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## **INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (of UNESCO)**

**Eleventh Intergovernmental Session of the IOC Sub-  
Commission for the Western Pacific (WESTPAC-XI)**

Qingdao, China, 21-23 April 2017

Item **4.3** of the Provisional Agenda

### **THE FUTURE OF IOC, AND THE ROLE OF WESTPAC IN IOC'S ROADMAP**

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**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION  
(of UNESCO)**

**Forty-ninth Session of the Executive Council**

UNESCO, Paris, 7–10 June 2016

Item 5 of the Provisional Agenda

**CONTRIBUTION TO THE FUTURE OF THE IOC  
EXECUTIVE ROADMAP**

Summary

This document has been prepared in pursuance of Decision IOC-XXVIII/4 of the IOC Assembly at its 28<sup>th</sup> session (18–25 June 2015), which decided that the inter-sessional work on this subject should continue under the leadership of the IOC Officers with a view of providing a fully developed document with recommendation to the IOC Executive Council at its 49<sup>th</sup> session in 2016.

Consistent with the decision, the document proposed for the review by the Executive Council results from the discussions at the Joint ‘Think Tank’ Retreat of the IOC Officers and the IOC Management Team, held from 5 to 8 January 2016 in Gilleleje, Denmark.

The appendices to the document contain: (i) the draft messages adapted to specific audiences about the societal benefits of IOCs mission, programmes and activities based on the input from the sessional working group and the discussions in plenary; and (ii) a Concept note: A Second International Decade of (Integrated) Ocean Exploration, 2021-2030.

Document IOC/INF-1337, ‘Synthesis of IOC development, work and results: opportunities and coincidences 1960–2015’ by Gunnar Kullenberg (past Executive Secretary) completes the documentation for this agenda item.

Decision proposed: Full draft decision is presented in para. 173. The Executive Council will be requested to provide its recommendations on the proposed documentation to be used by the Officers in the intersessional period with a view of presenting the final proposal to the IOC Assembly at its 29<sup>th</sup> session in 2017.

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## 1. Purpose of the document

1. The purpose of this document is to present a coherent roadmap for the Intergovernmental Oceanographic Commission (IOC) of UNESCO for the next 15 years, exploring links between the IOC and the 2030 Agenda for Sustainable Development, the 2014 SIDS-SAMOA Pathway, the Sendai Framework for Disaster Risk Reduction, the Rio+20 Conference Outcome and 2015 UN General Assembly Resolution on the Oceans and the Law of the Sea, as well as the COP-21 Paris Agreement, which are all of the utmost relevance for the future of the IOC.

2. This document contains a draft statement by the IOC of its vision and responsibility with regards to the Agenda for Sustainable Development. The roadmap is in line with the statutory role of the IOC and consistent with the IOC Medium-Term Strategy, 2014-2021 (IOC/INF-1314). The current Medium-Term Strategy specifies four High-Level Objectives responding to Strategic Objectives 4 and 5 of the UNESCO Medium-Term Strategy, 2014–2021 (37 C/4) and the associated three Expected Results. The roadmap also takes into account the IOC Capacity Development Strategy, 2015–2021 (IOC/INF-1332). The IOC long term strategy towards 2030 will have to evolve to embrace the new developments that have taken place since the adoption of current medium term strategy documents.

3. The roadmap aims at raising the profile of the IOC, assigning priority to its core and unique mandate in the fields of long-term sustained observations and related data and information management, capacity development, marine scientific research, transfer of marine technology, the science-policy interface, and linking regional priorities to national ones.

4. The roadmap starts with an overview (Section 2) that concerns ocean conditions and the need for research, data, analysis and management. Section 3 provides a description of the legal regime within which the IOC must function as an intergovernmental body within the UNESCO and UN system, to serve its Member States. Several long-term constraints and challenges of the IOC are discussed in Section 4. Sections 5-8 outline the directions given to IOC by the 2030 Agenda for Sustainable Development, the links of the IOC to the Sustainable Development Goals, the programme strategy in response to the new UN Global Platform and related regional perspectives. Sections 9-11 address areas in which the IOC has specific roles, including the links to different communities, the public and the Commission's outreach needs. Section 12 concludes the roadmap with suggesting a goal the IOC may aim to reach by 2030 or before. Most of the sections contain proposed action items.

5. The content is based on an extended meeting of IOC Officers and senior staff in Denmark, 6–8 January 2016, the document “Synthesis of IOC development, work and results: opportunities and coincidences 1960–2015” (IOC/INF-1337), and some scientific publications referenced at the end of the document.

## 2. Ocean conditions: Need for research, data, governance and management

6. There is a general consensus on the major ocean and coastal zone issues. According to public perception, the leading concerns are pollution and overfishing. There is also great concern among the public about ocean acidification, changes of ocean currents, sea-ice melting, sea-level rise, coastal flooding, extreme weather events and changes in their frequency, environmental impacts of aquaculture, effects of marine invasive species, habitat destruction, and coastal erosion (Gelcicha et al., 2014). According to scientific views the main concerns are overfishing, warming, waste and contamination, and acidification (Gelcicha et al., 2014).

7. Public support is key to address the challenges successfully and it is very important to take public perceptions and understanding into account in related management decisions and actions. Furthermore, according to studies, public perceptions show strong connections to marine and coastal environments, affected by aesthetics, identity, practical considerations of access, livelihoods,

assessment of impacts on marine wildlife, and clean energy production. It is important to note that international evaluations of human impacts on the marine environment, as a rule, do not assess public awareness or perceptions, concerns and priorities.

8. The leading 20 marine research questions identified by scientists are the following (Rudd, 2014): cumulative stressors; ocean productivity; ocean acidification; monitoring cumulative effects; oceanographic data; biodiversity contributions to ecosystem function; greenhouse gas flux; climate change mitigation and manipulation; global biodiversity and ecological function; benthopelagic coupling; science communication; contaminants; top predator decline; climate change-induced species dispersal; ecosystem structure to service linkages; thermohaline circulation; coral reef management strategies; cross-disciplinary ocean science and management; and energy development.

9. This ranking is based on a broad survey of scientists from 94 countries. Five of the top 10 research priorities were shared by respondents globally. Seven of the top 10 priority questions were shared by both physical and ecological scientists (global ranking is in parenthesis): cumulative stressors (1); ocean productivity (2); ocean acidification (3); monitoring cumulative effects (4); oceanographic data (5); greenhouse gas flux (7); and climate change mitigation and manipulation (8). However, only the question about cumulative stressors was among the top 10 priorities for social scientists. Many of the questions of high priority for social scientists were low in ranking order for natural scientists. Social scientists top-ranked science communication (1), risk assessment for governance (2), and ocean literacy messages (4), all of which show interest in the purpose of environmental management and normative aspects of our relationship with the environment and of interpreting, integrating and advocating science by engaging in the policy process.

10. There were also differences in the rankings between regions. Furthermore, the rankings did not reflect research priorities of society as a whole or of government policy makers. In that sense, it would be valuable to systematically gauge and compare existing ocean research priorities among governments and other bodies. Other high-level reports have highlighted the emerging role of public-private partnerships, greater stress on productive seas and knowledge of relevance for the marine (ocean) economy (reports from the World Bank and the European Commission cited from Rudd, 2014).

11. These reports point increasingly to the view of the ocean as the driver of economic and social well-being, as well as to the importance of safety and security, all influenced by ocean conditions. To achieve this vision, the health of the ocean must be restored and maintained (Rudd, 2014). The European Environment Agency (2014, cited by Rudd) states, "Our seas are rapidly changing while our dependence on them is growing. We do not fully understand the complex interactions of natural and human-driven changes. But we do know that we are not yet on the path to achieving healthy, clean and productive seas".

12. Rudd (2014) concludes that his results "provide insights as to how research scanning results can be synthesized and used to target ocean research on questions that, if answered, would be central to achieving ocean sustainability". It may be noted that the potential of the ocean as the driver of socio-economic development and well-being during this century was brought out earlier notably by Elisabeth Mann Borgese, the founder of the International Ocean Institute (1995, 1998).

13. The results by Rudd were supported by the Nordic study (W. Boonstra, Marine Policy; cited by Catherine Jex, *ScienceNordic*, January 21, 2016). According to that study, overfishing is the top concern for marine scientists, followed by elevated temperature, contamination and waste, and ocean acidification. Differences depend upon the scientific background. Natural scientists stress the symptoms of global change driven by human impacts, whereas social scientists tend to focus on the human causes of the threats.

14. The silent services of the ocean in the context of global and climate change include (Stocker, 2015):

- the uptake of over 90% of the excess energy present in the climate system, confirmed by observed ocean warming on a worldwide scale to depths of more than 2,000 metres;
- acting as a receiver and global distributor of the excess water from melting land glaciers, melting ice sheets of Greenland and Antarctica, with the sea-level rise caused by warming;
- ocean absorption of up to 30% of the carbon dioxide emitted by society and about 28% of the cumulative anthropogenic carbon dioxide emissions between 1750 and 2011, which is roughly equivalent to the amount taken up by the land biosphere.

15. The price for such ocean uptake is ocean acidification, and, more specifically, gradual calcium carbonate undersaturation. Its critical threshold can be predicted probably with the smallest uncertainty of all projections of future change related to the climate issue. Model simulations suggest this threshold will be first crossed in the Arctic, possibly as early as this decade. The prediction made by leading oceanographers over 20 years ago that “the ocean will decide” in the context of global and climate change seems to be coming true. Ocean acidification appears to be the most important issue. This could provide the focus for achieving one of the IOC expected results, around which the programme and budget for the 2018–2019 biennium will be formulated, as requested by the IOC Assembly in June 2015.

16. The specific Sustainable Development Goal 14.3 calls for minimizing and addressing the impacts of ocean acidification, notably through enhanced scientific cooperation at all levels. Thus a focus on this issue would be well justified from the perspective of the 2030 Agenda.

17. A major task in the context of a developing ocean economy is documenting the potential impacts of changes on established and emerging maritime industries and their ability to generate economic growth. This concerns fisheries and aquaculture; tourism; adaptation of and in coastal megacities; port and infrastructure services; development of pharmaceuticals, chemicals and marine biotechnical industry; coastal developments; sea bed mining; oil and gas extraction; desalination; habitat protection and restoration; blue carbon; and nutrients and recycling.

18. The impacts of climate change on the ocean will have profound implications for all human societies and most of our activities. In view of this insight, there is a need to bring in knowledge and understanding from other science disciplines, in addition to natural sciences and economics, in order to assess oceanic and coastal changes, such as maritime history, ethnographies of coastal cultures, and political geography of oceans (Allison and Bassett, 2015). It is in these areas of knowledge that IOC could seek broadened cooperation and visibility within UNESCO. The scientific activities of the IOC may focus on closing knowledge gaps and increasing interdisciplinarity.

19. The fate of the ocean depends on the balance of all considered factors. Slightly reformulated, the most critical issues that have been observed are:

- ocean warming caused by climate change;
- confirmed relatively rapid ocean acidification caused by oceanic uptake of excess carbon dioxide;
- overfishing and noted migration of species caused by both the warming and acidification, in particular the migration of species from the tropical zones to higher latitudes;
- confirmed loss of biodiversity, including extinction of species; and
- potential changes in ocean circulation.

20. Moreover, loss of ecosystem services, enhanced coastal erosion due to sea-level rise, and extreme storms and waves aggravate the deterioration of coasts and ecosystems, while inundation and catastrophic events are becoming more frequent, driven by ocean-atmosphere interactions. Other challenges are: continued pollution of the open ocean as well as shelf seas – particularly through spreading of plastic and other types of debris; continued overfishing – with complete depletion of some stocks, for instance through illegal, unreported and unregulated (IUU) fishing; and

the uncertain status of the high seas. Concern for overfishing is exacerbated by the doubts surrounding the reliability of global fisheries statistics, as they tend to underestimate the total catch and omit at least the artisanal fisheries.

21. Interactions between the ocean, atmosphere, coastal seas and land have created imbalances and changes. These are noted in the decrease of ice cover, change in nutritional balances in many Large Marine Ecosystems (LMEs) leading to changes in organic production, deprival of oxygen, and deoxygenation in subsurface and bottom waters, generating dead zones. The process appears to also have generated a change in Harmful Algal Bloom (HAB) occurrence, impacting fisheries, aquaculture, coral reefs and human health.

22. In order to address the threats to society, there is a growing need for coastal protection and development, marine spatial planning, hazard assessments, with related preparedness, adaptation, mitigation, education and information. Such actions can create jobs, livelihoods, and well-being.

23. As the only UN-specialized body for ocean science, the IOC is committed and mandated to demonstrate as well as explain the roles of science and observations, the links between these, and the use of scientific information in successfully addressing the challenges and issues and assisting in solving the related problems.

24. The interconnection between issues and impacts underlines the necessity of considering not only the global warming target, but several other combined targets of the Sustainable Development Goals (SDGs). As such, a holistic approach is needed for evaluating the life-support system and mitigation of changes of the entire Earth system. This reflects the realization by the UN Convention on the Law of the Sea (UNCLOS) that the ocean has to be considered as a whole. It is also reflected in the Preamble to the 2030 Agenda for Sustainable Development (Resolution adopted by the UN General Assembly on 25 September 2015) stating that “the interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new Agenda is realized”.

25. In conclusion, it can be noted that: (i) the call for research and data; science communication and dialogue between sciences, as well as between scientists and policy makers; (ii) the need for governance and management, coordination of research and monitoring efforts; (iii) the regard for differences between regions and capacities brought out by studies, together with the socio-economic consequence of a healthy ocean - all provide for many opportunities and challenges for the IOC. Many of the research priorities identified by the surveys are addressed by IOC projects. Regional differences in priorities as well as differences in capacities are addressed in both global and regional programme activities.

#### **ACTION ITEMS – Ocean conditions: Need for research, data, governance and management**

26. The IOC could carry out a survey among policy makers and science policy advisers on priority concerns related to the marine environment, in the context of research and observations, with a focus on the Member States which joined the IOC following the entry into force of UNCLOS in 1994. Such a survey may indicate their reasons for joining the IOC, as well as help identify the socio-economic priorities of the participating countries with respect to the marine environment and its resources. This could provide guidance for the scientific communities in these countries and their respective regions about research and data retrieval, and help enhance the link and dialogue between science and policy making.

27. The IOC could, with regard to some of these Member States, consider how to address the contribution of ocean science in the development of the Blue Economy, the valuation of marine ecosystem services, and the cost-benefit of investments in observations. A working group could be established with participants from the IOC and Global Ocean Observing System (GOOS) scientific communities, on the one hand, and, on the other hand, economists identified and invited in

consultation with the United Nations Division for Ocean Affairs and the Law of the Sea (UN-DOALOS), the United Nations Development Programme (UNDP), and the World Bank.

### **Possible additional IOC strategy actions:**

28. (1) In order to raise awareness and achieve greater involvement of high-level decision makers and science programme managers in policy shaping and activities, an active advocacy based on a qualified briefing document is required. The substance should focus on the importance and returns of having scientific basis for a sound management, development and governance of the marine environment and its resources, including coastal areas and shelf seas. Ongoing contact with representatives of Member States and the permanent representatives to UNESCO are an essential part of the process. The efforts should lead to more active participation of Member States through their institutions in the implementation of agreed IOC programs, projects and other activities, including in making sustained ocean observations and providing services.

29. (2) IOC could prepare a brief, concise report on our present understanding and knowledge of the role of the ocean in climate change and the impacts on the ocean thereof. The report, to be developed by experts in physics, geochemistry, biology and policy, should address several of the issues mentioned above. Prepared under the leadership of the Executive Secretary, this report would not duplicate other assessments but rather use their results, in particular those of the Transboundary Waters Assessment Programme (TWAP) and Group of Experts on Scientific Aspects of Marine Environmental Protection (GESAMP) with regards to pollution. Several IOC endeavours pertaining to HAB, Integrated Coastal Area Management (ICAM), the Ocean Biogeographic Information System (OBIS), and the World Climate Research Programme (WCRP) could also contribute. By referring to public perceptions and concerns, the report would serve policy and decision makers and help to stimulate international ocean research. Being relevant for SDG 14a and c, the report would help to advance understanding among decision and policy makers of the major role of science and observations in the context of socio-economic and sustainable development.

### **3. Legal regimes and institutional conditions**

30. The three pillars of Sustainable Development – economy, development and environment – are covered in the UN Convention on the Law of the Sea and in the Agenda 21 of the 1992 UN Conference on Environment and Development (UNCED). Taken together, these global agreements specify the legal regime within which the IOC functions and has its mandate.

31. The IOC is of course also influenced by and associated with several other global and regional agreements and conventions, including the UN Framework Convention on Climate Change, the Convention on Biological Diversity, the 1995 Agreement on the Protection of the Marine Environment from Land-based Activities, the 2012 UN Conference on Sustainable Development (Rio+20), and the most recent ones on Small Island Developing States: SIDS Accelerated Modalities of Action (SAMOA) Pathway of 2014, the 3<sup>rd</sup> Disaster Risk Reduction Conference of 2015 with the Sendai Framework for Disaster Risk Reduction 2015-2030, and the Paris Agreement of the 21<sup>st</sup> Conference of the Parties of the UN Framework Convention on Climate Change (UNFCCC COP21).

32. The IOC is a body within UNESCO, with its own Member States, Governing Bodies, Statutes and Rules of Procedure. It has functional autonomy in UNESCO and a protected budget agreed on by the General Conference of UNESCO. It reports directly to the Director-General of UNESCO.

33. Ocean governance and management for sustainable development need to cover: an ethical dimension; an economic dimension; an environmental dimension; and a peace and security dimension. These are inherent in UNCLOS and are all referred to in the 2030 Agenda for Sustainable Development. The IOC is explicitly mentioned in UNCLOS, Annex II, Article 3.2 Annex VIII, Article 2.2, as well as in Agenda 21, Chapter 17, programme area (e).

## Responsibilities of the IOC within UNCLOS

34. Following the entry into force of UNCLOS, the IOC supported the Lisbon Conference 1994, took the initiative of the International Year of the Ocean (1998), and furthermore responded to new legal environment by establishing in 1997 the Advisory Body of Experts on the Law of the Sea, IOC/ABE-LOS. This body is tasked with providing advice to the Commission with respect to its function in relation to UNCLOS.

35. Article 247 of Part XIII of UNCLOS, focused on marine scientific research, stresses the importance of cooperation between States through a competent international organization that promotes, facilitates and coordinates research projects. This is precisely the mission of the IOC. The work of IOC/ABE-LOS resulted in the adoption of a procedure for the application of Article 247 by the IOC Assembly at its 23<sup>rd</sup> Session in 2005.

36. Transfer of marine technology is another central theme of UNCLOS through its Part XIV, including Article 271 on guidelines, criteria and standards, and section 3 on the creation of national and regional marine scientific and technological centres. Through IOC/ABE-LOS, the IOC could meet its role in promoting guidelines, criteria and standards for transfer of marine technology.

37. The ocean observations organized through GOOS constitute important components in the implementation of UNCLOS, meeting needs in particular of its parts: V on Exclusive Economic Zones (EEZ); VI on Continental Shelf; VII on High Seas, mainly its section 2; X on Enclosed and Semi-Enclosed Seas; XI on The Area; XII on Protection and Preservation of the Marine Environment; and of course parts XIII and XIV, along with elements of parts XV and XVI. GOOS involves floats, satellites and ships whose operations also depend on the implementation, interpretation and application of UNCLOS provisions. IOC/ABE-LOS addressed related questions, which resulted in provisions adopted by the IOC Executive Council in 2008.

38. For its application, the Law of the Sea also requires information on the practices of Member States in the areas of research and transfer of marine technology. IOC/ABE-LOS invited Member States to supply relevant information through a questionnaire that has been circulated a number of times and should be seen as a long-term effort. Responses and analysis provided useful inputs to DOALOS concerning the updating of "Marine Scientific Research: A guide to the implementation of the relevant provisions of UNCLOS". It also resulted in a constructive cooperation between IOC/ABE-LOS and DOALOS.

39. The on-going project of the IOC Global Ocean Science Report is also relevant in this context. The work of the Advisory Body resulted in April 2012 in a resolution by the UN General Assembly on the Ocean and the Law of the Sea, encouraging Member States to use the *Criteria and Guidelines on Transfer of Marine Technology* (IOC/INF-1203) developed by the IOC, and taking note of the advice of IOC/ABE-LOS in the implementation of parts XIII and XIV of UNCLOS. The same resolution also took note of the part played by GOOS in expanding the understanding of the ocean-atmosphere interface through observations and the development of geographic information systems.

40. In the context of UNCED 1992, the responsibilities related to the IOC appear in Chapter 17 of Agenda 21, which introduces seven programme areas: (a) Integrated management and sustainable development of coastal areas, including economic zones; (b) Marine environmental protection; (c) Sustainable use and conservation of marine living resources of high seas; (d) Sustainable use and conservation of marine living resources under national jurisdiction; (e) Addressing critical uncertainties for management of the marine environment and climate change; (f) Strengthening international, including regional, cooperation and coordination; and (g) Sustainable development of small islands.

41. In programme area (e), *inter alia*, in paragraph 17.102, States are invited to "Recogniz[e] the important role that oceans and all seas play in attenuating potential climate change", and it is stated that "IOC and other relevant competent United Nations bodies, with the support of countries having

the resources and expertise, should carry out analysis, assessments and systematic observation of the role of oceans as a carbon sink". Paragraph 17.103b supports "the role of the IOC in cooperation with the World Meteorological Organization (WMO), UN Environment Programme (UNEP) and other international organizations in the collection, analysis and distribution of data and information from the oceans and all seas, including as appropriate, through the Global Ocean Observing System, giving special attention to the need for IOC to develop fully the strategy for providing training and technical assistance for developing countries through its Training, Education and Mutual Assistance (TEMA) programme". The IOC does address these actions and related concerns.

### **Institutional situation of the IOC**

42. The IOC functions as a part of UNESCO and can use its association with UNESCO with regards to UNCLOS, UN and its Economic and Social Council (ECOSOC).

43. The IOC is highly regarded in UNESCO. As a commission in UNESCO the IOC can broaden its visibility. It may also simplify the communication to outside stakeholders to clarify why the IOC is in UNESCO as an intergovernmental commission.

44. Enhanced interaction with other UNESCO sectors and programmes, such as Education, Social and Human Sciences, the International Hydrological Programme (IHP), and engineering, – as called for by the IOC Assembly – can radiate into other communities than the purely marine ones in Member States. The IOC has the potential to provide considerable contributions to UNESCO interests and projects, for instance in relation to transfer of technology, the Action Plan for SIDS, and activities related to climate change and risk reduction, notably as regards social security. The IOC could be a prominent actor and contributor to these activities without being in the exposed position as the leader. However, it would also put an additional demand on the staff of the Secretariat.

45. Member States agree on the need to raise awareness on the part that the IOC and its regional bodies can play as the global hub for intergovernmental ocean science cooperation, advice and information (Report of IOC Assembly 2015, IOC-XXVIII/3). The IOC "has a unique mandate to establish a long-term, systematic ocean observing, modelling and analysis programme, which is the foundation of environmental protection, sustainable development, climate change and hazard risk reduction and these commonly agreed priorities should be adequately reflected in the budgeting process". These priorities go together with the overall aim to support, strengthen and promote the vision and mission of the Commission, and boost investments in ocean-related activities at national level and provision of extra-budgetary funds to the IOC. These priorities also link very well with Sustainable Development Goals and the 2030 Agenda.

46. Many developing States have joined the IOC following the entry into force of UNCLOS in 1994 (in total 25 Member States joined IOC since 1995). It could be conjectured therefore that the interest to join the IOC might be related to the new "ocean constitution" and the increasing role of the ocean in socio-economic development and concern among governments and the public about the deteriorating conditions of oceans, coasts and marine living resources, and the associated competition for limited resources. These facts all highlight the importance of UNCLOS. An economically appropriate and socially acceptable way to address the situation requires cooperation, coordination, and the pooling of resources through a specifically mandated platform, together with the establishment of the necessary knowledge, observations or monitoring, data management, and analysis, preferably within the UN system. The IOC has the mandate and is the ideal body with its small administration and decentralized actions, with a common interest for the cause, and where all parties and interests can be heard equally at the global level. Furthermore, the IOC has a track record of delivering valuable results.

47. The current IOC Medium-Term Strategy, 2014–2021, adopted by the IOC Assembly at its 27<sup>th</sup> Session in 2013, constitutes the operational legal regime for this period. It specifies the vision of the IOC as follows: "Strong scientific understanding and systematic observations of the changing world ocean climate and ecosystems shall underpin sustainable development and global governance for

a healthy ocean, and global, regional and national management of risks and opportunities from the ocean”.

48. In order to achieve this vision, the Medium-Term Strategy specifies the operational procedure of implementation through six core functions:

- ocean research to enhance knowledge of ocean and coastal processes and human impacts;
- observing systems, data management and information systems;
- early warning services and preparedness to mitigate risks of hazards;
- assessment, information for policy and science-policy interface;
- sustainable development, governance and management with regional cooperation; and
- cross-cutting capacity development, institutional capacity and human resources development.

49. Noting that the combined UNCLOS and UNCED 1992 legal regimes cover both ocean and coastal areas, they support a possible IOC long-term focus and visionary strategic goal, which can also contribute significantly towards achieving the aims of the 2030 Agenda. Along this line the visionary strategic goal of the IOC for the coming decades could be:

*to help secure a healthy ocean – the ocean we depend on for survival –  
on the basis of science, observations, technology and related services.*

This goal is to be achieved within the policy-enabling combined legal regimes of UNCLOS and UNCED. Facilitating and responding to the requirements deriving from UNCLOS and UNCED is in conformity with IOC Statutes, Articles 2 and 3, and in particular Article 3c.

#### **ACTION ITEMS – Legal regimes and institutional conditions**

50. An immediate strategic action of the IOC could be the revitalization of IOC/ABE-LOS and assigning to it some tasks, possibly in consultation with UN-DOALOS. For example, the Group could be asked to advise the IOC on which components of UNCLOS would need development of capacity in science and technology and operationalization of ocean services.

51. Another action item could be to analyze to what extent the original arguments for having the IOC as a body within UNESCO still hold, and consult, possibly through the Officers, with Member States as to their reasons for joining the IOC.

#### **4. Constraints, lessons learned and challenges**

52. Ocean and marine affairs drive many socio-economic activities and contribute significantly to national economy. The IOC must bring out the importance of science, observations and knowledge, including about uncertainties, in the context of ocean activities for national economy and growth.

53. The IOC should show decision makers how forecasts of environmental conditions (precipitation, drought, temperature, seasonal wind patterns, occurrence of some natural hazards – for instance early warnings for tsunamis, made possible from ocean observations) depend on the ocean data and save lives and infrastructure. They can also improve management of agriculture, fisheries, water resources, transport and support industries – such as tourism – which are all of great economic value. This should demonstrate the returns obtained from governments’ investments in scientific and technical development and maintenance of related infrastructure.

54. The IOC must attract economic experts who can evaluate quantitatively these returns on investments. Government investments are essential to secure the development of infrastructure for

sustained ocean observations. Accordingly, decision makers require a product and a result they can use to protect society and justify their investment.

55. In some cases, a cost-benefit analysis can be carried out. However, cost-benefit analysis is difficult and there is no agreed procedure. The IOC could discuss this with partners, such as UNDP. Some LME programmes have done it (e.g. the Yellow Sea LME) with an economist working in the team. It appears necessary for the IOC to pursue this matter and address problems of economic nature. This could also enhance its credibility in the context of a growing ocean (Blue) economy. We can refer to early warning systems, GOOS and several other tools such as marine spatial planning, standards, norms, pollution control, management of HAB, runoff from land, eutrophication and marine resources.

56. In several cases, for example GOOS, the end products resulting from the work of the IOC are delivered not by the ocean science or technological communities but by other sectors or presenters, or other organizations than the IOC, which tend to work within applied sectors. This means that the scientific community and the IOC do not get proper credit and visibility. The role of the upstream efforts undertaken for the end products must be more clearly brought out. The IOC functions to some extent as an assembly line. It must emphasize the applications of its activities and results, for instance regarding forecasting, and explain the related uncertainties and how to improve the forecasting. Scientific results and knowledge about coastal conditions are not obvious to the public, but must be explained and demonstrated (- one example being rip currents along a beach). The IOC could support such efforts at national level through a pool of experts, exchange of experiences and best practices.

57. Using demonstration sites, examples and leadership seminars involving all relevant sectors and stakeholders, the IOC could both explain the results of the science efforts and help create a dialogue between the different sectors and users. This could function horizontally and vertically with the participation of managers and decision makers and also help to overcome the frequent communication problem between various stakeholders. The key role of science communication was highlighted in the surveys referred to earlier.

58. An important question in this context concerns the right administration and balance between centralization and decentralization. Many Member States want and need help at national-local level to address their own problems. The Law of the Sea stresses that the whole ocean is connected and that "the problems of ocean space are closely interrelated and need to be considered as a whole". Local conditions are influenced by regional conditions and in some cases driven by global processes and teleconnections. Hence, cooperation and coordination between regional and global programmes and actions are necessary.

59. The required communication mechanism also must connect to local conditions and activities, working both top-down and bottom-up. It should facilitate horizontal connections and exchanges between efforts in various locations, local actions, as well as help in vertical connections between local and national governments. Through its regional cooperative research projects and subsidiary bodies, the IOC has created dialogue and cooperation between Member States in several regions; in turn this contributes to mutual assistance, understanding and peace, fully in line with the spirit of UNCLOS, UNESCO, and requirements for sustainable development.

60. Several examples can be given, and the IOC could provide such incentive in regions where there is a requirement for more ocean-related cooperation. Differences between regions as regards capacity and development are well acknowledged in the IOC strategy. The Commission aims to serve the international community with respect to provision of knowledge on the role of the ocean for development, taking into account the different scales and distinctions between regions. However, it remains clear that the socio-economic role of the ocean is very significant for all regions. Thus the IOC is well placed to play a part in science diplomacy, the application of which can lead to changes of policies and enhanced interactions, cooperation and mutual assistance.

61. The approach to capacity development towards Member States has to some extent evolved into support to the IOC regional bodies and activities. It is currently larger than ever before, including with respect to extra-budgetary funding. Nevertheless, the project implementation process needs to be clearly presented and explained to Member States. This constitutes one aim of the new Capacity Development Strategy. With its unique position and mandate in terms of long-term sustainable ocean observations and modelling, the Commission is ideally placed to assist in the implementation of UNCLOS and UNCED 1992 and sustainable development.

62. To a large extent, extra-budgetary funding originates from project formulation and implementation. Should the IOC embark more on project implementation and operational activities in parallel to policy shaping and programme development for ocean research and observations? This would support ocean management and governance, including stimulating related cooperation and coordination. Therefore, at present in IOC there may seem to be an ad hoc mixture of project execution, operational activities and work on the regular programme, with broad differences between programmes themselves and potential bottlenecks in management and rate of implementation.

63. The result is that IOC may be seen as inefficient due to the many varying and time consuming duties at the Secretariat level, as well as the lack of proper communication and funding. In this respect several questions can be raised: How would the IOC make itself visible without project generation and implementation processes, how can it ensure that it is priority-driven and independent, and not project or donor driven? A robust mechanism for reliable funding and staffing at the appropriate level is required – how can that be achieved? Is the Secretariat strong enough to back projects from the Global Environment Facility (GEF) and others? Compared with the International Maritime Organization (IMO), WMO or UNEP, the IOC Secretariat is small. This does not mean it is weak, but certainly more vulnerable than the other organizations. The IOC also seems to have a more limited number of experts to draw on, or less ability to pay than the other organizations.

64. Some of the IOC programmes are more suited for project implementation than others. Member States tend to support operational projects because they lead to tangible results. It should be noted that several activities receive considerable in-kind support from countries for specific projects of interest to them, and that such contributions are accepted as counterpart support by GEF and others. The IOC Financial Advisory Group could be invited to suggest criteria for evaluating or valuing in-kind contributions so as to have an agreed, common basis to apply. When there is no demand for deliverables from Member States, it usually implies that the activity will be low-key, but may be revitalized when there is a need. The turnover varies between programmes, being relatively large in IOC science section and in its drivers.

65. The IOC has several field offices for projects where activities are implemented in close cooperation with Member States, often in association with the related regional subsidiary body or bodies. These offices can also prepare projects in consultation with Member States in order to address their more immediate priorities. Pragmatism, flexibility and some opportunism can function for the whole process, along with a guaranteed involvement of Member States.

66. In a period of relatively rapid change of circumstances and boundary conditions beyond the influence of the Commission, the IOC is faced with several challenges. Some of the challenges also offer larger opportunities, which will drive change and open up new avenues for IOC future. Regrettably, real bottlenecks may well prevent satisfactory use of these opportunities. Such bottlenecks often include dysfunctional communication channels or lack of communication strategy; uncertain financial support; lack of secretarial staff and over-loaded staff in the Secretariat; shortage of experts or expertise, lack of time, insufficient lead-time; lack of authority to take quick decisions, or lack of decision-making ability; lack of adequate governance to ensure reaching out to Member States, national communities and agencies to obtain their timely response; or failing to communicate a coherent message on the role of the IOC to other UN bodies and partners, leading to a lack of acknowledgement.

67. Staff at the Secretariat – professional and general service – has been reduced in recent years while the number of tasks has increased, together with demands for multiple reporting (often duplications) and number of meetings where the IOC must be present, and sometimes organize and co-sponsor, in order to be visible and able to participate in further developments. Much of this derives from both heightened competition and time pressure. However, it is also worth noting that while the trend towards increased decentralization, with all staff reductions absorbed at Headquarters, appears to privilege operational activities, the lack of critical mass at Headquarters further contributes to the vulnerability of the current staffing situation by weakening the reporting lines and thus impeding strategic, comprehensive and well-coordinated approach to programme delivery.

68. In light of the situation, there appears to be a necessity for some concentration and streamlining, for instance with respect to reporting, as well as use of the same products for several activities. In general, it seems that the credibility of the IOC is hurt by lack of adequate financial support to match its ambitions; shortage of experts and staff time; and imbalance between guaranteed, regular programme support and the agreed/adopted programmes.

69. The ambitions of the IOC are not matched by the support it receives. The imbalance may be particularly noted in the context of the cross-cutting capacity development function, the IOC being a focal point globally for this action. A dedicated capacity development fund could be established. It may also be relevant to further emphasize the facilitating role of the IOC in the context of capacity development. Another cross-cutting and equally ambitious project, which is hurt by insufficient provision of resources, is the Global Ocean Observing System.

70. The far-reaching positive consequences that could be achieved by overcoming these disparities must be more vigorously communicated and the facilitating role of the IOC stressed. This should lead to greater actions at the level of Member States. The balance between centralization and decentralization has to be carefully considered in the context of limited resources, influencing the cohesiveness, consistency and continuity of activities.

### **ACTION ITEMS – Constraints, lessons learned and challenges**

71. A satisfactory achievement of its tasks requires more means than presently available to the IOC. It should be possible for IOC to obtain more resources since governments and the public are becoming more and more aware of the deterioration of the ocean's conditions, and other issues as indicated in section 2. Growing importance is attached to marine resources and other uses of the ocean and coastal areas. Cost-benefit analyses of returns from research, observations, warning systems and capacity development could help gain support for those actions.

72. The IOC needs to focus on the priorities of its Member States, specify what is required to address these and what can be achieved, and engage Member States in the process and activities by helping to pool knowledge and resources. The IOC must demonstrate that it deserves its mandate, just as a leader must show that he/she deserves the trust of the people. With respect to marine science and technology and their applications for extracting ocean resources, the IOC also must work for equality in competence and fairness in sharing and using its resources, in order to meet the spirit of UNCLOS. The Executive Secretary should ask the scientific communities what the IOC could do to help them and establish credibility with them, also underlining that the IOC is much more than its Secretariat.

73. Through presentation of ocean conditions, demonstrating the role of the ocean in socio-economic development and management of related risks, as evidenced by scientific studies and quite long-term observations, IOC should:

- address the science-policy interface and raise, with associated data, through direct contacts with high-level policy and decision makers, the understanding of the critical value of the ocean, shelf seas and coasts, in terms of livelihoods, human health and security of most countries, and sustainable development, to lead to changes in attitude, policy and participation; bring public perceptions and concerns about the ocean, evidenced in various

contexts, to the attention of the scientific community and the science policy advisers; explain in a clear and understandable way the link between science and the part played by the IOC in helping address critical current issues of society, which include coastal deteriorations and pollution, loss of ecosystem services and biodiversity, climate change, open ocean genetics, in addition to ocean warming, acidification and migration of species; and

- strengthen capacity development through regional cooperation, teaching about the importance of the ocean and the need for understanding, with demonstration of economic and social impacts as well as returns; enhance participation of Member States and engage them and the scientific community in projects as much as possible, particularly by keeping them abreast of technical advances and making them aware of emerging issues; this may now cover the formulation of new major research programmes, with projects tackling the main issues and priorities, filling gaps in on-going activities, possibly with the help of a council of scientists, practitioners and science programme managers appointed by Member States.

74. All these actions can generate more involvement from several sectors, strengthened participation and more support to the intergovernmental mechanism of the IOC.

## **5. Relation to the 2030 Agenda for Sustainable Development**

75. The Preamble to the 71<sup>st</sup> UN General Assembly Resolution “Transforming our World: The 2030 Agenda for Sustainable Development” emphasizes the fact that the Agenda is a plan of action for people, planet and prosperity, also seeking to strengthen universal peace in greater freedom, and that eradication of poverty in all its forms and dimensions, notably extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. The 17 Sustainable Development Goals and 169 targets seek to build on the Millennium Development Goals and complete what they did not achieve. The Goals are integrated and indivisible and balance the economic, social and environmental dimensions of sustainable development. The Declaration specifies the Vision as, inter alia, a world free of poverty, hunger, disease and want, where all life can thrive, free of fear and violence, with universal literacy.

76. The earlier shared commitments are recalled, including the Rio Declaration on Environment and Development, the World Summit on Sustainable Development, the United Nations Conference on Sustainable Development, the 3rd International Conference on Small Island Developing States, the 3rd United Nations World Conference on Disaster Risk Reduction; and the principles of the Rio Declaration on Environment and Development are reconfirmed.

77. Challenges and commitments call for integrated solutions. The vast challenges to sustainable development are recognized, climate change being seen as one of the greatest of our time. It is noted that increases in global temperature, sea-level rise, ocean acidification and other climate change impacts are seriously affecting coastal areas and low-lying coastal countries, particularly many least developed countries and small island developing States. The survival of many societies and biological support systems of the planet is at risk.

78. However, it is also mentioned that this is a period of immense opportunity, and that significant progress has been made in meeting many development challenges: hundreds of millions of people have emerged from extreme poverty; access to education has greatly improved for both boys and girls; the spread of information and communication technology and global interconnectedness has great potential to accelerate human progress, as has scientific and technological innovation, across several diverse areas.

79. The new Goals, “alongside continuing development priorities such as poverty eradication, health, education and food security and nutrition, set out a wide range of economic, social and environmental objectives”. The new Agenda recognizes that “sustained, inclusive and sustainable

economic growth is essential for prosperity. The mobilization, from all sources, of financial and technical assistance is called for to strengthen developing countries' scientific, technological and innovative capacities to move towards more sustainable patterns of consumption and production".

80. The United Nations Framework Convention on Climate Change is recognized as the primary international, intergovernmental forum for negotiating the global response to climate change. It is also recognized that social and economic development depends on the sustainable management of the planet's natural resources: "We are therefore determined to conserve and sustainably use oceans and seas, freshwater resources, [...] and to protect biodiversity, ecosystems and wildlife. [...] [T]o promote sustainable tourism, tackle water security and water pollution, [...] and to promote resilience and disaster risk reduction". Sustainable urban development and management are recognized as crucial to the quality of life of people.

81. Implementation calls for global partnerships bringing together governments, the private sector, civil society, the United Nations system and other actors, with the aim to mobilize all available resources. Full implementation of the Addis Ababa Action Agenda, from the 3rd International Conference on Financing for Development (July 2015), is seen as critical for the realization of the Sustainable Development Goals and targets. The means required for its implementation include "mobilization of financial resources as well as capacity building and the transfer of environmentally sound technologies to developing countries on favourable terms".

82. Governments "have the primary responsibility for follow-up and review at the national, regional and global levels, in relation to the progress made in implementing the Goals and targets over the coming 15 years". A High Level Political Forum under the auspices of the General Assembly and the Economic and Social Council will have the central responsibility in overseeing such follow-up and review at the global level. Indicators are being developed to assist this work. Quality controlled and accessible data will be needed. However, baseline data for several of the targets remain unavailable and increased support for strengthening data collection and capacity building is called for to develop baselines in Member States where they do not exist. This provides for many opportunities to give inputs to the implementation.

83. The links between the IOC projects and the SDGs and targets are brought out in the document IOC/EC-XLIX/2 Annex 4 "The 2030 Agenda for Sustainable Development: what role for IOC?" (2016). This document identifies strong linkages and relevance to many goals and targets, not only Goal 14 on the ocean and coasts but also several others, and highlights some comparative advantages for the IOC regarding experiences and networks for capacity building and transfer of technology with adopted guidelines.

84. The paper calls for a clear integration of the 2030 Agenda into the IOC core functions as recalled above. The IOC Capacity Development Strategy adopted in 2015 should provide a framework for tailoring IOC contributions to the capacity development needs brought out in the 2030 Agenda. The IOC has several advantages in this context, in particular its unique mandate within the UN system for ocean science, cooperation and coordination; ocean observations, data management, and information with related services, on the basis of verified functioning structures; and capacity for analyzing, assessment and monitoring regional and global data for various evaluations. This capacity has been proven most recently in the Transboundary Waters Assessment Programme, providing for much data and statistics, by the management of the Ocean Biogeographical Information System (OBIS) data set, and contributions to and involvement in the UN inter-agency coordination mechanisms and related processes.

85. A large strength of the IOC lies in its deep global and regional coverage in terms of Member States, geography and oceanography, and scientific and technical disciplines. The IOC is not a donor organization or a funding agency, but can facilitate fundraising mainly through active involvement of its Member States, a lesson learned from its institutional development. It is primarily through articulate and convincing communications from Member States, through the adopted channels, that further assistance from UNESCO to the IOC may be obtained.

86. Capacity at regional and national level is also being cultivated through exchange of information on best practices and sharing of experiences with other countries and regions, using proven tools of training and research and working with and through National Commissions. At the global level, the IOC assists the progress of this type of capacity building by providing overviews of national ocean policies and good examples from several Member States and their National Commissions, notably on how to attract the most appropriate people and experts. In this context, promoting a dialogue and strengthening contacts during governing body meetings can play an important role.

87. The IOC cooperates with other entities such as the Food and Agriculture Organization (FAO), WMO, IMO, UNEP and the UN itself mainly through DOALOS, along with its scientific and technical support to UNCLOS, thus providing a foundation and legal intergovernmental regime for the capacity development process. The association with the basic science communities includes links with the International Council for Science (ICSU) and Scientific Committee on Oceanic Research (SCOR). The success and proven results of international cooperation within ocean research, and its application in terms of tsunami and hazards warning systems, data and information exchange, and ocean education through several networks justify such continuing involvement.

88. The structure and design of the IOC organization may be conceptually seen as a tree with its feeding roots being the sciences, research and technological results on one side, and data and capacity building on the other. The branches are specific, dedicated programmes addressing, among others, socio-economic needs such as Harmful Algal Blooms, Warning Systems, Integrated Coastal Area Management, Marine Spatial Planning, and OBIS. Concerning communication requirements, Member States constitute the owners and the community with which the executive branch must communicate in order to know their needs, expectations and priorities, and through governance reach an agreement among stakeholders on which priorities to focus on and how to address them.

89. In this context, the different groups and audiences may correspond to the branches of the conceptual model tree. The groups consist of the intergovernmental connections within UNESCO and the UN, the representatives of Member States there, the scientific organizations such as ICSU, SCOR and national science managers and decision makers, other NGOs and the general public. They all must be involved in the communication strategy, receiving the same message but in a language adapted to the target audience. These structures, conceptual model and outreach efforts all fit well with the integrated approach described in the 2030 Agenda.

90. It is concluded that the IOC as an organization and mechanism is well positioned to coordinate the technical capacity development programme called for in SDG Target 14a. With its global network of regional training centres, the IOC Ocean Teacher Global Academy offers an excellent basis for increasing national capacities in coastal and ocean knowledge and ability to use observations and data to help achieve sustainable development of the marine resources and environment. These efforts could be linked and combined with the Transfer of Marine Technology called for in the Law of the Sea and in the SAMOA Pathway. The existing regional training centres could, in accordance with the wishes of Member States, also be constituted as “regional marine scientific and technological research centres, particularly in developing States”, the establishment of which is called for in Article 276 of Part XIV of the Law of the Sea. The functions of the centres outlined in Article 277 match well with the sustainable development requirements.

91. The following question then remains: how can the IOC get the means to meet expectations? Access to additional funding – including from non-traditional private sector sources, more in-kind support and enhanced operational abilities are necessary. This is a challenge that the IOC Member States have to meet to obtain full benefit of their intergovernmental organization.

#### **ACTION ITEM: Relation to the 2030 Agenda for Sustainable Development**

92. The 2030 Agenda could be used by the IOC to trigger dialogue, actively involving Member States, for instance through a consultation during its governing body meetings on the IOC approach

and strategy. This could reinforce participation of Member States in the process. Examples of good practices at national level could be presented as well, possibly by some of the Officers.

## 6. Further specifications of IOC links to the Sustainable Development Goals

93. For the IOC, Goal 14 “Conserve and sustainably use the oceans, seas and marine resources for sustainable development” is the foremost priority with its targets and time scales. In particular:

- Target 14a: “Increase scientific knowledge, develop research capacity and transfer marine technology taking into account the IOC criteria and guidelines, to improve ocean health and to enhance the contribution of marine biodiversity to the developing countries, in particular small island developing States and least developed countries”;
- Target 14c: “Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for conservation and sustainable use of oceans and their resources as recalled in ‘The Future We Want’”.

94. These overall targets are further underlined by specific targets as follows:

- Target 14.1: “By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution”;
- Target 14.2: “By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans”;
- Target 14.3: “Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels”;
- Target 14.4: “By 2020, effectively regulate harvesting and end overfishing [...] and implement science-based management plans in order to restore fish stocks [...]”;
- Target 14.5: “By 2020, conserve at least 10% of coastal and marine areas [...] based on best available scientific information”;
- Target 14.7: “By 2030, increase the economic benefits to Small Island Developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism”.

95. Goal 13 – “Take urgent action to combat climate change and its impacts” – is likewise of primary interest to the IOC in light of the role of the ocean in the climate system and the impacts from a changed ocean on life on the planet, as well as the impacts on the ocean from climate change and increased carbon dioxide in the atmosphere, part of which is taken up by the ocean and causing ocean acidification.

96. The following targets seem of particular relevance:

- Target 13.1: “Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries”;
- Target 13.3: “Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning”;
- Target 13b: “Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and Small Island Developing States, including focusing on women, youth and local and marginalized communities”.

97. In this context, the potential authority of the IOC in the follow-up to the COP21 could be considered. The Paris Agreement notes in its Preamble the importance of ensuring integrity of all ecosystems including the ocean’s. Several items in the text of the Paris Agreement can be relevant for the IOC:

- Articles 4.6, 4.13 and 5.1 on sinks and removal of greenhouse gases for SIDS;
- Article 7.7 on strengthening cooperation and enhancing action on adaptation, notably with regard to sharing of information, good practices, and experiences, strengthening scientific knowledge and climate research, systematic observation of the climate system and early warning systems; assisting developing country Parties in identifying effective adaptation practices and needs; 7.8 calling for participation and contribution of all United Nations specialized organizations and agencies; 7.9 calling on all parties to engage in adaptation, including assessment of climate change impacts and vulnerability;
- Article 8.4 highlighting that areas of cooperation include early warning systems and emergency preparedness;
- Article 10.1 and 2 on technology development and transfer to improve resilience to climate change and the necessity of strengthened cooperative action;
- Article 11.1 on capacity building focusing on least developed countries, including SIDS and their need for adaptation and mitigation actions;
- Article 13.7a calling on all parties to provide information, including on removals where sinks of coastal areas and EEZs are concerned.

98. The IOC can contribute to several of these points through its existing programmes, with involvement of its regional subsidiary bodies. The IOC must create a dialogue among its Member States as regards the response to the Paris Agreement, possibly through the Officers.

99. The results presented in the document Synthesis of IOC development, work and results: opportunities and coincidences 1960–2015 (IOC/INF-1337) show that the Commission actively addresses most of the issues pinpointed in the goals through research, sustained ocean observations, services, for instance through the development of management tools, specification of indicators and criteria, preparation of guidelines, capacity building, networking and implementing warning systems.

100. The actions undertaken by the IOC could tackle: marine pollution, marine debris and plastic pellets, nutrients and HABs; management and protection of coastal and marine ecosystems; addressing ocean acidification, and adaptation and mitigation related to global and climate change; addressing scientific and policy concerns regarding conservation of marine areas; supporting science base for the development of the ocean economy, and interfacing science and policy.

101. Several other SDGs are also of relevance for the IOC in terms of actual contributions and potential for delivery, as shown in the mapping in IOC/EC-XLIX/2 Annex 4:

- Goal 2: “End hunger”;
- Goal 3: “Ensure healthy lives”;
- Goal 4: “Ensure inclusive and equitable quality education and promote lifelong learning”;
- Goal 5: “Achieve gender equality”;
- Goal 7: “Ensure access to sustainable energy”;
- Goal 8: “Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all”;
- Goal 9: “Build resilient infrastructure”;
- Goal 11: “Make cities and human settlements inclusive, safe, resilient and sustainable”;
- Goal 12: “Ensure sustainable consumption and production patterns”;
- Goal 15: “Protect, restore and promote sustainable use of terrestrial ecosystems, [...] and halt and reverse land degradation and biodiversity loss”;

- Goal 17: “Strengthen the means of implementation and revitalize the global partnership for sustainable development”.

### **ACTION ITEM: Further specifications of IOC links to the Sustainable Development Goals**

102. Possibly arrange a consultation during the upcoming governing body meetings on the response of the IOC to the 2030 Agenda and the SDGs, perhaps also as a recurring item of the annual 8 June World Oceans Day programme.

103. The year 2015 also saw another major breakthrough of great interest for the IOC and of high relevance for SDG 14 in particular, but also for other SDGs. It concerns the potential development of a legally binding instrument/agreement under UNCLOS with respect to handling the conservation and sustainable use of marine biological diversity (BBNJ) in areas beyond national jurisdiction (ABNJ), which has been a topic of discussion since 2006.

104. Many activities of the IOC, all parts of the IOC mandate, could be recognized under the new agreement, including (IOC/INF-1330, June 2015): (i) the Ocean Biogeographic Information System (OBIS); (ii) the Ocean Teacher Global Academy network of 10 regional training centres, coordinated by the IOC Project Office for International Oceanographic Data and Information Exchange (IODE), which could present itself as a model for global training in marine biodiversity resources management, conforming very well to the Capacity Development Strategy; (iii) sustained ocean observations under the umbrella of GOOS; (iv) guidance on marine spatial planning.

105. This argues strongly for an IOC participation in the Preparatory Committee, or corresponding mechanism, of the agreement, and associated enhanced cooperation with UN-DOALOS. Currently, a majority of Member States are in favour of a third agreement under UNCLOS to consider biodiversity as a common heritage, with equitable access and benefit sharing. This provides the IOC with a considerable opportunity to prove its usefulness and achieve further recognition. The package under consideration covers marine genetic resources, sea-based management tools as marine protected areas, environmental impact assessments, capacity building and transfer of marine technology. In this context, the recognition by UNCLOS of the role of the IOC in these fields is important, defining both the Commission’s responsibility and opportunity.

106. The part played by OBIS in the identification of Ecologically or Biologically Significant Areas within and beyond EEZs, a process led by the Secretariat of the Convention on Biological Diversity (CBD), should be stressed and promoted; as well as that of the Ocean Teacher Global Academy as explained in Article 276 of UNCLOS in relation to the establishment of regional centres for marine scientific research and transfer of marine technology, which was called for by the 3rd International Conference on SIDS (Samoa, 2014).

107. Ensure proper contacts in this matter with UN-DOALOS and CBD Secretariat; continue cooperation in capacity building and transfer of marine technology and associate when appropriate with the UNESCO Action Plan on SIDS to benefit from UNESCO’s interdisciplinary comprehensive approach.

### **7. UN global frameworks and IOC programme structure development**

108. Recent global perspectives and frameworks offer extensive opportunities and challenges for the IOC. Frameworks include the COP21 Agreement, 2030 Agenda for Sustainable Development Goals, Sendai Framework for Disaster Risk Reduction 2015–2030, Small Island Developing States SAMOA Pathway of 2014, Sustainable Development Conference Rio+20, and developments regarding biodiversity resources in areas beyond national jurisdiction, the BBNJ process. Much or all is owned by Member States and they should be stimulated to prepare actions and provide input to the IOC Executive Council and Assembly.

109. We have entered a new phase of climate change actions with increasing attention given to adaptation and mitigation, as well as ecosystem protection and impacts. What are the impacts on the ocean, can tipping points be predicted, how can we use the ocean to address problems, through resources, renewable energy, ocean-blue-economy and also at the same time manage the whole so we keep the ocean we need as part of the “Future We Want” (from Rio+20)?

110. Linkages and interactions between uses, users and environmental processes are brought out in many IOC activities. Examples of such linkages are visible between HAB, ICAM, LMEs, marine spatial planning, but also in the modelling programme of the WCRP on prediction of marine life coupled to climate, development of acidification and calcium carbonate undersaturation.

111. How can the IOC adjust existing endeavours and plans to meet these challenges? It seems most realistic to consider how the core functions identified in the last IOC Medium-Term Strategies, 2008–2013 and 2014–2021, with similar directions, are responding to the challenges, noting that the IOC has been much involved in the preparatory work for COP21 and the SDGs. The science programme can respond proactively: the IOC can contribute to the calculations of CO<sub>2</sub> uptake in coastal areas, the application of climate predictions, the potential use of geoengineering, and capacity building with respect to the understanding of climate change issues and the marine environment. Much of this is called for in the Paris Agreement as noted in section 6.

112. The IOC has, as part of UNESCO, possibilities to gradually create additional interactions and links with social sciences, engineering, and education to achieve a more interdisciplinary, comprehensive and coordinated approach. Continued efforts in Education for Sustainable Development are called for in all frameworks, also as a follow-up to the dedicated UN Decade. SDG 14 and its sub-targets warrant particular attention from the IOC, including through its participation in and contribution to the related UN Conference planned in Fiji for June 2017. The operational process needs to take into account indicators for meeting the targets, monitoring development and reporting sequences, all of which are being put in place outside of the IOC. The tabular overview of the IOC activities, together with the relevant SDGs, identifies many links and potential contributions. The table could be supplemented by adding a column showing results of the IOC actions relevant for achieving the related SDG.

113. A similar overview presentation could be used for other frameworks to bring out their linkages and potential contributions. Goal 14a is cross-cutting, with a special reference to the IOC for capacity building and transfer of marine technology, and could also possibly serve as a link to other frameworks, capacity building being a key activity for all. The explicit reference to the IOC in the target 14a brings out both the acknowledgement of the IOC and its responsibility to continue to meet expectations and respond properly. There are several entries available: the Capacity Development Strategy adopted in 2015 with its explicit references to UNCLOS, UNCED 1992, Rio+20 and the SDGs, as well as the regional subsidiary bodies, networks of academies and teaching centres through IODE.

114. The questions are thus as follows: how can the IOC best connect these potentials to the topics mentioned in the SDGs, how can it deliver policy advice and ensure proper association with the national plans developed by Member States, how can it encourage the upscaling of marine spatial planning and ICAM, and how can it best increase links to other partners and agencies? Options include integrating the SDG issues into existing IOC programmes, restructuring or realigning the programmes or creating new ones. The programme options may be used in a pragmatic way by the regional subsidiary bodies.

115. The IOC may identify specifically vulnerable Member States, for instance many SIDS and low-lying countries in Asia, and seek to apply different climate scenarios obtained by means of modelling developed through the WCRP on the basis of one agreed, common protocol. Noting that there are several mechanisms on transfer of technology within the UN system, the IOC science and guidelines on transfer of technology could as well be applied in the context of other efforts within UNESCO, turning the IOC function into a clearinghouse mechanism.

116. UNESCO Permanent Delegates should be used to communicate SDG-related projects to the IOC Member States and stimulate specification of activities. Since Sustainable Development Goals are reflected in all the other frameworks and pathways, it is useful to seek synergism and use the same language as in the SDGs when communicating with Member States in this respect at high and medium level. Through its regional bodies and networking with a global coverage, the IOC can bring in Member States with more limited capacity than others into the process and achieve a regional-global coverage. This is important in view of the dynamics surrounding the ocean, as we should treat it as a whole, single entity.

117. In the IOC strategic response, frameworks could be synergized into one broad platform, still taking into account differences between regions. The global platform of the UN gives large opportunities to the IOC to help secure a healthy ocean by supporting the implementation of UNCLOS in close collaboration with UN-DOALOS, UNCED Agenda 21, the SDGs and other frameworks. There seems to be no necessity for restructuring or reinventing IOC programmes, but rather to enhance the links and coordination between them, use the synergism as much as possible, and convey this strategy very clearly to Member States.

118. This approach necessitates a strong dialogue between the IOC Secretariat and IOC Officers on one side and Member States and regional bodies on the other, as well as good communication between regional bodies and between Member States. Communication at national level is also very important so that relevant, related national agencies and authorities linked to other parts of the UN system are aware of the activities and plans of the IOC as a whole, and can convey the message to these other partners. High-level participation from all relevant sectors, institutions, ministries and agencies with the IOC National Commission or focal point is thus essential.

#### **ACTION ITEM: UN global frameworks and IOC programme structure development**

119. The proposed strategy is thus to develop an integrated response using synergism in capacity building and transfer of technology, ensuring through coordination that the IOC programmes adopt this approach in their activities. Since the IOC has been associated with the development of the frameworks from the start, linkages of these activities with the adopted Medium-Term Strategy for the coming years are reasonably well ensured. This integrated response is also logical in relation to the desire to treat the ocean as a whole. The subsequent Medium-Term Strategy must be adjusted on the basis of the experiences and identified priority actions, some of which are indicated here.

120. An immediate action should be to communicate within the Commission, between programmes, in order to face the challenges and communicate outwards on how the IOC can best respond, leading to the integrated response. For the climate change issue, the focus could be on adaptation, mitigation, impact on and prediction of marine life, sea-level rise, hazards and warning. Particular attention and cooperation with Small Island Developing States and low-lying countries will be essential. Risk reduction actions through tsunami and other warning systems will have to be carried out in a unified fashion working with HAB, IODE, GOOS and the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).

#### **8. Regional perspectives in the global context**

121. The 2030 Agenda “respects national policy space for sustained, inclusive and sustainable economic growth, in particular for developing States, while remaining consistent with relevant international rules and commitments”. It also acknowledges “the importance of the regional and sub-regional dimensions, regional economic integration and interconnectivity in sustainable development. Regional and sub-regional frameworks can facilitate the effective translation of sustainable development policies into concrete action at national level”.

122. The IOC realized the importance of regional dimension at the early stages of its activities, building participation in ocean research, coastal studies, observations and data exchange through regional activities, also taking into account socio-economic development. This approach has led to

the creation, following expressed wishes by the Member States concerned, of regional subsidiary bodies, which include now three active regional Sub-Commissions. These bodies are implementing regional and sub-regional programmes relevant to sustainable development, coastal area protection and management, marine pollution, and creation of baseline data.

123. Many IOC Member States make in-kind commitments to hosting and organizing training activities and analysis workshops by providing infrastructure and human resources. They also contribute funds for specific activities of high priority. These activities all involve scientists and other human resources from the region. The Sub-Commissions can identify gaps in ocean research capacities, which need to be filled in terms of sustainable development of marine resources, responding to the requirements of the 2030 Agenda. They can facilitate the link between regional actions and priorities on one side and global programmes on the other, as for instance for the Global Ocean Acidification Observing Network, the Global Network for Harmful Algal Blooms, the Global Sea Level Observing System, and other observing and training networks. The development of ocean observations network has been identified as a priority for Africa and Adjacent Island States by the IOC Sub-Commission for Africa, IOCAFRICA.

124. The various training centres that have been established facilitate capacity building, making the IOC Capacity Development Strategy operational. Cooperation and communication between the Sub-Commissions are essential elements, which are strengthened by seeking synergies with other endeavours, for example the UNESCO Action Plan for SIDS for 2014–2021.

125. Suggested solutions to meet regional needs include sharing best practices, integrating and co-developing with global programmes, and strengthened communication with and reporting to the constituencies. Experiences show that ownership of the regional subsidiary body by Member States of the region is essential for mobilizing and attracting regional resources. The challenge for the IOC is to secure sufficient resources for the implementation of regional projects. The main opportunity lies in pursuing the 2030 Agenda in regional contexts and using existing subsidiary bodies and synergism between global and regional programmes and between regional subsidiary bodies themselves.

#### **ACTION ITEM: Regional perspectives in the global context**

126. The IOC could build on the experiences from regional subsidiary bodies to provide information on best practices, standards and norms for marine pollution and coastal area protection, and help translate sustainable development policies into national actions, for instance through the organization of regional leadership seminars.

### **9. Small Island Developing States and disaster risk reduction**

127. Small Island Developing States are represented in most if not all regional subsidiary bodies of the IOC, and the links to the previous section are to be noted.

128. The SIDS Accelerated Modalities of Action (SAMOA) Pathway of 2014 highlights the significant risks posed by sea-level rise and other adverse impacts of climate change, the fact that growth prospects have also been hindered by the impact of natural disasters and the degradation of coastal and marine ecosystems. The SAMOA Pathway expresses deep concern for extreme weather events, sea-level rise, coastal erosion, and ocean acidification. It urges for heightened technology, finance and capacity building support in the context of climate change, calling for assistance to improve baseline monitoring of island systems. It reaffirms that for oceans and seas, international law as reflected in UNCLOS provides the legal framework for the conservation and sustainable use of ocean and their resources. The critical importance of international cooperation and partnership in the implementation of sustainable development is recognized, and increased coordination and support from the UN system to SIDS is called for, together with a support initiative for sustainable tourism when needed.

129. The Sendai Framework for Disaster Risk Reduction 2015–2030 highlights international, regional, sub-regional and transboundary cooperation and calls for a broad and more people-centred preventive approach to disaster risk. Seven global targets are specified, among which is the need to substantially enhance international cooperation to developing countries to complement their national actions and substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

130. The IOC hazard warning system is highly relevant in the context of SIDS and low-lying countries. Its work is in complete accordance with the Sendai Framework's call to "enhance the development and dissemination of science-based methodologies and tools to record and share disaster losses [...] as well as to strengthen disaster risk modeling, assessment, mapping, monitoring and multi-hazard warning systems; [...] to promote and enhance, through international cooperation, including technology transfer, access to and the sharing and use of non-sensitive data and information [...] maintain and strengthen *in situ* and remotely-sensed earth and climate observations; to promote common efforts in partnership with the scientific and technological community, academia and the private sector to establish, disseminate and share good practices internationally".

131. Overall, services provided by the IOC in the context of disaster risk address the needs of governments and general public for warnings of coastal hazards, tsunamis, exceptional wave conditions and flooding, protection of coastal areas, marine pollution incidents, with sustained observations, as is the case for sea-level with GLOSS. The mobilization of government support for the establishment of several additional regional tsunami warning systems after the 2004 Indian Ocean tsunami and the IOC's ability to put them in place show that it all can be done. The IOC is operating these efforts in cooperation with the UN Office for Disaster Risk Reduction (UNISDR).

132. An integrated ecosystem-based approach to ocean-related activities is required to seize opportunities. Actions are called for to promote efforts at national, sub-regional and regional level to assess, conserve, protect, manage and sustainably use the ocean, seas and their resources by supporting research and the implementation of strategies on coastal zone and ecosystem-based management, and address marine pollution by developing effective partnerships. There is an expressed need to undertake marine scientific research and develop the associated capacity of SIDS, notably through the establishment of dedicated regional oceanographic centres and provision of technical assistance for the definition of the maritime areas. National, regional and global cooperation should be enhanced to tackle the causes of ocean acidification together with studies to minimize its impact, including through information-sharing, regional workshops, and the integration of scientists from SIDS into international research teams.

133. The IOC should note that all the essential actions called for are already part of on-going IOC programmes at global and regional level. This is the case in particular with observations – meant to complete baseline information; data analysis and modelling services through the Global Sea Level Observing System (GLOSS); HAB studies; nutrient studies; coastal erosion and coastal management; several guidelines for small island norms; and the existing regional training and capacity building regional centres of the Global Ocean Teacher Academy Network.

#### **ACTION ITEMS: Small Island Developing States and disaster risk reduction**

134. The IOC could work in partnership with the UNESCO Action Plan for SIDS so as to be associated with other branches of research and data and with social sciences. The possible working group on economic aspects could also be active here, for instance in the tourism compact called for, and in the context of coastal erosion. The IOC could ensure that scientists and technicians from SIDS are, or become, involved in programme teams, possibly generating buy-in from the related constituencies.

135. Regional training activities – such as the course for Pacific Small Island Developing States on the conduct of marine scientific research under UNCLOS, held in Busan (Republic of Korea) in December 2015, – should be carried out also in other regions. These can address specific needs

identified in the SAMOA Pathway and take into account capacity building requirements in the context of the ABNJ. Interaction could be considered in some cases with the UNESCO Action Plan for SIDS, possibly ensuring an interdisciplinary and comprehensive approach to key social issues.

136. The Sendai Framework contains four priority actions. Priority 1 is the disaster risk understanding. A number of national and local actions are specified including collection, analysis, management and use of relevant data and practical information; use and strengthening of baselines and periodic assessment of disaster risk and vulnerability and exposure; promotion of real time access to reliable data; promotion and improvement of the dialogue and cooperation among scientific and technological communities, other relevant stakeholders and policy makers to facilitate a science-policy interface for effective decision making; strengthening of technical and scientific capacity to capitalize and consolidate existing knowledge and to develop and apply methodologies and models to assess disaster risks, vulnerabilities and exposure to all hazards. Clearly, the IOC regional bodies could provide help and support to several of these activities at national-local level through involvement of their scientific and technical communities.

137. A number of activities are likewise specified at global and regional level, where the IOC hazard warning systems, observations and modelling programmes, and data, information and management programme, together with capacity development when appropriate, can contribute significantly, working in consort with and through the relevant regional subsidiary body.

138. Priority 2 concerns strengthening disaster risk governance to manage disaster risk. At global and regional levels, the IOC may contribute through the synthesis of its global and regional programmes to “guide action at the regional level through agreed regional and sub-regional strategies and mechanisms for cooperation for disaster risk reduction [...] in order to foster more efficient planning, create common information systems and exchange good practices for cooperation and capacity development, in particular to address common and transboundary disaster risks”.

139. Priority 3 – “investing in disaster risk reduction resilience” – and priority 4 – “enhancing disaster preparedness for effective response and to ‘Build Back Better’” – may for the IOC be recalled in the context of the contributions suggested under priority 1. Specific attention may be given to priority 4 in terms of the development and strengthening of coordinated regional approaches and operational mechanisms to prepare for and ensure rapid and effective disaster response in situations that exceed national coping capacities, again through the IOC early warning systems. This may also be the case with respect to the development and dissemination of standards, codes, and operational guides to support coordinated action in disaster preparedness and response, and to facilitate information sharing. Experiences acquired by several of the IOC projects and results can be utilized through regional actions. One action item can be to generate more inter-regional communication and sharing of practices, results, experiences and experts.

140. The IOC could create more outreach toward and involvement of the public through regional or sub-regional consultations organized in cooperation with UNISDR by the relevant regional subsidiary body, to provide direct capacity development and awareness raising at ground level.

## **10. Capacity building and ocean literacy**

141. Goal 17 of the 2030 Agenda, which calls on Member States “to strengthen the means of implementation and revitalize the global partnership for sustainable development”, encompasses capacity building in target 17.9: “Enhance international support for implementing effective and targeted capacity building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation”. In this context it is also appropriate to recall the Agenda 21, Chapter 36 – “Promoting education, public awareness and training” –, and particularly part of paragraph 36.3: “Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues”.

142. The new Capacity Development Strategy adopted in 2015 refers extensively to the role of the IOC in conjunction with UNCLOS and the necessity to address in particular the growing demands of Africa and Small Island Developing States, as well as some other regions. This should help ensure that all Member States can effectively participate in and benefit from all of the work carried out by the IOC in favour of maintaining healthy ocean ecosystems, for example through transfer of marine science and technology. This is highlighted through the SDGs of 2015, as shown above.

143. Noticeable reference is made in the CD Strategy to the emerging concept of Blue Economy, or ocean-based economics, generating in many developing countries incentives for focusing economic development plans on the exploitation and management of marine resources. This underlines the need for scientific and observational capabilities.

144. Reference is likewise made in the CD Strategy to the IOC Global Ocean Science Report, which aims at providing an overview of national: (i) investments; (ii) resources; and (iii) scientific productivity in ocean science, and its potential to stimulate development of human and institutional capacities in the IOC Member States. The IOC should take the lead in integrating existing capacity development programmes from the UN and NGOs to optimize capacity development on a global scale. This harmonizes well with SDG 17 cited above and the spirit of SDG 6.

145. Education in oceanography involves both the study of the ocean and sustainable development, in line with the UN Decade of Education for Sustainable Development. Such adjustments are occurring for example in the World Maritime University (WMU) and Ocean University of China in Qingdao, which is also opening up to foreign countries. Having a training centre there, the IOC is well positioned to be associated in an appropriate way with a network of ocean education institutes. Recalling previous cooperation with the WMU, the IOC could further explore it, especially in light of the already established collaboration between the IOC and IMO.

146. The IOC Capacity Development Strategy is adjusted to follow this kind of development in ocean education. It can be pursued in the specification of activities that will be asked of Member States and subsidiary bodies. The Strategy furthermore recommends association with the Education Sector and in particular UNESCO Chairs. The IOC may consider preparing an ocean literacy curriculum in cooperation with the relevant UNESCO Chairs and possibly other ocean education institutions, to be used through that mechanism. This same curriculum could also support and be part of cooperation with the WMU. It could provide an input to the activities of UNESCO related to education for sustainable development as well.

147. The IOC may want to examine more in depth who the main players are. Through the UNESCO Science Sector, the IOC could proceed further to explore links with hydrology and the related UNESCO-IHE Institute for Water Education. The IOC could also renew its Training-through-Research activity. Other avenues include additional development of certificates and seeking certification with respect to training courses, possibly in cooperation with related universities; provision of International Ocean Citizen Passports, Citizen of Planet Ocean, Marine Education Associations. It seems prudent to continue to explore the situation, identify available and suitable opportunities and partners, initiate consultations with the Education Sector to find out about possibilities there, bearing in mind the shift towards SIDS and the SDGs, and link with the UNESCO National Commissions through the IOC National Commissions/Committees.

### **ACTION ITEMS – Capacity building and ocean literacy**

148. With respect to operations of the Capacity Development Strategy, invite, collect and synthesize desires and action proposals solicited from Member States, possibly through the regional bodies.

149. In relation to transfer of marine technology and marine research, the IOC could organize consultations with relevant UNESCO partners, UN-DOALOS and UNDP, possibly others, to explore the possibility of establishing a consortium of organizations and donors in support of the efforts and capacity building needed to meet the requirements of SDGs 14 and 17, in particular.

150. As regards advanced ocean literacy, an immediate action could be to establish cooperation with the WMU, recalling that such cooperation had been in place before, and seek further cooperation with a set of ocean education institutions.

## **11. Information and communication**

151. Proper communication is very important to reach the right audiences through the correct channels. For the IOC, communication with Member States should be initiated through the Permanent Delegates, the Foreign Offices, and the national coordinating bodies for liaison with the IOC (possibly National Oceanographic Committees) and related focal points. Updated information on these is essential and formal channels should be used to confirm the national focal point. A website for each Member State could be prepared, including information on the contact points and delegations and an updated list of e-mail addresses, as well as an updated, living list of ocean experts. All these elements do exist but need to be updated and then kept up-to-date. Using the [ioc@unesco.org](mailto:ioc@unesco.org) e-mail address and avoiding using names of persons will make it easier to keep contact since the persons change. The updating process must go through Permanent Delegations and Foreign Offices to Member States, which are the key components of the whole.

152. There is need for a focal point in the Secretariat for this and for communication. Communication goals may consist of: enhancing understanding and knowledge of the IOC and ocean conditions among policy and decision makers; explaining the link between ocean science and its role in addressing critical current issues of society; stimulating interest in the IOC among Member States with the aim to enhance their active participation in the IOC governance, programmes and activities; raising the interest of scientific and technical communities to stimulate their involvement with the IOC.

153. This may all help reach the important goal of increasing the visibility and knowledge of the IOC in its Member States, and provide support in terms of appropriate communication about the Commission at national level, beyond the purely ocean science communities. The well-functioning regional frameworks provided by the Sub-Commissions can act for coordination and exchange of information and mutual assistance, and may also try to reach on the ground activities through local and other NGOs and practitioners, thereby helping establish communication between local, national and regional perspectives and enhancing the benefit for all, breaking local isolations, and obtaining more bottom-up interactions.

### **ACTION ITEMS – Information and communication**

154. Go forward with communication; identify focal point for communication in the Secretariat and grow expertise; critical to be “intergovernmental” (professional) about maintaining a list of focal points through formal mechanisms and ensure it is easily available to Member States; set up Member States pages with the name of the focal point, the date of appointment, the people involved in the IOC programmes at national level, and what they contribute (database-driven from OceanExpert, JCOMMOPS, etc.); advertise [ioc@unesco.org](mailto:ioc@unesco.org) as the central communication point and well-organized follow-up system for managing correspondence with Member States; present to Member States examples of developments at national level that highlight the role of governments in initiating a process, the involvement of high level public officers, and the importance of having a well-functioning coordinating committee bringing together representatives of all relevant sectors, ministries and other institutions.

## **12. Outreach**

155. The 2030 Agenda is a plan of action for people, planet and prosperity. All countries and stakeholders, acting in collaborative partnership, will implement the plan integrating the three dimensions of sustainable development: economic, social and environmental. In order to achieve the global partnership for sustainable development already envisaged in the Rio Declaration and

Agenda 21, and to be revitalized through the 2030 Agenda, an effort must be made in order to reach out beyond a single sector. This also follows from Principle 1 of the Rio Declaration, which states that "Human beings are at the centre of concerns for sustainable development".

156. Public support is key to the successful implementation of change. It is essential to both reach out to the public with knowledge-based information and to take into account public perceptions and understanding in the implementation. It is equally important to raise the awareness of new insights and explain the potential improvements, which can be achieved from them and from new technology and innovations. This will, despite such efforts, take time to diffuse into society, so the awareness raising process must be initiated immediately, just as education.

157. Along these lines there is a strong need for the IOC to reach out beyond the traditional ocean community, and to make use of this opportunity to continue and strengthen the efforts already initiated.

158. How should the IOC approach society, with whom it should collaborate at present and in the future? The IOC has a visibility problem: the organization exists but is unknown to many and most still do not know what the IOC is. The primary interest of the IOC is governmental. Sub-constituencies include: various national agencies and science programme managers; policy shaping bodies; ocean and coastal management and protection agencies; science communities; marine private industries; data, information and evaluation societies; educators; and several marine environment oriented NGOs.

159. Delegations to the IOC governing bodies and National coordinating bodies for liaison with IOC have a duty to provide information to these constituencies and societies in a proactive way. For this to be achieved, the national coordinating mechanism entails having sufficient status to be able to ensure cooperation, decision making, communication and outreach. There appears to be a need to inform delegations more about the Commission, how it functions, what the boundary conditions are, and how the IOC can help their country.

160. A second International Decade for Ocean Exploration (see also paragraph 166 and Appendix II) while primarily proposed in order to ensure the role of the ocean in serving global sustainability goals, could also help increase public awareness about the ocean and the IOC and give an opportunity to marketing IOC through briefing documents, as is done in the context of important international conferences and symposia. However, marketing the IOC at national level should be a high priority regardless of a possible ocean decade. This should aim to explain what the IOC can do, demonstrate some important results, showing its role as facilitator and its relevance for UNCLOS as well as other frameworks as discussed here.

161. In order to achieve renewal and stimulate a wider interest at national level, National Delegations could be encouraged to involve a new delegate at each or every other governing body meeting, and help ensure participation of national experts in various IOC groups of experts and in the IOC subsidiary body meetings. The IOC Secretariat could in consultation with UNESCO provide a briefing course for newcomers so as to ensure they know and understand how the intergovernmental mechanism functions. All delegations must be informed about the IOC activities, programmes and responsibilities in the context of various international agreements such as UNCLOS, UNCED and others. They have to know as well that decisions are required from Member States on their priorities, needs and possible support to the IOC, and commitments. A workshop could also be organized at regional and national level by the Sub-Commissions and National coordinating bodies for liaison with IOC. The Secretariat and the Officers should aim for high-level participation of decision and policy makers with national authority to decide and to commit resources during governing body meetings.

## **ACTION ITEMS – Outreach**

162. A suitable package should be prepared including the functioning of the IOC and using the Medium-Term Strategy as appropriate. A training workshop could be given to the IOC delegations on the same model as the one for UNESCO governing body meetings, or an adjusted version thereof.

163. At regional level, scientific symposia organized by Sub-Commissions can reach many of the scientific communities and provide a strong communication platform. These actions could also aim to go beyond the purely scientific community, for instance by having a few sessions dedicated to the science-policy interface, science-economy, and science and observations in support of local needs and local governments. This would require invitations to NGOs, local authorities and practitioners, with appropriate explanations of the aim. At global level, the IOC could aim at providing regular information about the state of the ocean and other hazards, on harmful algal bloom conditions, or on spreading of dead bottoms. The information could be transmitted to the national delegations for them to transfer to relevant national recipients. Regional subsidiary bodies would have to be involved and could help transmit the information in view of the necessity to cover different languages. Such an effort would clearly require much work from the Secretariat and must be carefully evaluated and prepared, if it is at all realistic.

164. The main collaborators of the IOC are the national delegations and this has to be clarified to the delegations themselves so they are aware of their key positions, notably in terms of communicating with national agencies and policy and decision makers. Information about what the IOC has done could be provided regularly from the delegations in a stimulating manner, aiming also to reach the younger generation of coming scientists and managers and to make the IOC known at various levels of society. This could start with a concise briefing document on the IOC and its role, tasks and aims with results on what has been achieved, how this is helping resolve and address various ocean and coastal issues, and how the results relate to international agreements, including the 2030 Agenda and others referred to here, and to regional and local conditions.

165. Promote and empower delegations to communicate about the IOC and its messages by using tools such as fact sheets and high quality policy briefs as part of a communication strategy; young members of the National coordinating bodies for liaison with IOC or oceanographic institutions, future delegates, could come to the IOC Secretariat to receive a tutorial about IOC governance, possibly a day before each IOC Assembly or before meetings of regional subsidiary bodies (starting from 2017); incorporate in the Ocean Teacher Global Academy courses on how the IOC operates and science and policy issues; involve and help establish young marine scientists' organizations; highlight the IOC products and indicators; take advantage of ocean news; and present one or more examples of national developments which could serve as models.

## **13. IOC and the future of the ocean**

166. Ocean research and observation activities cover a wide range of interests, sectors, users and uses, disciplines, transfer of technology, skills and technology development, industrial development, and now biotechnology, of potentially very large significance. All of these activities are of great socio-economic importance, and ensuring that benefits are shared in a fair way is one of the foundations of UNCLOS as well as of the 2030 Agenda.

167. International cooperation in marine research over the last 50 years or even more has been a great success in many ways. The statutory task of the IOC is to promote coordination and cooperation in ocean research, services and capacity building. Since 1960, the number of institutions and other organizations having the marine environment or parts thereof in their sphere of interest has increased at least by an order of magnitude, probably two. This is reflected in the number of marine scientists, research and education institutions and significant infrastructure investments in ocean observations. The situation confirms the large current interest in the ocean and its resources

as well as the need for the IOC, also highlighted in its surge in membership: from 40 in 1960 to 147 in 2015<sup>1</sup>, representing 45 and 75%, respectively, of all independent States.

168. However, the diversity of interests, including the fast growing development of ocean (Blue) economy, the decisive role of the ocean in the context of climate change and the impacts on ocean resources from this and other human uses, and the fragmented, essentially sector-oriented management despite UNCLOS, call for a unifying effort to mobilize over a time period new government resources towards marine science, sustained observations and the required infrastructure and services with related capacity building and transfer of technology, all in support of the implementation of the 2030 Agenda.

169. Experiences from the International Decade for Ocean Exploration (1970–1980) and the International Year of the Ocean (1998) show that they inspired much support for ocean-related activities at local, national and global level by governments, the public, civil society and scientific communities. National governments were willing to provide additional resources for research and infrastructure while local governments supported local awareness raising actions.

170. The 50th anniversary of the International Decade for Ocean Exploration covers the decade 2020–2030. It is proposed that the IOC informally consults with a range of stakeholders on the proposal for a second international ocean decade possibly starting in 2020, or in the adjoining decade. Exploratory consultations could be held with the G7, G20, BRICS, SIDS-Alliance of Small Island States, and the UN Group of Friends of Oceans and Seas. If positive responses are received indicating an interest and willingness to support such an initiative, champions could be identified to bring the proposal to the UN for possible adoption by the UN General Assembly. Pragmatism as to starting time, programme specification, coverage and governance is surely needed.

#### **ACTION ITEM – IOC and the future of the ocean**

171. A concept note is presented in Annex II. Ideas consist of: development of an information system on the ocean with interpretation to help keep science involved; different goals which have been globally agreed on to reach the 10% target for global marine protected areas coverage; climate change related actions on mitigation and adaptation, including handling of potential environmental migrations; assessments and ocean economy development; stimulation of interactions and integration to obtain a holistic approach to ocean management; improved links with sectors dealing with other compartments of the environment which are necessary to achieve sustainable development.

172. The aim should be that, by 2030 at least, the IOC has succeeded in clearly demonstrating to governments and decision and policy makers the role of marine science and technology for economic development and the links between science, observations, forecasting, ocean governance implementation and a healthy ocean, in support of sustainable development. The IOC has brought out the applications of scientific results in support of socio-economic development and social security, thus justifying governmental investments. The IOC has succeeded in ensuring strong coordination between global, regional and national actions and programme formulation. Through these achievements, the visibility has much increased and the IOC is widely known for what it is and can do. In order to drive this process to 2030, by 2021 there should be well-functioning national focal points and National Coordinating Bodies for liaison with IOC (possibly National Oceanographic Committees) with broad coverage and high status for the IOC in most if not all Member States, with established national communication channels reaching also beyond the purely marine scientific and technical communities. Likewise, a global well-functioning communication system will be in place. A satisfactory funding mechanism has been created in the form of an Ocean Development Fund.

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<sup>1</sup> Currently 148 Member States at the date of publication.

## Proposed decision

173. In light of the foregoing, the IOC Executive Council may wish to consider the following draft decision:

The Executive Council,

1. Recalling previous decisions on this subject, and in particular EC-XLVII/Dec.4 (2014) and IOC-XXVIII/Dec.4 (2015),
2. Having examined document IOC/EC-XLIX/2 Annex 9,
3. Recognizing that the UN 2030 Agenda for Sustainable Development, and in particular its Sustainable Development Goal 14 which calls to “conserve and sustainably use the oceans, seas and marine resources for sustainable development”, constitutes an essential point of reference for IOC’s future engagement with its Member States as well as for its programmatic presence at the global, regional and country levels,
4. Acknowledging the need for the IOC to take a comprehensive look at its objectives, priorities, operations and funding in the context of its Medium-Term Strategy, 2014–2021, to ensure it is able to effectively support its Member States in achieving the commitments towards the Goals for sustainable developments by 2030, as well as the goals and objectives emerging from other internationally agreed frameworks like the Sendai Framework for Disaster Risk Reduction, the SIDS Accelerated Modalities Of Action [S.A.M.O.A.] Pathway and the COP21 Paris Agreement under the United Nations Framework Convention on Climate Change,
4. Having considered the presentation by the IOC Chair of the work accomplished by the Officers and the Secretariat since the 28<sup>th</sup> session of the IOC Assembly (18–25 June 2015) and the document IOC/INF-1337,
5. Noting the consensus reached by IOC Member States that the IOC Governing Bodies should maintain in their agendas an item and mechanism to enable Member States to continuously reflect and exchange ideas on this highly strategic and important subject,
6. Noting also the input by Member States and the decisions on the four global frameworks/agreements taken by this Executive Council (SDGs, Samoa Pathway, Sendai Framework for DRR, Paris Agreement/UNFCCC),
7. Expresses its appreciation to Professor Peter M. Haugan and to the IOC Officers for their leadership and guidance to the Secretariat in the intersessional period;
8. Endorses the course of action proposed in the ‘Roadmap’, including the Concept note: A Second International Decade of (Integrated) Ocean Exploration, 2021–2030;
9. Approves the messages to be addressed to specific audiences about the societal benefits of IOC’s mission, programmes and activities as presented in Appendix I to document IOC/EC-XLIX/2 Annex 9 [or if approved with modifications – as presented in Annex 1 to this decision...];
10. Encourages the Chair, the Officers and the Executive Secretary to convey these messages clearly and explicitly in a timely fashion to UNESCO and other UN organizations;
11. Encourages Member States to use these common messages as a reference to assist them in raising the profile of the mandate and work of the IOC and related capabilities in fostering a common national approach in intergovernmental fora;
12. Further requests the Executive Secretary, in close consultation with the Officers, to explore ways of increasing IOC’s strategic and functional visibility using a range of communication

tools, and its contribution to the 2030 Sustainable Development Goals consistent with IOC's vision and report back to the IOC Assembly at its 29<sup>th</sup> session;

13. Entrusts the Officers of the Commission with the mission of further clarifying the special status of IOC within UNESCO in particular in connection with the ongoing audit of the governance of UNESCO and depended funds, programmes and entities, and of exploring, in consultation with the Member States, of means of ensuring to the Commission the required institutional and operational sustainability, including the possibilities offered by Article 10 of the IOC statutes;
14. Decides that the inter-sessional work on this subject should continue under the leadership of the IOC Officers with a view of providing a fully developed document with recommendations for adoption by the IOC Assembly at its 29<sup>th</sup> session in 2017.

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## APPENDIX I

### **Draft messages to specific audiences about the societal benefits of IOC's mission, programmes and activities**

#### **Message to Decision Makers in Member States (managers in marine affairs)**

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##### WHAT IS IOC?

- It is an intergovernmental organization established in 1960. Its purpose is to promote international cooperation and to coordinate programmes in research, services and capacity-building, in order to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of management, sustainable development the protection of the marine environment, and the decision-making processes of its Member States.
- IOC is a community of Member States, assisted by the Secretariat. It operates by making decisions by consensus through formal governing bodies and primary subsidiary bodies (technical and regional).

##### VALUE OF OCEAN SCIENCE

- Knowledge of the ocean conditions gives the base of understanding climate, living resources and availability, hazards from the ocean, storms, cyclones, tsunamis and warning systems for them, of marine pollution and impacts; changes in the ocean (acidification, sea level rise, warming and impacts thereof on coral reefs, coastal conditions, erosion, and how to adapt and mitigate; ocean uptake of CO<sub>2</sub> and impacts thereof). The global ocean can impact local conditions and well-being. It is too big to study by any one country so cooperation is essential.

##### VALUE OF COOPERATION

- Pooling of resources; development of resources, especially human; exchange of information, knowledge, best practices, standards, norms, stimulation through exchanges, education and training, data interoperability.

##### WHAT IS IN IT FOR MY INSTITUTION/COUNTRY

- 1- The intergovernmental character allows countries to agree on issues as countries, rather than as individual scientists. The mechanism allows such agreements to move upwards to the UN level. It is an advisory body to UNCLOS (IOC has developed guidelines for the transfer of marine technology).
- 2- Decisions made by the IOC Governing Bodies can assist in decision making by national governments. IOC allows messages arising from marine science to feed in to the governmental (decision making) level.
- 3- The intergovernmental mechanism facilitates undertaking joint research/observations in other countries' waters.
- 4- IOC agrees on, and promotes applying best practices (technical and political), standards reference materials, guidelines and nomenclature.
- 5- IOC ensures/promotes sharing of data and information.
- 6- Participation in IOC programmes allows countries to, through a limited investment, become co-owner of global infrastructures and networks (leveraging their own investment). IOC facilitates the opportunity for marine science experts to meet and discuss issues on a regular basis enabling 'science alignment' to take place, ensuring that national investment in major infrastructure such as research ships, cruise planning and decisions regarding priority areas for research can be coordinated with partner nations.
- 7- IOC assists developing countries in acquiring the necessary expertise/capacity to carry out nationally relevant marine research and management. IOC develops and implements "standardized" training mechanisms, emphasizing north-north, north-south, south-south cooperation and training.

- 8- IOC assists developing countries to participate, in an equitable fashion, in global programmes in marine research, observation and management where global issues/risks impact also at the regional level.
- 9- IOC assists developing countries to organize and collaborate regionally and to jointly build capacity based on regional needs but in a global framework
- 10- IOC assists countries to establish and maintain Disaster Risk Reduction systems [tsunami].

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### **Message to Member States representatives/delegates to UNESCO and UN at large**

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Various national economic assessments of the contributions of marine-related activities to national economies have typically shown that 5% of GDP, or in some cases even more, is directly due to marine activities. Societal benefits from national investments in ocean observations and marine science and international collaboration in these fields can contribute to development of national capacity for marine science, for safeguarding coast, for developing or supporting offshore industry, improved management of marine resources, coastal tourism, safe navigation, and national security.

As recognized in the UN Sustainable Development Goal No 14 the healthier and resilient the ocean, the more positive its contribution to the environmental, social and economic dimensions of sustainable development and vice versa. The Ocean is a jointly shared value. It covers nearly three-quarters of the planet's surface and it forms an essential part of our environment, the air we breathe, the water we drink, the weather and climate. In addition, we rely on the oceans for food, to carry 80% of our trade, to absorb our wastes and to be part of our culture and enjoyment.

Since the ratification of the Law of the Sea in 1994, jurisdiction over large tracts of the coastal waters, stretching out to two hundred nautical miles and more, have been accorded to the Coastal States. However, much of the ocean waters remain an international commons and the ocean waters and their inhabitants recognize no man-made boundaries, flowing at will from one jurisdiction to another.

To reduce loss of life and property from ocean-related hazards and to sustainably use of the ocean resources we need to understand and, as much as possible, to predict the ocean behaviour. Great opportunities and challenges are associated with the economy of the ocean, but this requires responsible, coordinated and sustainable management.

Understanding and predicting the ocean behaviour and long term changes require sustained observations on a global scale in analogy with what is in place for the atmosphere. The generation of ocean information products largely depend on the national marine research community (where it exists) with access to ships.

No single country can observe the global ocean alone. Oceanography, just as meteorology, is international by necessity. It requires governmental cooperation as well as coordination and pooling of resources, being costly in terms of manpower and infrastructure. The Intergovernmental Oceanographic Commission —the intergovernmental mechanism to help achieve this— was established in 1960, with the objective to also stimulate and support capacity development, data exchange and storage, and building of trust.

IOC has increased from 40 Member States in 1960 to 148 Member States as of today. IOC is hosted at UNESCO in Paris.

The IOC has for more than 50 years assisted governments to address their individual and collective ocean and coastal problems through the sharing of knowledge, information and technology and through the coordination of national programs. Without the IOC there would for instance be no (i) International standards and exchange mechanism for of oceanographic marine observations; (ii) Global Ocean Observing System; (iii) Global Tsunami Warning System; ...

## **Message to the scientist and practitioner community**

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### **Main message**

The Intergovernmental Oceanographic Commission of UNESCO (IOC) provides opportunities for Member State individual scientists, practitioners, and their institutions in ocean and marine science, planning and resource management to enhance the quality, scope, visibility and societal value of their research.

### **Sub messages**

1. The IOC offers scientists and research institutions engaging with the IOC and its activities access to participate in fora which focus their scientific field and which provides a platform for new research partnerships where the research capacity is scattered, transdisciplinary or emerging.
2. Working with the IOC allows formulating complex and societal relevant science that would otherwise not be addressed systematically and coordinated. Ocean and marine research is expensive, and such coordination implies mechanisms to pooling of resources instead of relying on national resources alone. Research institutions as well as individual scientists and practitioners involved get opportunities to access more data and to communicate and promote a given research area in the context of larger issues and political priorities and thereby contribute to translate their science into societal value.
3. Exchange of experience and approaches in ocean and marine science, strengthened networks and collaboration potentials at regional and global scale enhance both individual and institutional research competencies and thus the likelihood of funding for research in both a short and a long term perspective.
4. Complementing individual or institutional ocean and marine research by engaging in international collaboration, offers involvement in high impact scientific products such as manuals and guides and peer reviewed publications with other leading scientists, allows more efficient use and benefits from IOC services and products, and adds credibility and recognition of own research at both the national and international level.

## APPENDIX II

### **Concept note: A Second International Decade of (Integrated) Ocean Exploration, 2021–2030**

#### **Motivation**

The celebration of the 70th anniversary of the United Nations saw the endorsement of new Sustainable Development Goals through the Resolution “Transforming our world: the 2030 Agenda for Sustainable Development” adopted at the General Assembly on 25 September 2015.

One of the seventeen goals, Goal 14: “Conserve and sustainably use the oceans, seas and marine resources for sustainable development”, specifies several targets to be achieved before 2030. These cover all major current ocean and coastal issues, discussed also in section of the Roadmap. The SDG targets direct the attention to ocean management and use the following aspects:

- preventing, reducing marine pollution;
- minimizing and addressing impacts of ocean acidification;
- managing and protecting marine and coastal ecosystems sustainably, strengthening their resilience and restoration;
- regulating the harvest, ending overfishing, as well as illegal, unregulated and destructive fishing;
- implementing science-based management plans to restore fish stocks and achieve at least maximum sustainable yields determined by the biological characteristics;
- conserving at least 10% of coastal and marine areas based on best available scientific information;
- prohibiting and eliminating certain forms of fisheries subsidies;
- increasing economic benefits of Small Island Developing States and least developed countries through sustainable use of marine resources, particularly fisheries, aquaculture and tourism;
- increasing scientific knowledge, broadening research capacities and transferring marine technology to improve ocean health and enhance contributions of marine biodiversity in the growth of developing countries, in particular small island States and least developed countries;
- providing access of small-scale artisanal fisheries to marine resources and markets;
- enhancing the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS.

In addition to these, several other Goals include targets and actions of high relevance for the ocean and coastal conditions, or being influenced by these conditions, thus also influencing the situation on land. In particular, Goal 13 on the climate change issue is very important for the ocean, together with the Paris Agreement, as they acknowledge and take into account the role of the ocean in the climate system. For further information, see discussions in sections 5 and 6 of the Roadmap. The linkages and influences of the ocean and coasts on most human activities and health, as well as on other components of the planet, are parts of the whole.

The 2030 Agenda is a “plan of action for people, planet and prosperity” to be implemented by all countries and all stakeholders acting in collaborative partnership. The Agenda can be seen as specifying a unifying and integrated global adventure lasting for at least a decade. How can ocean communities, in partnership with all others, best contribute to and help achieve involvement and support from governments so as to ensure its implementation? Can we accomplish focus, cohesiveness, cooperation and coordination of our efforts by launching a decadal enterprise in the form of a Second International Decade of (Integrated) Ocean Exploration for Sustainability, 50 years after the first International Decade of Ocean Exploration?

## **THE CONCEPT: HISTORICAL BACKGROUND AND EXPERIENCES**

The first International Decade of Ocean Exploration (IDOE) was conceived by the U.S. National Council of Marine Resources and Engineering, chaired by the U.S. Vice-President, in 1966. The Council argued the case for such a collaborative global effort on the basis of “expanding food for the world population, maritime threats to world order, waterfront deterioration in coastal cities, rise in pollution at the shoreline, expanding requirements for sea-bed oil, gas and minerals, and expanding ocean shipping”. The concept was officially announced in March 1968 by U.S. President Lyndon B. Johnson in a special message to the Congress on conservation, proposing “an historic and unprecedented adventure – an International Decade of Ocean Exploration for the 1970’s.”

The Council then sought international support for the Decade. Following consultations, the IOC recommended in June 1968 support for the IDOE. In December of the same year, the UN General Assembly endorsed “the concept of an IDOE to be undertaken within the framework of a long-term programme of research and exploration designed to assist in a better understanding of the marine environment through science”. The Decade, initiated a century after the Challenger expedition, marked a major turning point in ocean exploration and changed the science of oceanography (Report by NSF on IDOE, in *The Discovery of Hydrothermal Vents – 25th Anniversary*, WHOI, 2002).

Through a Group of Experts on Long-term Scientific Policy and Planning, the IOC had already published a General Scientific Framework for World Ocean Study (GSF) in 1965, with a final version in *Perspectives in Oceanography* in 1968 (IOC Technical Series, 6). It was purely scientific and followed the classic lines of oceanography. Broader perspectives for understanding and use of the ocean were specified in a “comprehensive outline of the scope of the Long-term and Expanded Programme of Ocean Exploration and Research (LEPOR)” (IOC Technical Series n°7).

Subsequently, the group of experts included specifications of a set of scientific exercises and multinational experiments, with corresponding oceanographic services and a strong component of training, education, and mutual assistance. The aim was “to increase knowledge of the ocean, its contents and its subsoil, its interfaces with the land, the atmosphere and the ocean floor, and to improve understanding of processes operating in or affecting the marine environment, with the goal of enhanced utilization of the ocean and its resources for the benefit of mankind”.

The IOC decided to begin the implementation of LEPOR through an initial ten-year project in order to accelerate the acquisition of scientific knowledge of the ocean and improve the capacity of all Member States to participate in oceanographic research through the IDOE, scheduled for 1971-1980. Member States were encouraged to participate in the IDOE, and to “move from individual, uncoordinated efforts to probe the ocean to new levels of scientific enterprise based on systematic planning and multidisciplinary approaches to the whole system”.

Several criteria were specified for the potential projects of the IDOE, including the following: “Does the research require increased emphasis because of economic potential of the resources or ocean use, or the urgency of human needs to which it relates?” Activities were proposed by Member States or groups thereof, taking into account the criteria. In order to further encourage and facilitate active participation, the IOC organized a series of regional workshops. On the basis of the various proposals, the IDOE came to focus on four main areas: environmental forecasting and major physical processes; environmental quality, notably baseline studies of several contaminants such as DDT, PCB and heavy metals; seabed assessment addressing plate tectonics, continental margins and non-living resources; and living resources, assessments and ecology (e.g. of coastal upwelling systems). A coherent approach was emphasized.

Regional cooperative studies previously initiated by IOC Member States continued but were not seen as part of the IDOE programme. However, there is no doubt that they stimulated participation in the IDOE, and helped elucidate the linkages between regional and global processes and conditions. Several IOC regional subsidiary bodies were launched during the 1970’s. The IDOE was also used at national level to intensify and raise support for sub-regional cooperative studies involving several

Member States. These extended over several years and stimulated further cooperation and data exchange between scientists and institutions. The development of sustained ocean observations was gradually initiated with the Integrated Global Ocean Services System (IGOSS) in cooperation between IOC and several agencies, in particular members of the Inter-Secretariat Committee on Scientific Programmes Related to Oceanography, ICSPRO (see Synthesis of IOC Development).

The efforts and results of the International Decade raised considerable support from governments for ocean research and observations, motivated much interest in the ocean and marine environment, as well as in marine resources and their use and management. One of the major discoveries was that of the deep sea hydrothermal vents with their exceptional ecosystem. The large role of the ocean in the human environment and health was furthermore brought out at the UN Conference on the Human Environment (Stockholm, 1972).

Negotiations for the law of the sea were initiated and almost completed during the IDOE, with signature in 1982. The research carried out during Decade also triggered and prompted support for several large scale global ocean research activities pertaining to the World Climate Research Programme (WCRP) and the International Geosphere-Biosphere Programme (IGBP), such as the World Ocean Circulation Experiment. Studies of marine pollution, including biological effects and interaction between physical, chemical and biological processes, increased as well. Sustained observations, monitoring and warning systems attracted growing attention, notably regarding seawater and seafood contamination, and algal blooms. The international reviews of the health of the ocean were initiated, with the first completed in 1982.

### **SUBSEQUENT RELATED DEVELOPMENTS**

The last two decades of the 20th century saw the emergence of the Sustainable Development paradigm, the UN Conference on Environment and Development (Rio 1992) resulting in the Rio Declaration, Agenda 21, and conventions on climate change and biological diversity, and several follow-up meetings.

The UN Convention on the Law of the Sea (UNCLOS) entered into force in November 1994. Chapter 17 of Agenda 21 specifies the programme for conservation and management of resources with respect to “protection of the oceans, all kinds of seas and coastal areas and the protection, rational use and development of their living resources”. This inherently extends the Law of the Sea to coastal seas and semi-enclosed seas, thus the notion of treating the ocean as a whole is met. Interest in the ocean was demonstrated by the end of the century through the International Year of the Ocean (1998). It has been noted that the Law of the Sea does not sufficiently address certain elements of shipping, for instance so-called “flagging out”. Furthermore, it does not cover the conservation and sustainable use of marine biological diversity in areas beyond national jurisdiction. The formulation of a legally binding agreement under UNCLOS to meet this need has been initiated (see section 6 of Roadmap).

In the new millennium, the global framework of international agreements has been further established through the Outcome Document of the Sustainable Development Conference Rio+20 (2012); the Small Island Developing States-SAMOA Pathway (2014); the Sendai Framework for Risk Reduction of the 3<sup>rd</sup> UN Risk Reduction Conference (2015); and the results of the UNFCCC COP21 in Paris (2015). These are all referred to in the Road Map, in addition to the new Sustainable Development Goals and the 2030 Agenda.

### **CURRENT ECONOMIC AND SOCIAL SIGNIFICANCE**

The implementation of all these international legal instruments and agreements requires large efforts at national level, with coordinated and cohesive projects responding to specific local needs as well as to regional and global requirements. In order to achieve this, there is a strong necessity to strengthen the dialogue, interaction, cooperation and coordination between institutions and sectors at national and international level, as well as between scientific disciplines, ocean observations and

services. This aspect is particularly important for the ocean. Although some frameworks have been agreed upon, for instance with respect to sustained ocean observations, data and information exchange, and capacity building (see Roadmap and Synthesis of IOC Development), more must be done, including in economic terms. Is it worth it?

Covering 70% of the Earth, the ocean is a vital source of nourishment, supporting the livelihood of about 500 million people, especially in the poorest nations. Food from the ocean is vital to human health and brain development. Recent economic assessments assign to the Gross Marine Product an annual value of 2.5 trillion USD, of the order 3% of global GDP. Marine and coastal resources and industries represent over 5% of global GDP. Over 90% of the world trade is carried by sea, currently at a value of about 13 trillion USD, having increased from about 7 trillion in early 1990s. Ocean economics are among the most rapidly growing in the world, providing benefits to many sectors of great economic value, of which fisheries, energy, tourism and transport, and to climate change regulation, carbon sequestration, habitat, biodiversity and influence on human health and well-being.

Additionally, the ocean biological system offers exciting opportunities for the conception of new drugs to treat many human ailments, such as asthma, tuberculosis and cancer. Marine biotechnology is a rapidly rising industry. Financial benefits from worldwide sales of marine biotechnology-related products are estimated to represent at least a multibillion dollar market. The ocean is a necessary component of our common heritage and an important part of many cultures.

Coastal States around the world, in particular Small Island Developing States, are striving to protect and valorize their marine resources. The formulation of science-based and integrated management frameworks, such as Marine Spatial Planning, becomes a prerequisite to ensure sustainable economic activities, and help ensure long-term protection of ocean ecosystems. Dimensions of a blue economy need to guarantee a fair and sustainable development of marine resources and blue carbon markets; protection and restoration of ocean ecosystems; more use of renewable energy and deep sea resources from the ocean; recycling of pollutants reaching the ocean; and improvement of current fisheries and aquaculture management regimes. However, although these linkages and interactions are recognized, including the understanding that the ocean should be treated as a whole, ocean governance and management are still very fragmented.

Investments in sustained ocean observations, ocean services and marine science provide major returns through the establishment of early warning systems for extreme events and tsunamis; progress in marine technology, infrastructure and associated protection measures; sustainable use of marine living resources and support of aquaculture; offshore mineral and fossil fuel extraction; advancement of renewable energy sources; tourism and recreation; marine transportation; and improved basis for marine conservation and ecosystem protection. The healthier and more resilient the ocean, the more positive its contribution to the environmental, social and economic dimensions of sustainable development. All nations therefore have a vested interest in a healthy and resilient ocean, preserving its capacity to deliver food and income, and supporting transportation and many other components of sustainable development, especially support of human development and survival.

## **ACHIEVING SUSTAINABLE OCEAN DEVELOPMENT**

The challenges associated with sustainable development, protection, and proper governance and management of the ocean in accordance with the Law of the Sea, Agenda 21 and other related agreements, are also well recognized in the Sustainable Development Goals. From the Stockholm Conference (1972) onwards, an understanding has emerged around the fact that the ocean is finite, with finite resources which we are depleting, and that we are influencing its conditions and ecosystem, while at the same time sustainable development, human health, livelihoods and well-being, including brain development depending upon marine food, all require a healthy ocean.

Decisive services provided by the ocean in the context of global and climate change consist of – but are not limited to – the uptake of most of the excess energy in the climate system; absorption of about 30% of the excess carbon dioxide; and redistribution of the excess water from melting glaciers and ice sheets. From acidification, warming and melting to sea-level rise and changing weather patterns, the carbon dioxide uptake has several consequences. These interdependencies highlight the need to consider not only the warming target, but several combined targets as set out in the Sustainable Development Goals, as well as to adopt a holistic approach in evaluating the conditions of the Earth's life-support system and how to mitigate changes.

A major task in the context of a progressing ocean economy is documenting the potential impacts from changes on the established and emerging maritime industries, and their ability to generate growth while maintaining a healthy ocean ecosystem. Examples are capture fisheries; tourism; adaptation of and in coastal megacities; port and infrastructure services; growth of pharmaceuticals, chemicals and marine biotechnology industries; coastal developments; land reclamation; seabed mining; oil, gas and methane extraction; desalination for freshwater; habitat protection and restoration; blue carbon; use of nutrients; and waste management and recycling.

Impacts of climate change on the ocean will have profound implications for all human societies and most of our activities. In view of this insight, there is a necessity to bring in knowledge and understanding from other science disciplines, in addition to natural sciences and economics, in order to assess oceanic and coastal changes. Social sciences have a large role.

The fate of humanity is at stake, not that of the ocean which has survived through millions of years and profound ecosystemic changes. This understanding has emerged through research and observations, not only of the ocean and its resources, but also of human development. Research, technologies, sustained observations and dynamic modeling capabilities, as well as the capacities to utilize these elements at national, regional and global level, have likewise sufficiently flourished, making the organization of a Second International Decade of Integrated Ocean Exploration within the framework of the 2030 Agenda feasible and rewarding.

## **AN INTERNATIONAL DECADE OF INTEGRATED OCEAN EXPLORATION**

Our society depends upon the ocean more than at any other time in history. The ocean forms the largest and mostly unexplored ecosystem on the planet. It provides about half of the oxygen we breathe and is the origin of life on land. Seafood from the coasts appears to be the basis for our strong brain development.

Ocean research and observation activities are covering a wide range of interests, sectors, users and uses, disciplines, transfer of technology, skills and technology development, industrial development, and now biotechnology, of potentially very large significance. All of these activities are of great socio-economic importance, and ensuring that benefits are shared in a fair way is one of the foundations of UNCLOS. Observations of the ocean and coastal seas so far rest mainly on the scientific communities involving several disciplines and institutions. Nevertheless, a gradual shift in the methods of observing the ocean is underway, from exploration to sustained monitoring with the aim to provide ocean services.

The statutory role of the IOC is to promote coordination and cooperation in ocean research, services and capacity building. Since 1960, the number of institutions and other organizations having the marine environment or parts thereof in their sphere of interest has increased at least by an order of magnitude, probably two. This is reflected in the number of marine scientists, research and education institutions and significant infrastructure investments for ocean observations. The situation confirms the large current interest in the ocean and its resources as well as the need for the IOC, also highlighted in its surge in membership: from 40 in 1960 to 148 in 2016, representing 75% of all independent States.

However, the diversity of interests as presented in this note – notably the fast growing ocean economy –, the fragmented and essentially sector-oriented management despite UNCLOS, and the Sustainable Development Goals of the 2030 Agenda all call for a unifying proposal for mobilizing over a time period new government and industrial resources towards marine science, sustained observations and services, with related capacity building and transfer of technology in order to meet the goal of sustainable ocean development.

The positive experiences from the International Decade for Ocean Exploration (1970–1980) and the International Year of the Ocean (1998) show that they stimulated much support for ocean-related activities at local, national and global level from governments, the public, civil society and scientific communities. National governments were willing to provide additional resources for research and infrastructure while local governments supported local awareness creating actions.

The IDOE transformed ocean research and observation by impacting the way ocean research was funded and establishing a model for launching large projects. The IDOE projects were larger, more complex, and longer term than earlier efforts, and supported scientists from several disciplines and institutions, including from many countries in the process of initiating oceanography. The global coverage stimulated participation of scientists and students from many developing countries, which were proactively invited to contribute. Indeed, an important criterion for an IDOE project was the requirement for multinational participation. Moreover, the extended period of support permitted detailed planning and encouraged the formulation of new observing technology, equipment, and data collection protocols. Our understanding of the ocean became more quantitative and qualitative and less descriptive.

The IDOE stimulated follow-up activities, many of which grew out of ideas and themes that emerged during the Decade. For instance, the North Pacific Experiment for environmental forecasting stimulated the creation of the Tropical Ocean-Global Atmosphere project; the Geochemical Ocean Sections Study of geochemistry and ocean circulation – mixing in all ocean basins and giving the first modern description of ocean geochemistry – also influenced the Joint Global Ocean Flux Study and the World Ocean Circulation Experiment; and the Coastal Upwelling Ecosystem Analysis project stimulated the follow-up programme on Coastal Ocean Processes.

The IDOE established a pattern for the organization and funding of large oceanographic efforts, driven both by scientific curiosity and interests of policy makers. It demonstrated that clearly articulated goals and themes of large initiatives could provide credible arguments leading to sustained support from governments, national agencies and industry. In addition to generating very substantial funding increases, the IDOE also stimulated national oceanographic institution building and cooperation not only internationally but also nationally between agencies, research institutions and scientists. National steering committees involving science and science-policy interface leaders were set up and workshops organized to support project development and involve international partners. Those were followed up by symposia to present, analyze, and integrate results.

The IDOE was set up as a systematic programme for ocean exploration. It was motivated both by anticipated uses of marine resources and scientific curiosity, especially as regards questions about the health of the ocean. The aim of the IDOE to implement large-scale cooperative research efforts designed to strengthen scientific knowledge, enhance our ability to effectively and efficiently use marine resources, and follow the health of the ocean was fulfilled to a large extent. At the same time, the Decade motivated continued support for the advancement of ocean research and observing capacities in many countries, be they developed and developing.

The 50th anniversary of the International Decade of Ocean Exploration covers the decade 2020-2030. It is suggested that IOC consults with a range of interests on the proposal for a second international ocean decade possibly starting 2021, or in the adjoining decade. If positive responses are received indicating an interest and willingness to support such an initiative, champions could be identified in view of bringing the proposal to the UN for possible adoption by the UN General Assembly.

Aim, content and criteria can be specified on the basis of the Sustainable Development Goal targets given above, together with the other frameworks related to risk reduction, small island States and least developed countries referred to in this note, and elucidated more in the Roadmap. Cooperation with partners in the UN system and outside is of course necessary and should be sought primarily through existing channels. The ICSPRO agreement could be used in a suitable association with the Group of Experts established for guiding the implementation of the 2030 Agenda.