 2023. INVEMAR has been establishing partnerships with international and UN organizations to carry out training, seminars, workshops and courses, including the IAEA partnership for ocean acidification workshops.

245. The regional node for Ocean InfoHub LAC component has progressed well, and in the last two quarters of 2021 has significantly advanced with its development building on the CHM-TMT designed by INVEMAR and in the Caribbean Marine Atlas experience. There was an acknowledgement of the need to assess gaps in capacity, and build a regional programme for filling those gaps.

IOC Sub-Commission for the Western Pacific (WESTPAC)

246. Capacity development has been an integral part of each WESTPAC programme and activity. To assist Member States achieving the SDG 14, the Sub-Commission endeavours to accelerate transformations in capacity development through the integration of training and research, the enhancement of endogenous capabilities and ownership of Member States, and the well-established mutual assistance and cooperation in the region. Over the last intersessional period, WESTPAC continuously co-designed and co-implemented its capacity development activities with Member States in the region.

247. The Sub-Commission started to implement the *IOC Capacity Development Strategy (2023–2030)*, and fulfill its voluntary commitment to the UN Ocean Conference 'Develop research capacity and transfer of marine technology through the UNESCO/IOC Regional Network of Training and

Research Centers (RTRCs) on Marine Science' (#OceanAction15266), and the UN Decade Action 23: 'Accelerating capacity development transformations in the Western Pacific – Regional Network of Training and Research Centres (RTRCs) on Marine Science'. Over the last intersessional period, the Regional Training and Research Centre on Marine Biodiversity and Ecosystem Health (RTRC-MarBEST) in Indonesia organized its 7th training on Fish Taxonomy (October 2023), in partnership with the Archipelagic & Island States (AIS) Forum. The Regional Training and Research Center on Coral Reef Restoration and MPAs in the Philippines organized a training workshop on Coral Larval Reseeding, 1–11 April 2023. The Regional Training and Research Centre on Ocean Dynamics and Climate (RTRC-ODC) conducted its 12th International training on Ocean Models and Data Assimilation from 10–21 July 2023. The Regional Training and Research Center on Plastic Marine Debris and Microplastics in Shanghai, China co-organized an international workshop in November 2023 on Asia Rivers' Plastic Emission and associated training for participants from the region. To further improve its quality delivery, the Regional Training and Research Centre on Marine Toxins and Seafood Safety in Nha Trang, Viet Nam conducted an evaluation in September 2023 with the technical assistance of an international team of experts, organized by the Sub-Commission.

248. The RTRCs initiative gained wide recognition and support from Member States in the region. In light of the region-wide consultation and excellent evaluation result, all Member States expressed their unanimous support and thus approved the establishment of a new Regional Training and Research Centre on Coastal Contaminant Monitoring and Marine Innovative Technologies (Coastal COMMIT), hosted by the City University of Hong Kong. Since late 2023, the RTRC-Coastal COMMIT will assist countries, particularly the developing nations in the region, in strengthening their monitoring capacity for marine pollution focusing on chemical contaminants monitoring, phycotoxin producing algal species monitoring; promote the development of marine innovation technologies; and facilitate international research collaboration to promote marine environmental protection and sustainable development.

249. Meanwhile, to improve national and international capacity for molecular techniques for resources management and biodiversity conservation, in November 2023 the Sub-Commission successfully completed the implementation of the third phase of a UNESCO/Korean Funds in Trust project 'Enhance the Capacity for Species Identification and Genetic Analysis on Marine Organisms in the Coral Reef Ecosystems in the Western Pacific'. In addition, in November 2023, WESTPAC also successfully completed the implementation of the UNESCO/Japanese Funds-in-Trust project, which greatly promoted the transfer of marine technology for marine biodiversity conservation and seafood safety, particularly on coastal habitat conservation, marine toxin analysis and seafood safety, and other hotspot biodiversity related issues, such as the impact of ocean acidification and climate change, and coral reef restoration.

IOC Regional Committee for the Central Indian Ocean (IOCINDIO)

250. The IOC Regional Committee for the Central Indian Ocean considers that Capacity Development (CD) cannot and should not be a stand-alone programme, action or activity. It is a long-term, dynamic and evolving cross-cutting mechanism. Subsequently, IOCINDIO uses an approach based on Training-Through-Research based on both permanent academic and on-job training and career development. IOCINDIO established cross-cutting Capacity Development Working Groups on critical issues in the region, including: (i) Ocean policy, economy, and governance; (ii) Coastal vulnerability, Sea-Level Rise, storm surges prediction and forecasting in the Indian Ocean; (iii) Cross-cutting Capacity Development and Recommendation. More generally, CD cuts across the entire Workplan of IOCINDIO.

251. IOCINDIO contributed to the Mercator Ocean International for enhanced operational ocean sciences, technologies, innovations and services in the Indian Ocean.

252. IOCINDIO, in cooperation with the Global Ocean Teacher Academy, the International Training Centre for Operational Oceanography (ITCOOCean) and INCOIS organized training workshop and courses on the Coastal Vulnerability Mapping–QGIS with a total number of 23

overseas participants from 7 countries (Bangladesh, Guinea, Maldives, Kenya, Sri Lanka, Seychelles, India). The workshop provided tools and understanding to participants on the Geospatial science helping to generate vital information on the sustainable use of the coastal resource and planning. The use of such techniques helped for managing densely populated coastal environs. This course provided an overview of GIS applications pertaining to coastal vulnerability and analysis. It also provided the basic GIS mapping techniques on storm surge vulnerability, and its socio-economic impact using open-source GIS tools. Course integrated data acquisition, processing, analysis, and interpretation of coastal spatial data. In addition, extensive hands-on sessions to use tools for preparation of thematic base maps for coastal vulnerability due to Tsunamis, Storm surges and their impact. Participants gained knowledge on understanding of spatial data: raster and vector models, core tasks involved in the GIS analysis process including data acquisition, management, manipulation and analysis, and presentation and output, the use of QGIS, GRASS tools and Plug-in tools, creating and editing spatial data, basic understanding of coastal and marine GIS data applications.

UNESCO Category 2 Centres (C2C) and Chairs in ocean-related fields

253. The two Category-2 Centres (C2Cs) under the auspices of UNESCO in the fields of competence of the IOC, namely the Regional education and research Centre on Oceanography for West Asia (RCOWA) in Islamic Republic of Iran and the International Training Centre for Operational Oceanography (ITCOOcean) in India and the UNESCO Chairs in Iran, Oman, and Qatar conducted several research and training activities in ocean sciences, operational oceanography, data management and tsunami warning and mitigation. Both C2Cs duly and timely reported to UNESCO through the dedicated online reporting platform and webpage https://en.unesco.org/ocean-category-2-centres. The IOC Secretariat undertook the review of the ITCOOCean towards the renewal of its Agreement. The report of the evaluation will duly be presented to the UNESCO Executive Board at its autumn Session in 2024.

254. The International Centre for Capacity Development: Sustainable Use of Natural Resources and Societal Change (GRO) in Iceland is the first UNESCO cross-sectoral Category 2 Centre. Its training programme in science for sustainable fisheries has 25 years of experience, graduated to date 464 fellows, supported 66 countries, and held 52 short courses and workshops. There is dialogue with IOCAFRICA and with OTGA view a view to announcement of training opportunities and usage of the OTGA platform in the FTP activities.

255. There is a number of UNESCO Chairs in the fields of competence of the IOC, notably in Australia, Benin, Brazil, Canada, Chili, Germany, Islamic Republic of Iran, Latvia, Oman, Portugal, Qatar, Russian Federation, Senegal, Spain, Tanzania, the United Kingdom, and Uruguay. The UNESCO-IOC Secretariat contributed to the organization of the international Conference which celebrated the 30 years anniversary of the UNITWIN/Chairs Programme on the theme: ‘Transforming Knowledge for Just and Sustainable Futures to mark the 30th Anniversary of the UNITWIN/UNESCO Chairs Programme’, UNESCO HQ, Paris, 3–4 November 2022. In this context, the IOC Secretariat convened the first global meeting of the IOC-related Chairs on the theme: ‘Ocean Science and Knowledge for Sustainable Development: Towards a Global UNITWIN Network of UNESCO Chairs and Category 2 Centres (C2C) under the auspices of UNESCO in Ocean and Climate Sciences, Technology and Governance’. The Secretariat is now working on establishing a network that will bring relevant Chairs together to foster collaboration and synergies.