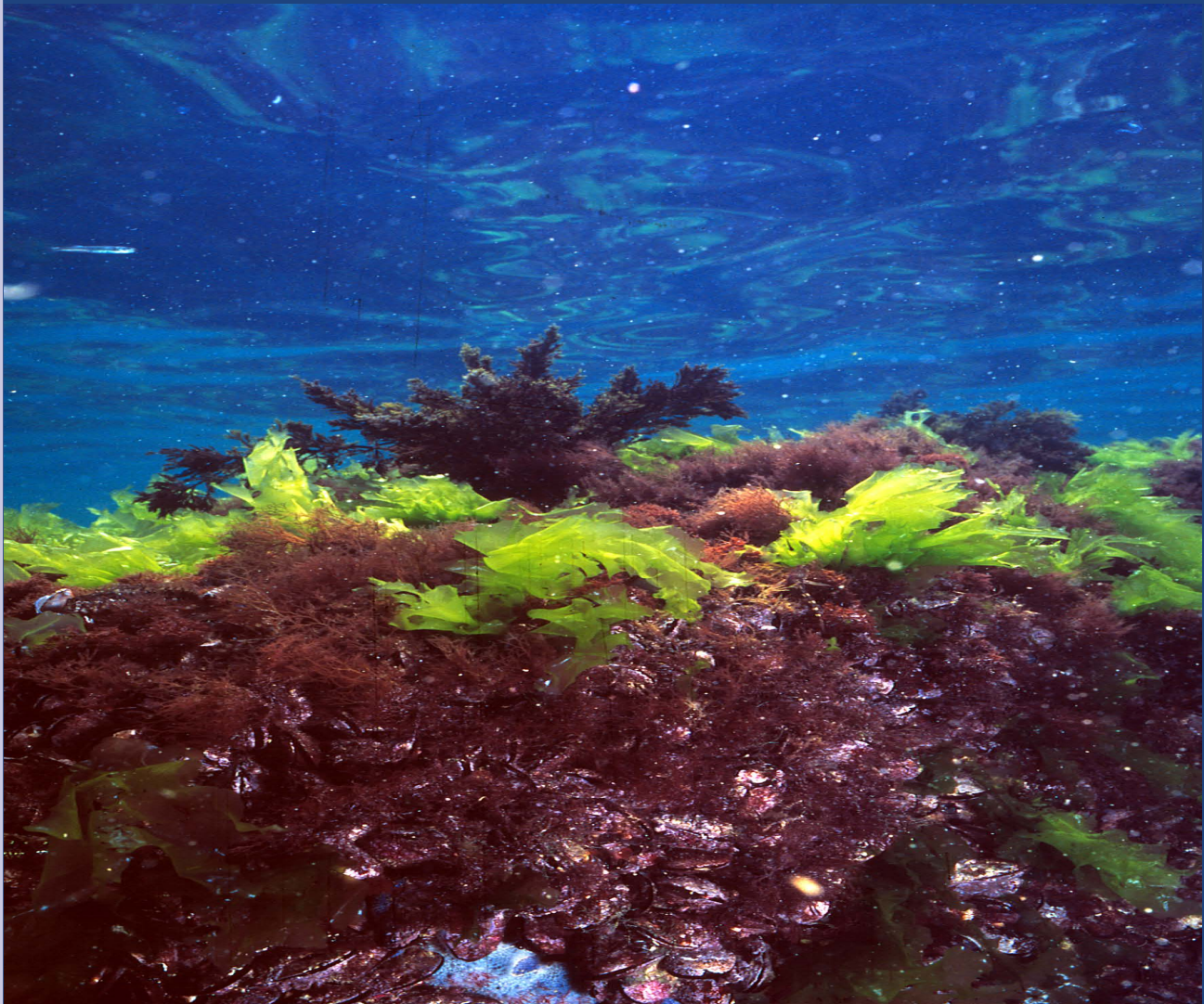




GESAMP
Joint Group of Experts on the
Scientific Aspects of Marine
Environmental Protection

REPORT OF THE 46th SESSION OF GESAMP

New York, USA, 9 to 13 September 2019



REPORTS AND STUDIES



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GESAMP

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Scientific Aspects of Marine
Environmental Protection

REPORTS AND STUDIES

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**REPORT OF THE
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Notes

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EXECUTIVE SUMMARY

0.1 Introduction: The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) held its 46th session from 9 to 13 September 2019 in New York, United States. The session was co-hosted by the United Nations Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs (DOALOS/OLA) and the United Nations Development Programme (UNDP). GESAMP was established in 1969 by a number of United Nations organizations as a Joint Group to encourage the independent, interdisciplinary consideration of marine pollution and environmental protection problems, with a view to avoiding duplication of efforts within the United Nations system. The main topics considered at this session are described below.

0.2 Evaluation of the hazards of harmful substances carried by ships (WG 1): This working group (WG) evaluates, at the request of the International Maritime Organization (IMO), the hazards to the environment and human health of bulk liquid chemicals carried by ships, with over 900 Hazard Profiles currently on record. The Hazard Profile contains a unique fingerprint of each substance, providing information on 14 separate human health, environmental and physico-chemical hazard criteria. WG 1 has met once since GESAMP 45, evaluating three new substances to assign full GESAMP Hazard Profiles. Furthermore, the Hazard Profiles for 12 substances were either modified or reconfirmed, based on new data. GESAMP noted the working group's finalization of the 'Reports and Studies' publication containing the revised hazard evaluation procedure, which was in the final stages of publication.

0.3 Review of applications for 'active substances' to be used in ballast water management systems (WG 34): WG 34 has convened twice since GESAMP 45 to discuss and evaluate six ballast water management systems. Two of these systems received a recommendation for Basic Approval, two received a recommendation for Final Approval, and one was recommended to not be granted Final Approval. One additional system evaluated was the first system that had received Final Approval based on the new procedure developed by the working group to consider data on freshwater treatment of ballast water for systems that previously received Final Approval only for brackish and marine water. GESAMP also noted the publication of the WG 34 evaluation methodology in August 2019.

0.4 Atmospheric input of chemicals to the ocean (WG 38): As a result of WG 38's work, 19 scientific papers have been published in the peer-

reviewed literature, with 2 other papers expected to be submitted for publication in the autumn of 2019, and 3 additional papers in an early stage of writing for ultimate submission. GESAMP noted that WG 38 organized, for the sixth year in a row, a session on atmospheric input of chemicals to the ocean for the 2019 European Geosciences Union meeting in Vienna, Austria, as part of the group's efforts to increase interaction with the International Nitrogen Management System and to contribute to the latter's initiative on methods to quantify nitrogen deposition. GESAMP also expressed its support, subject to available funding, to a proposed workshop by the group on the evaluation of potential impacts of biomass burning on biological productivity in the Southwest Indian Ocean and its implications for management issues.

0.5 Establishment of trends in global pollution in coastal environments (WG 39): The purpose of WG 39 is to contribute to the reduction of stress in the coastal ecosystem by providing stakeholders, scientists and society with an objective and global assessment of pollution trends over the last century in sensitive coastal ecosystems. The final version of the report was submitted in April 2019, and its final review and publication will conclude the work of the group.

0.6 Sources, fate and effects of plastics and microplastics in the marine environment (WG 40): The objectives of the third phase of the working group focused on harmonization of monitoring and assessment as a crucial part of addressing Sustainable Development Goal (SDG) 14.1.1, and culminated in the publication of 'Guidelines on the monitoring and assessment of plastic litter in the Ocean', in the 'Reports and Studies' series. WG 40 also organized a workshop on risk assessment in Geneva in May 2019, producing recommendations for improving risk assessment methods. GESAMP noted the continued strong interest in and commitment to the working group by the lead agencies and additional supporting organizations. Terms of reference for a fourth phase have been developed, and it was noted that further funding will be required to carry out the full, proposed work programme.

0.7 Marine geoengineering (WG 41): The working group published its first report in March 2019, followed by a workshop on the societal aspects of marine geoengineering, which would inform the second phase of the group's work. GESAMP noted the progress made and invited the co-chairs and the co-sponsoring organizations to revise the terms of reference intersessionally, for consideration by GESAMP.

0.8 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining (WG 42): GESAMP considered the progress made by WG 42 and was informed of a timeline for the production of its work. GESAMP noted that the working group's report was in its final stages, and that it was expected to be available for peer review by GESAMP in November. It would be imperative to have the report ready for the next joint session of the London Convention/Protocol Scientific Groups, in March 2020, for their consideration and possible future action.

0.9 Sea-based sources of marine litter, including fishing gear and other shipping-related litter (WG 43): The objective of WG 43 is to build a broader understanding of sea-based sources of marine plastic litter, in particular from the shipping and fishing sectors. Following a meeting to be held on 28–30 October 2019, hosted by the Food and Agriculture Organization of the United Nations (FAO) in Rome, the working group planned to produce a draft initial report describing and quantifying sea-based sources of marine plastic litter. A second meeting of the working group was planned for mid-2020 to address the subsequent terms of reference. GESAMP noted the progress made by WG 43 and encouraged dialogue by the working group with regional organizations to enable it to benefit from wider regional representation.

0.10 Contribution to other United Nations processes: GESAMP reconfirmed its strong interest in actively engaging in and contributing to the initiatives of the International Decade of Ocean Science for Sustainable Development and, therefore, established a Correspondence Group to facilitate its support to the Decade. GESAMP also noted recent progress in relation to the Regular Process, the 2030 Agenda for Sustainable Development and the SDGs, as well as the 2020 United Nations Ocean Conference to support SDG 14.

0.11 Scoping activities: GESAMP considered the progress of five Correspondence Groups that had been developing scoping papers in the intersessional period: 1) Causes and impacts of massive accumulations of the brown macro-algae *Sargassum* in the nearshore environment of the Caribbean and West Africa; 2) Relevance of inputs of disinfection by-products (DBPs) into the marine environment; 3) Sand and gravel mining in the marine environment: new insights on a growing environmental problem; 4) Updating the information on sources of the main pollutants impacting the global marine environment ('The 80:20 conundrum') and; 5) Impact of armed conflicts on the marine environment and sustainable development. It also considered

proposals for the establishment of a GESAMP working group on climate change impacts on contaminants in the ocean, and decided to establish a new working group (WG 44) on biofouling management, under the lead of the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO), co-sponsored by IMO and UNDP.

1 INTRODUCTION

1.1 The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) held its 46th session on 9–13 September 2019, in New York, United States, co-hosted by the United Nations Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs (DOALOS/OLA) and the United Nations Development Programme (UNDP). The session was chaired by Mr. Peter Kershaw, with Mr. Manmohan Sarin as Vice-Chair. The session was preceded by the GESAMP Executive Committee (ExCom) meeting and an informal meeting of GESAMP Members, both held in parallel, on 9 September 2019.

Adoption of the agenda

1.2 The meeting approved the provisional agenda, which is attached as Annex I to this report. The list of documents submitted to this session is shown in Annex II to this report, and the list of participants in Annex III.

1.3 Ms. Goettsche-Wanli, Director, DOALOS/OLA, welcomed GESAMP Members to New York and to the 46th meeting of GESAMP, co-hosted by DOALOS and UNDP. She congratulated GESAMP on the important occasion of its 50th anniversary and highlighted the independent and authoritative expertise of GESAMP as recognized through its products, in particular its landmark reports. Looking at the next 50 years, Ms. Goettsche-Wanli noted future challenges, including the growing need to address cumulative impacts in scientific assessments, but also emphasized the opportunities to continue to strengthen GESAMP and raise its profile, in particular with Member States.

1.4 Mr. Hiroyuki Yamada, Administrative Secretary of GESAMP and Director, Marine Environment Division of the International Maritime Organization (IMO), welcomed all participants on behalf of the GESAMP ExCom, and thanked DOALOS and UNDP for the preparations and hosting of the session.

1.5 The Chair, on behalf of GESAMP, expressed the Group's gratitude to DOALOS and UNDP for co-hosting the session, as well as for organizing the celebration of the 50th anniversary of GESAMP, which would be highlighted through a special event at the United Nations headquarters on 10 September.

1.6 A summary of the special event to celebrate the 50th anniversary of GESAMP, which was held during the annual session, at the United Nations headquarters on 10 September 2019, can

be found at <http://www.gesamp.org/gesamp-50-years-of-era-defining-global-sea-science>.

2 REPORT OF THE CHAIR OF GESAMP

2.1 The Chair of GESAMP noted that, since the 45th session, the focus of GESAMP had been on the planned activities of its Working Groups (WGs). Reports from WG 34, WG 40 and WG 41 had been published in the GESAMP Reports and Studies series, and WG 1 and WG 42 have reports ready for publication. A new Working Group on sea-based sources of marine litter was formed during the intersessional period, led jointly by the Food and Agriculture Organization of the United Nations (FAO) and IMO, and would be holding its second meeting at the end of October 2019.

2.2 The support from the United Nations Sponsoring Organizations is greatly appreciated, and GESAMP urges that this level of support should be maintained and, if at all possible, increased. The independence, credibility and cost-effectiveness of the GESAMP model are well recognized, and the continuing delivery of high-quality outputs is appreciated by the target audience and a much wider user group. This can only be maintained with continuing support from the United Nations Sponsoring Organizations, financially and in-kind. It has been encouraging to see the efforts being made to maintain or increase this support by agencies, but also to note the success in securing funding from a diverse range of sources for particular Working Group activities.

2.3 The Chair acknowledged the continuing efficient and enthusiastic support of the GESAMP Office, including the contribution of Ms. Chrysanthe Kolia, the GESAMP Administrative Coordinator.

GESAMP and the wider community

2.4 The Chair attended a meeting of the United Nations Ad Hoc Open-Ended Expert Group on marine plastic and microplastics, held in Geneva in December 2018, supported by the United Nations Environment Programme (UNEP), and attended the 4th UNEP Assembly (UNEA-4) in Nairobi, in March 2019 (supported by UNEP and IMO), making a number of contributions related to marine litter and plastics.

2.5 The Chair co-chaired the Clean Oceans Panel at the United Nations Decade of Ocean Science 1st Preparatory Meeting, held in Copenhagen in May 2019, and co-led a workshop on the same subject. The outputs from this event will be used to further develop plans for the Decade.

2.6 The Chair attended the 20th United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea, held in New York in June 2019. The topic of the meeting was Ocean Science and the United Nations Decade of Ocean Science for Sustainable Development. He gave a presentation on 'the use of science for advising the United Nations system' as part of a panel session, drawing on the example of how GESAMP has been doing this successfully for 50 years.

2.7 Invitations to attend a number of other international events during the year had to be declined for a number of reasons, including resource constraints.

2.8 The Chair noted that this year marked the 50th anniversary of GESAMP. However, 2019 also marked the year that the GESAMP community lost Ms. Joanna Toole, a wonderful colleague and friend from FAO. Joanna lost her life in March, one of the victims of the Ethiopian Airlines plane disaster, en route to Nairobi for UNEA-4. She was passionate about the environment, firstly working for approximately 10 years for various non-governmental organizations and latterly for FAO. She was the co-Technical Secretary for the establishment of the new GESAMP WG 43 (co-led by FAO and IMO), focusing on the impact of fishing gear on wildlife and fish resources.

2.9 GESAMP reiterated its determination to make WG 43 a success, as a token to Joanna, and to help carry on her mission.

3 REPORT OF THE ADMINISTRATIVE SECRETARY OF GESAMP

3.1 GESAMP noted that the ExCom had met on Monday, 9 September 2019.

3.2 The ExCom discussed the financial and in-kind support to which the 10 Sponsoring Organizations of GESAMP committed to support the activities of GESAMP in 2019-2020. The ExCom noted that the Sponsoring Organizations currently intended, as a minimum, to continue their support at the level of the previous years. The ExCom acknowledged with appreciation that the International Seabed Authority (ISA) had formally joined GESAMP as one of the Sponsoring Organizations in the intersessional period.

3.3 The ExCom also discussed the progress of the implementation of communications and outreach activities and noted the launch of the GESAMP website.

The GESAMP Office

3.4 The IMO Technical Secretary for GESAMP informed the meeting of the latest developments in the GESAMP Office, which is hosted at IMO as a co-sponsoring arrangement between the Sponsoring Organizations. GESAMP noted that the GESAMP Office continues to provide administrative support and coordination to GESAMP activities and its Working Groups. Since the last session, the main activities of the GESAMP Office had been:

- .1 supporting the activities of the existing Working Groups and Correspondence Groups of GESAMP, including the various peer review activities;
- .2 assisting in the publication of two GESAMP reports;
- .3 finalization and maintenance of the new GESAMP website;
- .4 preparation of the current session of GESAMP and the side-event on 'Harmful algal blooms and food security and safety in the context of climate change'; and
- .5 preparation for the 50th anniversary of GESAMP in 2019.

Activities and achievements of the Sponsoring Organizations of GESAMP since its last session

3.5 GESAMP considered the Administrative Secretary's report (GESAMP 45/3). The Administrative Secretary also presented an overview of the activities and achievements of the Sponsoring Organizations of GESAMP since GESAMP 45 in 2018. The highlights of these achievements are reported in detail in Annex IV to this report.

Action by GESAMP

3.6 GESAMP reiterated that the information contained in the report by the Administrative Secretary is unique and highly informative, as it provides a succinct but comprehensive overview of the work of the 10 Sponsoring Organizations in the field of marine environmental protection, and the scientific aspects in particular. It was, therefore, decided that the report should be given a more prominent place on the GESAMP website.

4 PLANNING OF GESAMP ACTIVITIES

4.1 Evaluation of the hazards of harmful substances carried by ships (WG 1)

4.1.1 A report of the activities of the Working Group on the evaluation of the hazards of harmful substances carried by ships (WG 1) was given by Mr. Thomas Höfer, its Chair.

4.1.2 GESAMP noted that, since the last meeting of GESAMP, WG 1 had met once. The 56th session (EHS 56) was held in London on 8–12 April 2019. The full report had been published as EHS 56/9 and circulated as IMO circular PPR.1/Circ.6.

Main use of GESAMP/EHS outputs

4.1.3 As outlined in the previous reports to GESAMP, the GESAMP Hazard Profiles (GHP) developed by WG 1:

- .1 contain a unique fingerprint for each substance, providing information on 14 separate human health, environmental and physico-chemical hazard criteria, and consist of an alphanumeric notation designed to communicate the hazards;
- .2 are published by IMO annually as the GESAMP Composite List (circulated together with the meeting report as a PPR.1/Circular) and placed on the IMO website for the use of maritime Administrations, the shipping industry and chemical manufacturers; and
- .3 provide the basis for the pollution categorization of over 900 substances. MARPOL Annex II and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) use these Hazard Profiles to determine the pollution category, ship type and carriage conditions for each chemical, for the purposes of bulk carriage in ships.

4.1.4 GESAMP noted that the latest draft version of Chapter 21 of the IBC Code makes direct reference to GHP ratings for all carriage conditions, including environmental protection, ship safety, and occupational health. The GESAMP Composite List is the only global list of hazard classifications/ratings used for regulating hazardous chemicals on a global scale based on guidance given by the United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Evaluation of substances

4.1.5 The main work carried out at the last session concerned the evaluation of substances, as per the usual practice. Data on three new substances were evaluated, and full GHPs assigned, accordingly. The GHPs for 12 substances were either modified or reconfirmed, based on new data.

The revised GESAMP Hazard Evaluation Procedure

4.1.6 GESAMP noted that WG 1 had initiated discussions on possible future amendments to the existing guidance during its 53rd session in 2016, developed first drafts intersessionally and finalized draft texts and rationales during its 54th and the 55th sessions in 2017-2018. Based on the resulting version, the usual GESAMP scientific review process started in early 2019. At the 56th session in 2019, WG 1 considered first responses, comments and proposals from the GESAMP reviewers. A number of amendments to the guidance were developed. A final draft version of the Hazard Evaluation Procedure based on the drafting work during EHS 56 and the latest reviews was prepared by the WG Chair in May 2019 and circulated to the members for final consideration and acceptance. At the time of GESAMP 46, the report was undergoing final layout, to be followed by printing.

Specific work in preparation for the revised GESAMP Composite List

4.1.7 It was noted that WG 1 had continued its review of flashpoint information for products, extracted from the Global Integrated Shipping Information System (GISIS) database, and agreed to continue the review intersessionally, with a view to completing the work intersessionally, for incorporation in the future Composite List in 2020. The next publication of the GESAMP Composite List would be based on the revised GESAMP Hazard Evaluation Procedure, including the amended and extended structure. Flashpoint ratings for all chemicals will be presented within the revised column E1. This GESAMP Composite List would be published as usual as an annex to the report of the next (57th) session of WG 1 in May 2020.

Specific work based on request by IMO

4.1.8 GESAMP was informed that WG 1 had noted the request by IMO on advice with regards to recommended cut-off values to be used when assessing mixtures containing components with a long-term health effect. The Working Group agreed that the relevant text from the revised Reports and Studies No. 64 would form the basis of the

development of a simplified recommendation for consideration by IMO.

4.1.9 It was also noted that IMO, through the Sub-Committee on Pollution Prevention and Response (PPR 6), had invited GESAMP/EHS to review the guidance contained in the draft IMO circular on decisions with regard to the categorization and classification of products and to consider the possibility of an update of GHP ratings in line with this guidance, for the purpose of consistency and harmonization. The Working Group reviewed the above-mentioned draft circular and the draft revised Circular 512 of the Marine Environmental Protection Committee (MEPC) on guidelines for the provisional assessment of liquid substances transported in bulk.

4.1.10 The Working Group had agreed to some editorial modifications to the draft circulars. However, in relation to the possibility of an update or amendment of hazard ratings for chemicals in the GESAMP/EHS Composite List, it confirmed the basic principle that all GHP ratings are based on a scientific assessment of data. It would not be appropriate to show any GHP ratings in the Composite List based on the regulatory guidance in the draft IMO circular—for example, assigning a B2 (chronic aquatic toxicity) rating based on ratings for acute aquatic toxicity (B1), bioaccumulation (A1) and biodegradation (A2).

Action by GESAMP

4.1.11 GESAMP noted with great appreciation the progress made by WG 1 in the intersessional period, not least with the finalization of the revised Reports and Studies, which would be published shortly. The Working Group also noted that the amendments to the GESAMP Hazard Evaluation Procedure would have an impact on IMO regulations, and would thus have to be explained to relevant IMO bodies, since amendments to regulative guidance would have to be developed.

4.2 Ballast water (WG 34)

4.2.1 A report of the activities of the Working Group on ballast water (WG 34) was given by Mr. Jan Linders, its Chair.

4.2.2 WG 34 convened twice since GESAMP 45 to evaluate proposed ballast water management systems (BWMS): once for a regular meeting, on 26–30 November 2018, where three BWMS were evaluated, and once for an additional meeting on 14–17 January 2019, also with three BWMS to be evaluated. Two of these six BWMS submitted to MEPC 74 received a recommendation for Basic Approval, one was not recommended for Final Approval, and two received a recommendation for Final Approval. During its

meeting in May 2019, MEPC agreed with the recommendations of WG 34 regarding all systems evaluated.

4.2.3 GESAMP noted that one additional system evaluated by WG 34 was the first system that had received Final Approval based on the new procedure developed by the Working Group on the request of MEPC, to consider data on freshwater treatment of ballast water for systems that previously received Final Approval only for brackish and marine water. There was a growing need to demonstrate that these systems, originally lacking data on freshwater because only two salinities were needed, were able to operate under freshwater conditions. In the procedure developed by WG 34, provisions on relevant data had been described to be submitted by the Administrations.

4.2.4 WG 34 was able to clear the whole stock of BWMS submitted for evaluation before the meeting of MEPC for which the evaluation was requested. The Working Group recognized that the number of BWMS presented to it had increased compared to recent reporting periods. It expected that more BWMS will have to be evaluated for freshwater, as there are still several BWMS that have received only Final Approval for marine and brackish water.

Methodology for information-gathering and the conduct of work of WG 34

4.2.5 It was noted that the evaluation methodology of WG 34 had been determined to be a living document based on increasing experience in the evaluation of BWMS. WG 34 added three more substances to the IMO GISIS database, including the also regularly occurring second neutralizer sodium sulphite. The current version of the database now contained 44 specific chemicals, including an active substance and two neutralizers frequently used in BWMS. For these 44 substances, the applicants of BWMS do not have to submit the physico-chemical characteristics and the data on (eco-)toxicology to IMO any more, as the Working Group considered that all and sufficient relevant information is already available. If, however, new data become available, they will have to be submitted to IMO in any application dossier.

4.2.6 GESAMP recalled that during the last meeting it was discussed whether or not WG 34 should continue working on the further development of the methodology. It was decided that there was no longer any need to have a regular stocktaking workshop (STW) every year, and MEPC 73 agreed. Nevertheless, the possibility is still open to continue improving the methodology based on newly emerging scientific developments. A possibility could be, for example, the occurrence

of heavy metals and persistent organic compounds that have recently been found in ballast water tanks (MEPC 71/INF.11 and MEPC 71/INF.10, respectively). Although the direct relation with the functioning of BWMS was not yet clear, it may be needed to establish further findings in this area.

4.2.7 GESAMP further recalled that WG 34 reported to GESAMP 43 that during the STW it was decided to publish part of the methodology as a report in the GESAMP Reports and Studies series. In November 2018 a finalized draft of the report was sent to GESAMP for peer review, and the report was published in August 2019.

Working arrangements related to WG 34

4.2.8 GESAMP noted that due to the decreasing number of BWMS to be evaluated by WG 34 and, therefore, the decreasing budget, the Secretariat, in dialogue with the Working Group, had taken measures to reduce the costs associated with the running of the Working Group, including the reduction of administrative costs and the costs of each Working Group meeting.

4.2.9 The current working arrangements would be kept under review and will depend on the upcoming workload for the Working Group. If the number of applications decreases further, additional working arrangements may potentially have to be discussed.

Planning ahead

4.2.10 GESAMP noted that the deadline for the submission of proposals for approval of BWMS to MEPC 75 was 13 September 2019. Two Working Group meetings, BWWG 39 on 4–8 November 2019 and BWWG 40 on 9–13 December 2019, had been scheduled to accommodate potential applications, if needed.

Acknowledgement

4.2.11 The Chair of WG 34 expressed the Working Group's appreciation to all Members of GESAMP who took the time to critically review the regular work of WG 34, and specifically the draft GESAMP Reports and Studies report. The quality of the report was improved as a result of this peer review.

Action by GESAMP

4.2.12 GESAMP noted with great appreciation the progress made by WG 34 in the intersessional period, including the publication of the Working Group's methodology in Reports and Studies.

4.2.13 GESAMP also expressed its appreciation to the Chair and the members of WG 34 for

working actively with the IMO Secretariat to adjust its working arrangements, in light of the decreasing numbers of BWMS, to ensure the long-term sustainability of the Working Group.

4.3 Atmospheric input of chemicals to the ocean (WG 38)

4.3.1 Mr. Robert Duce, Co-Chair of the Working Group on the atmospheric input of chemicals to the ocean (WG 38), described the activities of the Working Group in the past year and briefly outlined a proposal for a new workshop that the Working Group would like to undertake. Nineteen scientific papers developed by members of WG 38 as a result of WG 38 workshops have been published in the peer-reviewed literature as of this date. Two other papers were expected to be submitted for publication in late 2019, and three additional papers were at an early stage of writing for ultimate submission.

4.3.2 For the sixth year in a row, WG 38 organized a session on atmospheric input of chemicals to the ocean for the 2019 European Geosciences Union meeting, held in Vienna, Austria, in April: 'Air-sea Exchanges: Impacts on Biogeochemistry and Climate'. A number of oral and poster papers at this session were presented by a combination of WG 38 members and other scientists. WG 38 Co-Chair Mr. Tim Jickells participated in the Second East Asia Nitrogen Conference in Tsukuba, Japan, on 19–22 November 2018, where he gave a keynote talk on the atmosphere/ocean aspects of the nitrogen cycle on behalf of WG 38. He also participated in a subsequent workshop in Tsukuba. It was hoped that this effort will increase our interactions with the International Nitrogen Management System (INMS) activity, and to contribute to an INMS initiative on methods to quantify nitrogen deposition.

4.3.3 WG 38 proposed the following activity to be considered for the OceanObs'19 ocean observing community conference: 'Ocean observations to estimate atmospheric nutrient and trace metal inputs to the oceans'. This has been adopted and incorporated as part of a white paper that was published in a special issue of *Frontiers in Marine Science* in 2019. Mr. Alex Baker is taking the lead on this effort by WG 38. He also participated in the Expert Workshop on Measurement-Model Fusion for Global Total Atmospheric Deposition held in Geneva, Switzerland, in February 2019. Mr. Baker presented results from the GESAMP-supported paper recently published in *Atmospheric Chemistry and Physics*, 'Observation- and model-based estimates of particulate dry nitrogen deposition to the oceans'.

4.3.4 Having discussed a figure from one of the papers by WG 38 showing enhanced atmospheric transport of soluble iron to the Mozambique Channel region and the southwest Indian Ocean, one GESAMP Member (Mr. David Vousden) expressed strong interest, and it was suggested that this should be brought to the attention of managers in the region. Discussions were held during the past year about holding a potential workshop addressing whether or not the atmospheric input of nutrients to this region as a result of biomass burning may have a significant impact on biological productivity in that region.

4.3.5 A preliminary planning meeting for this workshop was held on 28 June 2019 at the University of East Anglia in Norwich, United Kingdom. Attendees at the planning meeting were as follows: a core group of WG 38 members (Mr. Alex Baker, Mr. Robert Duce and Mr. Timothy Jickells), the Chair of GESAMP (Mr. Peter Kershaw), Mr. Peter Liss (University of East Anglia, United Kingdom, former WG 38 Co-Chair) and Mr. Michael Roberts, Nelson Mandela University, South Africa and National Oceanography Centre, United Kingdom). Mr. David Vousden, Rhodes University, South Africa (GESAMP Member), attended by Skype. The World Meteorological Organization (WMO) Technical Secretary of GESAMP was unable to participate in the meeting but was fully involved in its planning and in subsequent activities.

4.3.6 Mr. Mike Roberts, attending GESAMP 46 as an Observer, provided detailed information on the physical and biological oceanography in the southwest Indian Ocean and the temporal variability of biomass burning. Mr. David Vousden then presented a description of an adaptive management process that could be used at a future workshop.

4.3.7 To evaluate the potential engagement mechanisms, WG 38 proposed to gather a group of 25–30 invited experts representing scientists and user communities, from both national and international organizations. The attendees would be selected for their relevant expertise and interest in this work area, with appropriate gender and geographical balance, and for their enthusiasm for developing such new ways of working together to improve adaptive management strategies and the operation of the policy–evidence interface. Invitees would include environment managers with regional connections and scientists with relevant expertise in atmospheric deposition and impacts, as well as experts on local oceanography, biomass burning and other relevant areas of science. This group would meet for about three full working days, with informal presentations and discussions, preceded by preliminary work by the participants preparing and reading various briefing documents. Some

preliminary scientific work might be necessary, such as deriving source apportionment for inputs to that specific geographical region.

4.3.8 The proposed workshop would take place in September–October 2020, tentatively in Cape Town or Port Elizabeth, South Africa. The possibility of some of the workshop invitees offering lectures prior to the workshop for a group of up to 30 students from the region was also considered. These students would then be invited to attend the workshop to see how the workshop participants evaluate the potential impacts of biomass burning on biological productivity in the nearby ocean and the implications this may have for management issues.

Action by GESAMP

4.3.9 Following extensive discussion, GESAMP expressed its support for the workshop, subject to available funding, and approved the new Terms of Reference as set out in Annex V of this report.

4.4 Establishment of trends in global pollution in coastal environments (WG 39)

4.4.1 A report of the Working Group on the establishment of trends in global pollution in coastal environments (WG 39) was given by the International Atomic Energy Agency (IAEA) Technical Secretary of GESAMP.

4.4.2 During GESAMP 45, hosted at the FAO in Rome, the Chair of WG 39, Ms. Ruiz Fernandez, had provided a draft version of the final report of WG 39. The report had been peer-reviewed by GESAMP, and some necessary changes were agreed during the discussion. GESAMP agreed that with the submission of the final report to GESAMP, this Working Group had fulfilled its terms of reference and would be dissolved. GESAMP thanked the Chair of WG 39 for all her hard work over several years and expressed its appreciation to the past and present members of the Working Group for their considerable efforts in concluding this report.

4.4.3 Ms. Ruiz Fernandez submitted the final revised report on 26 April 2019. It received additional review by IAEA and the Chair of GESAMP, and all revisions were considered acceptable. The report was sent out for English proofreading to GESAMP Members Mr. Alex Baker and Ms. Tracy Shimmield on 17 May 2019.

Actions by GESAMP

4.4.4 GESAMP noted that IAEA is awaiting the completion of this final review to publish the document in the GESAMP Reports and Studies series as soon as possible.

4.5 Sources, fate and effects of plastics and microplastics in the marine environment (WG 40)

4.5.1 A report of the activities of the Working Group on sources, fate and effects of plastics and microplastics in the marine environment (WG 40) was given by Mr. Peter Kershaw, its Chair.

4.5.2 The objectives of WG 40 for the period 2017–2018 (third phase) included developing guidelines covering terminology and methodologies for the sampling and analysis of marine macro-plastics and microplastics, including: size and shape definitions of particles; sampling protocols for the whole spectrum of particle/object sizes in surface and subsurface seawater, seabed sediments, shorelines and biota; methodologies for physical and chemical identification and analysis of polymers and associated chemicals; and requirements for monitoring and assessment. This will address the need for harmonization of monitoring and assessment, which will reduce uncertainty, allow data comparisons and sharing, encourage regional cooperation, spread good practice and help meet SDG targets and indicators. Such harmonization of the monitoring and assessment methodology is crucial in the context of SDG 14.1.1 on floating plastic litter, to support raising the related indicator from Tier 3 (“No internationally established methodology or standards are yet available”) to Tier 2 (“Indicator is conceptually clear, has an internationally established methodology and standards are available...”).

4.5.3 The lead agencies for the third phase were UNESCO’s Intergovernmental Oceanographic Commission (IOC) and UNEP, with support from IMO (residual industry funding), the National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program (the United States), Ministry of Environment of Japan, the State Ocean Administration of China, the North West Pacific Action Plan (NOWPAP), the Ministry of Fisheries & Oceans of the Republic of Korea, and BASEMAN (a Joint Programming Initiative Healthy and Productive Seas and Oceans (JPI Oceans) project).

4.5.4 The Guidelines (GESAMP Reports and Studies No. 99) were launched at UNEA-4, in Nairobi, Kenya, in March 2019. Subsequently, they were presented at several meetings, including at the G20 officials meeting (Japan, in February), at a microplastics experts meeting (Japan, in March), at a waste management workshop (Dubai, in April), at a G7 workshop (France, in May) and at a G20 Japan–European Commission workshop (Japan, in October).

4.5.5 It was recalled that GESAMP 45 had agreed to develop a Scientific Summary for Policymakers, with the full report being published in early 2019 in the GESAMP Reports and Studies series.

4.5.6 The WG 40 third phase ToR were approved at GESAMP 45 and implied the need to carry out some form of risk analysis to answer the ‘so what?’ question. To identify in more detail what key questions to address, a GESAMP international workshop assessing the risks associated with plastics and microplastics in the marine environment was held on 21–23 May 2019, hosted by the Secretariat of the Basel, Rotterdam and Stockholm (BRS) Conventions, in Geneva, Switzerland. The workshop was attended by 14 independent experts funded by UNEP, and with attendance by UNEP, IOC-UNESCO, FAO, the World Health Organization (WHO), the United Nations Industrial Development Organization (UNIDO), BRS Conventions, the Organisation for Economic Co-operation and Development (OECD) (not in person), the European Chemicals Agency, the International Council of Chemical Associations, Plastics Europe, the Mediterranean Science Commission (CIESM), Greenpeace, the International Union for Conservation of Nature (IUCN) and the Pew Foundation.

4.5.7 The specific objectives of the workshop were to provide a state-of-the-art overview of risks and exposure pathways due to plastics and microplastics, including particles in the nano size range, and to provide an overview of existing or planned international or other initiatives, to identify synergies, avoid overlap and critically examine current methods of risk assessment. The workshop also made recommendations for improving risk assessment methods, including the potential for developing a risk assessment framework that can capture the complex risks and exposure pathways identified, and provided guidance to GESAMP on its future work programme with respect to assessing the risks from plastics and microplastics.

4.5.8 As a result, the WG 40 Co-Chairs suggested the modification of the ToR for the fourth phase. The term ‘impact’ carries negative connotations; ‘effect’ may be a better descriptor, as some effects can be positive. As there is a lack of data on exposure, it would be desirable to reflect this in the ToR. It should be included in the wording of the ToR that the Working Group will be working on developing the risk assessment methodology and data needs, rather than carrying out a risk assessment; a risk assessment could be considered later. Finally, a public perception element should be included, as this is important both for communication and for policymakers (e.g. benefits vs. dis-benefits of seafood consumption).

4.5.9 GESAMP noted that the composition of WG 40 for a fourth phase was not yet completed and that atmospheric transport of plastic particles should be included in deliberations, possibly through a link to WG 38. GESAMP also discussed the importance of effective communication as part of a fourth phase and that including experts on science communication could be considered, alternatively drawing more systematically on the communication units of the sponsoring agencies.

4.5.10 GESAMP discussed the potential value of a product/paper on the myths about ocean plastic, referring to and pointing to the WG 40 reports. The drafting of such a paper could be added to the ToR for the fourth phase.

4.5.11 IOC-UNESCO reconfirmed its interest in continuing to act as a co-lead agency for WG 40, and it was also agreed that the GESAMP Office would contact UNEP to investigate its future commitment. The GESAMP Office would also contact FAO to investigate its interest and potential links with WHO.

4.5.12 IAEA expressed an interest in engaging in the fourth phase, and in investigating possibilities to sponsor Working Group meetings and potential funding options via industry associations.

4.5.13 The Technical Secretary of WMO indicated support for the next phase of WG 40 work by ensuring links with WG 38, and interest in investigating further support possibilities.

4.5.14 DOALOS noted that GESAMP reports on plastic are mentioned at the United Nations General Assembly in various contexts. While interested, DOALOS cannot contribute financially to WG 40 but will contribute by communicating WG 40 products in the United Nations system.

4.5.15 It was proposed to investigate options for producing a short, well-illustrated brochure to inform policymakers of the development of the monitoring guidelines (Reports and Studies No. 99), using the communications group in IOC-UNESCO to produce a digital file that could be transferred to another sponsoring agency for printing. This would be explored in the intersessional period.

Action by GESAMP

4.5.16 GESAMP welcomed the significant progress made by WG 40 and noted the continued strong interest in and commitment to the Working Group by lead agencies IOC and UNEP and additional supporting organizations.

4.5.17 GESAMP noted that WG 40 will not take further action until funding has been identified and

stated that the rest of 2019 will be used for fundraising.

4.6 Marine geoengineering (WG 41)

4.6.1 A report of the activities of the Working Group on marine geoengineering (WG 41) was given by Mr. Chris Vivian, its Co-Chair.

4.6.2 Since the last session, the Working Group's first report, entitled 'High Level Review of a Wide Range of Proposed Marine Geoengineering Techniques', had been published as GESAMP Reports and Studies No. 98, in March 2019. A short summary of the main findings was published in June 2019 as a Comment in *Nature* (see <https://www.nature.com/articles/d41586-019-01790-7>).

4.6.3 GESAMP noted that regarding future work, WG 41 recommended:

- .1 revisiting parts of the ToR not fully addressed to date, such as:
 - .1 identifying those techniques that appear to be likely to have some potential for climate mitigation purposes and that bear further detailed examination;
 - .2 an outline of the issues that would need to be addressed in an assessment framework for each of those techniques using the London Protocol Assessment Framework for Scientific Research Involving Ocean Fertilization as a template; and
 - .3 the potential environmental and social/economic impacts of those marine geoengineering approaches on the marine environment and the atmosphere where appropriate;
- .2 fostering the development of socio-economic, geopolitical and other relevant societal aspects of marine geoengineering assessments, including societally relevant metrics where possible, to ensure a holistic approach to subsequent assessment process(es); and
- .3 the development of a coordinated framework for proposing marine geoengineering activities, submitting supporting evidence and integrating independent expert assessment. This is essential to begin to transition towards a more holistic assessment that includes social, political, economic, ecological and ethical dimensions.

4.6.4 The availability of funding from the Government of Canada enabled WG 41 to hold a

small workshop at IMO in March 2019 to focus on the societal issues of marine geoengineering, involving GESAMP Working Group experts from the humanities, mainly from the United Kingdom but with some participants from Europe. The idea was that the workshop would inform the next phase of WG 41.

4.6.5 The overall objectives for the workshop were:

- .1 to develop an appreciation of where the social sciences stand in terms of being able to contribute substantively to the work of the GESAMP Working Group and where the knowledge gaps are; and
- .2 to think about a modus that allows the Working Group to benefit from the social science work.

4.6.6 A full report of the workshop was provided as document GESAMP 46/7/9. GESAMP noted the following outcomes from the workshop:

- .1 All the disciplines that we had planned to cover in the workshop were relevant to the consideration of marine geoengineering.
- .2 Throughout the presentations there were calls by speakers, representing a wide range of disciplines, to move away from use of the term 'geoengineering' towards that of 'climate intervention'.
- .3 Framing the topics is very important, as context and methods can affect outcomes. This issue was raised by almost every speaker regardless of their discipline.
- .4 There was general consensus that the Working Group should integrate natural sciences and societal disciplines into a holistic assessment of marine geoengineering techniques and that a systems approach framework would be a useful way to do this.

4.6.7 Looking ahead to a potential second phase, GESAMP noted that:

- .1 the terms of reference would need revision, particularly to integrate natural sciences and societal disciplines into a holistic assessment of marine geoengineering techniques using a systems approach framework;
- .2 It would be challenging (from a funding perspective) to be inclusive with the range of disciplines covered at the March workshop in a second phase of the Working Group, since it would be necessary to also maintain a core of

natural scientists. However, some experts can cover more than one discipline; and

- .3 It would likely be difficult to achieve the geographical coverage GESAMP aims for in its Working Groups, given the highly specialized nature of some of these disciplines. This was noted as an issue when setting up the initial Working Group membership in 2016 and may be further exacerbated in the transition to a mix of the natural sciences, technology and the humanities.

4.6.8 To revise the ToR, the sponsoring agencies (IMO, UNESCO-IOC and WMO) would need to provide their views on the future work to be undertaken by the Working Group. This would include direction from the Contracting Parties to the London Convention and London Protocol, which were due to consider the Working Group report, including the initial views of the London Convention/London Protocol Scientific Groups on the report, during their meeting on 7–11 October 2019. In addition, the Intergovernmental Panel on Climate Change (IPCC) report 'The Ocean and Cryosphere in a Changing Climate' is due to be released on 25 September 2019, which may influence the ToR.

4.6.9 GESAMP welcomed the information that initial funding for the second phase had already been secured by IMO, from the Government of Canada.

Action by GESAMP

4.6.9 GESAMP noted with great appreciation the progress made by WG 41 in the intersessional period, including the publication of the Working Group report in the GESAMP Reports and Studies series.

4.6.10 Noting the need for input from the Sponsoring Organizations, including their relevant governing bodies etc., GESAMP invited the Co-Chairs and the Sponsoring Organizations to revise the TORs intersessionally, for consideration by GESAMP.

4.7 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining (WG 42)

4.7.1 A report of the activities of the Working Group on impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining (WG 42), was given by Ms. Tracy Shimmield, its Chair.

4.7.2 GESAMP was informed that the draft

report was developing but at a slower pace than expected. Two main reasons were identified: first, the Working Group had only met together in person once at the start of the project; and, second, the majority of the members were currently active scientists with limited time to devote to the production of the report. However, the involvement of active researchers ensured that the most recent research and developments are being included in the report.

4.7.3 GESAMP also noted that the Working Group had been active in promoting the work that was being undertaken by WG 42 at several meeting/conferences, and that one new member had joined the Working Group in the intersessional period.

Action by GESAMP

4.7.4 GESAMP noted that the Working Group report was in its final stages, and that it was expected to be available for peer review by GESAMP in November. It would be imperative to have the report ready for the next joint session of the London Convention/London Protocol Scientific Groups, in March 2020, for their consideration and possible future action.

4.8 Sea-based sources of marine litter, including fishing gear and other shipping-related litter (WG 43)

4.8.1 A report of the activities of the Working Group on sea-based sources of marine litter, including fishing gear and other shipping-related litter (WG 43), was given by Ms. Kirsten Gilardi, its Chair.

4.8.2 It was recalled that the Working Group's ToR were formally approved in April 2019. The overall objective of WG 43 is to build a broader understanding of sea-based sources of marine litter, in particular from the shipping and fishing sectors, including the relative contribution of different sources, analysis of plastic use and management within both industries and the range and extent of impacts from sea-based sources of marine litter. The Working Group will build a more comprehensive understanding of types of sea-based sources of marine litter, to guide interventions on these sources based on identified priorities and the expertise of FAO, IMO and UNEP.

4.8.3 GESAMP noted that since the formal establishment of WG 43, Ms. Gilardi had been identified as the Working Group Chair. The membership of the Working Group, selected by its Chair in dialogue with the Sponsoring Organizations, comprised scientists with expertise in fishing, shipping and dumping of waste at sea,

including technologies, impacts and interventions from both wild capture and aquaculture fisheries. An initial scoping meeting of WG 43 was held by conference call on in June 2019, during which ToR were reviewed and an initial phase of work proposed, discussed and adopted. The Working Group is currently conducting research (using both the published and 'grey' literature) on available knowledge on sea-based industries as sources of marine litter, including shipping, fishing, aquaculture, dumping of wastes at sea, and other ocean uses (e.g. recreational fishing and boating). These findings will be collated in the form of a draft initial report describing and quantifying sea-based sources of marine litter, to be produced during a meeting of WG 43 to be held on 28–30 October 2019, hosted by FAO in Rome.

4.8.4 GESAMP also noted the Working Group's intended approach to accomplishing subsequent tasks, as delineated in its ToR, prior to a second meeting to take place in mid-2020.

4.8.5 It was noted that the Working Group would benefit from a better geographical diversity, in particular in its second phase, when regional distribution patterns would be of greater focus. GESAMP, therefore, encouraged a dialogue with relevant regional organizations, including Regional Seas Programmes through UNEP.

Action by GESAMP

4.8.6 GESAMP welcomed the initial progress made by WG 43, and thanked the Working Group and its Chair for the first progress report.

5 CONTRIBUTION TO OTHER UNITED NATIONS PROCESSES

5.1 The United Nations Decade of Ocean Science for Sustainable Development

5.1.1 The IOC-UNESCO Technical Secretary for GESAMP provided an overview of the current state of preparations for the Decade of Ocean Science for Sustainable Development.

Action by GESAMP

5.1.2 Following discussion, GESAMP agreed that the Decade was an important opportunity for GESAMP to be even more relevant to the agencies, through:

- .1 ongoing activities that can be identified as contributing to the Decade; and
- .2 new initiatives that can be addressed by GESAMP for the Sponsoring Organizations.

5.1.3 To facilitate its work in relation to the Decade, GESAMP decided to establish a Correspondence Group, under the lead of Mr. David Vousden and Mr. Mike Huber.

5.2 Other United Nations processes

5.2.1 GESAMP noted recent progress in relation to the Regular Process, the 2030 Agenda for Sustainable Development and the SDGs, as well as the 2020 United Nations Ocean Conference to support SDG 14. A presentation on these issues was provided by Mr. Yoshi Takei of the United Nations Department of Economic and Social Affairs (DESA) (see further under section 7, below).

Action by GESAMP

5.2.2 GESAMP reiterated its readiness to support the Sponsoring Organizations, as and when required.

5.2.3 To further highlight the relevance of its work in relation to the SDGs, GESAMP decided to update the template for the establishment of Working Groups to include an indication of how the proposed Working Group will support specific SDGs and their targets (see Annex VI).

Presentations by Observers

5.2.4 Mr. Yoshinobu Takei, Sustainable Development Officer at the Division for Sustainable Development Goals at DESA, gave a presentation on DESA's work related to the ocean. In particular, he provided the meeting with an overview of the 2017 United Nations Ocean Conference and its follow-up activities, such as the Communities of Ocean Action (COAs), and the main characteristics of the 2020 United Nations Ocean Conference, to be held in Lisbon on 2–6 June 2020. He outlined how GESAMP and its Members could contribute to the implementation of SDG 14, including through the COAs and the 2020 United Nations Ocean Conference.

5.2.5 Ms. Ellen Moore presented the work of Earthworks, a US-based non-profit organization dedicated to protecting communities and the environment from the adverse impacts of mineral development and oil and gas extraction, while promoting sustainable solutions. Earthworks supports communities affected by the disposal of mine waste into oceans, rivers, lakes and streams and is concerned about the irreversible impacts of the rush to mine the deep seabed. Metals mining is one of the world's dirtiest industries, due in large part to the hazardous waste produced during the mining process. Ms. Moore stated that GESAMP must play a leading role in providing independent, scientific information to communities, governments

and decision makers grappling with responsible and safe mine waste disposal and seabed mining. She further stated that scientific information generated independent of mining industry influence is critical to levelling the playing field and ensuring the immediate and future protection of fragile marine environments on which we all depend.

5.2.6 Oceana's representative, Ms. Javiera Calisto, presented the organization's findings on the only Chilean mining facility that disposed tailings into the ocean and explained how, following a sanction procedure initiated by the Superintendence of Environment, this resulted in the company ceasing submarine tailings disposal. Ms. Calisto reiterated GESAMP's significant impact on policymaking and expressed her wish that the results of the work of WG 42, as stipulated in its ToR, can encourage countries to follow 'best practices' in mine tailings disposal.

5.2.7 Ms. Mary Wisz gave an overview of the World Maritime University (WMU) and Sasakawa Global Ocean Institute (GOI). WMU is a United Nations capacity-building hub for maritime and ocean affairs, founded by IMO. GOI is based at WMU and carries out research at the interface of science, policy, industry and capacity-building. Through its currently funded projects, WMU and GOI offer to explore possibilities to contribute to Working Groups and collaborate with GESAMP on a number of topics—for example:

- .1 research in science diplomacy to increase the uptake of science in policy, with work at GESAMP as a case study;
- .2 expertise to support Working Groups that consider, for instance, cumulative impacts that might disrupt connectivity of ecological processes across scales, environmental impacts of activities in Areas Beyond National Jurisdiction, the governance of marine debris in the Caribbean region, etc.; and
- .3 possible establishment of a Working Group to examine the impacts of human activities on the mesopelagic zone, due to the growth of attention and research directed towards the ecosystem.

6 IDENTIFICATION OF NEW AND EMERGING ISSUES

6.1 This agenda item is intended to provide an opportunity for GESAMP Members to bring new topics related to the status of the marine environment to the attention of the Sponsoring Organizations, and to discuss issues arising during

the course of the current annual session. During the informal meeting of GESAMP Members held in the morning session on Monday, 9 September 2019, they expressed views on some relevant issues; however, no specific issues were highlighted as worthy of following up in the intersessional period.

6.2 Members also believed that as GESAMP already has a full programme of topics under consideration, it may be advisable to only bring urgent new issues to this session.

7 SCOPING ACTIVITIES

7.1 Causes and impacts of massive accumulations of the brown macro-algae *Sargassum* in the nearshore environment of the Caribbean and West Africa

7.1.1 Massive accumulations of *Sargassum* seaweed first occurred on the shores of West Africa and many Caribbean islands in 2011, and they have re-appeared every year since, with one exception. The social, economic and environmental impacts have been considerable, but the cause or combination of causes responsible remain uncertain.

7.1.2 The IOC-UNESCO Technical Secretary for GESAMP presented a progress report on progress in this field, since the GESAMP Scoping Paper was presented at GESAMP 44 (document GESAMP 44/7/2). This included a list of activities and planned initiatives by a number of organizations that directly or indirectly address this issue—for example:

- GESAMP WG 38 on atmospheric deposition of chemicals; IAEA Technical Meeting on *Sargassum* in Jamaica (4–8 November 2019);
- activities within the Global Partnership on Nutrient Management (UNEP); IOC Scientific Committee on Oceanic Research (SCOR) GlobalHAB plans for an Open Science Meeting (OSM) on *Sargassum*;
- activities under the Abidjan Convention; *Sargassum* component in the FAO Caribbean fisheries project;
- recommendations from meetings of the Scientific and Technical Advisory Committee (STAC) to the Protocol Concerning Specially Protected Areas and Wildlife (SPAW) in the Wider Caribbean Region; conference organized by the Senate of Mexico (19–20 September);

- expo on *Sargassum* Management Technologies organized by the Organisation of Eastern Caribbean States (OECS); and
- two studies on beneficial use and heavy metal contamination organized by the Caribbean Public Agency. This is a non-exhaustive list and does not include several academic research studies studying the physical, chemical and biological oceanography of the phenomenon.

7.1.3 In the discussion that followed, it was noted that *Sargassum* is of concern to several of the Sponsoring Organizations, and GESAMP provides a framework to coordinate a response.

Action by GESAMP

7.1.4 It was agreed that GESAMP should join IOC-SCOR GlobalHAB in organizing an OSM on *Sargassum*. The objectives would be: i) to identify research priorities to understand *Sargassum* growth dynamics; and ii) to develop improved management and mitigation technologies for *Sargassum* beaching. Initial discussions have taken place on the scope of the OSM, and these will continue to be refined.

7.15 It was further agreed that it would be appropriate to create a GESAMP Task Team to which those sponsoring agencies that have expressed an interest (IOC, FAO, IAEA, UNEP, WMO, UNDP) and individual members can contribute. This will provide a mechanism to coordinate GESAMP interests contributing to the planning and organization of the SOM.

7.2 Relevance of inputs of disinfection by-products into the marine environment

7.2.1 The Co-Chair of the Correspondence Group, Mr. Thomas Hofer, presented the progress achieved on the scoping activity on the relevance of inputs of disinfection by-products into the marine environment.

7.2.2 It was recalled that GESAMP's work on this topic started with an initial discussion at the 37th session, followed by two scoping papers which were discussed at the 39th and 40th sessions. Due to budget constraints, the activity remained on standby for some years. With funding from the Government of Germany and a revised focus, a third scoping paper was provided to the 44th session and became the basis for an international workshop held in Berlin, Germany, in late 2018. Scientists from Asia, Australia, Europe and North America with a high level of expertise

and a publication history on specific areas relevant for this topic were invited. It was perceived as a success and a confirmation of the relevance of this topic that 19 scientists participated in the workshop, presenting the scientific work done so far as well as draft sections for a comprehensive report.

7.2.3 Draft sections were discussed during the workshop. Relevant aspects not covered at this time could be identified, and workshop participants offered to provide further scientific assessments. Based on this, the participants amended their drafts, discussed details of revisions in subgroups and produced final versions of chapters of a future GESAMP report.

7.2.4 GESAMP noted that a full draft report incorporating all these parts, including editorial work by the leads and the Co-Chair, had just been finalized for circulation to all authors. A further correspondence period was expected to lead to a near final version in late 2019.

7.2.5 The report will cover natural and anthropogenic sources of chemicals which are also created by disinfection processes. These chemicals are in general halogenated hydrocarbons. Four industrial sectors have been identified as anthropogenic sources: cooling water for coastal industries (in particular power stations), desalination plants, ballast water treatment in ships and wastewater treatment, including seawater toilets. The technologies used around the globe are explained, together with estimations of inputs into the marine environment. The experts agreed on strategies for assessing the risks for marine life, human health and the atmosphere (in particular the ozone layer). In many cases, the actual or future exposure of marine life and humans to these halogenated hydrocarbons cannot be determined with a sufficiently reliable accuracy for local and regional environments. The work on an estimated future global input range of some of the most relevant chemicals such as bromoform is still ongoing.

7.2.6 The report will be the first of its kind to summarize the generation of disinfection by-products in marine waters by sources, their generation pathways, their input into the marine environment and the exposure situation for marine life, humans and the atmosphere. Due to a lack of data, any reliable impact assessment is not possible at this time. However, specific proposals for generating a better information base through measurements and research will be made.

7.2.7 GESAMP noted with great appreciation the financing of this scoping activity, including the international GESAMP workshop, by the German Federal Institute for Risk Assessment

(Bundesinstitut für Risikobewertung—BfR) and the extensive coordinating input, review and additional drafting by Matthias Grote, the Co-Chair of this scoping activity.

Action by GESAMP

7.2.8 Following discussion, GESAMP agreed to follow the proposed way forward, with a draft report scheduled for the first half of 2020. It would then be peer-reviewed by GESAMP with the aim of publication in the GESAMP Reports and Studies series, subject to the availability of funding.

7.2.9 Finally, GESAMP noted the possible relevance of the issue to several Sponsoring Organizations, and agreed that this would be revisited once the report had been finalized.

7.3 Sand and gravel mining in the marine environment: new insights on an growing environmental problem

7.3.1 The Chair of the Correspondence Group, Mr. Chris Vivian, reported on the progress since GESAMP 45 in Rome in 2018. The main activities were:

- additional documents were uploaded to Basecamp folders (some 300 papers/reports);
- a draft scoping paper was prepared and circulated to GESAMP Members in May 2019;
- a UNEP report entitled ‘Sand and Sustainability: Finding new solutions for environmental governance of global sand resources’ was published in May 2019;
- comments on the draft scoping paper were received from several GESAMP Members;
- the draft scoping paper was revised to take into account both GESAMP Members’ comments and also the UNEP report; and
- a final version of the scoping paper was submitted to the GESAMP Office in July 2019.

7.3.2 GESAMP noted that key issues from the report included those related to policies and resource management. The UNEP (2019) report suggested a hierarchy of three major strategies that could lay new foundations for improved governance of sand resources in 2019 and thereafter:

- .1 avoiding unnecessary natural sand consumption in construction;
- .2 using alternative materials to replace natural sand in construction; and
- .3 reducing sand extraction impacts with existing standards and best practices.

7.3.3 It was noted that most, but not all, of the suggested solutions in the second and third strategies suggested by UNEP (2019) were relevant to the scoping paper and were very largely already incorporated in the draft version of this paper.

7.3.4 GESAMP noted that the scoping paper identified a number of policies and actions that could be undertaken to reduce the demand for marine sand and gravel, including:

- More efficient use of concrete in buildings and infrastructure: In the United Kingdom, aggregates consumption and construction output was closely correlated before 1995, but this changed with the introduction of the Landfill Tax in 1996. It appears that absolute decoupling was achieved with an overall increase in construction output and an overall decrease in aggregates consumption over the period between 1995 and 2010.
- Waste minimization in construction
- Greater use of timber in construction (where timber is readily available) would reduce the demand for concrete and hence the demand for sand and gravel. There is evidence of a resurgence of construction of timber buildings in many countries.
- Recycling of material from the demolition of buildings and infrastructure—for example, in the United Kingdom the use of recycled and secondary aggregates increased from 30 Mt in 1990 to 225 Mt in 2015, with their share of the aggregates market rising from 10 percent to 28 percent over that period. The 28 percent market share is three times the European average.
- Use of secondary aggregates—i.e. by-products of other industrial processes, such as pulverised fuel ash, metallurgical slags, waste foundry sand and quarrying wastes
- Accessing unused resources, such as the

sand and gravel accumulated behind dams and other impoundments and desert sand

- Pricing and tax: In the United Kingdom, the Landfill Tax introduced in 1996 and the Aggregates Levy from 2002 have encouraged both more efficient use of aggregates in construction and increased use of recycled and secondary aggregates.

7.3.5 In principle, mining of aggregates from nearshore areas and dunes immediately behind the high-water mark should be discouraged and preferably phased out. However, local circumstances are likely to make this impractical in some locations—for instance, small islands.

7.3.6 The report's recommendations in nearshore areas and dunes immediately behind the high-water mark presented three options:

- .1 Prepare a good practice guide for managing the extraction of aggregates aimed at small islands or other locations with similar limitations that are not in a position to phase out the extraction of aggregates from their intertidal areas. This would require a Working Group.
- .2 Prepare a synthesis document summarizing the available information on the recovery/restoration of intertidal areas and dunes immediately behind the high-water mark that have been damaged by aggregate extraction. This would also require a Working Group and be a more substantial task than that above.
- .3 As a simple alternative to the above, prepare an annotated bibliography covering all the issues that would have been covered in the synthesis document referred to above. This would still require a range of experts in a Working Group to prepare such a document but could probably be done by correspondence.

7.3.7 The report's recommendations in offshore areas presented three options:

- .1 Prepare an international good practice guidance document. Some generic guidance about regulation/legislation would need to be added. This would require a Working Group and would be a significant piece of work. Regionally based guidance could also be prepared where needed.

- .2 Prepare a synthesis document covering the impacts, assessment, monitoring, mitigation and management of offshore dredging for marine aggregates. It would take a substantial effort, and we would need to involve a range of experts in a Working Group to prepare such a document. It would be primarily of use to those countries already involved in offshore marine aggregate dredging that do not have well-developed regulatory and management systems for offshore marine aggregates or those that may be considering moving into such activities.
- .3 Prepare an annotated or detailed bibliography covering all the issues that would have been covered in the synthesis document referred to above. This would still require a range of experts in a Working Group to prepare such a document but could probably be done largely by correspondence.

7.3.8 In the discussion that followed, GESAMP noted that further guidance for dredging in offshore areas could be developed in partnership with other organizations such as the World Association for Waterborne Transport Infrastructure (PIANC), the World Organization of Dredging Associations (WODA), the World Bank and the UNEP Regional Seas Programme.

Action by GESAMP

7.3.9 GESAMP agreed that before finalizing the report and agreeing on the next steps, it would be of great importance to discuss with UNEP, in particular considering its recent report on the topic.

7.4 Update the information on sources of the main pollutants impacting the global marine environment (the 80:20 Conundrum)

7.4.1 The Chair of the Correspondence Group, Mr. David Vousden, presented the current status of the discussions around the scoping paper to update the information on sources of the main pollutants impacting the global marine environment (more briefly referred to as the 80:20 Conundrum). This scoping exercise arose because GESAMP had expressed concerns about the original source and accuracy of the 80:20 figures for land-based versus marine sources of pollution. GESAMP further noted that even if this were a reliable figure 40 years ago, it would almost certainly need revision for the current era. In reviewing the existing data, it had become clear that defining any global or regional overall percentages for sources of marine pollution or contamination is a relatively meaningless and misleading exercise in view of:

- .1 the very diverse range of contaminants and wide range in emissions volumes involved—for example, millions of metric tonnes of plastic versus kgs of POPs versus metric tonnes of petroleum hydrocarbons; and
- .2 the different levels of impact and potential toxicity to the environment—for instance, methane versus CO₂ as a greenhouse gas or mercury versus Fish Aggregation Devices (FADs) or microplastics.

7.4.2 It was noted then that a more valuable exercise would be to strengthen information on each individual type or more logically selected groups of contaminant and pollutant at both the global and the regional level. In doing this it was felt that GESAMP should reach out to other recognized science groups and programmes working in related fields.

7.4.3 An update on the information on sources of the main pollutants impacting the global marine environment could be presented by GESAMP as a contribution to the United Nations Decade of Ocean Science for Sustainable Development. GESAMP should use appropriate channels to distribute this updated information so as to 'put to rest' the now-inaccurate 80:20 figure which has been used for nearly 40 years. It was also suggested that the 2020 United Nations Ocean Conference could be a valuable opportunity to present the outcome of this exercise.

7.4.4 It was suggested to set up a 'base camp' for the future work. Additional information could also be sourced in the Transboundary Waters Assessment Programme, as well as with the Transboundary Diagnostic Analyses undertaken by each large marine ecosystem (LME) project.

Action by GESAMP

7.4.5 Following discussion, GESAMP agreed that the work going forward should focus on types of contaminants/pollutants and their impacts, rather than percentages. It was also agreed that it would be useful to include some best case studies with reliable peer-reviewed data.

7.4.6 GESAMP also agreed that it would be advisable to await the first outcome of the work of WG 43 before taking the next steps, but that if possible, and if time allows, the aim would be to prepare some form of press release or briefing document for the 2020 United Nations Ocean Conference.

7.5 Impact of armed conflicts on the marine environment and sustainable development

7.5.1 The Chair of the Correspondence Group, Mr. Ahmad Abu Hilal, presented an overview of the zero draft of this scoping exercise, which had not yet been reviewed by all Members.

Action by GESAMP

7.5.2 Following extensive discussion, GESAMP agreed to revise and expand the document in the intersessional period, with inputs from other Members. The revised scoping paper would then be circulated for internal review by GESAMP.

7.5.3 It was also stressed that it was important to ensure that the document was a factual collection of the evidence and the impacts, avoiding any political opinion or sensitivity.

7.6 Proposal to establish a GESAMP Working Group on climate change impacts on contaminants in the ocean

7.6.1 An initial proposal for a possible future Working Group on the impact of climate change on contaminants in the ocean was presented by the IAEA Technical Secretary for GESAMP.

7.6.2 GESAMP noted that the topic had already received support ahead of this meeting from UNEP, through its sound management of chemicals and proper waste disposal programme (Basel Convention), the Stockholm Convention on POPs and the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA), and IOC-UNESCO.

7.6.3 GESAMP noted that it was shown that climate change impacts, deoxygenation, ocean warming, sea-level rise and ocean acidification cause fundamental changes in ocean physics and chemistry, affecting the release, speciation, bioavailability and cycling of many contaminants, including trace elements, radionuclides and organic pollutants. The extent to which environmental changes will affect the source, behaviour and fate of these contaminants in the marine environment under future climate change scenarios is still poorly understood. The case was made for a pressing need to better understand the impact of climate change on contaminants in the ocean to build resilience in coastal and marine ecosystems and their adjacent communities.

7.6.4 It was noted that the proposal was relevant to both SDG 13 (climate change) and SDG 14 (life below water). Links were also made to the IPCC reports and UNEP/AMAP report on climate change and POPs, two SCOR Working

Groups (WG 145 MARCHEMSPEC, on sea water speciation modelling, and WG 149 Changing Ocean Biological Systems) and GEOTRACES.

7.6.5 The IAEA Technical Secretary stressed the importance of the correct demographics for IAEA to support a future Working Group. A minimum of 40 percent of members must be female, and half of the members should be from outside Western Europe and North America.

7.6.6 In the discussion that followed, the proposal received support from the Sponsoring Organizations present, as well as the GESAMP Members. It was noted that FAO's food safety programme and WMO's World Climate Research Programme (WCRP) may also have interest in supporting this new Working Group.

7.6.7 It was also suggested that other contaminant classes, such as pathogens and major nutrients, could potentially also be included in the list of contaminants.

Action by GESAMP

7.6.8 GESAMP concluded that there was sufficient support from the Sponsoring Organization, and invited IAEA to submit a full Working Group proposal in the intersessional period, for consideration.

7.7 Proposal to establish a GESAMP biofouling management Working Group

7.7.1 The IOC-UNESCO Technical Secretary for GESAMP presented a proposal to establish a GESAMP biofouling management Working Group (see document GESAMP 46/7/2).

7.7.2 GESAMP was informed that at the 71st session of IMO's Marine Environment Protection Committee (MEPC), on 3–7 July 2017, the Committee approved the introduction of a new agenda item of its Subcommittee on Pollution Prevention and Response (PPR) to review the IMO Biofouling Guidelines. This review will take place during two sessions scheduled in 2020 and 2021.

7.7.3 Some countries have recently taken steps to address the role of biofouling in the transfer of non-indigenous species (NIS) and are at different stages in the development of national legislation and requirements to manage biofouling across maritime sectors.

7.7.4 The IMO Secretariat, partnering with the Global Environment Facility (GEF) and UNDP, has also stepped up its efforts to meet the challenge of biofouling, based on specific requests from several countries. The three organizations launched a new project in January 2019, the GEF-UNDP-IMO

GloFouling Partnerships, to develop suitable tools and build capacity on biofouling management in 12 developing countries and Small Island Developing States. IOC-UNESCO has joined the three agencies to provide scientific guidance and coordinate efforts to address non-ship pathways.

7.7.5 GESAMP noted that in the proposal, the overall objective of the GESAMP Working Group on biofouling management and NIS is to build a broader understanding of the introduction and spread of NIS via biofouling across all maritime industries. The Working Group will provide a global overview of the impact of biofouling across all maritime industries and structures and support the initial information requirements of the GloFouling Partnerships to understand the role of biofouling in the transfer of NIS. GESAMP can provide valuable support and scientific advice for the growing programmes of work on marine biofouling and its role within different maritime industries as a vector for the transfer of NIS. This information will form the basis for policy instruments and tools which deal with marine biofouling.

7.7.6 To guide interventions within this wide range of areas and industries exposed to marine biofouling, the GESAMP Working Group should draw on the expertise of IMO, IOC, FAO, WMO, ISA and other relevant organizations and experts.

7.7.7 GESAMP noted that the Working Group would support the mandates and programmes of work within IMO (and its GloFouling Partnerships), IOC and other agencies related to marine biofouling, with emphasis on its role as a vector for the transfer of NIS. The Working Group will address data gaps, including those that have been highlighted through the respective relevant governing bodies of these organizations, such as MEPC and the PPR Subcommittee. It would seek to identify areas of common scientific interest which will benefit all contributing agencies by: i) reducing the costs of scientific research and monitoring of trends; ii) ensuring the consistency of scientific advice; and iii) facilitating the coordination of activities of United Nations agencies on the transfer of NIS through marine biofouling, in the wider international context.

7.7.8 It was further expected that the output from this Working Group will contribute to the review of the IMO Biofouling Guidelines conducted within the framework of IMO's PPR Subcommittee, as well as other United Nations processes associated with SDG 14 and Aichi Target 9.

7.7.9 GESAMP noted that the core source of funding was secured through the GEF-UNDP-IMO GloFouling Partnerships, while IMO and IOC-UNESCO were expected to provide in-kind expertise and support. Other sources of funding

could also be identified once the Working Group is established, with inter-agency leadership which will help reduce the contributions needed from each organization.

Action by GESAMP

7.7.10 Following discussion, GESAMP agreed to establish Working Group 44 on biofouling management, under the lead of IOC-UNESCO, co-sponsored by IMO, and approved its ToR and work plan as set out in Annex V.

8 DATE AND PLACE OF GESAMP 47

8.1 GESAMP gratefully accepted the offer by IAEA to host the 47th session of GESAMP in Monaco in 2020 and agreed that the exact dates would be confirmed by the ExCom as soon as possible. IMO also indicated its intention to host the 48th session in 2021, at its headquarters in London.

9 FUTURE WORK PROGRAMME

9.1 GESAMP discussed the work programme for the intersessional period, including imminent tasks for each Working Group. The currently active GESAMP Working Groups, Correspondence Groups and Task Teams are listed, with their current ToR, in Annex V.

10 ANY OTHER BUSINESS

10.1 No other business was raised under this agenda item.

11 ELECTION OF CHAIRPERSONS

11.1 GESAMP unanimously elected David Vousden (South Africa) as Chair, and Manmohan Sarin (India) and Tracy Shimmield (United Kingdom) as Vice-Chairs, for the intersessional period and the 47th session of GESAMP. The Administrative Secretary thanked the outgoing Chair, Peter Kershaw, for his outstanding contribution and efforts to advance the work and mission of GESAMP.

12 CONSIDERATIONS AND ADOPTION OF THE REPORT OF GESAMP 46

12.1 The report of the 46th session of GESAMP was considered and approved.

13 CLOSURE OF THE SESSION

13.1 The Chair of GESAMP, Mr. Peter Kershaw, closed the 46th session of GESAMP on Friday, 13 September 2019 at 12:50 hrs.

ANNEX I - Provisional agenda

PROVISIONAL AGENDA

46th session of the Joint Group of Experts on the Scientific Aspects of
Marine Environmental Protection (GESAMP) held at
UNDP/UN-DOALOS, New York, United States,
9–13 September 2019

Monday, 9 September

Morning session (closed session)

Initial meeting of the Executive Committee of GESAMP (ExCom)

Informal meeting of the Members of GESAMP

Afternoon session

Opening of the 46th session of GESAMP

- 1 ADOPTION OF THE AGENDA
- 2 REPORT OF THE CHAIR OF GESAMP
- 3 REPORT OF THE ADMINISTRATIVE SECRETARY OF GESAMP
- 4 PLANNING OF GESAMP ACTIVITIES:
 - .1 Evaluation of the hazards of harmful substances carried by ships (WG 1: IMO leading)
 - .2 Review of applications for 'active substances' to be used in ballast water management systems (WG 34: IMO leading)

Tuesday, 10 September

50th Anniversary of GESAMP

All-day event

Wednesday, 11 September

Morning session

- .3 Atmospheric input of chemicals to the ocean (WG 38: WMO leading)
- .4 Establishment of trends in global pollution in coastal environments (WG 39: IAEA leading)
- .5 Sources, fate and effects of plastics and microplastics in the marine environment—a global assessment (WG 40: IOC-UNESCO and UNEP co-leading)
- .6 Marine geoengineering (WG 41: IMO leading)

Afternoon session

- .7 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining (WG 42: IMO and UNEP co-leading)
- .8 Sea-based sources of marine litter, including fishing gear and other shipping related litter (WG 43: FAO and IMO co-leading)

5 CONTRIBUTIONS TO OTHER UNITED NATIONS PROCESSES

Thursday, 12 September

Morning session

- 6 IDENTIFICATION OF NEW AND EMERGING ISSUES REGARDING THE DEGRADATION OF THE MARINE ENVIRONMENT OF RELEVANCE TO GOVERNMENTS AND SPONSORING ORGANIZATIONS
- 7 SCOPING ACTIVITIES

Afternoon session

Presentations by Observers

- 8 DATE AND PLACE OF GESAMP 47
- 9 FUTURE WORK PROGRAMME

Friday, 13 September

Morning session

- 10 ANY OTHER BUSINESS
- 11 ELECTION OF CHAIR AND VICE-CHAIR OF GESAMP
- 12 CONSIDERATION AND ADOPTION OF THE REPORT OF GESAMP 46
- 13 CLOSURE OF THE SESSION (AT 1:00 P.M.)

Afternoon session

Concluding meeting of the ExCom (closed session)

ANNEX II - List of documents

Agenda item 1

- 46/1 Provisional agenda
- 46/1/1 Annotations to the provisional agenda
- 42/INF.1 Provisional list of participants

Agenda item 2

- 46/2 Report of the Chair of GESAMP

Agenda item 3

- 46/3 Report of the Administrative Secretary of GESAMP

Agenda item 4

- 46/4 Evaluation of the hazards of harmful substances carried by ships—report of the Chair of WG 1
- 46/4/1 Review of applications for ‘Active Substances’ to be used in ballast water management systems—report of the Ballast Water Working Group (WG 34)
- 46/4/2 Atmospheric input of chemicals to the oceans—report of the Co-Chairs of WG 38
- 46/4/3 Sources, fate and effects of plastics and microplastics in the marine environment—report of the Chair of WG 40
- 46/4/4 Marine geoengineering—report of the Co-Chairs of WG 41
- 46/4/5 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining—report of the Chair of WG 42
- 46/4/6 Sea-based sources of marine litter, including fishing gear and other shipping-related litter—report of the Chair of WG 43
- 46/4/7 Global trends in pollution of global ecosystems—report by the IAEA Technical Secretary on behalf of the Chair of WG 39
- 46/4/8 Atmospheric input of chemicals to the oceans—management implications—a proposal for a workshop by GESAMP WG 38
- 46/4/9 Marine geoengineering – Report of GESAMP WG 41 workshop on societal issues of marine geoengineering techniques

Agenda item 7

- 46/7 Proposal to establish a GESAMP Working Group on climate change impacts on contaminants in the ocean, submitted by IAEA and UNEP
- 46/7/1 Proposal to establish a GESAMP biofouling management Working Group
- 46/7/2 Causes and impacts of massive accumulations of the brown macro-algae Sargassum

in the nearshore environment of the Caribbean and West Africa—progress report, submitted by IOC UNESCO, Chair of GESAMP, GESAMP Member and UNEP

- 46/7/3 Scoping paper to update the information on sources of the main pollutants impacting the global marine environment—‘the 80:20 Conundrum’—results from the Discussion of the 80:20 Conundrum Paper, submitted by the co-leads of the Correspondence Group
- 46/7/4 Sand and gravel mining in the marine environment—new insights on a growing environmental problem, submitted by the co-leads of the Correspondence Group
- 46/INF.1 List of participants

ANNEX III - List of participants

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ANNEX IV - Activities and achievements of the Sponsoring Organizations of GESAMP during the intersessional period

This document provides a summary of the Sponsoring Organizations' achievements since the 45th meeting of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP 45) on 17–21 September 2018, from the International Maritime Organization (IMO), the International Atomic Energy Agency (IAEA), the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO), the United Nations Development Programme (UNDP), the Food and Agriculture Organization of the United Nations (FAO), the Division for Ocean Affairs and the Law of the Sea (DOALOS), the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP).

INTERNATIONAL MARITIME ORGANIZATION (IMO)

Implementation of the Ballast Water Management Convention

1 The Ballast Water Management (BWM) Convention was adopted in February 2004 and aims to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments. The BWM Convention entered into force on 8 September 2017. The number of Contracting Governments is currently 81, representing 80.76 percent of the world's merchant fleet tonnage as at 26 July 2019.

Matters directly related to the GESAMP Ballast Water Working Group

2 In total there are over 70 type-approved ballast water management systems (BWMS) available.

3 At its 73rd and 74th sessions, the Marine Environment Protection Committee (MEPC) granted a total of three Basic Approvals and three Final Approvals to BWMS that make use of Active Substances, and extended the original Final Approval for one BWMS for use in fresh water, based on the recommendations of the 36th, 37th and 38th meetings of the GESAMP Ballast Water Working Group (WG 34).

4 Regarding the procedure for submission of new data on fresh water testing of BWMS with Final Approval, MEPC 74 agreed that the application of Procedure (G9), including the aforementioned procedure on fresh water data, is mandatory and should be followed.

5 In addition, MEPC 74 agreed with the Working Group's recommendation that the relevant Administration should conduct a readiness evaluation before the applicant prepares an application for evaluation by the Working Group.

Other matters

6 A summary of the most important outcomes from MEPC 73, MEPC 74 and the 6th sessions of the Sub-Committees on Pollution Prevention and Response (PPR 6) and Implementation of IMO Instruments (III 6) is provided in this section.

New work outputs

7 MEPC 73 approved three new outputs related to the BWM Convention, as follows:

- .1 'Development of training provisions for seafarers related to the BWM Convention', in the post-biennial agenda of the Committee, assigning the Sub-Committee on Human Element, Training and Watchkeeping (HTW) as the associated organ, with two sessions needed to complete the work;
- .2 'Review of the BWM Convention based on data gathered in the experience-building phase', in the biennial agenda of MEPC, with a target completion year of 2023; and
- .3 'Urgent measures emanating from issues identified during the experience-building phase of the BWM Convention', in the biennial agenda of MEPC, with a target completion year of 2023.

Guidance on system design limitations of BWMS

8 Recognizing the need to develop separate guidance on system design limitations for use in conjunction with the 2016 Guidelines (G8), MEPC 73 approved BWM.2/Circ.69 on 'Guidance on system design limitations of ballast water management systems and their monitoring'.

Revision of the data gathering and analysis plan for the experience-building phase

9 Following a proposal by the International Council for the Exploration of the Sea (ICES) (PPR 5/5/2), PPR 6 agreed to insert a link to standard operating procedures (SOPs) for the

collection of treated ballast water samples in the 'Data gathering and analysis plan for the experience-building phase associated with the BWM Convention' (DGAP) (BWM.2/Circ.67). Subsequently, MEPC 74 approved the revised DGAP (BWM.2/Circ.67/Rev.1).

10 In the context of the experience-building phase (EBP), MEPC 74 also noted that a new tab had been developed by the Secretariat to accommodate the EBP in the Ballast Water Management module in the Global Integrated Shipping Information System (GISIS), structured in accordance with the interfaces in the DGAP, and urged Member States to use the GISIS module to provide information at the earliest opportunity.

Amendments to the form of the International Ballast Water Management Certificate

11 MEPC 73 and MEPC 74 considered proposals from China (MEPC 73/4/7 and MEPC 74/4/14) to amend the form of the International Ballast Water Management Certificate to include additional ballast water management methods. MEPC 74 approved amendments to Appendix I of the BWM Convention (Form of International Ballast Water Management Certificate), with a view to adoption by MEPC 75.

Unified interpretations of the form of the International Ballast Water Management Certificate

12 MEPC 72 had approved a unified interpretation (UI) of the term 'date installed' in the International Ballast Water Management Certificate (BWM.2/Circ.66), which needed to be updated with appropriate references to the Code for Approval of Ballast Water Management Systems (BWMS Code), which enters into force on 13 October 2019. MEPC 74 approved the updated UI (BWM.2/Circ.66/Rev.1).

13 Separately, MEPC 74 considered a proposal by China (MEPC 74/4/16) to develop a UI on calculation methods of ballast water capacity in the International Ballast Water Management Certificate, and invited further proposals at a future session of the PPR Sub-Committee, which has a standing agenda item on 'Unified interpretation to provisions of IMO environment-related conventions'.

Commissioning testing of ballast water management systems

14 MEPC 73 approved the 'Guidance for the commissioning testing of ballast water management systems' (BWM.2/Circ.70), recognizing the need for amendments to

appropriate mandatory instruments to require commissioning testing and for interim measures to address this matter before the entry into force of any such amendment.

15 Subsequently, MEPC 74 approved amendments to regulation E-1 of the BWM Convention to make commissioning testing mandatory, with a view to adoption by MEPC 75. In this regard, MEPC 74 invited submissions to PPR 7 concerning proposals on any necessary changes to BWM.2/Circ.70 in light of the amendments to regulation E-1. Moreover, as an interim measure, MEPC 74 urged Administrations to provide the recognized organizations, which act on their behalf, with written and clear instructions in relation to the conduct of indicative analysis testing of BWMS at the time of their commissioning.

16 In addition, MEPC 74 agreed that commissioning testing should begin as soon as possible in accordance with BWM.2/Circ.70; that the analysis undertaken in the context of commissioning testing would be indicative; and that commissioning testing should not be applicable to ships that had already installed a BWMS and were certified for compliance with regulation D-2.

Review of the Survey Guidelines in relation to the BWM Convention

17 III 4 had incorporated the 'Interim Survey Guidelines for the purpose of the International Convention for the Control and Management of Ships' Ballast Water and Sediments under the Harmonized System of Survey and Certification' (BWM.2/Circ.7) in the '2017 Survey Guidelines under the Harmonized System of Survey and Certification' (HSSC Guidelines). In this context, MEPC 72 had recognized that a review of the Survey Guidelines under the HSSC in relation to the BWM Convention would be required in light of the '2016 Guidelines for approval of ballast water management systems (G8)'.

18 In addition, in light of the aforementioned approval of the 'Guidance for the commissioning testing of ballast water management systems', MEPC 73 agreed that the validation of BWMS at their commissioning should be incorporated in the 2019 HSSC Guidelines for all ships.

19 III 6 reviewed the Survey Guidelines accordingly to address these two issues and amended the relevant section of the HSSC Guidelines. This will form part of the 2019 HSSC Guidelines, which are expected to be adopted by the IMO Assembly at its upcoming 31st session.

Development of a standard for verification of ballast water compliance monitoring systems

20 PPR 6 and MEPC 74 considered a proposal by Denmark (PPR 6/4 and MEPC 74/4/11) for the development of a standard for verification of ballast water compliance monitoring systems. In light of overwhelming support for the proposal, MEPC 74 invited concrete proposals for the development of such a standard to PPR 7.

Application of the BWM Convention to specific ship types

21 MEPC 74 considered proposals by the Russian Federation (MEPC 74/4/13) and Turkey (MEPC 74/4/18, MEPC 74/4/19 and MEPC 74/4/20) highlighting issues faced by certain types of ships in complying with the BWM Convention. Some delegations supported the further consideration of the proposals, while other delegations expressed the view that the use of the full range of available ballast water management options in the BWM Convention should be encouraged instead of developing new exemption provisions. Due both to the lack of consensus and to time constraints, MEPC 74 deferred the consideration of these proposals to MEPC 75.

Contingency measures in the ballast water management plan

22 MEPC 73 considered the inclusion of elements introduced by the 'Guidance on contingency measures under the BWM Convention' (BWM.2/Circ.62) in ballast water management plans. In this regard, MEPC 73 adopted amendments to the 'Guidelines for ballast water management and development of ballast water management plans (G4)' through resolution MEPC.306(73), and agreed that each Member State could determine the timing for the incorporation of information on contingency measures in the ballast water management plans of ships flying its flag.

Ballast water sampling and analysis

23 PPR 6 invited MEPC to note that the work on revised guidance on ballast water sampling and analysis had been completed. However, MEPC 74 received submissions from France (MEPC 74/4/10 and MEPC 74/INF.17) providing information on a new analysis method proposed to be added in the 'Guidance on ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2)' (BWM.2/Circ.42/Rev.1). Therefore, MEPC 74 referred both documents to PPR 7 and consequently extended the target completion year for this output to 2021.

Revised guidance on methodologies that may be used for enumerating viable organisms

24 The output on revised guidance on methodologies that may be used for enumerating viable organisms was also scheduled to complete at PPR 6. However, that session received submissions from the Netherlands (PPR 6/5 and PPR 6/INF.22) on analytical methods for enumerating organisms in the 10–50 µm size class to be added in the 'Guidance on methodologies that may be used for enumerating viable organisms for type approval of ballast water management systems' (BWM.2/Circ.61). As these submissions stated that validation of these methods was ongoing and expected to be submitted to PPR in the future, PPR 6 recommended and MEPC 74 agreed to extend the target completion year for this output as well to 2021.

Future work

25 MEPC 75 (scheduled from 30 March to 3 April 2020) is expected, *inter alia*, to consider the following matters related to the BWM Convention:

- .1 any applications for Basic and/or Final Approval of BWMS that make use of Active Substances, based on the recommendations of the 39th (and, if required, 40th) meeting(s) of the GESAMP Ballast Water Working Group;
- .2 the first aggregate data report on the experience-building phase; MEPC 75 is also expected to take stock of the EBP's timeline;
- .3 adoption of amendments to regulation E-1 and Appendix I of the BWM Convention;
- .4 any revision of the 'Guidance for the commissioning testing of ballast water management systems' (BWM.2/Circ.70) that may be recommended by PPR 7 in light of the amendments to regulation E-1; and
- .5 proposals on the application of the BWM Convention to specific ship types.

26 PPR 7 (scheduled for 17–21 February 2020) is expected, *inter alia*, to consider the following matters related to the BWM Convention:

- .1 any proposals for a unified interpretation of ballast water capacity in the International Ballast Water Management Certificate;

- .2 any proposals on necessary changes to BWM.2/Circ.70 in light of the amendments to regulation E-1;
- .3 development of a standard for verification of ballast water compliance monitoring systems;
- .4 new method(s) for ballast water analysis to be added in the 'Guidance on ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2)' (BWM.2/Circ.42/Rev.1); and
- .5 new method(s) for enumerating viable organisms to be added in the 'Guidance on methodologies that may be used for enumerating viable organisms for type approval of ballast water management systems' (BWM.2/Circ.61).

Amendment of the Anti-fouling Systems Convention

27 The Anti-fouling Systems (AFS) Convention was adopted in October 2001 and aims to prohibit the use of harmful anti-fouling coatings used on ships. The Convention entered into force on 17 September 2008 and the number of Parties is currently 86, representing 96.04 percent of the world's merchant fleet tonnage as at 27 July 2019. The Convention has not been amended since its entry into force.

28 Currently, Annex 1 to the AFS Convention prohibits the use of organotin compounds acting as biocides in anti-fouling coatings used on ships, and the Convention has a mechanism to prevent the potential future use of other harmful substances in anti-fouling systems. In this context, the consideration of a proposal to amend Annex 1 to the AFS Convention to include controls on cybutryne was approved by MEPC 71 and has been ongoing since PPR 5. This process entails a two-stage consideration of an initial and a comprehensive proposal.

29 PPR 5 and MEPC 73 considered the initial proposal and noted the scientific evidence for the adverse effects of cybutryne to the marine environment and to human health. MEPC 73 agreed that a more in-depth review was warranted, along with consequential revision of relevant guidelines, and invited the submission of a comprehensive proposal to PPR 6.

30 PPR 6 considered the comprehensive proposal and agreed to draft amendments to Annex 1 (Controls on anti-fouling systems) and Appendix 1 to Annex 4 (Model form of International Anti-fouling System Certificate) of the

AFS Convention, for approval by MEPC 74.

31 However, MEPC 74 considered also a proposal by Japan (MEPC 74/10/9) to modify the draft amendments to the AFS Convention—specifically, to delete the requirement for removal or sealing of existing AFS containing cybutryne. In the ensuing discussion, some delegations shared the concerns raised by Japan and supported the further consideration of the matter, while others were of the view that the proposal by Japan should not be considered, as it conflicted with article 4(2) of the AFS Convention and the intent of the Convention. Consequently, MEPC 74 referred the draft amendments to Annex 1 of the AFS Convention to PPR 7 for further consideration and finalization, taking into account both the concerns expressed by Japan and the potential conflict between the proposal by Japan and article 4(2) of the AFS Convention, as well as any information on the impact of the removal or sealing of existing AFS containing cybutryne.

32 PPR 7 will consider the draft amendments to Annex 1 of the AFS Convention with a view to finalization for approval by MEPC 75, as well as the revision of relevant guidelines. The relevant outcome of PPR 7 will be reported to MEPC 75 as an urgent matter.

Review of the 2011 Biofouling Guidelines

33 The Biofouling Guidelines were adopted in July 2011 through resolution MEPC.207(62) and are intended to provide a globally consistent approach to the management of biofouling, which is the accumulation of various aquatic organisms on ships' hulls, to minimize the transfer of invasive aquatic species. Biofouling management can also be an effective tool in enhancing energy efficiency and reducing air emissions from ships.

34 As scientific and technological advances are made, the Biofouling Guidelines may be refined to enable the risk to be more adequately addressed. In support of this review process, IMO has prepared guidance for evaluating the Guidelines (MEPC.1/Circ.811). In this context, MEPC 72 had agreed to a new output for the PPR Sub-Committee to review the Biofouling Guidelines. The review, which will be based on the principles of the aforementioned guidance, is expected to be carried out over two PPR sessions and will commence at PPR 7.

35 The IMO Secretariat has also embarked on a new major project titled 'Building Partnerships to Assist Developing Countries Minimize the Impacts from Aquatic Biofouling' (GloFouling Partnerships), which is funded by the Global Environment Facility (GEF) through UNDP. Project implementation started in September 2018

and will last for a period of five years. This project aims to build capacity in developing countries to implement the Biofouling Guidelines, and the experience gathered through the project's activities may also inform the review of the Guidelines.

MARPOL Annex VI (Prevention of air pollution from ships)

Consistent implementation of 0.50% sulphur limit under MARPOL Annex VI

36 Following the completion of a review of the availability of compliant fuel oil, MEPC 70 (October 2016) decided that the 0.50% m/m sulphur limit shall become effective on 1 January 2020. Following this decision, and noting concerns of Member States, MEPC 70 initiated a new output on consistent implementation of the 0.50% sulphur limit under the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI.

37 MEPC 73 adopted amendments to MARPOL Annex VI for a prohibition on the carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship that are expected to enter into force on 1 March 2020. MEPC 73 also adopted 'Guidance on the development of a ship implementation plan for consistent implementation of the 0.50% sulphur limit under MARPOL Annex VI'.

38 MEPC 74 considered and approved draft amendments to MARPOL Annex VI concerning procedures for sampling and verification of the sulphur content of fuel oil. MEPC 74 also adopted/approved several instruments to support the consistent implementation of the 0.50% m/m sulphur limit, including:

- .1 '2019 Guidelines for consistent implementation of the 0.50% sulphur limit under MARPOL Annex VI';
- .2 '2019 Guidelines for port State control under MARPOL Annex VI Chapter 3';
- .3 'Guidance on indication of ongoing compliance in the case of the failure of a single monitoring instrument, and recommended actions to take if the exhaust gas cleaning system (EGCS) fails to meet the provisions of the 2015 EGCS Guidelines (MEPC.259(68))';
- .4 'Guidance for port State control on contingency measures for addressing non-compliant fuel oil'; and
- .5 '2019 Guidelines for on board sampling

for the verification of the sulphur content of the fuel oil used on board ships'.

Fuel oil quality

39 The following best practice guidance on fuel oil quality has been approved:

- .1 'Guidance on best practice for fuel oil purchasers/users for assuring the quality of fuel oil used on board ships', approved by MEPC 72;
- .2 'Guidance on best practice for fuel oil suppliers for assuring the quality of fuel oil delivered to ships', approved by MEPC 73; and
- .3 'Guidance for best practice for Member State/coastal States', approved by MEPC 74.

EEDI reviews

40 Amendments to MARPOL Annex VI, regulations for the prevention of air pollution from ships, adding a new chapter 4 to Annex VI on regulations on energy efficiency for ships to make mandatory the Energy Efficiency Design Index (EEDI) for new ships, and the Ship Energy Efficiency Management Plan (SEEMP) for all ships, entered into force on 1 January 2013.

41 Regulation 21.6 of MARPOL Annex VI requires, at the beginning of phase 1 (1 January 2015) and at the mid-point of Phase 2, the Organization to "review the status of technological developments and, if proven necessary, amend the time periods, the EEDI reference line parameters for relevant ship types and reduction rates set out in this regulation". MEPC 67 established a correspondence group to review the status of technological developments relevant to implementing phase 2 of the EEDI regulatory framework which begins on 1 January 2020.

42 MEPC 70 considered a final report of the Correspondence Group and, following consideration, agreed to retain the current reduction rates, time periods and the EEDI reference line parameters of EEDI phase 2 requirements for ship types other than ro-ro cargo ships and ro-ro passenger ships.

43 MEPC 70 further agreed that it would be necessary to start a thorough review of EEDI phase 3 requirements (1 January 2025 and onwards), including discussion on its earlier implementation and the possibility of establishing a phase 4. In this respect, the Correspondence Group on review of the EEDI beyond phase 2,

established at MEPC 71, provided an interim report to MEPC 73 and a final report to MEPC 74 (May 2019). Currently, phase 3 requirements provide that new ships be built to be 30 percent more energy efficient compared to the baseline.

44 MEPC 72 adopted amendments to regulation 21 of MARPOL Annex VI regarding EEDI requirements for ro-ro cargo and ro-ro passenger ships that will enter into force on 1 September 2019. MEPC 73 agreed to retain the current EEDI phase 3 requirements for tankers and bulk carriers.

45 MEPC 74 in May 2019:

- .1 adopted draft amendments to MARPOL Annex VI related to Electronic Record Books and EEDI regulations for ice-strengthened ships that are expected to enter into force on 1 October 2020;
- .2 approved draft amendments to MARPOL Annex VI so that the entry into effect date for EEDI phase 3 should be amended to 1 January 2022 for gas carriers of 15,000 DWT and above, containerships, general cargo ships, LNG carriers and cruise passenger ships having non-conventional propulsion;
- .3 approved draft amendments to table 2 of regulation 21 of MARPOL Annex VI to amend the calculation parameters for the reference line for very large bulk carriers,
- .4 agreed that the entry into effect date for EEDI phase 3 of 1 January 2025 should be retained for refrigerated cargo ships and combination carriers;
- .5 approved draft amendments to MARPOL Annex VI so that the reduction rates for containerships for EEDI phase 3 should be based on different size categories; and
- .6 finalized draft amendments to MARPOL Annex VI to require mandatory reporting of verified attained EEDI values.

Further technical and operational measures to enhance energy efficiency

46 MEPC 68 agreed that the development of a data collection system for ships should follow a three-step approach, consisting of data collection and data analysis, followed by decision-making on what further measures, if any, are required. This approach was reaffirmed by MEPC 69 and led to the approval of draft amendments to chapter 4 of MARPOL Annex VI to introduce a mandatory data

collection system for fuel oil consumption of ships.

47 MEPC 70 adopted amendments to Chapter 4 of MARPOL Annex VI, including a new regulation 22A on a mandatory data collection system for fuel oil consumption. Under the amendments, from 1 January 2019, ships of 5,000 gross tonnage and above are required to collect consumption data for each type of fuel oil they use, as well as other, additional, specified data including proxies for transport work. The aggregated data will be reported to the flag State after the end of each calendar year, and the flag State, having determined that the data have been reported in accordance with the requirements, will issue a Statement of Compliance to the ship. Flag States will be required to subsequently transfer these data to an IMO Ship Fuel Oil Consumption Database. The IMO Secretariat will be required to produce an annual report to the MEPC, summarizing the data collected.

48 MEPC 71 agreed on guidelines for verifying, managing and reporting data. Both MEPC 72 and MEPC 73 received from the Secretariat updates on the status of the development of the IMO Ship Fuel Oil Consumption Database, which was launched in March 2018. MEPC 73 agreed, in principle, that a methodology for conducting the data analysis needed to be developed as a priority with a view to its approval by MEPC 75, to be in line with the timeline set out in paragraph 6.2 of the 'Initial IMO Strategy on reduction of GHG emissions from ships' (resolution MEPC.304(72))—see below.

Reduction of greenhouse gas emissions from ships

49 MEPC 70 approved a road map for developing a Comprehensive IMO Strategy on reduction of greenhouse gas (GHG) emissions from ships, which foresaw an initial GHG reduction strategy to be adopted in 2018.

50 In April 2018, MEPC 72 adopted resolution MEPC.304(72) on 'Initial IMO Strategy on reduction of GHG emissions from ships'. The Initial Strategy represents a framework for Member States, setting out the future vision for international shipping, the levels of ambition to reduce GHG emissions and guiding principles, and includes candidate short-, mid- and long-term further measures with possible timelines and their impacts on States. The strategy also identifies barriers and supportive measures including capacity-building, technical cooperation, and research and development (R&D).

51 The Vision set out in the Initial Strategy confirms that IMO remains committed to reducing GHG emissions from international shipping and,

as a matter of urgency, aims to phase them out as soon as possible in this century.

52 More specifically, under the identified 'levels of ambition', the Initial Strategy envisages for the first time a reduction in total GHG emissions from international shipping, which, it says, should peak as soon as possible, and reducing the total annual GHG emissions by at least 50 percent by 2050 compared to 2008, while, at the same time, pursuing efforts towards phasing them out as called for in the Vision. The strategy includes a specific reference to "a pathway of CO₂ emissions reduction consistent with the Paris Agreement temperature goals".

53 Continuing the momentum of work on this important issue, MEPC 73 (October 2018) approved a programme of follow-up actions to the Initial Strategy and agreed to the holding of the fifth meeting of the Intersessional Working Group on Reduction of GHG Emissions from Ships (ISWG-GHG 5), which was held back to back with MEPC 74, and agreed to the holding of an expert workshop in preparation for the fourth IMO GHG study, which was held in March 2019.

54 MEPC 74 in May 2019:

- .1 adopted resolution MEPC.323(74) on 'Invitation to Member States to encourage voluntary cooperation between the port and shipping sectors to contribute to reducing GHG emissions from ships';
- .2 approved the Terms of Reference of the fourth IMO GHG study. The final report of the study is expected to be submitted to MEPC 76 (Autumn 2020). A Steering Committee of Member States has been established to review and monitor progress and confirm that the study meets its Terms of Reference;
- .3 approved the Terms of Reference for ISWG-GHG 6 and ISWG-GHG 7; and
- .4 discussed various candidate short-term measures and mid-/long-term measures, including strengthening the energy efficiency requirements for existing ships based on the SEEMP, speed and other technical, operational measures and the effective uptake of alternative low-carbon and zero-carbon fuels. In view of the vast number of proposals, the Working Group focused on how to consider, organize and streamline proposals on candidate short-term and mid-/long term measures.

Protecting the Arctic from heavy fuel oil

55 MEPC 72 considered the development of measures to reduce risks of use and carriage of heavy fuel oil (HFO) as fuel by ships in Arctic waters and agreed the scope of work for the Sub-Committee on Pollution Prevention and Response (PPR)—namely, to develop a definition of HFO; prepare a set of guidelines on mitigation measures to reduce risks of use and carriage of HFO as fuel by ships in Arctic waters; and on the basis of an assessment of the impacts, develop a ban on HFO for use and carriage as fuel by ships in Arctic waters, on an appropriate timescale.

56 MEPC 72 also requested Member Governments and international organizations to submit proposals on an appropriate impact assessment methodology process for consideration at MEPC 73 in October 2018, with a view to facilitating the work to be undertaken by the PPR Sub-Committee.

57 MEPC 73, having considered several relevant proposals and comments, instructed the PPR Sub-Committee to finalize the impact assessment methodology using documents MEPC 73/9/1 (United States) and MEPC 73/9/2 (Finland) as a basis, taking into account documents MEPC 73/9 (Canada and Russian Federation), MEPC 73/9/3 (FOEI et al.) and MEPC 73/INF.19

58 Subsequently, PPR 6 (February 2019) developed a working definition for HFO, agreed to the draft methodology to analyse impacts of a ban on the use and carriage of HFO as fuel by ships in Arctic waters (PPR 6/20/Add.1, annex 16), and established a Correspondence Group on Development of Guidelines on Measures to Reduce Risks of Use and Carriage of Heavy Fuel Oil as Fuel by Ships in Arctic Waters. MEPC 74 (May 2019) approved the methodology to analyse impacts of a ban on the use and carriage of HFO as fuel by ships in Arctic waters and noted that PPR 6 had:

- .1 agreed that the methodology should be a guidance document, instead of a prescriptive one, as not all of the items and particular details mentioned in the methodology would be applicable to every Member State and organization that might conduct an impact assessment; and
- .2 invited submissions to PPR 7 on impact assessments guided by, but not limited to, the methodology.

59 The use and carriage of HFO is banned in Antarctic waters under MARPOL Annex I, and

the Polar Code recommends that Member States follow the same practice in the Arctic.

Marine litter and microplastics

60 MEPC 72 agreed to include a new output on its agenda, to address the issue of marine plastic litter from shipping in the context of 2030 Sustainable Development Goal (SDG) 14. Specifically, Member Governments and international organizations were invited to submit concrete proposals to MEPC 73 on the development of an action plan. The Food and Agriculture Organization (FAO) and other international organizations were invited to keep the Committee updated on their work related to addressing marine plastic litter.

61 Having taken into account several proposals and comments relating to ways of addressing marine plastic litter, MEPC 73 adopted the 'Action Plan to address marine plastic litter from ships' (resolution MEPC.310(73)) and agreed that the measures in the Action Plan would be reviewed at MEPC 74 based on follow-up proposals. A Correspondence Group was also established to, *inter alia*, identify issues to be considered under an IMO study on marine plastic litter from ships and determine the most appropriate mechanism to undertake the study, in particular whether a literature review and/or a quantitative study should be pursued.

62 Concerning information-gathering, the Committee:

- .1 instructed the Secretariat, in cooperation with FAO, to request GESAMP to also include shipping-related sources in the scope of work of the GESAMP Working Group on Sea-based Sources of Marine Litter, as a starting point to inform the future study on marine plastic litter from ships;
- .2 encouraged interested Member States and international organizations to submit to MEPC 74 information on relevant studies and work undertaken to address marine plastic litter from ships for the purpose of information-sharing and informing future work on this issue; and
- .3 invited Member States and international organizations to undertake studies to better understand microplastics from ships and submit them to the Committee for information.

63 MEPC 74 noted the information provided in document MEPC 74/8/1 (Secretariat) on the outcomes of the London Convention/Protocol

(LC/LP) governing bodies meeting (LC 40/LP 13) in relation to marine litter, and the inputs by the LC/LP governing bodies to the Action Plan. In this regard, the Committee agreed that the Action Plan should be updated accordingly at its next revision, but not at this session, and requested the Secretariat to keep the LC/LP governing bodies updated on MEPC developments in relation to marine plastic litter and vice versa.

64 The Committee also noted the following developments:

- .1 the adoption of resolution UNEP/EA.4/L.7 on marine plastic litter and microplastics, in which the adoption of the IMO Action Plan and the work of MEPC and LC/LP had been noted;
- .2 the publication of two reports under the framework of the Global Partnership on Marine Litter, one on the issue of disposal of fibreglass vessels, and one on the review of hull scrapings and marine coatings as a source of microplastics;
- .3 the recent publication of the GESAMP Reports and Studies 99 on 'Guidelines for the monitoring and assessment of plastic litter in the ocean';
- .4 the cooperation by the Secretariat with FAO on these matters, including agreeing to contribute to four regional FAO workshops on best practices to prevent and reduce abandoned, lost or otherwise discarded fishing gear (ALDFG), which would be held throughout 2019; and
- .5 the establishment of a new GESAMP Working Group on Sea-based sources of marine litter (WG 43), co-sponsored by FAO and IMO, which would, *inter alia*, review and analyse the existing body of knowledge on marine plastic litter from all sea-based sources and provide an assessment of data gaps.

65 Having taken the above developments into account, MEPC 74 approved the Terms of Reference for an IMO study on marine plastic litter from ships (MEPC 74/18, annex 20), which covered the following two broad elements:

- .1 information on the contribution of all ships to marine plastic litter; and
- .2 information of storage, delivery and reception of plastic waste from and collected by ships.

66 In this regard, the Committee agreed that:

- .1 subject to sufficient funds being available, procuring the services of contractor(s) to undertake the IMO study on marine plastic litter from ships was the preferred way for carrying out the study;
- .2 Terms of Reference 1 and 2 (MEPC 74/WP.10, annex 1), relating to understanding shipping's contribution to marine plastic litter, should be undertaken as a priority, subject to sufficient financial contributions being made; and
- .3 subject to additional financial contributions being made, term of reference 3, relating to storage, delivery and reception of plastic waste from ships, should also be undertaken.

67 Consequently, the Committee invited Member States and other stakeholders to support the IMO study on marine plastic litter from ships by providing financial contributions to ensure the completion of the study Terms of Reference, and to provide information on relevant studies undertaken to support this work.

68 Having noted that, pending sufficient funding for procuring the services of contractor(s), the work of GESAMP WG 43 would begin to address Terms of Reference 1 and 2 of the IMO study on marine plastic litter from ships, in terms of a review and analysis of the existing body of knowledge on marine plastic litter from all sea-based sources, and an assessment of data gaps, the Committee recognized the importance of the work of GESAMP in progressing the IMO study.

69 In this connection, the Committee requested GESAMP to provide a report to MEPC 75 on the work of GESAMP WG 43, together with an accompanying presentation.

70 The Committee agreed that, as soon as sufficient funding had been provided by Member States and other stakeholders, it would consider requesting the Secretariat to issue an invitation to tender for Terms of Reference 1 and 2 of the IMO study on marine plastic litter from ships, noting that the work of the selected contractor(s) should not duplicate the work of GESAMP.

71 Accordingly, the Committee further requested GESAMP to review term of reference 3 of the IMO study on marine plastic litter from ships, with a view to determining whether there was any additional work that GESAMP could undertake to progress the work.

Ship recycling

72 Following the adoption of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, in May 2009, the MEPC has finalized and adopted all six guidelines required under the terms of the Convention to facilitate the global implementation of its requirements in a uniform and effective manner. Thus the whole package for Member Governments to ratify the Convention is in place. To date, 12 States—i.e. Belgium, the Congo, Denmark, Estonia, France, Japan, Malta, the Netherlands, Norway, Panama, Serbia and Turkey—have ratified or acceded to the Convention, whose combined merchant fleets constitute 28.82 percent of the gross tonnage of the world's merchant fleet, and whose combined ship recycling volumes constitute 1,727,944 gross tonnage.

Electronic record books

73 MEPC 74 adopted amendments to MARPOL Annexes I, II, V and VI to allow for electronic record books to be used on board ships (resolutions MEPC.314(74) and MEPC.317(74)) as well as related 'Guidelines for the use of electronic record books under MARPOL' (resolution MEPC.312(74)). The amendments on electronic record books are expected to enter into force on 1 October 2020.

Issues related to MARPOL Annex II and IBC Code

Revision of the IBC Code—Chapters 17, 18, 19 and 21

74 Following the finalization by PPR 5 of draft amendments to the IBC Code, comprising of the full text of draft revised chapters 17 (Summary of minimum requirements), 18 (List of products to which the Code does not apply), 19 (Index of Products Carried in Bulk) and 21 (Criteria for assigning carriage requirements for products subject to the IBC Code), as well as draft new paragraph 15.15 (Hydrogen sulphide (H₂S) detection equipment for bulk liquids), MEPC 74 and MSC 101 adopted them by means of resolutions MEPC.318(74) and MSC.460(101), respectively, with an entry into force date of 1 January 2021.

Review of MARPOL Annex II requirements that have an impact on cargo residues and tank washings of persistent floating products with a high viscosity and/or a high melting point

75 MEPC 74 also adopted resolution MEPC.315(74) on amendments to MARPOL Annex II to address issues related to the

discharge of persistent floating substances with a high viscosity (equal to or greater than 50 mPa•s at 20°C) and/or a high melting point (equal to or greater than 0°C).

Oil pollution preparedness and response

76 MEPC 74 approved, in May 2019, the 'Guide on practical methods for the implementation of the OPRC Convention and OPRC-HNS Protocol', developed under the lead of Norway.

77 The Guide's main purpose is to assist countries with the ratification and implementation of the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC Convention) and its Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol), but can also be used by all countries regardless of their level of preparedness and response. In addition, the Guide can be used not only by maritime authorities, but by all possible national and local authorities and industry with roles and responsibilities related to pollution preparedness and response.

London Convention and Protocol

78 Since its 45th session, the following developments may be of interest to GESAMP. The Scientific Groups of the LC/LP met for their joint annual session (LC 42/LP 13) on 18–22 March 2019 at the Simon Fraser University, Morris J. Wosk Centre for Dialogue in Vancouver, British Columbia, Canada.

Specific guidelines for assessment of platforms or other man-made structures at sea

79 The Scientific Groups finalized the 'Revised Specific Guidelines for assessment of platforms or other man-made structures at sea' and agreed to forward to the next LC/LP governing bodies meeting in 2019 for approval.

Disposal of fibreglass vessels

80 The Scientific Groups made progress with the development of recommendations on the disposal of fibreglass vessels following the publication of the report titled 'End-of-life management of fibre-reinforced plastic vessels: alternatives to at sea disposal', and agreed to continue to gather more information from Contracting Parties and other relevant bodies (e.g. UNEP and FAO) on current operating procedures and best practices.

Marine litter and microplastics

81 The Scientific Groups had extensive discussions on their continued work on marine litter and microplastics and agreed on a number of actions, including to re-establish the Correspondence Group on marine litter and microplastics, to finalize the inventory of the work carried out by the LC/LP bodies on marine litter and microplastics and to further address the issue. They also instructed the Secretariat to engage a consultant to extensively review the information provided by Contracting Parties on their source control options to reduce the presence of marine litter in LC/LP waste streams, and update as much as possible and provide further information on source control options that have not been captured in the information provided by the Contracting Parties, including an outline of regulatory bodies that are specifically addressing upstream sources, as well as their source control options.

Marine geoengineering

82 The Scientific Groups noted the report of WG 41 on marine geoengineering, titled 'High-level review of a wide range of proposed marine geoengineering techniques', and recognized the strong and timely contribution that the report provided, not least considering the recent discussions on geoengineering at the fourth session of the United Nations Environment Assembly. It was further noted that the report was comprehensive and objective, and addressed a wide range of aspects.

83 The Scientific Groups agreed that phase 2 of the work of WG 41 should proceed, with a particular focus on recommendations 1 and 3 contained in the report, then recommendation 2, and that in carrying out the work, the potential for impacts from the activity should be the primary concern, irrespective of the purpose of the activity (e.g. ocean fertilization activities will have effects that are similar and of concern to the LC/LP, regardless of their stated purpose). The Scientific Groups also agreed to recommend that the governing bodies consider the report of WG 41 and begin work to start identifying the pertinent elements that may need further consideration in phase 2.

Science Day 2019

84 As part of the joint session, Science Day 2019 was held as a one-day symposium devoted to the topic of 'Practical and achievable monitoring techniques'. The Science Day programme included high-level presentations from a range of speakers from academia, scientific and government agencies and port authorities. Those

speakers shared experiences, research activities and assessments being undertaken in relation to practical and achievable monitoring techniques as they related to the disposal of waste or other matter listed in Annex 1 of the London Protocol (e.g. dredged material, fish waste, organic material, vessels and platforms, etc.), underwater noise and the application of low-cost, low-technology field and compliance monitoring guidance.

Deposition of materials jettisoned during the launch of space vehicles

85 The Scientific Groups continued work on the proliferation of space vehicle launch facilities around the world, with a view to identifying those with the potential for deposition of jettisoned components at sea during routine launches. Following discussion, they noted that there was a need to continue collecting information, and that this work was currently in its early stages and, therefore, re-established the Correspondence Group on this issue and instructed the Secretariat to continue its outreach efforts, in particular with the United Nations Office for Outer Space Affairs (UNOOSA).

Joint session of the Scientific Groups

86 The next meeting of the governing bodies of the LC/LP will be held on 7–11 October, at IMO Headquarters. The next joint session of the LC/LP Scientific Groups is tentatively scheduled for March 2020, also at IMO Headquarters.

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

Marine Environmental Studies Laboratory (MESL) activities

Production of Certified Reference Materials and interlaboratory comparison exercises

87 The International Atomic Energy Agency (IAEA) Certified Reference Materials (CRMs) are produced to assist Member States improving the quality of measurement results in the analysis of trace elements, methyl mercury and persistent organic pollutants (POPs) in marine environmental samples, in view of assessing pollution levels and trends and enhancing seafood safety. The certification of three CRMs was finalized: for trace elements and methyl mercury in fish (CRM IAEA-476) and sediment (IAEA-475), and for polycyclic aromatic hydrocarbons in sediment (IAEA-477).

88 The IAEA participated in the proficiency tests for trace elements and organic pollutants in

marine samples organized by Quasimeme.

89 One worldwide interlaboratory comparison on the determination of trace elements and methyl mercury, IAEA-MESL-ILC-TE-SEDIMENT-2018 was finalized. In total, 81 laboratories from 49 countries reported results back to the organizers.

Strengthening data quality assurance of regional seas laboratories participating in marine monitoring programmes

90 The IAEA provided technical support for strengthening the capability of Mediterranean laboratories to accurately analyse contaminants in marine samples in the framework of the MEDPOL 'Programme for the Assessment and Control of Pollution in the Mediterranean Region' of the UNEP Mediterranean Action Plan (MAP). Designated national monitoring laboratories in Mediterranean countries benefit by being able to use the analytical support of the Nuclear Applications Environment Laboratory (NAEL) in the development of their quality assurance programmes for the determination of trace elements and organic contaminants in the marine environment.

91 The IAEA organized two proficiency tests to assist Member States strengthen data quality assurance in laboratories participating in marine pollution monitoring programmes. In total, 74 laboratories from 17 Member States participated in these exercises:

- .1 Analytical Performance Study for MEDPOL: Determination of trace elements in marine biota sample: 39 laboratories from 17 Mediterranean Member States (Albania, Algeria, Bosnia & Herzegovina, Croatia, Cyprus, France, Greece, Israel, Italy, Lebanon, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia and Turkey); and
- .2 Analytical Performance Study for MEDPOL: Determination of chlorinated pesticides, PCBs and petroleum hydrocarbon in marine biota sample: 35 laboratories from 14 Mediterranean Member States (Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Italy, Lebanon, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia and Turkey).

92 The IAEA organized two training courses on the analysis of contaminants in marine samples:

- .1 Training workshop on the analysis of

trace elements in marine samples for laboratory practitioners in MEDPOL countries, 29 October to 9 November (six trainees from five Mediterranean Member States: Albania, Cyprus, Israel, Montenegro [2] and Turkey); and

- .2 Training workshop on the analysis of organic contaminants in marine samples for laboratory practitioners in MEDPOL countries, 29 October to 9 November (five trainees from five Mediterranean Member States: Algeria, Bosnia & Herzegovina, Cyprus, Morocco, Tunisia and Turkey).

93 Four fellows were trained at the MESL laboratories: three on trace element analysis and one on the analysis of PAHs, chlorinated pesticides, PCBs and PBDEs in marine samples. The fellows were from Côte d'Ivoire, Djibouti, Jamaica and Japan.

94 The IAEA hosted an Expert Consultations Meeting on Mercury Monitoring on Soil and Biota for UNEP in the framework of the Minamata Convention. 14 experts from 10 different countries, including staff from UNEP, GEF and the Minamata Secretariat, were present. This is in line with the efforts of MESL to assist Member States in the quality assurance/quality control of mercury monitoring in the marine environment and the development, validation and dissemination of recommended analytical methodologies. Several analytical procedures dealing with the determination of mercury and methylmercury in seawater, marine biota and sediment samples have been recently validated and published in peer-reviewed journals.

95 A new agreement between IAEA-NAEL and UNEP-MAP to continue the collaboration on strengthening data quality assurance in marine pollution monitoring in the Mediterranean region is under final discussion. Already two proficiency tests and two training courses are under preparation. The project is ongoing and will be completed in 2019.

96 Within the IAEA technical cooperation (TC) projects, MESL has assisted in the development and implementation of: an emergency TC project for Cuba on a recent oil spill that occurred in Cienfuegos Bay in May 2018; TC project CHD70001 to build capacity to monitor petroleum hydrocarbons in Chad; TC project BZE7002 to build capacity to monitor pesticides in the environment of Belize; TC project BRA7011 to provide training and capacity for compound-specific stable isotopes to assess the impact of the Brazilian Fundaéo dam collapse on the coastal environment; TC project SRL7005 to establish a

National Centre for Marine Pollution Control, including the use of stable isotopes to fingerprint sources of pollution; TC project DJI7001 in Djibouti for Enhancing and Strengthening the Analytical Capacities of the National Laboratory of Chemistry; TC project DOM7005 on Issuing a Regulation for the Control of Marine Contamination in the Southern Coast Region of the Dominican Republic; TC project ELS0008 in El Salvador for the Determination of Threats to Health and the Environment from Toxic Pollution in the Reservoir Cerrón Grande Ecosystem; TC project FIJ7001 for Establishing an Environmental Monitoring Laboratory for the Protection of the Marine Coastal Resources in the Context of Mining in Fiji; TC project MHL7001 for Developing a National Radioactivity Monitoring Capacity on the Marshall Islands; regional TC project RER7009 for Enhancing Coastal Management in the Adriatic and the Black Sea by Using Nuclear Analytical Techniques; and regional TC project RLA7019 for Developing Indicators to Determine the Effect of Pesticides, Heavy Metals and Emerging Contaminants on Continental Aquatic Ecosystems Important to Agriculture and Agroindustry in the Asian Pacific.

Developing tools and the monitoring of contaminants and long-lived radionuclides in marine samples to assist Member States

97 The IAEA continued the development and validation of analytical methods for monitoring the marine environment, which were published in peer-reviewed journals and presented at international conferences: i) method for strontium isotope ratios in biota and in seawater samples; ii) reference methods for toxic elements in biota and sediment samples, based on direct and species-specific isotope dilution inductively coupled plasma mass spectrometry; iii) multi-residue analytical procedures for historical POPs, including emerging halogenated flame retardants; and iv) a comprehensive sampling and analytical methodology for measuring petroleum hydrocarbons in seawater using a large-volume sampling system.

98 Analytical methodologies, research and monitoring studies performed at MESL for emerging and regulated contaminants and for the determination of isotope ratios in the marine environment as a tool for pollution source apportionment and understanding of processes included work on: i) lipid biomarkers and compound-specific isotopes in corals; ii) the bioavailability of copper to marine organisms; iii) lead and mercury isotope ratios in marine samples; iv) the study of plastic debris as a sources of flame retardants in the marine environment; and v) the use of sponges as passive samplers for biomonitoring

99 The IAEA contributed to the baseline monitoring studies of the Namibian coast for trace elements and new emergency pollutants as well as to the pollution history investigations in the same region. The use of sponges as passive samplers for biomonitoring of toxic trace elements was investigated.

Radioecology Laboratory (REL) activities

Strengthening capabilities for biotoxin monitoring in seafood through research and development, training and cooperation

100 The receptor binding assay (RBA) for harmful algal blooms (HABs) toxin detection continues in full operation at the IAEA for research and development applications and for technology transfer and capacity-building. Laboratory performance is assessed through successful participation in Quasimeme proficiency testing exercises for paralytic shellfish poisoning. The RBA method is also being used to study biotoxin food web transfer and metabolism. It has been optimized for application to the emerging ciguatera toxins, and its verification and validation is under way. The RBA method was put into operation in 2017 in Morocco and tested on a large set of samples. Results imply that it may be a potential replacement for the mouse bioassay currently in use for regulatory purposes.

101 The IAEA provides technical and scientific support to over 40 Member States in Latin America, Asia-Pacific and Africa to build capacity in HABs management through 12 national and regional TC projects. The IAEA continues to host fellowships and internships to transfer the RBA technology to IAEA Member States (11 individuals). NAEL is joining efforts with other national and international organizations (IOC-UNESCO, FAO, the World Health Organization (WHO), US-NOAA, Malarde Institute in French Polynesia, IFREMER France and IRTA Spain) to improve knowledge and enhance capabilities in HABs management and to participate actively in the International Panel on HABs.

102 Member State participants from Brazil, Cuba, France, Spain and Thailand in the IAEA Coordinated Research Project (CRP) on the application of the RBA techniques for improving coastal management met in Monaco in 2019 for the final RCM meeting. Major achievements included: i) the sampling and screening of over 60 fish for the preparation of fish matrix reference material; ii) the establishment of the first culture of toxic benthic HABs from Cuba; iii) findings of high diversity of benthic toxic genera of *Ostreopsis* associated with a mass mortality of sea-urchin; and iv) a rising risk of ciguatera poisoning with the

findings of *Gambierdiscus* species on the north and south-east coasts of Brazil. CRP project findings were communicated through five presentations at international conferences.

103 The IAEA led an international workshop on Monitoring and Management Strategies for Benthic HABs. Organized in the framework of joint activity involving Asia-Pacific, Africa and Latin America and the Caribbean, the workshop was attended by 60 participants from 30 countries, 15 international experts and representatives of 3 other United Nations agencies (FAO, WHO and IOC-UNESCO).

104 The Philippine Nuclear Research Institute (PNRI), re-designated in 2016 as an IAEA collaborating centre to work on HABs in the context of environmental and global change, continues to collaborate actively with the IAEA to expand the use of nuclear techniques for HABs management. In particular, PNRI assessed the performance of the CTX-RBA using a brevetoxin as standard and assessed the performance and uncertainty budget of the PSP-RBA.

105 With the support of a Peaceful Uses Initiative project (funded by the United States) on 'Capacity-building for the detection and quantification of paralytic shellfish poisoning and ciguatera fish poisoning toxins in seafood for the management and the mitigation of HABs impacts Phase II', a field sampling mission was organized in collaboration with the Marshall Islands Marine Resources Authority (MIMRA) at Ailinglaplap coral atoll in the Marshall Islands in view of preparing fish matrix reference material for Pacific Ciguatoxins.

106 NAEL held a technical meeting to advance the Inter-Agency Global Ciguatera Strategy in Monaco which is currently under approval.

107 The IAEA is in an ongoing partnership with the Collaborative Research Centre, SPB 754, at the University of Kiel, Germany. SFB 754 addresses the threat of ocean deoxygenation and its consequences for the global climate biogeochemistry system. Originally, the low oxygen content of oxygen minimum zones (OMZ) is due to a natural process of enhanced oxygen consumption related to the remineralization of sinking organic matter produced in the nutrient-rich surface waters. Some of the richest fisheries in the world supported by these nutrient-rich surface waters are predicted to be highly impacted by the oxygen decline.

108 The IAEA participated in field campaigns in the upwelling zones off West Africa. NAEL will continue the collaboration with the EAF NANSEN Programme, to advance NAEL marine interests.

Research and development of nuclear applications for studying contaminants and essential elements in marine biota

109 The IAEA continues to use radiotracers to investigate bioaccumulation of contaminants and essential elements in diverse marine organisms and to assess seafood safety concerns of IAEA Member States. The focus for this period was on: i) factors affecting accumulation of trace metals in select marine organisms; ii) effects of multiple stressors (ocean acidification, hypoxia, temperature in parallel with metals, toxins and radionuclides contamination) on fish and marine invertebrates; iii) the calcification rate of corals under changing environmental conditions (e.g. pH or hypoxia); and iv) effect of microplastics on the physiology of marine organisms or their role as vector of contaminants to fish and shellfish. The IAEA has also been investigating for the last five years the exposure of different marine species through various exposure pathways to better understand the fate of accidental releases of radiocaesium into the marine environment, and to be able to address the following key questions: How is caesium bioaccumulated? What is the major pathway, and what is the transfer mechanism through the food chain? What is the overall environmental risk?

110 Additionally, through collaboration with the Oceanographic Observatory of Villefranche-sur-Mer (part of the Université Pierre et Marie Curie, Paris VI) and with support from CNRS and the National Commission of the Coastal Fleet, the IAEA collects monthly and seasonal seawater samples from the time-series site DYFAMED in the Mediterranean Sea. Using nuclear techniques, these samples are analysed to investigate aspects of the marine carbon cycle, including carbon flux, remineralization, and microbial carbon uptake under changing climate conditions.

Activities of the IAEA's Ocean Acidification International Coordination Centre (OA-ICC)

111 Through a vigorous programme of support and collaboration, the IAEA OA-ICC continues to advance international activities in ocean acidification science, capacity-building and communication. The OA-ICC works with international partners to foster a strong ocean acidification research community across the globe, providing access to data, training, standardized methodology, resources and opportunities for regional and international networking and collaboration. Activities continued to ramp up in 2018–2019, in particular in response to a heightened demand from Member States to build capacity to report on target 3 of SDG 14, which specifically addresses ocean acidification. The coordination work, activities and resources

offered by the OA-ICC are directly relevant to helping Member States reach this target.

112 The OA-ICC participated in an expert group convened by IOC-UNESCO to develop a methodology for countries to report on SDG target 14.3, specifically addressing ocean acidification, in Paris on 16–18 January 2018. The methodology provides guidance in terms of what measurements are needed and how often, as well as how to report the collected information so that it is transparent and traceable. Following the work of this expert group, the SDG 14.3.1 indicator methodology was upgraded to Tier II by the IAEG-SDG of the United Nations Statistical Commission, meaning that the methodology is now ready to be used by countries.

113 The OA-ICC co-leads the SDG 14 Community of Ocean Action on Ocean Acidification. A series of webinars has been initiated, and the group has provided input to several conferences (co-focal point meeting in Nairobi, November 2018; Asia-Pacific Day of the Ocean, Bangkok, November 2018; COA meeting in Incheon, May 2019).

114 A key effort of the OA-ICC is to ensure the sustained archival and quality control of data on the biological response to ocean acidification, and to promote easy access to the data for all users. To this end, a portal to improve the search experience of data sets included in the OA-ICC Data Compilation, maintained in cooperation with Xiamen University and hosted at the Germany-based data centre Pangaea, was launched in December 2018.

115 New tools for estimating uncertainties for ocean acidification variables were developed (consultancy). Uncertainty propagation add-ons are now available for four of the software packages commonly used to calculate carbonate chemistry parameters used in ocean acidification research.

116 The OA-ICC collaborated with the Ocean Acidification international Reference User Group (OA-iRUG) to organize the group's first regional meeting in Santa Marta, Colombia, on 19–21 March 2018. The meeting brought together scientists, policymakers and the aquaculture industry to develop a Latin American action plan to better understand and address ocean acidification.

117 The OA-ICC continued to work closely with partners throughout the year to provide state-of-the-art ocean acidification training to several Member States and to support the development and needs of emerging regional ocean acidification networks in Latin America and Africa.

For example, the OA-ICC organized an advanced three-week training course on ocean acidification in Kristineberg, Sweden, on 4–22 June 2018, in the framework of the inter-regional TC project on ocean acidification (INT7019). This was the first time an ocean acidification training course had centred around a joint experiment. Participants are currently analysing the results for publication in a scientific journal. The OA-ICC also organized training on the management, analysis and quality control of ocean acidification data in Monaco on 22–26 October 2018. The workshop brought together both chemical oceanographers and biologists from all IAEA regions and took an interdisciplinary approach to discuss ocean acidification data analysis. Participants also provided feedback on the reporting process for the SDG target 14.3 indicator, which calls for “average marine acidity measured at an agreed suite of representative sampling stations”.

118 The OA-ICC also collaborated in a number of meetings and workshop to support participants from IAEA Member States to present their results and network with peers. For example, the OA-ICC provided support for seven participants from four countries (Cameroon, Egypt, India and Philippines) to participate in the 4th Symposium on the Effects of Climate Change on the World’s Oceans on 4–8 June 2018 in Washington, DC, USA. The OA-ICC also supported four students to attend the 7th biennial summer school of the Surface Ocean Lower Atmosphere Study (SOLAS) in Corsica, France, from 23 July to 4 August 2018, and collaborated with the Latin American Ocean Acidification Network (LAOCA) to organize an advanced ocean acidification summer school in Galapagos on 19–28 August 2018. The OA-ICC also partnered with the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA) to organize a training course on ocean acidification for PERSGA Member States from 30 September to 4 October 2018 in Aqaba, Jordan. The course was one of the first organized in the region on the topic and was an opportunity to raise awareness about ocean acidification.

119 The OA-ICC collaborated and financially supported a training course in Santa Marta, Colombia, in February 2019, organized by the Ocean Foundation, the US Department of State, the Swedish International Development Agency and other partners, and supported six scientists to participate in the Fourth International Workshop of the Global Ocean Acidification Observing Network (GOA-ON) in Hangzhou, China, in April 2019.

120 The OA-ICC continued to support the development of regional ocean acidification networks. For example, the project supported a side event on the status and future vision of ocean

acidification research in Africa at the Blue Oceans Conference, Monrovia, Liberia, in March 2019.

121 The OA-ICC continued to inform stakeholders about ocean acidification at several high-level international conferences in 2018, such as the Our Ocean conference in Bali in October 2018 and the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) 24 in Katowice, Poland, in December 2018.

122 Finally, work on the OA-ICC news stream and the other online resources (website, bibliography and database) continued on a daily basis. The bibliographic database now contains more than 5,700 references, and the OA-ICC Data Compilation on the Biological Response to Ocean Acidification offers access to data sets from 920 scientific articles. The Ocean Acidification News Stream welcomed more than 35,000 visitors from 173 countries in 2018.

Radiometrics Laboratory (RML) activities

IAEA project for Marine Monitoring: Confidence Building and Data Quality Assurance

123 With a view to assisting the Government of Japan in its objective of making the Sea Area Monitoring Plan comprehensive, credible and transparent, the IAEA, through its Environment Laboratories, is helping to ensure the high quality of marine radioactivity monitoring data and to prove the comparability of the results. A three-year project titled ‘Marine Monitoring: Confidence Building and Data Quality Assurance’ (2014–2016) was initiated as a follow-up activity to recommendations made on marine radioactivity monitoring in a report issued by the IAEA in 2013 which reviewed Japan’s efforts to plan and implement the decommissioning of the Fukushima Daiichi nuclear power station. Six sampling missions and interlaboratory comparisons (ILCs) and three proficiency tests (PTs) were organized during this project. The project was concluded with a report published in 2017 showing that Japan’s sample collection procedures follow the appropriate methodological standards required to obtain representative samples. The results obtained in ILCs demonstrate a high level of accuracy and competence on the part of the Japanese laboratories involved in the analyses of radionuclides in marine samples for the Sea Area Monitoring Programme, corroborating the conclusions of the PTs. The project was extended for a period of four years. Three sampling missions and ILCs and three PTs were organized since 2017. As before, these exercises demonstrated a high level of accuracy and competence on the part of the Japanese

laboratories and the importance of regular participation in PTs and ILCs of monitoring laboratories.

Technical cooperation

IAEA regional TC project RCA RAS7028 (Asia-Pacific)

124 The IAEA regional TC project 'Enhancing Regional Capabilities for Marine Radioactivity Monitoring and Assessment of the Potential Impact of Radioactive Releases from Nuclear Facilities in Asia-Pacific Marine Ecosystems' is running in the Asia-Pacific region under the 'Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific' (RCA). It aims to improve the integrated regional quality-assured capabilities for marine radioactivity monitoring and for impact assessment of routine and accidental releases of radioactivity into the marine environment. The project, extending between 2017 and 2020, is training scientists and laboratory staff from the region in analytical and assessment techniques for radioactivity in seawater, sediment and biota. Training includes collection and preparation of marine samples, routine and rapid analytical methods, quality management in the analytical laboratory, experimental radioecology, dose assessment and risk analysis modelling.

IAEA regional TC project RAF7015 (Africa)

125 Due to the transboundary nature of marine pollution, the project 'Strengthening Regional Capacities for Marine Risk Assessment Using Nuclear and Related Techniques' (supported jointly by Radioecology and Radiometrics Laboratories) aims at assisting Member States to determine the sources of contaminants on a national and regional scale and to strengthen their capacities to analyse radionuclides and organic and inorganic pollutants in marine samples for assessing marine pollution and risk for humans. The objectives of the project are to complement and strengthen the regional capacities for monitoring marine pollution and for risk assessment using nuclear and related techniques; to address transboundary pollution for a sustainable use of marine ecosystem services and enhanced socio-economic benefits; and to generate national and regional databases available to decision makers. Twenty-one Member States are strongly cooperating in employing an integrated regional approach for effective marine monitoring. The IAEA provides expertise in radionuclides measurement, quality assurance/quality control aspects, trace elements contamination in marine organisms and seafood safety issues.

IAEA regional TC project RAF7017 (Africa)

126 The project 'Promoting Technical Cooperation among Radio-Analytical Laboratories for the Measurement of Environmental Radioactivity' aims to enhance the competence of the participating African Member States in the monitoring and assessment of the environmental impact of nuclear and NORM industries. Specific objectives of the project are to establish an integrated regional quality-assured capability for radionuclide analysis of environmental samples, and to improve the competence of laboratories for the analysis of environmental samples via increased collaboration between the members of the ALMERA-Africa regional group of the worldwide network of Analytical Laboratories for the Measurement of Environmental Radioactivity (ALMERA) and mentorship by advanced laboratories in the ALMERA network. Thirty-two Member States are involved in a wide range of project activities related to radioanalytical techniques and quality management.

IAEA TC project MHL7001

127 The project 'Developing a National Radioactivity Monitoring Capacity in the Marshall Islands' has been designed to build capacity in the Marshall Islands to enable local scientists to undertake environmental radioactivity monitoring and to provide advice to authorities on radiation exposure and subsequent health consequences. The radioactive source of most concern in the Marshall Islands is the residual contamination resulting from the use of some of the islands in the 1940s and 1950s by the USA as atmospheric nuclear weapons test sites. An important objective of the project is to assist the Marshall Islands' technical personnel in addressing concerns and a current lack of public understanding regarding legacy issues related to nuclear weapons testing. Therefore, there will be a strong emphasis on public communication. The IAEA Environment Laboratories conducted two expert missions to the atoll in 2016 to review existing sampling and laboratory capabilities and protocols and to help define the requirements for establishing a national radioactivity monitoring capability. Fellowship training of key Marshallese scientists and an expert mission focusing on sampling and pretreatment techniques and basic gamma-ray spectrometry were undertaken in 2017 and early 2018. A national training course in radiation protection and environmental radioactivity has also been provided. Provision of required radiometric equipment continues. The initial project was completed in December 2017, and a follow-up project, running from 2018 to 2021 and aiming to continue to develop this capacity, is currently being implemented.

Analytical quality services

128 One new IAEA reference material is in the initial phases of production and is expected to be available in 2020-2021: Radionuclides in shrimp tissue.

129 Proficiency testing: Seven worldwide PTs for radionuclides in seawater were organized between 2012 and 2018. In 2019 the IAEA is organizing an eight-PT exercise with seawater samples spiked with H-3, Sr-89/90, Cs-134, Cs-137 and Eu-155. Approximately 110 participants will take part in the 2019 PT.

MARiS database

130 The IAEA's MARine information System (MARiS) is an open-access global database for marine radioactivity measurements that is accessible online at www.maris.iaea.org. Development and update of the database and website are ongoing. MARiS is forming a central part of the data collection effort of the IAEA's CRP K41017 'Behaviour and Effects of Natural and Anthropogenic Radionuclides in the Marine Environment and their Use as Tracers for Oceanography Studies'. To meet the requirements of CRP K41017, the templates, tools and workflow for capturing and parsing data into the MARiS database have been reviewed and updated. Developments include new data submission templates, the use of new software for data handling and an upgrade by the IAEA's IT department of the underlying computing infrastructure. In response to the increasing need to educate the wider general audience on the topic of marine radioactivity and the issues surrounding marine radioactivity, a new FAQ page has been prepared for publication on the MARiS website. The volume of data in MARiS has been substantially increased: in May 2019 MARiS contained over 500,000 individual measurement results of radionuclides in seawater, suspended matter, bottom sediment and biota.

Coordinated research

IAEA CRP K41015

131 CRP K41015 'Radioanalytical and isotopic studies of climate trends and variability in marine paleo-records' was initiated in 2017, following the recommendations of an experts' meeting held in 2016 at the IAEA. The project aims to use paleo proxy records to study trends and variability in past climate. It builds on the previous CRP 'Nuclear and isotopic studies of the *El Niño* phenomenon in the ocean', which used nuclear and isotopic tools to study the *El Niño* effect in the Pacific Ocean. This new CRP expands and takes a broader temporal and spatial

scope to include the study of other lower-frequency climate phenomena found in different ocean regions. The CRP focuses on the second part of the Holocene (0–5,000 years before present—yBP), with emphasis on the more recent time period (0–1,500 yBP), and there is scope to link this time period to more recent samples that overlap the instrumental record for the purposes of calibration, comparison and application to present-day climate issues (1950 is the established reference date for 0 yBP). The project is expected to be finalized in 2021.

IAEA CRP K41016

132 GESAMP suggested that the IAEA support the development and implementation of nuclear applications to coastal pollution studies. The CRP 'Study of temporal trends of pollution in selected coastal areas by the application of isotopic and nuclear tools' was initiated in 2016. The main aim of the CRP is to develop new insights on the application of isotopic and nuclear tools in the study of temporal trends of pollution in coastal areas. The overall objective of the CRP is to provide Member States with improved and harmonized environmental archive dating tools to evaluate sources and temporal trends of pollutants, which will enable them to sustainably manage their coastal marine environment. Specific research objectives are to establish a scientific platform to improve the radiometric dating methods for defining time-trends of pollution, to verify the improved and harmonized common approach on a broad range of case studies in selected coastal areas with high sedimentation rates and to appraise pollution sources using stable- and radio- isotopes. After a four-year period it is expected to achieve a streamlined, harmonized and validated methodology for sediment dating which will assure reliable, high-quality, comparable data on temporal trends of pollutants from coastal areas in different geographical regions. A mid-term research coordination meeting was organized back to back with a technical meeting and hosted 35 participants from 27 Member States. The main objective of the technical meeting was to complement and expand on the work currently being performed within the framework of the CRP. The project has spurred very active collaboration, producing many scientific publications, and will be finalized in 2020.

IAEA CRP K41017

133 The CRP 'Behaviour and Effects of Natural and Anthropogenic Radionuclides in the Marine Environment and their Use as Tracers for Oceanography Studies' aims to develop and apply methods combining advanced and rigorous data treatment and modelling approaches for the

determination of spatial and temporal patterns, behaviour and effects of radionuclides in the marine environment, to provide Member States with methodological guidance, data and information on levels, trends and effects of radionuclides and their applications to oceanographic process studies. The expected outcomes of this CRP include improved guidance for IAEA Member States for assessing marine radioactivity according to harmonized, best practice methodologies; an updated, comprehensive understanding of the behaviour and effects of natural and anthropogenic radionuclides in the global marine environment and of processes affecting their distributions; and increased capacity for the application of radiotracer techniques to oceanographic research. The CRP started in 2017 and is due for completion in 2022. A comprehensive data compilation of global marine radioactivity measurements covering approximately the last decade is currently being developed as part of the CRP. This is due for completion in early 2019 and will provide the data required for the assessment phase of the CRP. The data set will also be made publicly available through MARiS and will constitute a comprehensive and reliable baseline against which any future changes can be compared.

Collaboration with regional conventions

134 The IAEA collaborates with the Helsinki Commission (HELCOM), as part of the Group of Experts for Monitoring Radioactive Substances in the Baltic Sea (HELCOM MORS EG), on database development and analytical quality support. In the same area of expertise, the IAEA also collaborates with the Oslo Paris Convention (OSPAR), through its Radioactive Substances Committee (RSC).

DIVISION FOR OCEAN AFFAIRS AND THE LAW OF THE SEA, OFFICE OF LEGAL AFFAIRS

Introduction

135 Among its core functions, the Division for Ocean Affairs and the Law of the Sea (DOALOS), Office of Legal Affairs, United Nations, carries out the responsibilities entrusted to the Secretary-General under the 1982 United Nations Convention on the Law of the Sea (UNCLOS) and the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (United Nations Fish Stocks Agreement), and as provided by the General Assembly through

its annual resolutions on oceans and the law of the sea and on sustainable fisheries. This section is intended to highlight information on the work of the Division since September 2018 that may be relevant to GESAMP.

Informal consultative process

136 The United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (the Informal Consultative Process) held its 20th meeting on 10–14 June 2019 and, pursuant to [General Assembly resolution 73/124](#), focused its discussions on the topic ‘Ocean Science and the UN Decade of Ocean Science for Sustainable Development’. As in the past, the meeting was organized around panel presentations by experts representing developed and developing countries and reflecting various perspectives and disciplines, followed by interactive discussions. The Chair of GESAMP, Mr. Peter Kershaw, was invited as a panellist to give a presentation on ‘Use of science for advising the UN system’. In his statement under the agenda item ‘Inter-agency cooperation and coordination’, the United Nations Legal Counsel called attention to the celebration of the 50th anniversary of GESAMP.

137 Prior to the 20th meeting of the Informal Consultative Process, the report of the Secretary-General on oceans and the law of the sea was prepared, with a view to facilitating discussions on the topics of focus at that meeting ([A/74/70](#)). The report of the Secretary-General, as well as panel presentations and other documents relevant to the meeting, are available on the DOALOS website at http://www.un.org/depts/los/consultative_process/consultative_process.htm.

Conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction

138 Building on the recommendations of the Preparatory Committee established by [General Assembly resolution 69/292](#), in its [resolution 72/249](#) of 24 December 2017, the General Assembly decided to convene an intergovernmental conference, under the auspices of the United Nations, to consider the [recommendations of the Preparatory Committee](#) on the elements and to elaborate the text of an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, with a view to developing the instrument as soon as possible.

139 In accordance with resolution 72/249, the conference will address the topics identified in the

package agreed in 2011—namely, the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, in particular, together and as a whole, marine genetic resources, including questions on the sharing of benefits, measures such as area-based management tools, including marine protected areas, environmental impact assessments and capacity-building and the transfer of marine technology.

140 The conference held a three-day organizational meeting in New York on 16–18 April 2018. The first and second sessions of the conference were convened, respectively, on 4–17 September 2018 and from 25 March to 5 April 2019 in New York. The third session will take place in New York on 19–30 August 2019. Negotiations will be assisted by a 'Draft text of an agreement under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction', prepared by the President of the Conference, with the assistance of DOALOS. A fourth session is scheduled to be held in the first half of 2020.

141 Documents relevant to the work of the conference are available online at <https://www.un.org/bbnj/>.

The Regular Process for Global Reporting and Assessment of the State of Marine Environment, including Socioeconomic Aspects

142 The Ad Hoc Working Group of the Whole on the Regular Process held its 11th meeting on 23–24 August 2018, pursuant to paragraph 330 of [General Assembly resolution 72/73](#). The Working Group had before it: i) a note by the Joint Coordinators on the preliminary timetable and implementation plan for the second cycle of the Regular Process; ii) a note by the Joint Coordinators on the annotated outline of the second world ocean assessment; and iii) a draft agenda and draft concept note for the multi-stakeholder dialogue and capacity-building partnership event to be held in January 2019. The Working Group adopted by consensus draft recommendations for the consideration of the General Assembly at its 73rd session. It also adopted guidance to the Bureau, the Group of Experts and the Secretariat.

143 A number of States offered to host regional workshops for the second round of regional workshops in 2018 in support of the second cycle of the Regular Process. The aim of these workshops was, *inter alia*, to inform the collection of regional-level information and data for the preparation of the second world ocean

assessment. The workshops were held in Koror, Palau, on 8–9 August 2018; Valletta, Malta, on 27–28 August 2018; Odessa, Ukraine, on 17–18 October 2018; Bali, Indonesia, on 8–9 November 2018; Doha, State of Qatar, on 28–29 November 2018; Accra, Ghana, on 3–4 December 2018; and Guayaquil, Ecuador, on 17–18 December 2018.

144 A multi-stakeholder dialogue and capacity-building partnership event took place on 24–25 January 2019 at United Nations Headquarters in New York. The event provided an opportunity to build awareness and collaboration with respect to capacity-building in support of the Regular Process, including with respect to building capacity to participate in, and make use of, integrated assessments. During the event, experts from around the world gathered to discuss the importance of integrated assessments for decision-making, the capacity gaps and needs related to the conduct of integrated assessments, and opportunities, best practices and lessons learned for enhancing the science–policy interface. The event generated several recommendations on how to enhance capacity-building (see <https://www.un.org/regularprocess/content/multi-stakeholders>), which will be considered at the forthcoming meeting of the Ad Hoc Working Group of the Whole on the Regular Process.

145 Pursuant to paragraph 334 of General Assembly resolution 73/124, the 12th meeting of the Ad Hoc Working Group of the Whole on the Regular Process will be held on 29–30 July 2019 and will receive the report of the Bureau of the Working Group and information from the Group of Experts. It will also consider the outcome of the multi-stakeholder dialogue and capacity-building partnership event, as well as the possible outcomes and building blocks of the third cycle of the Regular Process. The Working Group will further be invited to consider and adopt recommendations to the 74th session of the General Assembly, for consideration in the context of the informal consultations of the General Assembly on the draft resolution on oceans and the law of the sea.

146 Documents relevant to the Regular Process can be found on the DOALOS website at <https://www.un.org/regularprocess/>.

Sustainable fisheries

147 In 2016, the resumed Review Conference on the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks recommended that the

Informal Consultations of States Parties to the Agreement be dedicated, on an annual basis, to the consideration of specific issues arising from the implementation of the Agreement, with a view to improving understanding, sharing experiences and identifying best practices for the consideration of States Parties, as well as the General Assembly and the Review Conference (A/CONF.210/2016/5, annex, para. 15).

148 The 14th round of Informal Consultations of States Parties to the Agreement, held in New York on 2–3 May 2019, focused on performance reviews of regional fisheries management organizations and arrangements. The report of the 14th round, prepared by the Chairperson, as well as the presentations made during the discussion panel and other relevant information, will be made available on the website of the Informal Consultations at www.un.org/depts/los/convention_agreements/fish_stocks_agreement_states_parties.htm.

UN-Oceans

149 The United Nations Legal Counsel/DOALOS serves as the focal point of UN-Oceans. At its 19th meeting, hosted by the World Meteorological Organization (WMO) in Geneva on 7–8 February 2019, UN-Oceans established an internal Contact Group to facilitate the provision of inputs and guidance to the preparatory phase of the UN Decade of Ocean Science for Sustainable Development. The Contact Group is coordinated by IOC-UNESCO and will operate until the end of the planning phase (end of 2020).

150 UN-Oceans members also agreed, as part of the UN-Oceans Work Programme for 2019–2020, to contribute to the 2020 United Nations Conference to Support the Implementation of SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development. The conference, which will be co-hosted by Kenya and Portugal, will take place on 2–6 June 2020 in Lisbon, Portugal, under the theme ‘Scaling up ocean action based on science and innovation for the implementation of Goal 14: stocktaking, partnerships and solutions’.

151 Furthermore, the 2019–2020 Work Programme calls for UN-Oceans members to collaborate with and contribute to the celebration of the 50th anniversary of GESAMP in September 2019.

World Oceans Day

152 Pursuant to General Assembly resolutions 63/111 and 73/124, the United Nations

celebrated World Oceans Day 2019, with a focus on the theme ‘Gender and the ocean’ at United Nations Headquarters on 7 June 2019. An interactive event featured storytellers and speakers from around the world, who shared their perspectives on building greater ocean and gender literacy and discovering possible ways to promote gender equality in ocean-related activities, such as marine scientific research, fisheries, labour at sea, policymaking and management. The event was opened by the Under-Secretary-General for Legal Affairs and United Nations Legal Counsel, together with the Deputy Executive Director, UN-Women. Information on World Oceans Day can be found on the United Nations World Oceans Day website at www.unworldoceansday.org.

UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)

153 UNEP is the leading authority that sets the global environmental agenda, having an impartial convening role in fostering policy dialogue and implementing numerous global environmental conventions and commitments, which include the sustainable management of marine and coastal resources. Its work is built around enabling governments, business and civil society across all levels to better integrate the foundational principles of ecosystem-based management into social and economic development through an extensive partnership network, in association with governments and multiple institutions.

154 In addition to the central role that UNEP has in assisting the international community in making decisions to address global/transboundary environmental issues and in assisting countries in implementing environmentally sound policies and practices, UNEP undertakes global normative work and services that include the synthesis and application of ocean-related research, integrated environmental assessments, risk assessments and vulnerability analyses, and operationalizes ecosystem-based management principles and solutions, including nature-based solutions to climate change, with capacity-building as a cross-cutting focus. Other core areas of expertise relevant to oceans include the green economy, sustainable trade, the circular economy and sustainable consumption and production principles and approaches, and sustainable green financing.

155 UNEP established the Regional Seas Programme which consists of 18^a Regional Seas Conventions and Action Plans across the world. UNEP hosts seven^b of the Regional Seas Programme secretariats, thereby creating a direct means through which the agency promotes and enhances regional integration and cooperation in many areas, ranging from the translation of science to policy, to facilitating coordination in the governance of shared coastal and marine ecosystems in the multilateral partnership arena. UNEP also hosts the autonomous secretariats for multilateral environmental agreements that are relevant to marine environment protection, such as the joint Secretariat of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the Stockholm Convention on Persistent Organic Pollutants Conventions, and the Secretariat for the Convention on Biological Diversity.

Marine and coastal strategy

156 [The fourth session of the United Nations Environmental Assembly \(UNEA-4\)](#), held in March 2019 in Nairobi, took note of the proposal of a new marine and coastal strategy ('UNEP/EA.4/INF/7: Proposal for a new marine and coastal Strategy of United Nations Environment Programme for the period 2020–2030'). The strategy outlines the overall strategic direction, operational objectives, approach and priority actions of UNEP to support national, regional and global efforts to ensure healthy and sustainable oceans and coasts by 2030.

157 The new strategy also supports global innovation and delivery of normative services, and contributes to an enhanced coordination of actions in collaborative frameworks addressing marine and coastal issues. This includes contributing to important global processes, such as the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea, the Regular Process for Global Reporting and Assessment on the State of the Marine

^a They are Antarctic, Arctic, Baltic, Black Sea, Caspian, Eastern Africa, East Asian Seas, Mediterranean, North-East Pacific, Northwest Pacific, Pacific, Red Sea and Gulf of Aden, ROPME Sea Area, South Asian Seas, South-East Pacific, Pacific, Western Africa and Wider Caribbean.

^b Abidjan Convention, Barcelona Convention, Cartagena Convention, East Asian Seas Action Plan, Nairobi Convention, Northwest Pacific Action Plan and Tehran Convention.

Environment, including Socioeconomic Aspects, the High-Level Political Forum on Sustainable Development, the implementation of the Paris Agreement under the United Nations Framework Convention on Climate Change, the post-2020 biodiversity agenda and the UN Decade of Ocean Science for Sustainable Development.

158 The strategy is intended to operationalize and communicate the convening role and contributions of UNEP in its support to countries in achieving healthy and resilient marine and coastal ecosystems globally. This ranges from identifying strategies and actions to assist transitions at the national and regional levels towards sustainable blue economies, to strengthening concerted multilateral efforts in support of healthy oceans and coasts, to grounded-in-truth, effective, nature-based solutions that ensure long-term, ocean-based sustainable development.

Regional Seas Programme

159 [The UNEP Regional Seas Programme](#) has been UNEP's most important regional mechanism for the conservation of the marine and coastal environment since its establishment in 1974. The Programme aims to address the accelerating degradation of the world's oceans and coastal areas through a 'shared seas' approach—namely, by engaging neighbouring countries in comprehensive and specific actions to protect their common marine environment. Currently, more than 143 countries have joined 18 Regional Seas Conventions and Action Plans for the sustainable management and use of the marine and coastal environment. In most cases, the Action Plan is underpinned by a strong legal framework in the form of a regional Convention and associated Protocols on specific problems.

160 A major role of the programme is to support regions to fulfil their responsibilities towards the priorities identified in relevant UNEP Governing Council Decisions and resolutions of the United Nations Environment Assembly, to contribute to reaching global targets such as the SDGs.

161 UNEP administers regional programmes in [West Africa](#), the [Caribbean](#), the [Mediterranean](#), [Northwest Pacific](#), [East Asian Seas](#), the [Caspian Sea](#) and [East Africa](#). The programme also covers several other regions of the world, making it one of the most globally comprehensive initiatives for the protection of marine and coastal environments: [Antarctic](#), [Arctic](#), [Baltic](#), [Black Sea](#), [North-East Atlantic](#), [North-East Pacific](#), [Pacific](#), [Red Sea and Gulf of Aden](#), [ROPME Sea Area](#), [South Asian Seas](#) and [South-East Pacific](#). Fourteen of the Regional Seas Programmes have

also adopted legally binding conventions that express the commitment and political will of governments to tackle their common environmental issues through joint coordinated activities. Most conventions have added protocols, legal agreements addressing specific issues such as protected areas, integrated coastal zone management (ICZM) and land-based sources of pollution (LBS), including oil spills and movement of hazardous waste.

Activities in the regions

Coordinating Body on the Seas of East Asia

162 The Coordinating Body on the Seas of East Asia (COBSEA) is a regional intergovernmental policy forum and the sole decision-making body for the East Asian Seas Action Plan, supporting participating countries (Cambodia, People's Republic of China, Indonesia, Republic of Korea, Malaysia, Philippines, Singapore, Thailand and Viet Nam) in the development and protection of the marine environment and coastal areas of East Asian Seas. The COBSEA Secretariat is hosted by Thailand and administered by UNEP, located at the UNEP Asia and the Pacific Office in Bangkok, Thailand.

163 COBSEA supports participating countries to address priority issues in line with the COBSEA Strategic Directions 2018–2022, adopted in 2018, focusing on regional governance; addressing land-based marine pollution with a focus on nutrients, sediment, wastewater and marine litter; and marine and coastal planning and management, with a focus on ecosystem-based management approaches, including Marine Protected Areas (MPAs) and Marine Spatial Planning (MSP), towards achievement of relevant SDGs and Aichi Targets. A regional outlook document on COBSEA's contribution to the follow-up and review of the 2030 Agenda for Sustainable Development is being prepared, identifying how COBSEA will support participating countries with the implementation and monitoring of ocean-related SDGs and associated targets. A Voluntary Commitment made at the UN Ocean Conference in 2017 ([#OceanAction15986](#)) is on track.

164 COBSEA adopted a Regional Action Plan on Marine Litter (RAP MALI) in 2018. A revision will be considered for adoption at the 24th Intergovernmental Meeting of COBSEA in June 2019, following consultations through the COBSEA Working Group on Marine Litter in Bangkok, Thailand, in December 2018 and in Bali, Indonesia, in June 2019. The 24th Intergovernmental Meeting will also consider establishment of a Regional Node of the Global

Partnership of Marine Litter to support knowledge management and information exchange on marine litter; and establishment of a Regional Capacity Centre for Clean Seas proposed by Indonesia (following the Bali Declaration arising from the 4th Intergovernmental Review of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities in 2018, and as noted in UNEP/EA.4/L.12).

165 COBSEA and UNEP have launched a regional project (USD6.4 million supported by Sida) on 'Reducing marine litter by addressing the management of the plastic value chain in South East Asia'. The project engages national and local governments, plastic producers and retailers, and civil society to develop inclusive and equitable market-based solutions and policy pathways, as well as to strengthen assessment, monitoring and knowledge management for decision support, thereby supporting countries to implement key regional and global frameworks and action plans, including the COBSEA RAP MALI, the global Clean Seas campaign, and voluntary commitments related to SDG 14, target 14.1.

166 With support from the Global Partnership on Marine Litter (GPML), a training of trainers on the 'Guidelines for the monitoring and assessment of plastic litter and microplastics in the ocean' prepared by GESAMP WG 40 will be held in September 2019. An annual regional constituency engagement and partnership forum on marine litter and plastic pollution titled 'SEA of Solutions' is being developed with UNEP and other partners. The inaugural event is planned for 11–15 November 2019 in Bangkok, Thailand.

167 A project titled 'Including coral reef resilience and vulnerability to climate change in marine spatial planning in Malaysia' supported by UNEP and the International Coral Reef Initiative (ICRI) and implemented by SymbioSeas, WWF and COBSEA successfully concluded in 2019. The project developed and demonstrated an approach to improve MSP for a more climate-resilient network of MPAs, by integrating climate vulnerability considerations in planning and zoning processes. It provides a model that can be used and replicated more broadly in the region and beyond.

168 UNEP GEF projects in the context of the East Asian Seas Action Plan include the USD15 million project 'Implementing the Strategic Action Programme for the South China Sea', which addresses the habitat, land-based pollution and regional coordination components of the Strategic Action Programme (starting in 2019); and the USD3 million project 'Establishment and Operation of a Regional System of Fisheries

Refugia in the South China Sea and Gulf of Thailand', which implements the fisheries component of the Strategic Action Programme, executed by SEAFDEC (under way).

169 COBSEA will contribute to the implementation of the UN Decade of Ocean Science (2021–2030) through ongoing and emerging efforts, in particular in relation to Strategic Objective 2 on evidence base and capacities for ecosystem-based management as well as Cross-cutting Objective 4 on networks, data systems, other infrastructure and partnerships, and Cross-cutting Objective 6 on knowledge-to-policy cooperation, coordination and communication. The COBSEA Secretariat participated in initial planning for the UN Decade of Ocean Science during the 12th Intergovernmental Session of the IOC Sub-Commission for the Western Pacific (IOC-WESTPAC) in Manila, Philippines, in April 2019, and will continue engaging in the planning process at the regional level and, through UNEP, at the global level.

Northwest Pacific Action Plan (Northwest Pacific)

170 Northwest Pacific Action Plan (NOWPAP) activities are structured around six major thematic areas: regular assessments, integrated coastal and river basin management, pollution prevention and reduction, biodiversity conservation, climate change impacts and information management. The NOWPAP Regional Coordinating Unit and four Regional Activity Centres (RACs) continued to address marine and coastal environmental issues such the development of Ecological Quality Objectives (EQOs), prevention and reduction of pollution from harmful substances and marine litter, and strengthening regional cooperation to prepare and respond to oil and HNS spills, among key priorities. NOWPAP experts are also implementing projects focusing on major threats to marine and coastal biodiversity: eutrophication, destruction of coastal habitats and introduction of alien invasive species. Other projects are related to seagrass and seaweed habitat mapping and assessment of the status of threatened and endangered marine and coastal species in the region. 'Assessment of major pressures on marine biodiversity in the NOWPAP region' and 'Feasibility Study Towards Assessment of Seagrass Distribution in the NOWPAP Region' were published in 2018.

171 In May 2018, representatives of Japan, People's Republic of China, Republic of Korea and the Russian Federation met at the annual NOWPAP Special Monitoring and Coastal Environmental Assessment Regional Activity

Centre meeting in Toyama to discuss and agree on the next steps in the preparation of a Regional Action Plan on Marine and Coastal Biodiversity Conservation scheduled to be launched after 2021. The region is under growing threat from human activities and climate change but does not yet have a regional framework for marine biodiversity protection and sustainable use to advance achievement of the SDGs in a regionally harmonized manner.

172 The number of marine species inhabiting the Northwest Pacific areas of China, Japan, the Korean peninsula and the Russian Federation that are at risk of survival is higher than previously estimated, according to an assessment completed by the NOWPAP Beijing-based Data and Information Regional Activity Centre for its Endangered Species Database. The assessment finds that more endangered species are living in Northwest Pacific Action Plan member countries than those listed in the Red List of the International Union for Conservation of Nature (IUCN). Up to 143 species living in at least one of the NOWPAP member countries were evaluated as endangered in the IUCN Red List.

173 On 25 June 2018, four NOWPAP members adopted the NOWPAP Medium-Term Strategy 2018–2023. The Strategy envisages "a resilient Northwest Pacific marine and coastal environment, supporting sustainable development for the long-term benefit of present and future generations". This is to be promoted by leveraging the best scientific knowledge to inform policy- and decision making and promoting intraregional cooperation and greater synergy among various activities. The Strategy ensures that NOWPAP activities will support national and regional progress towards the SDGs, and thus marks a historic step in the organization's evolution.

174 The sinking in January 2018, 160 nautical miles off Shanghai, of the oil tanker *Sanchi*, loaded with 136,000 tons of condensate, was the world's largest marine pollution incident since the March 1989 *Exxon Valdez* oil spill off the coast of Alaska, in the United States of America. The world's largest oil spill at sea in decades was met with a speedy response thanks to timely information exchange, according to the maritime authorities of the countries exposed to the environmental disaster. An online marine Pollution Reporting System, set up by a joint UNEP and IMO-NOWPAP Marine Environmental Emergency Preparedness and Response Regional Activity Centre enabled China, Japan, the Republic of Korea and the Russian Federation to speedily share information on the spreading spill and measures being taken to contain it. More than 250 reports were exchanged during the *Sanchi* incident, exhibiting the importance of an effective

information-sharing platform such as the one set up by NOWPAP.

175 In July 2018, experts at the annual meeting of the NOWPAP Pollution Monitoring Regional Activity Centre made important progress in defining 'good environmental status' of the Northwest Pacific coastal seas by agreeing on six common NOWPAP Ecological Quality Objective indicators for all four countries. The agreed indicators include nutrient concentration in the water column; nutrient ratios (silica, nitrogen and phosphorus); chlorophyll concentration in the water column; HABs; concentration of contaminants in sediments, water and organisms; and trends in the amount and composition of litter washed ashore. All selected indicators are closely related to several SDG indicators. Equipped with data for these indicators, NOWPAP countries would be able to assess the state of their coastal marine environment and report on the progress of their management responses in a regionally coherent way. All the above parameters are transboundary in nature. In March 2019, NOWPAP experts met in Vladivostok, Russia, discussed six most applicable indicators related to monitoring marine ecological quality in the region and agreed on the targets for the four of them, aligned with environmental SDGs.

176 In October 2018, representatives of the four Member States of NOWPAP attending the 23rd Northwest Pacific Region Intergovernmental Meeting on 9–11 October 2018 called for enhanced regional cooperation in support of SDG 14: life below water in the Northwest Pacific. The annual Northwest Pacific Region Intergovernmental Meeting was convened to review implementation of the 24-year-old NOWPAP. The meeting launched an innovative project to produce up-to-date information on key species and habitats of transboundary concern in the Northwest Pacific that could be used as important indicators of biodiversity change caused by natural and human factors. The project will generate key information for a Regional Action Plan on Marine and Coastal Biodiversity Conservation to be formulated as part of the medium-term strategy.

177 In March 2019, marine scientists from China, Japan, Republic of Korea and the Russian Federation meeting in Vladivostok, Russia, endorsed the effectiveness of the Northwest Pacific Action Plan Eutrophication Assessment Tool (NEAT) in protecting the region from eutrophication, which threatens marine and human health and can severely harm fisheries and tourism. The Regional Seas Programme's NOWPAP intends to collaborate with global online search giant Google and the Japan Aerospace Exploration Agency to test NEAT to monitor

eutrophication in oceans around the world, using cloud computing. A significant reduction in marine pollution from land-based activities by 2025 is part of the commitment made by world leaders in the 2030 Agenda for Sustainable Development. Use of NEAT will help countries in the region to report their progress to achieve the SDGs.

178 The NOWPAP Regional Action Plan on Marine Litter is also being implemented in cooperation with central and local governments in the NOWPAP Member States as well as non-governmental organizations (NGOs), including the organization of highly successful International Coastal Clean-up campaigns in all participating countries. The 'Review and analysis of existing prediction models for floating marine litter' and 'Oiled wildlife response in the NOWPAP region' were published in 2018. The Expert Meeting of the NOWPAP special project 'Monitoring and Assessment Methods for Microplastics Pollution' was organized in Busan, Republic of Korea, on 3 June 2018. Participants agreed that the special project would use existing microplastics monitoring criteria in NOWPAP countries. NOWPAP is a member of the Global Partnership on Waste Management (GPWM) and has been hosting the Northwest Pacific Regional Node of the Global Partnership on Marine Litter (GPML) since 2014.

179 In June 2018, on World Environment Day under the theme #BeatPlasticPollution, the NOWPAP and Tripartite Environmental Ministers Meeting organized an annual marine litter management workshop focused on ALDFG, sharing progress in policy and management. Joint efforts were made with the Asia Pacific Civil Forum on Marine Litter to share experiences with South East Asian countries. A beach clean-up campaign with local communities concluded four days of inspiring information and knowledge exchange.

180 NOWPAP continues developing and strengthening partnerships with the relevant organizations and programmes in the region, including the North-East Asian Subregional Programme for Environmental Corporation (NEASPEC), the North Pacific Marine Science Organization (PICES), Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) and the IOC-UNESCO Sub-Commission for the Western Pacific (WESTPAC) Yellow Sea Large Marine Ecosystem (YSLME) Phase II Project. NOWPAP contributes to the implementation of the Sustainable Development Strategy for the Seas of East Asia and provides technical expertise to the Convention on Biological Diversity on relevant issues such as description of ecologically or biologically significant marine areas (EBSAs) in the region.

Abidjan Convention (West Africa)

181 The Abidjan Convention has finalized its revitalization process, which led to the implementation of several activities that have increased its visibility and expertise on issues related to the management of marine and coastal zones, climate change and coastal resilience.

Development of protocols

182 The Convention has embarked on the formulation of additional protocols on the sustainable management of mangroves, ICZM and the environmental norms and standards for offshore oil and gas activities.

183 To ensure protection and better management of mangrove ecosystems, the Abidjan Convention Secretariat initiated the process of developing the protocol on sustainable management of mangroves following its COP10 and COP11 decisions (CP.10/7 and CP.11/1). The final version of the protocol will be submitted for the plenipotentiaries' signature to be held in early July 2019 in Abidjan, Côte d'Ivoire. Despite their importance (spawning and nurseries for fish, protection of islands and coastal habitats, carbon sequestration, etc.), mangroves are under pressure (particularly anthropogenic), which has considerably reduced their surface areas in West and Central Africa.

184 Marine and coastal areas serve as homes to many human activities such as shipping, fishing and aquaculture, production of renewable energy, extraction of raw materials and nautical tourism. Experts raised the alarm years ago on the threats that these activities have on the marine and coastal environment. Strengthening their framework has become a major objective for the Contracting Parties to the Abidjan Convention. In this respect, management based on an ecosystem approach was recalled at COP10 and COP11. The Parties evaluated the importance of drafting a protocol on ICZM which would contribute to more effective management of the marine and coastal zones. This process of drafting has been completed, and the protocol will be submitted with the other protocols in July 2019 during the plenipotentiaries' meeting in Abidjan.

185 During COP10, the Contracting Parties adopted the decision CP.10/8 'Environmental standards for the offshore exploration and exploitation activities of mining and mineral resources off the coasts of the States Parties'. The implementation of a regulatory framework for the surveillance and monitoring of offshore oil and gas activities follows COP9, at which the Contracting Parties to the Abidjan Convention adopted important decisions aiming at preventing

and combating pollution from offshore activities. This refers to the third protocol that will be submitted to the plenipotentiaries with the previous protocols.

Projects framework and partnerships and implementation of activities.

186 The Abidjan Convention is recognized as a key actor and partner in terms of marine and coastal biodiversity management all over Africa's Atlantic coast. There is ongoing implementation of activities and partnerships, and other projects are being prepared or in their final stages.

187 Recognizing the significant role the Abidjan Convention plays in the region, the West Africa Biodiversity and Climate Change Programme (WABICC) conducted an assessment in October 2015 on integrated technical and organizational capacity (ITOCA), which resulted in the formulation of an institutional capacity-building plan leading to the elaboration of a joint communication strategy. With the support of WABICC, the Abidjan Convention will be equipped with a resource centre that will host most relevant publications on marine and coastal biodiversity and other ocean-related data.

188 To support strong protection of the high seas, the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit—BMUB) has funded a project to facilitate the development and implementation of comprehensive approaches, spanning many sectors, for the conservation and sustainable use of biodiversity in Areas Beyond National Jurisdiction (ABNJ) of the Southern East Atlantic and Pacific. Based on the interest of both regions, the project will identify best practices and provide regional institutions and national authorities with knowledge, tools and necessary capabilities to support the implementation of existing approaches and the development of new ones in terms of regional ocean governance.

189 Funded by BMUB, through its International Climate Initiative (Internationale Klimaschutzinitiative—IKI), the Mami Wata Project 'Enhancing Marine Management in West Africa through Training and Application' works in collaboration with African countries to develop their capabilities in Integrated Ocean Management. Experience will be shared through: i) MSP; ii) identification of EBSAs; and iii) elaboration of reports on the State of the Marine Environment (SoME).

190 Funded by the Mava Foundation for Nature, the ResilienSea project focuses on seagrass, one of the most important ocean

habitats. Serving as nurseries and feeding grounds, protecting our shores and storing carbon, among other benefits, the issue of seagrasses is unknown to the public. This project will aim to strengthen knowledge on seagrass all over West Africa and to carry out pilot actions on selected sites which are intended to implement management tools and improve the status of their protection and the services they provide.

191 As a fruit of collaboration between FAO and UNEP, the Coastal Fisheries Initiative in West Africa (CFI) project is being implemented in Cape Verde, Côte d'Ivoire and Senegal. It aims to strengthen fisheries governance, management of fisheries chain of values through the implementation of fisheries ecosystem approach, relevant international instruments and innovative governance partnerships. The Abidjan Convention is responsible for the implementation of the component on governance and fisheries management. Through a participatory approach involving different actors (States, civil society, private sector and researchers) at national and local levels, the Abidjan Convention Secretariat ensures the sustainable conservation and use of mangroves resources as dictated by its protocol on the sustainable management of mangroves and its implementation action plan. The Abidjan Convention Secretariat is expected, over the next three years, to conserve up to 700 hectares of mangroves in Senegal and Côte d'Ivoire.

192 Funded by the GEF, the overall goal of the project 'Support the implementation of the Strategic Action Plan (SAP) of the Guinea Current Large Marine Ecosystem (GCLME)' is to strengthen the regional governance and ecosystem-based management of the GCLME by assisting the countries in capacity-building for the implementation of the SAP measures related to transboundary fisheries, conservation of biodiversity and combatting pollution. The expected overall environmental benefits will be the protection of habitats and fish stocks with a global importance in the GCLME. The project will contribute to the improvement of governance and resource management and to enhance the capabilities of stakeholders to consider the value of sustainable fisheries. Improved resource management and poverty reduction in the 16 participating countries will further enhance sustainability in the GCLME.

193 Funded by the World Bank, the West Africa Coastal Areas (WACA) programme aims to: i) provide expertise and funding to the countries of the region for the sustainable management of their coastal areas, considering the risks of erosion, floods and pollution; and ii) strengthen the regional integration of countries by working with related regional institutions and agreements,

thereby enhancing the resilience of communities and the economic assets of the West African coastline. The programme is to be implemented in six countries through a regional investment for West African coastline resilience (Resilience Investment Project (ResIP) with a total cost of USD221.7 million and funded up to USD190 million by grants from the World Bank. The project consists of a combination of activities at political and institutional levels and addressing the demands for physical and social investment at both regional and national levels. The Abidjan Convention is responsible for assisting the six participating countries in all technical matters related to the ratification and implementation of regional and international coastal and marine protocols.

194 Supported by the Adaptation Fund, the UN HABITAT project on improving the resilience of coastal communities has an overall objective to strengthen Ghana and Côte d'Ivoire coastal communities' resilience to climate change. It is expected to later cover the rest of West Africa, while being consistent with the national priorities of the government in its implementation. The full proposal and lessons learned will benefit not only the most vulnerable communities but also governments at national and community levels, supporting Ghana and Côte d'Ivoire as well as their neighbours.

195 The project 'Multilateral Agreements on the Environment' is funded by the European Union (EU) in partnership with FAO. Its overall objective is to strengthen and improve the capability of African, Caribbean and Pacific (ACP) countries to implement selected multilateral environmental agreements. The goal is to increase the environmental sustainability of the agricultural sector. The project will focus on combating depletion and degradation of natural resources (water, soil and biodiversity) by developing synergies and collaboration between the environment and agricultural sectors from global governance to policy. The specific objective is to integrate biodiversity into all the sectors of the three ACP regions to support sustainable agriculture and conservation of natural resources, giving a focus to specific regional priorities. These will include land degradation and desertification—issues related to food security and migration—which are the results of damages caused by land clearing, invasive species, overuse of agrochemicals and other inadequate farm management practices.

196 The Abidjan Convention is now recognized as a key actor and a privileged partner in the management of marine and coastal biodiversity along the Atlantic coast of Africa. In addition to the activities implemented and

partnerships developed, other activities are being undertaken or finalized. The variety of partnerships developed helps the Convention's Secretariat achieve its mandate and programme objectives.

Mediterranean Action Plan Barcelona Convention Secretariat

197 The [UNEP-MAP Barcelona Convention Secretariat](#), with support from its relevant Components, has continued supporting the Contracting Parties for the implementation of its legal and policy framework, touching on most of the key issues addressed by GESAMP, including reduction/prevention of land- and sea-based pollution and marine litter, atmospheric inputs of chemicals, ballast water management, regulation of offshore activities, establishment of pollution trends and emerging issues.

198 Hazards of harmful substances carried by ships: In the framework of the Prevention and Emergency Protocol to the Barcelona Convention, UNEP-MAP is actively supporting the Contracting Parties to develop and implement Contingency Plans, including at subregional level (i.e. Adriatic/Ionian Subregional Oil Spill Contingency Plan (ASOSCoP); Subregional Contingency Plan between Algeria, Morocco and Tunisia; Subregional Marine Oil Pollution Contingency Plan between Cyprus, Greece and Israel; Subregional Marine Oil Pollution Contingency Plan between Greece, Cyprus and Egypt, etc.). At national level, Albania, Morocco, Tunisia and Turkey have been supported in the preparation of National Action Plans for the implementation of the Regional Strategy for Prevention of and Response to Marine Pollution from Ships (2016–2021), including national assessments, a national IMO training course on response to HNS in the marine environment, based on the newly developed IMO model course (Istanbul, Turkey, 13–16 November 2018), etc.

199 Active substances in ballast water management systems: Interested Parties for the implementation of a pilot on mutually granted exemptions under the International Convention for the Control and Management of Ships' Ballast Water and Sediments, making use of the same risk area concept for short sea shipping trade between two neighbouring countries, have been contacted to specify the type of assistance and time-frame to support the process. The organization of the Regional Workshop on the Anti-fouling Systems (AFS) Convention and Biofouling, to be held in Valletta, Malta, on 12–14 November 2019, has been initiated by REMPEC, in coordination with IMO.

200 Atmospheric input of chemicals to the ocean: Work has started on the possible designation of the Mediterranean Sea or parts thereof as an Emission Control Area (ECA) under Annex VI of MARPOL. In this respect, a technical and feasibility study to examine such a possibility was prepared by REMPEC and submitted to the SO_x ECA(s) Technical Committee of Experts. A proposal and draft road map will be submitted for review by the MAP Focal Point meeting in September 2019. [A relevant news item was published on the MAP website on the occasion of World Environment Day.](#)

201 Plastics/microplastics (sources, fate, effects), including sea-based sources of marine litter: UNEP-MAP efforts have continued and further increased towards prevention and reduction of marine litter from land- and sea-based sources, in accordance with the provisions of the Regional Plan on Marine Litter Management in the Mediterranean, adopted in 2013, as the first ever legally binding regional instrument to combat marine litter, including concrete measures and timetables. Targeted support has been provided to several Contracting Parties through pilot activities focusing on the implementation of selected measures, including Adopt-a-Beach, Fishing-for-Litter, development and implementation of the regulatory framework for the reduction of single-use plastic bags, promotion of Extended Producer Responsibility (EPR), better management of sea-based litter in ports and marinas, etc.

202 A set of marine litter guidelines is being developed to support the Parties in the implementation of the Regional Plan on Marine Litter Management, including: i) Implementation of the 'Adopt-a-Beach' measures in the Mediterranean; ii) Phase out Single-Use Plastic Bags in the Mediterranean; iii) Operational Guidelines on the Provisions of Reception Facilities in Ports and the Delivery of Ship-Generated Wastes in the Mediterranean; and iv) Guidance Document to Determine the Application of Charges at Reasonable Costs for the Use of Port Reception Facilities or, when Applicable, Application of No-Special-Fee System in the Mediterranean. The guidelines have been submitted to the respective MAP Components' Focal Points Meetings for technical approval and submission to higher MAP decision-making bodies. A socio-economic analysis of key measures to prevent/reduce single use of plastic bags and bottles is also under development.

203 Two regional meetings on marine litter best practices were organized (Izmir, Turkey, 9–10 October 2018 and Seville, Spain, 8–10 April 2019) which reviewed the progress on the implementation of the Regional Plan on Marine

Litter Management in the Mediterranean and introduced the main elements for its evaluation. Best practices and lessons learned from the implementation of the Regional Plan and the marine litter pilots were shared among the Parties. The Secretariat has initiated an activity to test and possibly refine the baseline values and thresholds for marine litter-related indicators of the Integrated Monitoring and Assessment Programme (IMAP). Work has advanced with regards to the development of the IMAP Candidate Indicator 24 'trends in the amount of litter ingested by or entangling marine organisms focusing on selected mammals, marine birds and marine turtles', with a focus on the common marine turtle, *caretta caretta*.

204 UNEP-MAP and the French G7 Presidency organized, with support from the Italian government, the Workshop on the G7 Action Plan to Combat Marine Litter in synergy with the Regional Seas Convention (Metz, France, 5–6 May 2019), which brought together representatives of G7 Countries, Regional Seas Conventions and Programmes to which G7 Countries are party, and a number of stakeholders from intergovernmental mechanisms, civil society and industry. The workshop built on the outcomes of the similar 2017 workshop organized in the framework of the Italian G7 Presidency and advanced the discussions on the contribution of the work at regional level to the implementation of the G7 Action Plan to Combat Marine Litter, and potential benefits from a stronger collaboration between the Regional Sea Conventions and Regional Fisheries Bodies. Key messages from the workshop were presented to the Meeting of the G7 Ministers of Environment by the MAP Coordinator, upon invitation by the Presidency.

205 UNEP-MAP continues working on pollution monitoring and assessment and the establishment of trends in the Mediterranean. Following the adoption of IMAP in 2016, providing for a coherent programme based on commonly agreed region-wide indicators, Contracting Parties are working, with support from the Secretariat, to develop, update and implement their national IMAPs, which are expected to generate real-time data to assess the status of the marine and coastal environment. The last Quality Status Report (QSR) for the Mediterranean dates from 2017. The next one will be prepared in 2023 (2023 Med QSR). During the meetings of the Correspondence Group on Pollution and Marine Litter Monitoring (CORMON Pollution and Marine Litter) the Parties approved the methodologies proposed for GES-integrated assessment based on the 'drivers, pressures, state, impact and response' (DPSIR) approach, the steps towards further refinement of the scales of assessment in the Mediterranean by applying a nested approach,

the IMAP Common Indicators Data Standards and Data Dictionaries, the implementation of a new quality assurance scheme and the proposed monitoring protocols.

206 Currently, UNEP-MAP is preparing a State of Environment and Development report which addresses the environmental status and main sustainability issues related to the environment and development in the Mediterranean region, including the state, evolution and trends of the environment and development, driving forces and root causes, as well as existing and required policy and societal responses.

207 Reporting of pollutant loads discharged directly or indirectly into the Mediterranean is mandatory. Work is ongoing to ensure an update of the last 2015 reporting of pollutant budgets by all Contracting Parties through the National Baseline Budget and Pollutant Release and Transfer Register (NBB/PRTR) reporting, and UNEP-MAP is cooperating with the European Environment Agency (EEA) to deliver a joint regional report in 2019. The Secretariat is providing support to 10 Contracting Parties to submit quality-assured data to the NBB/PRTR infosystem. The Regional Meeting on Reporting of Releases to the Marine and Coastal Environment from Land-Based Sources and Activities and related Indicators (Tirana, Albania, on 19–20 March 2019) reviewed several documents, including lessons learned from the ongoing 4th Cycle of the NBB of Pollutants. As part of the ENI SEIS II South Support Mechanism, implemented jointly by UNEP-MAP and EEA, methodological factsheets and data dictionaries have been developed for the waste, marine litter and industrial emissions Horizon 2020 indicators.

208 The evaluation of the status of implementation of the existing pollution reduction and prevention regional plans adopted by COP decisions between 2009 and 2013 (i.e. for the reduction of BOD5 from urban wastewater and in the food sector; the reduction of inputs of mercury; the elimination/phasing out of POPs and marine litter management) has been carried out, providing information on trends and quantitative data. A synthesis of past evolution, current state and future trends of marine litter in the Mediterranean—with a focus on main sources and drivers as well as on prevention responses—was also prepared by MEDPOL. Through a highly consultative process, the main elements of six new or updated pollution reduction regional plans (Municipal Waste Water Treatment Plants, Sewage Sludge Management, Agriculture Nutrients Management, Aquaculture Nutrients Management, Urban Storm Water Management, Marine Litter (upgrade)) have been defined for the

development of the plans within the two next biennia.

209 Impacts from mining operations: UNEP-MAP, with support from REMPEC, is organizing the Second Meeting of the Barcelona Convention Offshore Oil and Gas Group (OFOG) Sub-Group on Environmental Impact in Athens, Greece, on 27–28 June 2019. The meeting is expected to review and approve at a technical level a set of Mediterranean Offshore Guidelines and Standards, addressing key aspects of offshore activities—namely the: i) Guidelines for the Conduct of Environmental Impact Assessment (EIA); ii) Common Standards and Guidance on the Disposal of Oil and Oily Mixtures and the Use and Disposal of Drilling Fluids and Cuttings; and iii) Common Standards and Guidelines for Special Restrictions or Conditions for Specially Protected Areas (SPAs) within the Framework of the Mediterranean Offshore Action Plan. In addition, the Secretariat has prepared and submitted for review by the OFOG meeting an analysis of the status of implementation of the Mediterranean Offshore Action Plan, including general recommendations for further streamlining of the ecosystem approach and other regional and global developments, and a review regarding possible amendments to the Annexes of the Offshore Protocol.

210 New emerging issues: The preparation of the draft scientific assessment report on environmental and climate change in the Mediterranean is progressing. Work has started to enhance the use of harmonized climate change vulnerability and impacts indicators for biodiversity in Specially Protected Areas of Mediterranean Importance (SPAMIs), also addressing socio-economic trends. A cost analysis for the implementation of the indicators in a sample of SPAMIs is under preparation. Work is also ongoing on 'Nature-Based Solution' as a means to adapt to climate change in the Mediterranean, by capitalizing on the best practices workshop organized by Plan Bleu/RAC, IUCN Med, IUCN France, Tour du Valat, Conservatoire du Littoral, MedWet and Wetlands International (Marseille, France, 22–24 January 2019). A policy paper on integrating natural areas in the methods of adapting to climate change has been prepared and submitted to the Plan Bleu Focal Points meeting (Marseille, France, 28–29 May 2019).

211 Global presence: In the last year, UNEP-MAP had an active presence in key regional and global events and forums, contributing to the discussions, presenting the work in the Mediterranean region and organizing side events, including at UNEA-4 (Nairobi, Kenya, 11–15 March 2019), the G7 Environment Ministers Meeting (Metz, France, 5–6 May 2019), the

Sustainable Blue Economy Conference (Nairobi, Kenya, 26–28 November 2018), COP14 of the Convention on Biological Diversity (Sharm el Sheikh, Egypt, 17–29 November 2018) and its side event on the Sustainable Ocean Initiative Global Dialogue, the GFCM Fish Forum 2018 (Rome, Italy, 10–14 December 2018), the UNFCCC COP24 (Katowice, Poland, 2–14 December 2018), the conference 'Before the Blue COP' organized by the Ministry for the Ecological Transition of Spain in preparation for the UNFCCC COP25, the Closing Conference of the SWIM and Horizon 2020 Support Mechanism (SM) (Brussels, Belgium, 8 April 2019), the 73rd Meeting of IMO-MEPC (London, UK, 22–26 October 2018), the 2019 Regional Forum on Sustainable Development for the UNECE Region (Geneva, Switzerland, 21–22 March 2019), the Annual Conference of the Arab Forum on the Environment and Development (AFED) (Beirut, Lebanon, 8–9 November 2018), the 2nd Sustainability Summit for South-East Europe and the Mediterranean (Athens, Greece, 1–2 October 2018) and the 2018 Eco City Forum 'Circular Economy in Smart Cities' (Thessaloniki, Greece, 3–5 October 2018). UNEP-MAP was also represented through one of its Contracting Parties at the side event on 'Application of area-based management tools under the regional seas programmes' organized in the framework of the second session of the 'Intergovernmental Conference on an international legally binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction' (New York, USA, 25 March to 5 April 2019) and others.

212 Cooperation/partnerships: UNEP-MAP has continued and further strengthened cooperation with key regional and global organizations and actors. Among others, the Memorandum of Understanding (MoU) with the Basel, Rotterdam and Stockholm Conventions (BRS) Secretariat was amended; formal cooperation with the Benguela Current Convention (BCC) was launched in the framework of a GEF-funded Inter-project Collaboration Opportunity (ICO); a direct assignment between SCP/RAC and the European Bank for Reconstruction and Development (EBRD) was signed; the MoU between REMPEC and the Centre of Documentation, Research and Experimentation on Accidental Water Pollution (Cedre) was renewed, and MoUs with Sea Alarm, Federazione Nazionale dell'Industria Chimica (FEDERCHIMICA) and the Mediterranean Operational Network for the Global Ocean Observing System (MONGOOS) are in force.

213 Cooperation with other organizations, including the European Environment Agency (EEA), the General Fisheries Commission for the

Mediterranean (GFCM), the Black Sea Commission, the ACCOBAMS, IOC-UNESCO, the Union for the Mediterranean (UfM), etc., has continued.

Nairobi Convention (East Africa)

214 The Nairobi Convention held the Ninth Conference of Parties to the Nairobi Convention on 30–31 August 2018 in Mombasa, Kenya. The 10 Contracting Parties adopted 15 decisions, including on priority areas such as the management of marine protected areas; marine and coastal biodiversity conservation and connectivity in exclusive economic zones and adjacent areas; ocean governance; pollution from land-based sources and activities; climate change; ocean acidification; environmental management for the oil and gas industry; growth of the blue economy; scientific research; fisheries management; MSP; integrated coastal management; and the sustainable development of ports and harbours.

215 On 27 March 2019, Contracting Parties to the Nairobi Convention agreed on the final language for the [ICZM Protocol](#). States had started discussing the protocol in 2012, and the meeting in Dar es Salaam, Tanzania, marked the fourth round of negotiations on the text. Some objectives of ICZM include promoting the sustainable use of resources, conserving the integrity and value of ecosystems and preventing and mitigating the effects of natural and human threats to coastal and marine environments. The protocol provides a framework to promote regional and national ICZM and enhance cooperation for sustainable development in the Western Indian Ocean (WIO) region. The protocol will now move to the Convention's Conference of Plenipotentiaries for formal adoption.

216 Project Steering Committee (PSC) Meetings: The Nairobi Convention held PSC meetings for its two GEF-funded projects: 'Implementing the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources' (WIOSAP) and 'Western Indian Ocean Large Marine Ecosystems Strategic Action Programme Policy Harmonization and Institutional Reforms' (WIO LME SAPPHERE) in June 2019. The meetings approved progress reports and Terms of Reference; proposals and concepts for demo projects; guidelines and toolkits; and annual work plans and budgets.

217 The Nairobi Convention has developed a partnership project on 'Marine and Coastal Governance and Fisheries Management for Sustainable Blue Growth' with the FAO's South West Indian Ocean Fisheries Commission (SWIOFC) and has signed an MoU. Contracting

Parties have committed to cooperating on fisheries management (through the SWIOFC) and on environmental protection (through the Nairobi Convention). Such cooperation will lead to a more integrated management of the fisheries and other uses of the coastal environment. The project will allow the Contracting Parties to benefit from a coordinated and mutually reinforcing intervention on both fisheries and environment conservation beyond what could be obtained by uncoordinated interventions in a singular field. The project aims to improve food security, increase resilience and reduce poverty of fisheries-dependent coastal communities.

218 The Nairobi Convention, in collaboration with IOC-UNESCO and the Western Indian Ocean Marine Science Association (WIOMSA), organized regional training courses on MSP in September and October 2018 in Kenya and Mauritius. The training course on MSP supported the implementation of the project 'Implementation of the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities' and presented the concepts of ecosystem-based management, including application to data, information and national needs on decision support tools, which are essential for ICZM. The Nairobi Convention also held training on MSP in Tanzania in March 2019, which allowed participants to examine MSP practices and tailor the implementation of MSP to their own maritime domains.

219 The Nairobi Convention has developed the 'Western Indian Ocean Regional Outlook on Marine Protected Areas', which will provide regional baselines on protected areas for SDG 14.5 (by 2020, states should conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on best available scientific information). The Regional Outlook is expected to be launched by the end of 2019. The Nairobi Convention organized 'Regional Training for Eastern Africa Countries on Oil Pollution Shoreline Clean-up Assessment and Response' on 6–9 November 2018 in Dar es Salaam, Tanzania, in collaboration with UNEP Post-Conflict and Disaster Management, Geneva; the Oil for Development programme, Norway; IMO; and the International Tanker Owners Pollution Federation Limited. The training focused on assessment of and response to incidents where oil reaches the shoreline—providing an understanding of how oil affects the local environment, the different vulnerabilities present in the region and how to prioritize response actions.

220 The Nairobi Convention Secretariat organized a regional training workshop on 10–11 December 2018 in Maputo, Mozambique, in

partnership with the UNEP Global Programme of Action, on the protection of the marine environment from land-based activities. The workshop demonstrated the use of tools for management of pollution from land-based sources and activities, including the Technology Matrix for Wastewater, the Nutrient Management Toolbox and the Ecosystem health scorecard. The workshop also validated the regional action plan on marine litter developed by the Institute of Marine Sciences of Tanzania and the Global Programme of Action for the protection of the marine environment from land-based activities.

221 The Nairobi Convention's GEF-funded WIOSAP project strives to reduce land-based stresses by protecting critical habitats, improving water quality and managing river flows. To this end, the project is funding several demonstration projects in Western Indian Ocean (WIO) countries to address various land-based stresses. The National Implementation Committees (NICs) of the project have reviewed 49 concepts for demonstration projects from all WIO countries. Of these, eight full proposals have been developed and approved by WIOSAP's PSC, thus paving the way for actual implementation of the demonstration projects.

222 The Nairobi Convention has developed tools and guidelines to support the implementation of national demonstration projects, including mangrove restoration guidelines, seagrass restoration guidelines, a climate change vulnerability assessment toolkit, economic valuation guidelines, and an e-flows assessment toolkit and assessment of alternative livelihoods. The guidelines and toolkits capture specific WIO case studies on how the various interventions have worked and lessons learned; they are expected to be released in the coming year.

223 The Nairobi Convention will be receiving funding and implementing the project 'Integrated Management of the Marine and Coastal Resources of the Northern Mozambique Channel', funded by the Global Environment Facility, the Swedish International Development Cooperation Agency (Sida) and members of the West Indian Ocean Consortium (WIO-C). The project will address scenarios for development to maximize the opportunities for sustainable development in the Northern Mozambique Channel, based on preservation of the health of marine ecosystems as a foundation for future prosperity. The project will use the holistic approach for Integrated Ocean Management to help the countries achieve the SDGs, especially SDG 14.

224 The Nairobi Convention organized the '[Partnership Meeting with Regional Economic Communities and Commissions in the Western](#)

[Indian Ocean Region](#)' in April 2019 in South Africa. The workshop established working relationships with Regional Economic Communities, Commissions, fisheries bodies and regional scientific bodies in the WIO region to support and facilitate regional economic integration and promote sustainable development and governance in the Member States. A recommendation from the meeting was to establish a 'core group' as a way for the Nairobi Convention Secretariat, Regional Economic Communities, Commissions and partners to communicate on these initiatives.

225 As part of its SAPPHIRE project (implemented by UNDP), the Nairobi Convention held four partnership meetings on oceanographic data and scientific research in the WIO region between March and June 2019. The sessions brought together scientists, policymakers and partners to discuss the status of national data centres; identify priorities of countries in using, managing and owning data findings; and agree on mechanisms and partnerships to improve data collection, sharing and archiving, among other topics. Accordingly, a small-scale funding agreement with KMFRI and IMS—which will support data collection and research in North Kenya and the Pemba channel of Tanzania—is ready to be signed

226 The Nairobi Convention showcased the results, related initiatives and key challenges of the 'Deep Seas' project on ABNJ at the 2019 Deep-Sea Conference held in Rome, Italy, on 9 May 2019. Stakeholders representing multiple sectors within ABNJ synthesized the opportunities and challenges faced and discussed support to sustainable deep-sea fisheries management and biodiversity conservation in ABNJ.

227 The Nairobi Convention organized the 'Western Indian Ocean Regional Science to Policy Workshop' on 27–29 May 2019 in Port Louis, Mauritius. The goal of the meeting was to establish and operationalize the Science to Policy Platform as a core structure within the Nairobi Convention; establish a Scientific and Policy Advisory Panel for the region; and facilitate information-sharing between institutions and the Nairobi Convention and other regional processes. The meeting reviewed the Platform's Terms of Reference, membership and modus operandi, and discussed the need for a regional ecosystem/indicator monitoring framework and road map on its development.

228 [World Oceans Day](#) was 8 June 2019, and the Nairobi Convention celebrated by releasing information on major issues facing the WIO region and how the Contracting Parties are working to sustainably protect, manage and use

their marine and coastal resources. In addition to sharing stories highlighting actions taken by each of its Contracting Parties, the Convention also received several stories from partner institutions outlining progress, challenges and recommendations.

Cartagena Convention-Caribbean Environment Programme

229 To date, the [Cartagena Convention](#) has been ratified by 26 of the 28 United Nations Member States in the Wider Caribbean Region. The Convention was adopted in 1983 and is supported by three Protocols: the [Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region](#), the [Protocol Concerning Specially Protected Areas and Wildlife \(SPA\) in the Wider Caribbean Region](#) (17 Contracting Parties) and the [Protocol Concerning Pollution from Land-Based Sources and Activities \(LBS Protocol\)](#) (14 Contracting Parties). On 13 October 2018, Honduras became the most recent country to ratify the Cartagena Convention and its three Protocols. During 2018, technical support was provided by the Secretariat to the governments of St. Kitts and Nevis, Suriname, St. Vincent and the Grenadines, Barbados, Haiti and Cuba to assist them with their ratification process for the LBS Protocol, while discussions with Mexico and Guatemala are ongoing with respect to possible ratification of the SPAW Protocol.

230 The 15th Conference of the Parties to the Cartagena Convention and the 10th and 4th Meetings of the Contracting Parties to the SPAW and LBS Protocols, respectively, were held on 3–6 June 2019 in Roatán, Honduras. Among the key outcomes were the adoption of a new 2020–2030 strategy for the Secretariat and approval of its work plan and budget for 2019–2020.

231 At the 10th SPAW COP, two new species were added to the Annexes of the SPAW Protocol: *Pristis pristis* (Largetooth sawfish) to Annex II, and *Carcharhinus falciformis* (Silky shark) to Annex III. The total number of listed species has now increased to 256. The 10th SPAW COP also endorsed two new protected areas: the Mount Scenery National Park of Saba Island proposed by the Kingdom of the Netherlands, and the National Natural Reserve of Kaw-Roura and the National Natural Reserve of Amana, both in French Guiana, proposed by the Government of France. These new additions bring the total number of SPAW listed sites to 35.

232 The COP to the Cartagena Convention adopted decisions to build partnerships for improving oceans governance through the Coordinating Mechanism established under the UNDP Global Environment Facility—the

Caribbean and North Brazil Shelf Large Marine Ecosystems (GEF CLME+) Project—as well as with the Inter-American Sea Turtle Convention, IAEA, the Ocean Foundation and the Caribbean Marine Environment Protection Association (CARIBMEPA).

233 Contracting Parties at the 4th LBS COP adopted the region's first State of Marine Pollution Report and decided to establish a new Open-Ended Working Group for Monitoring and Assessment to support the work of the LBS Protocol.

234 A report on the status of Styrofoam and plastic bag bans in the Wider Caribbean region was finalized and presented as a resource document for governments in the region. The report summarizes the bans and policies that have been implemented in the region to support ongoing efforts to regulate the use and production of single-used plastics and Styrofoam. The report is complemented by an [interactive map](#) of the region depicting the geographical distribution of these bans.

235 Other publications which the Secretariat contributed on marine pollution included '[Marine Pollution in the Caribbean: Not a Minute to Waste](#)', led by the World Bank, '[Guidelines for the Monitoring and Assessment of Plastic Litter in the Ocean](#)' by GESAMP and the 'Harmonized Manual on Marine Litter Monitoring' in partnership with the OSPAR Commission and the Gulf and Caribbean Fisheries Institute (GCFI).

236 The three-year project 'Biodiversity for Sustainable Development in the Caribbean (Ecosystem-Based Management—EBM)' (extended to four years), funded by the Directorate for the Environment within the Ministry of Foreign Affairs of Italy, is ongoing. Its objective is to increase the livelihood of the population in the Wider Caribbean region by contributing to the conservation and sustainable management of coastal and marine biodiversity through the application of the EBM approach.

237 The project is now focused on improving functionality and updating the data sets of the CaMPAM database, especially MPAs listed under the SPAW Protocol. This will contribute to the State of the Marine Ecosystems and Associated Economies (SOME/CLME+) and the State of the Convention Area Report (SOCAR) processes on the status of the marine environment of the Wider Caribbean Region. The website is currently being redesigned and will be launched via integration with the new server of the Secretariat to the Cartagena Convention. The forum will be redesigned to encourage open and interactive discussions between members and to enhance

linkages between managers of MPAs.

238 The Secretariat continues to promote the use of Ecosystem-Based Approaches and MSP tools for integrating habitat restoration and pollution reduction projects. In Trinidad and Tobago, the sampling of water quality sites of the Guayamare Cunipia study/Caroni swamp area was completed to address the impacts of land-based sources of pollutants on the mangrove swamp.

239 There has been continued progress towards the completion of the draft State of Habitat report and the 2020–2030 Regional Strategy and Action Plan and Investment Plan, supported by the UNDP GEF CLME+ Project. The full proposal for the GEF-funded Caribbean Regional Fund for Wastewater Management (CREW+) Project titled 'Upscaling and enhancing the experience of the Caribbean Regional Fund for Wastewater Management to the wider Caribbean promoting through an integrated approach of innovative technical solutions and financing mechanisms' was developed and submitted to the GEF Secretariat in May 2019 for review and possible approval.

240 Marine litter remains a priority for the Wider Caribbean Region. The community-based project launched in Panama and Jamaica under the Trash Free Waters International Partnership involving the Cartagena Convention Secretariat and the US Environmental Protection Agency has reduced the impacts of marine litter on coastal and marine ecosystems, livelihoods and humans. Sandals Foundation has been coordinating the implementation of pilot project activities in the towns of Bluefields and Whitehouse in Jamaica since 2018. The project will be scaled up and replicated in other countries.

241 New communications products including technical reports, infographics and factsheets on pollution and marine biodiversity were developed to increase awareness of the state of the marine environment and the threats to the sustainable use of coastal and marine resources. The Secretariat and the GCFI, as co-hosts for the Caribbean Regional Node on Marine Litter, expanded their communications and outreach efforts by developing factsheets on microplastics, marine litter and sargassum.

242 The Secretariat celebrated several environmental commemorative days, including International Day for Biological Diversity, World Environment Day and World Oceans Day, through outreach activities and/or social media. A mini social media campaign was undertaken in May 2019 to enhance dissemination efforts about EBM in the region and its related pilot project in the

Dominican Republic (#ecosystembasedmanagement). A one-month social media campaign on marine litter in July 2019 (#PlasticFreeJuly) is being coordinated through the Caribbean Regional Node on Marine Litter.

243 The Secretariat and GCFI convened a marine litter expert mworkshop in March 2019 to develop a five-year plan for a regional marine litter strategy, including priority project proposal concepts for marine litter management in the Wider Caribbean Region. This will support the continued implementation of the [Caribbean Regional Action Plan for Marine Litter \(RAPMaLI\)](#). A two-day regional marine litter expert workshop was also held on 18–19 October 2018 to highlight best practices on harmonized monitoring strategies, assess the effectiveness of monitoring and propose arrangements for strengthening monitoring programmes, as well as the management of marine litter data.

244 The Secretariats of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the Cartagena Convention have made a voluntary commitment to collaborate across the Atlantic as part of their contribution to achieving SDG 14. In 2018, funding for their cooperative agreement was provided by the Kingdom of the Netherlands and Sweden, and a proposed full-sized five-year project is being drafted on the management of MPAs and capacity-building. The proposal will include input from a task group (representatives from France, the Netherlands and United Kingdom in Europe and the Caribbean), as well as from the Cartagena Convention and OSPAR Secretariat staff.

245 There has been continued progress in the implementation of the five-year GEF-funded project 'Integrating Water, Land & Ecosystems Management' (GEF-IWEco), which focuses on the preservation of ecosystems in Caribbean Small Island Developing States (SIDS). Since the last reporting period, Project Cooperation Agreements were prepared for Trinidad and Tobago, Antigua & Barbuda, Saint Lucia, Jamaica and St. Kitts & Nevis. In relation to environmental education, communication and awareness-raising activities for the project under Component 4, 8 webinars were conducted, with over 72 participants being trained to date.

246 The GEF-IWEco Project Coordinating Unit hosted its 3rd Regional Project Steering Committee Meeting (RPSC3) in Santo Domingo, Dominican Republic, on 2–4 April 2019 and its Governance Partnership Meeting in March 2019. In November 2018, the IWEco national projects in Jamaica and Cuba ('Conservation and

Sustainable Use of Biodiversity from the Integrated Management of Watersheds and Coastal Areas in Cuba') were launched. A regional training workshop on Ecosystem Services Assessment and Valuation (ESAV) and Carbon Sequestration was also held in May 2019 as part of Component 2 of the project.

247 After the launch of the global 'Clean Seas Campaign' in 2017, the Secretariat actively promoted participation in the campaign, and 10 countries have signed on to the campaign in less than 15 months. Seven of the countries that have signed on to the campaign are also Contracting Parties to the LBS Protocol. They include the governments of Panama, Dominican Republic, Costa Rica, Saint Lucia, Grenada and France.

258 The Regional Activity Centre for the Protocol on Oil Spills (RAC REMPEITC-Caribe), based in Willemstad, Curacao, completed a feasibility study for the possible development of a Regional Reception Facility for Ship Generated Wastes among the SIDS of the Wider Caribbean Region. The study includes a detailed analysis of shipping data, site visits and assessments of ports in 16 United Nations Member SIDS, and identification of possible measures to address the inadequacy of port reception facilities throughout the Wider Caribbean Region.

249 Support from the SPAW Protocol's Regional Activity Centre has been integral in the implementation of two significant projects funded by the EU—namely, the Caribbean Marine Mammals Preservation Network (CARI'MAM Project 2017–2020) and the Caribbean Coastal Risks related to Climate Change for a Monitoring and Prevention Network (CARIB Coast Project). The CARI'MAM Project was launched in Martinique in October 2018.

South Asian Seas Programme

250 The South Asia Co-operative Environment Programme (SACEP) is the Secretariat for the South Asian Seas Programme, which is one of the 18 UNEP Regional Seas Programme, signed and formally adopted by the 5 South Asian maritime countries (Bangladesh, India, Maldives, Pakistan and Sri Lanka) in 1995 to protect and manage the marine environment and related coastal ecosystems of the region in an environmentally sound and sustainable manner.

Ongoing activities

251 Scoping study of nutrient pollution on the coastal and marine systems of South Asia: SACEP, with assistance from the International Nitrogen Management System, organized a regional meeting in Maldives on nitrogen

management on 12–14 September 2017. The 14th Governing Council meeting of SACEP held on 26–28 March 2018 in Colombo, Sri Lanka, suggested that the SACEP Secretariat lead Member States to redraft a nitrogen management resolution originally targeted for UNEA-3, according to the theme of UNEA-4. Led by the Government of India, the nitrogen resolution was submitted to UNEA-4, held on 11–14 March 2019.

252 SACEP has established the South Asian Nitrogen Hub, in collaboration with the Centre for Ecology & Hydrology and many other organizations across the United Kingdom and South Asia. The Hub is funded by UK Research and Innovation under its Global Challenges Research Fund. It will contribute to protection from marine pollution, air pollution and climate change from land-based sources in South Asia, with a view to establishing policy recommendations for nitrogen management in the South Asia region. Over the next five years, the Hub will study the impacts of the different forms of pollution to form a coherent picture of the nitrogen cycle. In particular, it will look at nitrogen in agriculture in eight countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. The Hub's recommendations will support cleaner and more profitable farming, as well as industrial recycling of nitrogen, fostering development of a cleaner circular economy for nitrogen.

253 Significance of nitrogen in the region: South Asia, home to a quarter of the world's population, is critical to the global nitrogen cycle. By 2050, its population of 1.8 billion is expected to grow by 20 percent, while its use of fertilizers could double. Around 12 million tonnes of nitrogen are used in fertilizers across South Asia to support food production, but the efficiency is low, with around 80 percent wasted, which contributes to multiple forms of nitrogen pollution. About USD10 billion worth of nitrogen is lost as pollution in South Asia. In India alone, the total societal cost of nitrogen pollution on human health, ecosystems and climate is estimated at about USD75 billion annually. Atmospheric nitrogen pollution stimulates growth of certain plants at the expense of more sensitive species with a high conservation value. There is a significant risk to global biodiversity hotspots such as the Himalayan foothills, especially as the Indo-Gangetic Plain has the highest ammonia (NH₃) concentrations in the world, arising mainly from livestock excreta and urea fertilizer used in agriculture. Government subsidies to the fertilizer industry in South Asia are around USD10 billion a year (including USD7 billion in India). In his [Mann ki Baat address](#) on 26 November 2017, India's Prime Minister, Narendra Modi, asked the country's farmers to cut urea fertilizer consumption by half by 2022.

254 Development of a marine and coastal biodiversity strategy for the South Asian Seas Region: To strengthen the updating of the National Biodiversity Strategies and Action Plans (NBSAPs) process, foster collaboration and help identify and address challenges that require regional solutions, the South Asian Seas Programme and UNEP have initiated an activity to develop a South Asia Regional Marine and Coastal Biodiversity Strategy in partnership with various other stakeholders. The Strategy was prepared in parallel with the NBSAPs; it will assist the five maritime countries of South Asia to achieve Aichi Targets relevant to coastal and marine biodiversity at national and regional levels. This process will support and guide future revision of the South Asian Seas Action Plan. SACEP, with assistance from UNEP, organized a regional consultative workshop in September 2018 in Maldives to ensure common understanding, agreement on strategy contents and a pathway to finalization. This report has been circulated among the member countries for their necessary consents prior to its adoption at the 6th Intergovernmental Meeting of Ministers for the South Asian Seas Programme.

255 Reducing the risk of degradation of the Kayankerni and Pasikuda coral reef ecosystems in Sri Lanka by addressing nutrient, wastewater and other land-based sources of marine pollution within the Maduru Oya watershed: Globally, coral environments are facing many challenges from climate change and ocean acidification. In addition, human and land-based pollution is another major ongoing problem, especially in the South Asian Sea region due to intense agriculture practices. The region is rich in marine biodiversity, and countries in the region have made a huge economic gain from tourism. To maintain the harmony and synergic relations among human activities and the coral environment, a meeting was held on 9 March 2018 in Colombo, Sri Lanka, with participants from government, civil society and academia, along with experts from UNEP, to discuss best possible management practices to overcome current issues. This study will fill the gaps between the economic damage due to environmental pollution and the sum of costs needed to prevent impacts of environmental pollution on recipients. The lessons learned from the initial pilot project exercises will be further scaled up to other South Asian Seas countries to guide appropriate measures.

256 Endorsement of the formal adoption of the Ballast Water Management (BWM) Convention for the South Asia Seas Region: SACEP and IMO jointly organized a regional workshop on the 2004 BWM Convention, hosted by the Government of the Republic of Maldives in Malé, Maldives, on 18–20 June 2019. The

workshop was aimed at government administrators responsible for the prevention and control of pollution of the marine environment, in particular the control and management of ships' ballast water and sediments to prevent the introduction of invasive aquatic species. The workshop also aimed to assist the administrations of South Asian member countries in preparing for ratification and implementation of the BWM Convention, with a special emphasis on compliance monitoring and enforcement, as well as Port Biological Baseline Surveys and risk assessments. More specifically, the workshop provided guidance for authorities involved in flag and port State control surveys and inspections carried out under the provisions of the BWM Convention. IMO has indicated that South Asia will receive many more benefits once all the members of the South Asian Seas Programme sign the MOU for collaborative activities. SACEP is further coordinating with IMO for the further implementation of activities in the region.

257 Regional Marine Litter Action Plan: SACEP developed a regional marine litter management framework in the South Asia Seas region in 2017 with the assistance of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities. The framework provided recommendations for further implementation, including the development of a regional policy on marine litter management in the region. The Regional Marine Litter Action Plan report was prepared after all the national Contracting Parties finalized their National Marine Litter Action Plans to combat marine litter pollution, containing programmes and measures for marine litter prevention and reduction, and a time-frame for their implementation. This report, submitted successfully to UNEP, is an implementation guide and reference tool. It will be used for future policy, planning, research and development of marine litter mitigation tools in areas related to the marine environment as well as pollution from land- and sea-based sources.

258 Endorsement of the formal adoption of the London Protocol for the South Asia Seas Region: As part of its mandate, SACEP has communicated to the maritime countries of the South Asian Seas on ratifying the London Protocol. The ratification of the Protocol will help combat human-generated pollution discharging to the coast and marine environment of the region. SACEP will be organizing a regional workshop on promotion of the Protocol in the South Asian Seas Region, with financial and technical supported from IMO and hosted by the Ministry of Environment and Forest, Government of Bangladesh on 10–11 July 2019 in Dhaka, Bangladesh. The workshop is aimed at government administrators responsible for the

prevention and control of pollution from dumping of wastes at sea. Participants from national authorities should be of a senior level within their administrations, with areas of responsibility involving both technical and policymaking decisions. The workshop will also sensitize relevant authorities to the benefits and implications of ratifying, implementing and enforcing the London Protocol, with a special emphasis on the protection of ports and the ocean environment.

Helsinki Convention

259 The Helsinki Convention (HELCOM) is a Regional Sea Convention in the Baltic Sea, consisting of 10 members: nine coastal countries (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden) and the EU. HELCOM works for a healthy Baltic Sea, and its mandate stems from a regional treaty adopted in 1974 and amended in 1992 that covers the whole sea area, including the seabed and the resident biota, and pollution sources that may influence the sea. The HELCOM Secretariat is located in Helsinki, Finland.

260 Ministerial Meeting 2018 and update of the Baltic Sea Action Plan (BSAP): The HELCOM Ministerial Meeting held in Brussels, Belgium, in May 2018 agreed to update the BSAP—the concrete road map for restoring the ecological balance of the Baltic Sea—by 2021. The updated BSAP will include new measures that are needed to achieve the existing goals: a Baltic Sea unaffected by eutrophication, with life undisturbed by hazardous substances, maritime activities carried out in an environmentally friendly way, and favourable conservation status of the Baltic Sea biodiversity. The objectives of the BSAP have not yet been reached, but it has shown promising results towards improving the environmental status of the Baltic Sea. The updated BSAP will consider the latest scientific knowledge about the ecosystems and use the water- and ocean-related SDGs as a framework. It will also be based on the analysis of the efficiency of current measures. In addition to existing commitments, the updated plan will address new issues such as underwater noise, marine litter, microplastics, pharmaceuticals, and seabed damage and disturbance, and take the foreseen climate change impacts into account.

261 The sixth HELCOM Pollution Load Compilation (PLC-6): Finalized in 2018, PLC-6 aggregates data on nutrients, focusing on annual and periodic assessments of inputs of nutrients and selected hazardous substances. According to the PLC-6 assessment, a significant reduction in nutrient inputs was achieved for the whole Baltic Sea in 2015: the normalized input of nitrogen and

phosphorus had decreased by 12 percent and 25 percent, respectively, compared to the reference period (1997–2003). The Maximum Allowable Inputs (MAI) of nitrogen in this period were met in the Kattegat, Danish Straits, Bothnian Bay and Bothnian Sea. The MAI of phosphorus input were met in the Kattegat, Danish Straits and Bothnian Sea.

262 Nutrient recycling: According to the results of the 2018 report on the state of the Baltic Sea, 97 percent of the Baltic Sea area suffers from eutrophication caused by nutrient loading. Agriculture remains a large source of nitrogen and phosphorus runoff to the sea. In 2018, HELCOM members, therefore, agreed to elaborate a Baltic Sea Regional Nutrient Recycling Strategy by 2020. The aim is to reduce nutrient loading to and eutrophication of the Baltic Sea by circulating the nutrients in the food chain.

263 New platform for nutrient management: To address eutrophication and reduce nutrient inputs to the Baltic Sea, a new project platform co-funded by the EU, ‘Sustainable manure and nutrient management for reduction of nutrient loss in the Baltic Sea Region’ (SuMaNu), in which HELCOM participates was launched. The platform will collect information from previous agriculture-related projects and share their best practices. The platform will also support the elaboration of the nutrient recycling strategy and the update of the agriculture part of the Baltic Sea Action Plan.

264 HELCOM work on fisheries in relation to the implementation of the ecosystem-based approach: HELCOM’s group on ecosystem-based sustainable fisheries (Fish Group) met in January 2019 to consider, *inter alia*, the update of the Baltic Sea Action Plan, the development of a road map on collection of fisheries data to assess incidental bycatches and the impact of fisheries on benthic biotopes in the Baltic Sea, as well as best available technology/best environmental practices (BAT/BEP) for sustainable aquaculture. Progress on this work had also been made during the third meeting of the Correspondence Group for fisheries data and the second meeting of the HELCOM Intersessional Correspondence Group on BAT/BEP for sustainable aquaculture in the Baltic Sea Region, both of which met in November 2018.

265 In 2018, HELCOM released its ‘[Status of coastal fish communities in the Baltic Sea during 2011–2016: the third thematic assessment](#)’ report, which concludes that only about half of the areas assessed are in a good state in regard to coastal fish. As highlighted in the report, fishing regulations that include permanent or temporary no-take areas, gear regulations, and habitat protection and restoration have been shown to

have a positive effect on fish populations. The three-year (2017–2020) RETROUT project led by HELCOM and co-financed by the EU focuses on establishing healthy fish populations for recreational fishing, such as sea trout. As recreational fishing in the Baltic Sea has unused potential, the overall scope of RETROUT is to develop and promote the Baltic Sea region as a coastal fishing tourism destination.

266 HOLAS II/State of the Baltic Sea report: HELCOM published the final version of the 'State of the Baltic Sea' report in 2018, providing a complete insight into the ecological state of the Baltic Sea and the pressures affecting it. The report shows that, despite improvements, the sea is not yet in a good state, with eutrophication causing the major stress. Approved by all HELCOM member countries, the report is based on verified scientific evidence stemming from a recently concluded HELCOM assessment, the '[Second Holistic Assessment of the Ecosystem Health of the Baltic Sea](#)' (HOLAS II). It is the most comprehensive baseline currently available on the Baltic Sea.

267 HELCOM work on response to oil and HNS spills: The HELCOM Response Working Group has met twice since the 45th Annual Meeting of GESAMP, making progress on a number of matters, such as updating the BSAP, assessing and revising HELCOM recommendations related to response, revising the HELCOM 'Response Manual' and improving the HELCOM response exercise framework. The OpenRisk project co-funded by the EU and led by HELCOM completed its work at the end of 2018 after two years working on methods for maritime risk assessments on accidental spills. One of the main outputs of the project was the '[OpenRisk Guideline for Regional Risk Management to Improve European Pollution Preparedness and Response at Sea](#)', which was published in November 2018 and provides guidelines and methods for maritime risk management.

268 The 'HELCOM Maritime Assessment 2018' covers a wide range of human activities at sea, from commercial maritime traffic to leisure boating and from fisheries to hazardous submerged objects. It describes the distribution of activities at sea, developments over time, related environmental issues, and future perspectives and scenarios. With regard to shipping, the Assessment highlights that many types of ship-based pollution have been effectively dealt with in the Baltic Sea over recent decades, including 90 percent reductions in both operational oil spills and sulphur oxide (SOx) emissions from ships' exhaust gases. For other types of ship-based pollution, recent decisions will result in more reductions soon. Those decisions include banning

of untreated sewage discharges by 2021 and a requirement of an 80 percent reduction in nitrogen oxide (NOx) emissions for new ships built 2021 or later.

269 The HELCOM Maritime Working Group Meeting of September 2018 agreed on the revised HELCOM Recommendations 33/1 on 'Unified interpretation in relation to access to and use of HELCOM AIS data' and 28E/13 on 'Introducing economic incentives as a complement to existing regulations to reduce emissions from ships'. Furthermore, discussions progressed, *inter alia*, on the update of the BSAP, marine litter, underwater noise and the development of the Green Team Reporting Mechanism and Method, which was established to find out the main barriers, obstacles and challenges hindering the development of green technologies and alternative fuels in Baltic Sea shipping.

270 The challenges presented by climate change are by their nature a regional concern, covering aspects from science to high-level policy. This requires a regional and inclusive working structure to allow the challenges to be tackled effectively. In 2018 a proposed process for dedicated climate change work within HELCOM was elaborated. The first steps in this process were the establishment of an Expert Network on Climate Change (EN CLIME) and the start of preparation of a factsheet on the effects and impacts of climate change in the region.

271 The HELCOM Action Plan for the Protection and Recovery of Baltic sturgeon *Acipenser oxyrinchus* aims to prevent the Baltic sturgeon from full extinction and, in the mid-term, to re-establish viable populations in the same areas where it was historically found. It suggests effective protection measures and can, therefore, guide HELCOM and the Baltic Sea States to meet their commitments arising from the BSAP, as well as under other international agreements (e.g. the Bern and Bonn Conventions, Convention on Biological Diversity targets, and for EU Member States, the Habitats Directive).

272 In 2018, significant progress was made to finalize the new HELCOM Recommendation on threatened biotopes, which was finally adopted at the 40th meeting of HELCOM in early 2019. The Recommendation recognizes that threatened Baltic Sea habitats and biotopes are not covered by existing regulations and may, therefore, require protection beyond the scope of existing measures to achieve the Aichi Targets, the BSAP and, for EU Member States, the aims of the Marine Strategy and Water Framework Directives. It also provides guidance on concrete ways in which the Baltic Sea countries can ensure that threatened biotopes in their area recover and thrive.

273 Monitoring guidelines for marine litter on beaches and continuous noise were adopted in 2018. Furthermore, the HELCOM countries also agreed on a monitoring subprogramme for continuous noise. Work is ongoing on arrangements for hosting indicator data for continuous noise. Countries keep on annually [reporting data to the registry](#) of impulsive licenced events. To ease the process, the format for reporting to the OSPAR-HELCOM registry of underwater noise was updated in 2018.

274 Proving its commitment on marine litter issues at international level, HELCOM joined a [collective statement by the Regional Seas Conventions and Programmes](#) to the second meeting of the United Nations Ad Hoc Open-Ended Expert Group on marine litter and microplastics. The Regional Action Plan on Marine Litter continues its implementation phase. Advances made on ALDFG are to point out where information on national activities on ALDFG have been compiled, with the contribution of all HELCOM countries.

275 Actions on microplastics will greatly benefit from the [FanPLESStic-sea](#) project 'Initiatives to remove microplastics before they enter the sea', of which HELCOM is a partner. The project was granted funding by the EU INTERREG Baltic Sea Region at the end of 2018 and will be running from January 2019 to June 2021. It will focus on decreasing and removing microplastics in the Baltic Sea, by increasing knowledge and understanding about dispersal pathways and sources through measurements in different flows in society, as well as cost-effective methods to reduce microplastics.

276 Targets for underwater noise: Effects of noise on the level of population are still very poorly understood, and good status for populations in relation to underwater noise has, therefore, not yet been defined. To guide further work, after a long and constructive discussion process, HELCOM agreed on the 'HELCOM input to the process of establishing environmental targets for underwater noise'. It will serve as a regional input to other forums, including other Regional Sea Conventions and European processes.

277 HELCOM involvement in United Nations processes: The HELCOM Secretariat and the HELCOM countries are engaged in the Second World Ocean Assessment (WOA II) by providing expertise to the writing teams and pool of experts, participation in WOA II workshops and offering synthesized information for use in the assessment. An initiative of the [United Nations Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including](#)

[Socioeconomic Aspects](#) (Regular Process), WOA II aims to support informed decision-making for sustainable management of oceans and seas, in accordance with international law, including the [United Nations Convention on the Law of the Sea](#) and other applicable international instruments and initiatives. The HELCOM HOLAS II assessment and the resulting HELCOM 'State of the Baltic Sea' report already cover most of the aspects foreseen in WOA II.

278 HELCOM also shared its experience with the Sustainable Ocean Initiative of the Convention on Biological Diversity on developing and implementing policies for ocean governance at the regional level, as well as its knowledge on ecosystem-based maritime spatial planning and harmonized implementation of the [IMO MARPOL Convention](#) to limit discharges of sewage and air emissions from ships. Furthermore, HELCOM co-partnered with the Convention on Biological Diversity to describe nine Ecologically or Biologically Significant Marine Areas (EBSAs) in the Baltic Sea region. EBSAs are particularly useful in MSP, especially for transboundary areas.

279 Since November 2018 the Baltic and North Sea Coordination and Support Action (BANOS CSA) project has been advancing cooperation between the Baltic and North Sea sub-basins and is an important step towards a stronger involvement of the Baltic Sea region at a worldwide level, notably on providing solutions for global ocean management. BANOS CSA comprises major research and innovation funds and organizations from 12 countries, as well as 4 transnational bodies: HELCOM, ICES, JPI Oceans and OSPAR. It follows up on the Baltic Organisations' Network for Funding Science (BONUS EEIG) project.

280 The EU co-funded Pan Baltic Scope supports the development of coherent maritime spatial plans across the Baltic Sea region. HELCOM participates in actions related to advancing the use of the ecosystem approach in MSP. It leads two activities within the project: i) developing harmonized, cross-border approaches for cumulative impact assessments; and ii) developing methods for integrating social and economic analysis in MSP. HELCOM also participates in an activity on data-sharing. The project was launched in 2018 and will run through 2019.

The Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects

281 UNEP has focused its support to the second cycle of the Regular Process on

awareness-raising, resource mobilization, identification of additional experts for the Pool of Experts, technical and scientific support to the Bureau and the Group of Experts, hosting workshops and meetings of the writing teams, capacity-building and the scoping process for the assessment(s) of the second cycle. UNEP provides scientific and technical support to the process and has nominated over 30 experts with varied background into the Pool of Experts through the Regional Seas mechanism and other expert mechanisms to support the process.

282 Through its Abidjan Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region, UNEP provided support to the Government of Ghana in hosting the regional workshop for the South Atlantic (between the African and American coasts) and the wider Caribbean on 3–4 December 2018 in Accra, Ghana. The workshop was held as part of implementation of the programme of work for the period 2017–2020 for the second cycle of the Regular Process. The objective was to support the development of WOA II by enabling relevant members of writing teams to meet and collect regional-level data. The following chapters were discussed during the workshop: Chapter 3: Scientific understanding of the ocean; Chapter 10: Changes in nutrient inputs to the marine environment; Chapter 13: Changes in erosion and sedimentation; Chapter 24: Developments in tourism and recreation activities; and Chapter 31: Developments in the understanding of overall benefits from the ocean to humans.

283 UNEP participated in a Regular Process [multi-stakeholder capacity-building event](#) on 24–25 January 2019 in New York. The event provided an opportunity to create awareness, collaboration and capacity in support of the Regular Process, and in the use of integrated assessments. In the panel discussion UNEP made a presentation on ‘The importance of integrated assessments for decision making (science and policy perspectives)’. HELCOM, the Black Sea Secretariat and other Regional Seas projects also participated in the event. The [co-chairs’ summary](#) of the discussions on the way forward highlighted the need to: i) promote synergies and opportunities for cooperation and coordination with respect to capacity-building initiatives; and ii) enable regional capacity and capability-building partnerships, including through the UNEP Regional Seas Conventions framework, as an important way to foster coordination and cooperation in marine science across geographical regions encompassing States of varying levels of development.

GESAMP activities in UNEP

284 The GESAMP WG 40 study report ‘Guidelines for the monitoring and assessment of plastic litter in the ocean’ was released during the UNEA-4 meeting. It is being transformed by the Open University into a training manual which will be used for the training of trainers in the Massive Open Online Course (MOOC) to support the implementation of a methodology for data collection for SDG target 14.1. The report was also used in the expert consultation on monitoring marine litter and microplastics globally, regionally and nationally on 25–26 February 2019 and at a national inventory workshop on 27–29 February 2019 held back to back in Kenya.

285 With the support of UNEP, a GESAMP international workshop on assessing the risks associated with plastics and microplastics in the marine environment was held on 21–23 May 2019 in Geneva, Switzerland. The overall objective was to address the environmental and human health risks associated with plastic litter and microplastics in the marine environment, from a biological, physical and chemical perspective. It was also to provide guidance to GESAMP on its future work programme with respect to assessing the risks from plastics and microplastics. The workshop was attended by 35 experts from United Nations agencies, including WHO, IOC-UNESCO, the BRS Conventions, FAO and the United Nations Industrial Development Organization (UNIDO), some international and regional bodies, independent experts from academia, industry and NGOs. The workshop was hosted by the Secretariat of the BRS Conventions administered by UNEP.

286 UNEP has joined IMO and FAO as sponsors for the new Working Group (WG 43) on sea-based sources of marine litter, including fishing gear and other shipping-related litter. The overall objective of the Working Group will be to build a broader understanding of sea-based sources of marine litter, in particular from the shipping and fishing sectors, including the relative contribution of different sources, analysis of plastic use and management within both industries and the range and extent of impacts. The Working Group will also work to build a more comprehensive understanding of specific types of sea-based sources of marine litter, and to guide interventions on these sources based on identified priorities, drawing on the expertise of FAO, IMO, UNEP and other relevant organizations and experts.

UN Decade of Ocean Science for Sustainable Development

287 As a member of UN-Oceans, UNEP

participated in the [first multi-stakeholder global planning meeting](#) organized by IOC-UNESCO as a key event in the preparation phase of the UN Decade of Ocean Science for Sustainable Development. The meeting aimed to identify: i) knowledge gaps and ocean science priorities for the 2030 Agenda; ii) existing relevant partnerships/networks/initiatives and gaps; iii) cross-cutting issues and focus areas of the Decade; iv) priorities in capacity-building/training; v) priority topics and themes; and vi) potential partners and links to other initiatives such as regional workshops and meetings. Six plenary panel and working group discussions were organized around the principal outcomes of the Decade, along with a communications task team discussion; they covered clean oceans; predicted oceans; healthy and resilient oceans; safe oceans; sustainably harvested and productive oceans; and transparent and accessible oceans.

288 The UN Decade of Ocean Science offers scope for UNEP to engage in new strategic and technical collaborations to address and innovate marine and coastal sustainable development challenges and solutions, using and advancing its science-policy work across several focal areas in new partnerships with many actors and capacities in relevant fields (including governments and public and private actors). The Decade aligns well with UNEP objectives to evolve, share and apply science-based policy- and decision-making.

Global Programme of Action for the Protection of the Marine Environment from Land-based Activities

289 The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) continues to focus its efforts mainly on the three pollution source categories of nutrients, wastewater and marine litter, through the establishment and management of global partnerships, in response to the Manila Declaration. The GPA held its 4th intergovernmental review meeting in Bali, Indonesia, in October 2018, attended by more than 240 delegates, representing over 60 States. The meeting also saw the participation of United Nations partner agencies, intergovernmental organizations, observers, experts, the private sector and academia. The participants considered a review of the GPA's work since the last intergovernmental review held in the Philippines in 2012, the outlook on future work, and strategic options for management of the programme, mandate and alignment to the UNEP Assembly. The meeting concluded with a 'Bali Declaration', in which countries affirmed the need for continued focus on the priority marine pollution categories—namely, marine litter, nutrients and wastewater. The countries underscored the value of the work

of the global partnerships associated with the three pollution categories, and encouraged strengthening them. The meeting mandated the GPA Coordination Office to complete a review of the future options for the programme for presentation at UNEA-4 for consideration by countries.

290 UNEP's GPA has developed a new project document titled 'Protecting the Marine Environment from Land-Based Pollution through Strengthened Coordination of Global Action'. The project, launched in January 2019, will be implemented on a global level and includes partners such as international organizations, the private sector and NGOs. It aims to strengthen responses to land-based pollution, enhance cooperation and foster action to tackle the issues related to wastewater pollution, nutrient management and marine litter also through the key role of global partnerships, including the Global Wastewater Initiative (GW²I).

291 The GPA organized side events during UNEA-4, which was hosted by UNEP on 10–15 March 2019 at its headquarters in Nairobi, Kenya. The events took place in the Clean Seas Tent, were all well attended and allowed the audience to interact directly with speakers and experts from different sectors and across the entire globe. A [cross-cutting event](#), aiming to touch on the three main source categories of pollution tackled by the GPA, was organized to discuss the nexus between nutrients, wastewater pollution and marine litter.

Wastewater and the Global Wastewater Initiative

292 Through the GPA/Wastewater and together with the Bremen Overseas Research and Development Association, which is also a member of GW²I and UN-Habitat, UNEP has provided support to the Tanzanian government in developing guidelines and standards for decentralized wastewater management systems. The project aimed to support the scale-up of decentralized sanitation solutions throughout Tanzania. The guidelines were finalized and presented before the local authorities for adoption and use.

293 Through the GPA/Wastewater and the Law Division, UNEP has continued the implementation of demonstration projects for biodiversity conservation and local community development through tree planting supported by the Korea Forest Service in Benin, Ethiopia, Ghana and Morocco. The projects in Ethiopia, Ghana and Morocco are ongoing.

294 Through the GPA/Wastewater, UNEP continues to provide support in the implementation of the UNEA-3 and UNEA-4 resolutions on water pollution, marine litter and microplastics, protection of the marine environment from land-based activities, sustainable nitrogen management and other resolutions.

295 A MOOC titled 'From Source to Sea to Sustainability. Integrated Cycle in Wastewater and Nutrient Management' was developed by UNEP-GPA, Concordia University and the Loyola Sustainability Research Centre to raise awareness and build capacity on the two pollution streams. The MOOC was launched in 2018 and rolled out in April 2019.

296 Through the GPA/Wastewater and GW²I, UNEP is organizing a series of webinars to enhance the understanding and recognition of wastewater as a resource and to expand knowledge generation, awareness-raising and outreach on crucial issues related to sustainable wastewater management. The webinars also serve as an opportunity for GW²I members to share their expertise and experiences regarding critical issues related to sustainable wastewater management. In November 2018, the GPA/Wastewater organized the webinar '[Wastewater Reuse, a Second Life for an Essential Resource: the example of Greywater](#)' in collaboration with the Grey Water Project, a member of GW²I. The webinar focused on the aspect of wastewater reuse, particularly looking at the case of greywater. The speakers included Mr. Howard Kahan (US Environmental Protection Agency), Ms. Shreya Ramachandran (the Grey Water Project) and Mr. Salfiso Kitabo (Water.org), and 55 attendees participated in the event. As financing in wastewater remains a challenge, the webinar provided examples and good practices and aimed to trigger further action and raise awareness on the need for investing in the field of wastewater. In February 2019, the GPA/Wastewater, through GW²I, organized the webinar '[Financing wastewater infrastructures: tools, mechanisms and best practices for a sustainable future](#)', focusing on wastewater infrastructures and the related aspect of financing. The speakers included Ms. Valerie Issumo (Prana Sustainable Water), Mr. Christopher Corbin (UNEP Caribbean Programme) and Mr. Thierry De Oliveira (UNEP). More webinars are scheduled to take place in 2019.

297 The ongoing African Development Bank (AfDB), UNEP and GRID Arendal project titled 'Wastewater Management and Sanitation Provision in Africa' aims to profile the trends in wastewater management and sanitation delivery in Africa through a range of communication

products. The GPA participated in the review workshop of the 'Wastewater and Sanitation Atlas', one of the project's major outputs, on 6–8 May 2019 in Gaborone, Botswana. The workshop gathered the lead authors, reviewers, representatives of the project partners, government representatives and experts from academia to further review the Atlas before finalization. The project partners also used this opportunity to address pending matters and gaps, and agree on the next steps to advance the finalization of the Atlas. The workshop was also a chance to explore possibilities for further collaboration among the participants. The project also envisages identifying advocates who can bring attention to the issues of sanitation provision and wastewater management in Africa; Rocky Dawuni, a famous singer from Ghana, has embraced the role of advocate for wastewater management.

298 On 27 April 2019 the GPA organized the 'Joint Global Partnership on Nutrient Management (GPNM) and Global Wastewater Initiative (GW²I)' in Nairobi, Kenya. The meeting brought together members of both partnerships for the first time. The participants shared their expertise and discussed relevant topics related to both partnerships, such as reuse of wastewater in agriculture, technology, funding, policy, communication and education, and highlighted good practices and their ongoing activities in these fields. The meeting paved the way for strengthened collaboration, and the next steps were discussed. The following day, 28 April 2019, the participants went on a field trip and had the opportunity to see the challenges and opportunities related to wastewater and nutrient management at the main wastewater treatment facility in Nairobi. Overall, the meeting was an excellent opportunity to foster synergies and explore opportunities for future collaboration among the two partnerships.

299 Through GW²I, the GPA/Wastewater organized side events during UNEA-4, which was hosted by UNEP on 10–15 March 2019 at its headquarters in Nairobi, Kenya. The events took place in the Clean Seas Tent, were all well attended and allowed the audience to interact directly with speakers and experts from different sectors and across the entire globe. The events all aimed to highlight and discuss some of the current and most pressing challenges of wastewater management. For example, [one event discussed the importance of the safe reuse of wastewater, highlighted the need for sustainable business models and put forward best practices such as the reuse of greywater](#). The event also saw the signature of an MoU between UNEP and the Counties of Kisumu and Machakos in Kenya on jointly tackling the challenges related to

wastewater management. Another event touched on the emerging issue of plastic and microplastics, and the speakers shared and discussed key findings and knowledge, and highlighted the need for methodologies to assess the presence of plastic, microplastics and microfibrils in wastewater and sludge.

300 A MOOC titled 'From Source to Sea to Sustainability. Integrated Cycle in Wastewater and Nutrient Management' was developed by UNEP-GPA, Concordia University and the Loyola Sustainability Research Centre to raise awareness and build capacity on the two pollution streams.

301 Through the GPA/Wastewater and GW²I, UNEP is organizing a series of webinars to enhance the understanding and recognition of wastewater as a resource and to expand knowledge generation, awareness-raising and outreach on crucial issues related to sustainable wastewater management. The webinars also serve as an opportunity for GW²I members to share their expertise and experiences regarding critical issues related to sustainable wastewater management. The first webinar, titled 'The need for innovative financial mechanisms for sustainable wastewater management', was hosted by UNEP on 30 April 2018. A second webinar, titled 'The impact of land-based pollution on coral reefs: focus on nutrients, plastics and wastewater', was hosted by UNEP on 24 May 2018. Two more webinars on the reuse of greywater and on the need for financing wastewater infrastructures were held in November 2018 and February 2019.

302 The GPA/Wastewater organized a mini workshop on the 'polluter pays' principle in March 2018. The mini workshop explored the principle from different perspectives, which triggered discussions around the benefits and challenges of implementing the principle, as well as some possible undertakings for UNEP.

Nutrient management and the Global Partnership on Nutrient Management

303 Under the nutrient pollution portfolio, the Secretariat continues to support the Global Partnership on Nutrient Management (GPNM) within UNEP's Programme of Work. The GPNM, in collaboration with GW²I and supported through the GPA, delivered a relaunch of a MOOC on nutrients and wastewater management over the first quarter of 2019 to assist in the outreach and availability of web-based resources. Concordia University in Montreal, Canada, developed the MOOC sourcebook and online platform, and administered the MOOC roll-out, which had an uptake of 1,080 registrants from 170 countries.

304 A significant body of knowledge related to quantitative modelling approaches (based on tools such as the Global NEWS model) on coastal nutrient enrichment has been generated under the GEF-funded Global Nutrient Cycling (GEF-GNC) Project, which is complete, with several published scientific journal articles available on the topic. Key collaborators to this work included IOC-UNESCO, University of Utrecht, Washington State University and University of the Philippines. The nutrient load data are fully integrated in a Global Nutrient Management Toolbox that was also developed under the project, along with a comprehensive suite of best field and policy management practices that is accessible through the Nutrientchallenge.org website. The watershed-based nutrient flux modelling for the Manila Bay watershed led by the Marine Science Institute of the University of the Philippines is complete. The work supported the design of watershed best management practices and strategies for addressing nutrient loading into the receiving environment. Specific deliverables included an Environmental Atlas of Manila Bay, a Laguna Bay ecosystem health report card (Philippines), a management plan for the Manila Bay and State of Coast reports for provinces surrounding Manila Bay. Under the project, a Chilika Lake ecosystem health report card (India) was also developed.

305 A collaboration was established with the World Resource Institute to prepare experience notes on the implementation highlights of the project and market the Global Nutrient Management Toolbox to global users. GRID-Arendal was engaged to translate the key scientific outputs from the project into a suite of information products for wider audiences and decision makers in formats that include information graphics, a map atlas and a story-map that focuses on Manila Bay. The work under the GEF-GNC Project is now being extended to support the development of the SDG 14.1 target indicator on nutrient pollution of the marine environment in collaboration with IOC-UNESCO and other partners under the guide of UNEP's Science Division.

306 A project in Sri Lanka on reducing the risk of degradation of coral reef ecosystems by addressing nutrient, wastewater and other land-based sources of marine pollution has been completed. The project contributed to strengthening local and regional enabling environments to foster the uptake and adoption of innovative approaches in reducing threats to coral reefs from land-based pollution. This initiative was a contributor to the UNEA-2 resolution on the protection of coral reefs and fed into activities under the 2018 International Year of the Coral Reef. Further, South Asian countries have agreed

to develop a transboundary International Waters GEF-funded project to protect coral reefs, mangroves and seagrass in Bay of Bengal Large Marine Ecosystem (BOBLME), Arabian Sea and then also partly in the Indian Ocean.

307 At the 4th Plenary of the International Nitrogen Management System Project (INMS-4), the Committee of Permanent Representatives, along with representatives of relevant conventions, participated in a high-level segment to commence the process of consideration of global policy options for integrated nitrogen management. The science-based community agreed to support countries take action to address the impacts of reactive nitrogen in the environment.

308 A [resolution on sustainable nitrogen management](#) was adopted during UNEA-4, led by the Government of India. Member states recognized that reactive nitrogen has adverse pollution impacts on terrestrial, freshwater and marine environments. Poor nutrients (nitrogen and phosphorus) management contributes to the world's food insecurity. In the next two years, the GPNM will take the lead in facilitating better coordination of policies on the nitrogen cycle; explore sustainable options for nitrogen management; coordinate existing relevant platforms for the assessment of improved nitrogen management; conduct capacity-building activities for policymakers and practitioners; and support Member States on informed decision-making on nutrients (nitrogen and phosphorus) management.

309 The 2018/19 edition of the UNEP 'Frontiers' report highlighted 'The Nitrogen Fix: From Nitrogen Cycle Pollution to Nitrogen Circular Economy', focusing on the emerging issues of environmental concern, in Chapter 4 of the report.

310 The GPNM and GW²I meeting discussed how to strengthen the synergies between the two partnerships by: restructuring the composition of the steering committees so that they are fit for purpose to deliver the expected progress; building on the momentum of existing projects and initiatives (including existing good practices and experiences—for example, the Global Soil Partnership and the Global Challenge Research Fund); ensuring effective science communication by the partnerships on the development of products; and creating a joint database by the two partnerships which will, in turn, be used by the International Nitrogen Management System for policy actions.

311 The WIOSAP project, in collaboration with the GPA, hosted a workshop on the application of tools and approaches for the management of land-based pollution. Three

specific tools were featured in the training: i) the nutrient runoff calculator derived from the [Global Nutrient Export from Watersheds \(Global NEWS\) model](#) that is contained in the GPNM Global Nutrient Management Toolbox; ii) a [wastewater technology matrix](#) (screening assessment) tool developed by the GW²I in association with the International Water Association; and iii) the ecosystem health report card that has been applied in GPNM-supported projects in India and the Philippines.

312 At the 'Soil in the nexus' event during COP14 on the Convention on Biological Diversity, discussion considered the unbalanced and geographically uneven access to and use of fertilizers (e.g. in the Africa region), and the need for fine-tuning best practices in nutrient use efficiency in accordance with the agro-ecological conditions. There is recognized need for better synergies between agriculture and environment ministries in designing mutually beneficial policies to achieve better results on the ground from the perspectives of both food production and maintenance of ecosystem services.

313 UNEP organized a technical exchange between experts from the [Laguna Lake Development Authority](#) of the Philippines, the [Chilika Lake Development Authority](#) of India and national stakeholders concerned with preserving the environmental and water quality of Lake Naivasha in Kenya. This exchange was to facilitate the development of an ecosystem health report card in a replication effort for Lake Naivasha, based on work undertaken in India and the Philippines as part of the project executed by the GPA with oversight by the Steering Committee of the GPNM.

314 Under the GPA, in association with IOC-UNESCO, UNEP brought together 23 scientific experts, [Regional Seas Programmes \(HELCOM, NOWPAP and MAP\)](#) and Earth observation specialists from the [NASA Ames Research Center](#) and the [European Space Agency](#) working on the science of marine pollution indicators, data capture and dissemination, to advance the development of a global methodology for the assessment of eutrophication and plastic debris under SDG target 14.1 target indicators—specifically, the index of coastal eutrophication potential (ICEP) and floating plastic debris, along with other relevant metrics. The meeting also explored the application of 'big data' through Earth observation systems and how these can be applied in monitoring freshwater and coastal pollution. Participants considered the process to facilitate country adoption of a 'harmonized approach' to report on the SDG14.1 target.

315 The concern over the impact of climate change related to ocean temperatures and influences on the proliferation and persistence of HABs will continue to be tracked under the GPA's nutrient management portfolio. Efforts will continue to improve the understanding of the phenomenon through research, while national measures to reduce nutrient loading (agricultural discharges, municipal wastewater) to the environment require continued, and in some areas, increased attention. The sargassum proliferation events in the Caribbean and West Africa in recent years have been suggested by researchers to be potentially linked to this phenomenon. In the Caribbean, there is collaboration under the Caribbean Large Marine Ecosystem Project to develop a nutrient management strategy, and in the West Africa region under the Abidjan Convention, an alien invasive species response strategy that includes sargassum management has been developed.

Marine litter and the Global Partnership on Marine Litter

316 One of the main focuses of the GPA during the period under review was continued development of the Global Partnership on Marine Litter (GPML), which is a voluntary open-ended partnership for international agencies, governments, businesses, academia, local authorities and civil society. As well as supporting the Global Partnership on Waste Management, GPML seeks to protect human health and the global environment through several specific objectives, with reduction and management of marine litter as its main goal. UNEP provides the Secretariat for the GPML in line with the mandate received in the 'Manila Declaration on Furthering the Implementation of the GPA' and leads on the focal area on land-based sources of marine litter. FAO and IMO lead the focal area on sea-based sources of marine litter. Much support has been provided to various organizations, including Regional Seas Conventions and Action Plans. Regional nodes for the GPML have been established in the Northwest Pacific, co-hosted by the Northwest Pacific Environmental Cooperation Centre and the NOWPAP Secretariat, and the Wider Caribbean Region, hosted by the Gulf and Caribbean Fisheries Institute and the Cartagena Convention Secretariat.

317 The first meeting of the Ad Hoc Open-Ended Expert Group was held at UNEP in Nairobi, Kenya, on 29–31 May 2018. The Expert Group was established in response to UNEP/EA.3/Res.7 'Marine Litter and Microplastics'. It was attended by 266 participants, representing 72 Member States, 9 intergovernmental organizations and 28 observers representing major groups and stakeholders accredited to UNEP's UNEA. The

[second meeting](#) was held in Geneva, Switzerland, on 3–7 December 2018.

318 UNEP and the Open University have created a [MOOC on marine litter](#). It is part of [Clean Seas](#) and contributes to the goals of the Global Partnership on Marine Litter. The MOOC strives to teach students through action-oriented learning how they can apply successful and inspiring activities to their own local context, regardless of their profession or location. The course will present different options and tools to combat marine pollution, such as the use of effective and legitimate tools such as the Honolulu Strategy. It will provide examples and case studies that will inspire leadership at all levels, thereby increasing awareness of and stimulating creative solutions to marine litter problems. Moreover, the course will benefit policymakers, practitioners and managers who wish to connect with other professionals to enhance their knowledge of marine litter issues. The course is ongoing.

319 The 24th COBSEA Intergovernmental Meeting (IGM-24) took place in Bali, Indonesia, on 17–21 June 2019 with the following outcomes. A revised COBSEA Regional Action Plan on Marine Litter was adopted, together with Terms of Reference of the COBSEA Working Group on Marine Litter. A request was put to the Secretariat, with the Working Group on Marine Litter, to develop an East Asian Seas Regional Node of the GPML, for consideration by the 25th IGM and to continue developing the project pipeline, including projects to support implementation of RAP MALL. The 'Guidance on the Establishment and Operation of COBSEA Regional Activity Centres' was adopted, and Indonesia was encouraged to further develop the Regional Capacity Centre for Clean Seas, aiming to make it a COBSEA Regional Activity Centre; this is for consideration at the 25th IGM. Also, the work plan and budget for the 2019–2020 biennium was approved, and Viet Nam offered to host the 25th IGM in 2021.

Basel, Rotterdam and Stockholm Conventions

320 The [Basel](#), [Rotterdam](#) and [Stockholm](#) (BRS) Conventions share the common objective of protecting human health and the environment from hazardous chemicals and wastes. Working in synergy, the Conventions promote environmentally sound management of chemicals and wastes throughout their lifecycles. Under the Basel Convention, this is achieved by the strict control of transboundary movements of covered wastes and through obligations pertaining to minimizing waste generation and ensuring their environmentally sound management. The Stockholm Convention requires each Party to prohibit or restrict the production and use of

POPs, reduce and ultimately eliminate the unintentional releases of POPs and ensure that wastes consisting of, containing or contaminated with POPs are managed in an environmentally sound manner.

321 As called for in UNEA resolution 3/7, the Basel and Stockholm Conventions have been increasing activities to prevent and reduce marine litter and microplastics and their harmful effects, in cooperation with relevant organizations. The BRS Secretariat participated in the first and second meetings of the UNEP Open-Ended Ad Hoc Expert Group on Marine Litter and Microplastics in Nairobi on 29–31 May 2018 and in Geneva on 3–7 December 2018, respectively. The [Regional Centres of the Conventions](#) have been undertaking activities to address marine plastic litter and microplastics. The BRS Secretariat hosted the GESAMP international workshop on assessing the risks associated with plastics and microplastics in the marine environment on 21–23 May 2019 in Geneva.

322 At its [meetings from 29 April to 10 May 2019 in Geneva](#), the Conference of the Parties to the BRS Conventions considered issues on marine plastic litter and microplastics under various agenda items such as international cooperation, financial resources, technical assistance and information exchange. The Conference of the Parties to the Basel Convention adopted decision BC-14/12, by which it amended Annexes II, VIII and IX to the Convention,^c with the objectives of enhancing the control of the transboundary movements of plastic waste and clarifying the scope of the Convention as it applies to such waste.

323 The amendment to Annex VIII inserting a new entry A3210 clarifies the scope of plastic waste presumed to be hazardous and, therefore, subject to the prior informed consent (PIC) procedure. A group of cured resins, non-halogenated and fluorinated polymers, as well as mixtures of plastic wastes consisting of polyethylene (PE), polypropylene (PP) or polyethylene terephthalate (PET) are listed in a new entry B3011 in Annex IX and remain excluded from the PIC procedure, provided that they are destined for recycling in an environmentally sound manner and are almost free from contamination and other types of wastes. The amendment to Annex II inserting a new entry Y48 covers all plastic waste, including

^c 'Hazardous wastes' and 'other wastes' subject to the PIC procedure under the Basel Convention are defined in Annexes I, II, III and VIII. Wastes listed in Annex IX are presumed not to be hazardous and, as such, not subject to the PIC procedure.

mixtures of such wastes unless these are hazardous (as they would fall under A3210) or presumed not to be hazardous (as they would fall under B3011). The new entries will become effective as of 1 January 2021. More information on the amendment can be obtained from the Secretariat.^d

324 The Basel Convention established a new [Partnership on Plastic Waste](#) (UNEP/CHW.14/INF/16/Rev.1) and invited nomination of [members of the working group](#) by 31 August 2019. The goal of the Partnership is to improve and promote the environmentally sound management of plastic waste at the global, regional and national levels and prevent and minimize their generation. The technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal (UNEP/CHW.6/21) will be updated, and other guidance documents to address plastic waste under the Basel Convention will be developed. The Secretariat is undertaking technical assistance activities on marine plastic litter and microplastics thanks to generous financial support by the governments of Norway and Sweden.

UNEP World Conservation Monitoring Centre

325 The [UNEP World Conservation Monitoring Centre \(UNEP-WCMC\)](#) works with scientists and policymakers worldwide to place biodiversity at the heart of environment and development decision-making to enable enlightened choices for people and the planet. During the period under review UNEP-WCMC has, *inter alia*, provided support to the Nairobi Convention, COBSEA and MAP.

326 The UNEP-WCMC is supporting UNEP to generate knowledge and build capacity to undertake area-based planning in ABNJ in two pilot regions: the Western Indian Ocean and the South East Pacific. At the 10th COP to the Nairobi Convention, pursuant to Decision CP.9/10.2, Parties agreed to cooperate with existing regional institutions on ocean governance and the conservation of marine biodiversity in adjacent ABNJ. Further, pursuant to Decision CP.9/10.3, Parties agreed to collaborate with partners to prepare a report on the feasibility, options and scenarios for the establishment of MPAs in ABNJ.

327 The work of UNEP-WCMC involves developing and testing area-based planning tools in ABNJ high seas within the Western Indian Ocean. Through the ABNJ project, multi-

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stakeholder workshops have been carried out to develop and test an MSP framework that could be applied in ABNJ in the future. To develop this framework, a range of outputs have been produced that have helped the Nairobi Convention and its Member States engage further in ABNJ-related issues, including discussions on the marine biological diversity of ABNJ.

328 As part of a collaborative partnership, UNEP-WCMC is working with the Association of Southeast Asian Nations (ASEAN) Working Group on Coastal and Marine Environment Secretariat, COBSEA, the ASEAN Centre for Biodiversity, PEMSEA and the Ramsar Secretariat to develop an open-access online data platform containing high-quality, accessible regional marine and coastal data. At present, regional coastal and marine ecosystem data are not synthesized in a coordinated manner, hindering efforts to address the issues. The application of such a platform would, therefore, provide cross-cutting benefits for regional coastal and marine resource management, serving ASEAN Member States, government agencies, resource managers and the corporate sector—all of which will continue to be consulted throughout the project. The improved access to regional data and knowledge products will strengthen the resilience of the ASEAN community by enhancing capacity to mitigate climate change and natural disasters, to identify opportunities for sustainable development and to strengthen conservation and wise use of marine and coastal ecosystems and associated ecosystem services.

329 The UNEP-WCMC is also supporting efforts to build capacity for monitoring of the state of the environment and biodiversity around the Mediterranean Sea. Capacity-building efforts are focused on North Africa. Increased monitoring capacity will support the implementation of the UNEP-MAP Integrated Monitoring and Assessment Programme (IMAP) and related assessment criteria.

330 The work of UNEP-MAP, under the Barcelona Convention, is guided by the Ecosystem Approach (EcAp), with the objective of achieving Good Environmental Status of the Mediterranean Sea and coast. The implementation of EcAp in the Mediterranean Sea is based on integrated assessment and monitoring of the marine and coastal environment (IMAP), and integration of the resulting information into decision-making processes. A key mechanism for supporting the implementation of the EcAp and IMAP is an institutionalized science-policy interface. Guidance for strengthening, structuring and sustaining the interface for EcAp and IMAP is being developed by the UNEP-MAP Regional Activity Centre Plan

Bleu. UNEP-WCMC is supporting this process as part of an expert advisory group.

WORLD METEOROLOGICAL ORGANIZATION (WMO)

331 WMO is the authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources. WMO contributes to ocean-related issues through: observation of the oceans, the climate and the composition of the atmosphere; Earth and climate system research; development and delivery of services for disaster risk reduction, including marine hazards; and provision of science-based information and tools for policymakers and the general public, as well as for the assessment of effects on ecosystems, at regional and global levels.

332 The 18th World Meteorological Congress (Cg-18, Geneva, 3–14 June 2019) adopted a historical reform of the WMO constituent bodies to embrace a more comprehensive Earth system approach, with a stronger focus on water resources and the ocean, more coordinated climate activities and a more concerted effort to translate science into services for society. It paved the way for greater engagement with the rapidly growing private sector and more structured collaboration with development agencies.

333 The Congress approved a new WMO strategic plan for 2020–2023 with five long-term goals and top overarching priorities, including:

- .1 enhancing preparedness for, and reducing losses of life and property from, hydrometeorological extremes;
- .2 supporting climate-smart decision-making to build resilience and adaptation to climate risk; and
- .3 enhancing the socio-economic value of weather, climate, hydrological and related environmental services.

334 The new governance structure is aligned to the strategic plan. Under the approved reforms, different WMO technical commissions will be replaced by two more coordinated commissions to streamline work and maximize impact—namely, the Commission for Observation, Infrastructure and Information Systems and the Commission for Weather, Climate, Water and Related Environmental Services and Applications. The Research Board on Weather, Climate, Water and the Environment will translate the strategic aims of WMO and decisions of the Council and Congress

into overarching research priorities and ensure the implementation and coordination of the research programmes to achieve these priorities. The Scientific Advisory Panel will draw up opinions and recommendations to Congress and to the Executive Council on matters concerning WMO research strategies and the optimal scientific directions to support the evolution of its mandate in weather, climate, water and related environmental and social sciences.

335 The ocean plays an increasingly important role in all WMO activities and needs to be mainstreamed in its technical and scientific work under an Earth system perspective. Given this, collaboration between the meteorological and oceanographic communities is expanding, and this requires a higher level of coordination and a strategic interface with both the governing bodies and the technical and scientific bodies of WMO and IOC. Congress, through Resolution 9 (ex 4(4)/3), and the 30th IOC Assembly, through Resolution XXX-2, decided to:

- .1 disband the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) established in 1999;
- .2 incorporate JCOMM functions and activities in existing and new WMO Technical Commissions and existing IOC bodies and co-sponsored entities such as the IOC-WMO-UNEP-ICS Global Ocean Observing System (GOOS);
- .3 encompass the full spectrum of WMO-IOC collaborative activities in observation, data management, research and services; and
- .4 establish the Joint WMO-IOC Collaborative Board, as a high-level, strategic coordination mechanism.

336 The Joint WMO-IOC Collaborative Board will coordinate the collaborative development, integration and implementation of the activities related to oceanographic and meteorological observation, data and information management, services, modelling and forecasting systems as well as research and capacity development.

Marine observations and applications

337 WMO continues strengthening observational networks by the implementation of the WMO Integrated Global Observing System (WIGOS) and the WMO Information System (WIS) and observing networks in collaboration with partners. WMO's strategic focus on Earth system approaches will demand increased efforts in

ocean research, observation and modelling. WMO is particularly strengthening its engagements with the GOOS and approved the GOOS Strategy 2030. For instance, GOOS continues to improve its capabilities in climate- and ocean-related services, and recognizes the importance of coastal observations and links to products for societal benefits. The physical, biogeochemical and biological components of GOOS support the ocean component of the Global Climate Observing System (GCOS).^e Cg-18 supported the establishment of a node of a distributed GOOS Office located within WMO through the consolidation of existing ocean observing activities at WMO, and additional effort to facilitate functional connections between WMO Technical Commissions and GOOS and to integrate ocean observations in WIGOS.

338 GCOS is working towards the next update to its status report (in 2021) and implementation plan (in 2022). The programme had an all panels meeting in March 2019 in Marrakech, Morocco, with a focus on the major climate budgets and cycles; energy, water and carbon; and particularly how to integrate observation requirements and approaches across the atmosphere, ocean and terrestrial domains. Additionally, the panels considered how to improve global biosphere observations and the monitoring of extremes. A list of seven global climate indicators has been agreed and promoted to be used to communicate to the widest community the scope and rate of changes to the climate: global surface temperature, ocean heat, atmospheric carbon dioxide, sea level, ocean acidification, sea ice extent in the Arctic and Antarctic, and glacier change.

339 GCOS and GOOS are taking a strong role in organizing the 3rd Decadal Ocean Observing Conference, [OceanObs'19](#), to shape priorities for sustained observations for the next decade. They are also running thematic observing system design and review projects on, for example, heat, freshwater and carbon storage, and oxygen minimum zones. In addition, GOOS is considering observation requirements for pollutants.

340 WMO continued providing assistance to members to improve marine meteorological and coastal area service provision. This is, in part, fulfilling the WMO requirements under the International Convention for the Safety of Life at Sea (SOLAS), including the regular provision of meteorological warnings and forecasts to ships at sea, also for the polar regions and links to the

^e Co-sponsored by WMO, IOC, the International Council for Science and UNEP.

Polar Code. WMO is also collaborating with partner organizations such as IOC-UNESCO to further develop, optimize and maintain in situ marine meteorological and oceanographic observing networks. These in situ observations, complemented by satellite and remote sensing technology, are required for applications such as weather forecasting and operational meteorology, monitoring, understanding and prediction of climate variability and climate change on various time scales, ocean forecasting and marine services activities. WMO is also working with partners to facilitate improved data-sharing.

341 Noting the IOC-UNESCO Decision EC-XLIX/3.4, Part III, under IOC and WMO guidance, the Data Buoy Cooperation Panel (DBCP) developed a regionally relevant education and outreach strategy that could be jointly implemented by IOC and WMO and their Member States, FAO, the fisheries sector and other relevant organizations to substantially reduce damage through vandalism or interference with ocean data buoys (DBCP Technical Document No. 58). Through its Task Team on Buoy Vandalism, DBCP takes the lead to integrate vandalism prevention information into capacity-building workshops and to create a repository of education material available nationally for broader use. The strategy document is now available in English and Spanish and can be made available in other languages as required. At the 34th DBCP session in 2018 (DBCP-34), the Task Team on Buoy Vandalism was requested to develop an implementation plan responding to the strategy. DBCP-34 further requested JCOMM to establish a cross-cutting Task Team to discuss the strategy and to provide any existing materials, tools and products of communication on vandalism awareness to prepare a guideline for new outreach materials. DBCP will continue annual reporting of vandalism events on data buoys to track progress towards implementation of the vandalism preventative measures.

Climate science and the oceans

342 A significant body of oceanographic research of direct benefit for decision-making in climate-related risks is spearheaded and coordinated by the World Climate Research Programme (WCRP), co-sponsored by WMO, IOC-UNESCO and the International Council for Science. EC-71 (Geneva, 17–19 June 2019) adopted the new WCRP Strategic Plan 2019–2028, which includes advanced research on the global carbon cycle and carbon budgets. Through its scientific leadership to consolidate global and regional efforts to understand the dynamics, the interaction and the predictability of the coupled ocean–atmosphere system, significant improvement has been made in understanding

climate variability and changes, as well as the benefit for society and the environment in which we live, such as predictive experiments for the future state of the climate system and how it will evolve under different emission scenarios. Implementation of the [Coupled Model Intercomparison Project phase 6](#) is now well under way with a dedicated Carbon Dioxide Removal Model Intercomparison Project that could inform ocean fertilization studies in the future.

343 Through its CLIVAR (Climate and Ocean) Core Project, with project offices in China and India, WCRP has increased focus on improving understanding of regional predictions, and how *El Niño* will change under a changing climate. WCRP's 'Regional Sea-level Change and Coastal Impacts' project has focused on the co-design of activities with coastal managers and policymakers. In particular during 2019 there will be a number of focused workshops—for example, on sea-level science for services, to explore what science can provide in relationship to coastal zone management (to be held in Orleans, France, in November 2019), and on the importance of land subsidence on a global scale. It was felt that a conference on sea-level change should be held in 2022 or 2023, with robust engagement of decision makers.

Monitoring and mitigating climate change

344 WMO released its '[Statement on the state of the global climate in 2018](#)' in March 2019. According to the Statement, 2018 was the fourth warmest year on record, with average global temperature reaching approximately 1 °C above pre-industrial levels. The four warmest years on record were 2015–2018, confirming that the long-term warming trend continues. It also examined other long-term indicators of climate change such as increasing CO₂ concentrations, sea-level rise, shrinking sea ice, ocean heat content and ocean acidification

345 Sea-surface waters in a number of ocean areas were unusually warm in 2018, including much of the Pacific with the exception of the eastern tropical Pacific and an area to the north of Hawaii, where temperatures were below average. The western Indian Ocean, tropical Atlantic and an area of the North Atlantic extending from the east coast of the United States were also unusually warm. Unusually cold surface waters were observed in an area to the south of Greenland, which is one area of the world that has seen long-term cooling.

346 Sea level continues to rise at an accelerated rate. Over the period January 1993 to December 2018, the average rate of rise was

3.15±0.3 mm/year, while the estimated acceleration was 0.1 mm/year. Accelerated ice mass loss from the ice sheets is the main cause of the global mean sea-level acceleration. In the past decade, the oceans have absorbed around 30 percent of anthropogenic CO₂ emissions, leading to ocean acidification. Ocean heat content is at a record high. Indeed, 2018 set new records for ocean heat content in the upper 700 m (data since 1955) and upper 2,000 m (data since 2005), exceeding previous records set in 2017. The extent of Arctic and Antarctic sea ice is well below average. Extreme weather had an impact on lives and sustainable development on every continent.

347 The Global Atmosphere Watch (GAW) continues to assess the latest trends and atmospheric burdens of the most influential long-lived greenhouse gases (LLGHGs). Results are published in WMO-GAW Annual Greenhouse Gas (GHG) Bulletins. WMO released its '[Greenhouse Gas Bulletin 2017](#)' in November 2018. The latest analysis of observations from the WMO-GAW network shows that globally averaged concentrations calculated from this in situ network for carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) reached new highs in 2017, with CO₂ at 405.5 ± 0.1 parts per million (ppm), CH₄ at 1 859 ± 2 parts per billion (ppb) and N₂O at 329.9 ± 0.1 ppb, which corresponds to, respectively, 146 percent, 257 percent and 122 percent of pre-industrial levels (before 1750). The increase in CO₂ from 2016 to 2017 was smaller than that observed from 2015 to 2016 and practically equal to the average growth rate over the last decade. The influence of the *El Niño* event that peaked in 2015 and 2016 and contributed to the increased growth rate during that period declined sharply in 2017.

348 At the 17th World Meteorological Congress, WMO adopted a [resolution on the implementation of the Integrated Global Greenhouse Gas Information System \(IG³IS\)](#) with the aim of expanding the observational capacity for GHGs, extending it to the regional and urban domains, and developing the information systems and modelling frameworks to provide information about GHG emissions to society. The implementation of IG³IS fundamentally relies on globally harmonized observations of GHGs, including in the oceans, and will require the development of high-resolution and complex observation systems, modelling tools and data assimilation techniques. The WMO Executive Council approved the IG³IS Science Implementation Plan at its 70th Session in June 2018. IG³IS was mentioned as a framework to improve estimates of GHG concentrations and fluxes by the [50th session of the Subsidiary Body for Scientific and Technological Advice \(SBSTA\)](#) and in the [2019 Refinement to the 2006](#)

[Guidelines for National Greenhouse Gas Inventories](#) adopted and accepted during the 49th Session of the IPCC in May 2019 (Volume I, Chapter 6).

Atmospheric composition information in support of marine ecosystem research and assessment

349 GAW is advancing well with activities outlined in the GAW Implementation Plan for 2016–2023, which places increased emphasis on the delivery of value-added and cross-cutting products and services that are relevant to society, including climate, weather forecasting, ecosystem sustainability, human health, mega-city development, agricultural productivity and many more. The Cg-18 adopted Resolution 60 (ex 7.1(2)/1 on 'Future WMO research and supporting activities', which refers to the recently established project within the GAW programme on the development of global maps of the total deposition to address the risks for food security and biodiversity. This project builds on the previous successes of 'A global assessment of precipitation chemistry and deposition of sulfur, nitrogen, sea salt, base cations, organic acids, acidity and pH, and phosphorus' delivered in 2014 and the work of GESAMP's Working Group on the Atmospheric Input of Chemicals to the Ocean (WG 38).

350 WMO-GAW has been a long-time sponsor of GESAMP's WG 38, which has published numerous studies related to the impact of atmospheric deposition of anthropogenic nitrogen to the ocean. Following the publication of the papers resulting from the 2013 workshop on the impacts of atmospheric nitrogen deposition to the ocean, WG 38 prepared a synthesis of the results from the scientific papers derived from that workshop. That report was reviewed by GESAMP and published by WMO in early 2018 as GESAMP Reports and Studies No. 97, 'The Magnitude and Impacts of Anthropogenic Atmospheric Nitrogen Inputs to the Ocean'. WG 38 is now completing its focus on two activities approved by GESAMP at its 42nd session. This included two simultaneous workshops held at the University of East Anglia, UK, from 27 February to 2 March 2017, addressing: i) the changing atmospheric acidity and the oceanic solubility of nutrients; and ii) the impact of ocean acidification on fluxes of non-CO₂ climate-active species. Four papers have been published in the peer-reviewed scientific literature from these workshops, and two more will be submitted shortly. A preliminary planning meeting was held for a possible new WG 38 workshop in 2020 titled 'The Atmospheric Input of Chemicals to the Ocean—Management and Policy Implications'. This workshop would bring together appropriate players to discuss the management and policy implications of current knowledge

about atmospheric inputs of nutrients and possibly other substances to the ocean and their interactions and impacts within the marine environment. For details, see the report from the Co-Chair of WG 38 submitted to GESAMP 46.

UN Decade of Ocean Science for Sustainable Development (2021–2030) and UN Ocean Conference 2020

351 As a contribution to the planning phase (2019–2020) of the UN Decade of Ocean Science for Sustainable Development (2021–2030), WMO organized a technical workshop ‘Enhancing ocean observations and research, and the free exchange of data, to foster services for the safety of life and property’ in Geneva on 5–6 February 2019. The key outcomes are as follows:

- .1 The workshop highlighted the relevance of WMO activities and applications to address socio-economic benefits, including in support of safeguarding life and property at sea.
- .2 The workshop agreed on the critical variables and observations gaps in ensuring adequate marine meteorological and oceanographic observations and data coverage for the safety of navigation and the protection of life and property in coastal and offshore areas (including exclusive economic zones—EEZs). The Resolution presented to Cg-18 recognized that there is no regulation in place for the collection of marine meteorological and oceanographic measurements within EEZs in support of operational applications of WMO, while the IOC ‘Guidelines for the Implementation of Resolution XX-6 of the IOC Assembly Regarding the Deployment of Profiling Floats in the High Seas within the Framework of the Argo Programme’ (IOC Resolution EC-XLI.4) are operated effectively and fully consistently with UNCLOS.
- .3 For data to have full benefit (e.g. for hazards, cyclones, etc.), the workshop recommended broader use and exchange of ocean data.
- .4 The workshop promoted partnership with private-sector entities to integrate their data for delivery of Earth system approaches/climate services, and proposed initiating a pilot project with the World Ocean Council.
- .5 The workshop agreed on a way forward for future collaboration between WMO and IOC regarding facilitating the making

of oceanographic observations in coastal regions in support of Earth system prediction and climate services.

- .6 The workshop recognized the importance of Observing System Simulation Experiments (OSSEs) and sensitivity analyses to be used to investigate the importance of data collected within EEZs. The workshop proposed conducting a pilot activity in this regard. Such activity will be a perfect candidate for the UN Decade of Ocean Science for Sustainable Development.

352 As a contribution to the preparations for the UN Ocean Conference 2020 and the UN Decade of Ocean Science for Sustainable Development, WMO, as part of Cg-18, organized an ‘Ocean Dialogue’ on ocean information to deliver weather, marine and climate services for a resilient and sustainable blue economy. The Congress adopted Resolution 66 (ex 7.3(1)/2) ‘United Nations Ocean Conference 2020’, which emphasizes the priority of ocean science, based on sustained observation and information-sharing, for delivering enhanced services to strengthen the resilience of societies to the socio-economic consequences of extreme weather, climate, water and other environmental events, and underpin their sustainable development.

353 As a further contribution to the Decade, WMO and IMO have started preparations to organize the ‘International Symposium on Extreme Maritime Weather: Towards Safety of Life at Sea and Sustainable Blue Economies’, which will be held at IMO Headquarters on 23–25 October 2019. Through a programme of presentations and discussion sessions, the Symposium aims to find possible solutions to the risks created by extreme maritime weather events—those which are dangerous to any ship at sea and are a threat to life, property or the marine environment, notwithstanding the economic impacts to the global blue economy. Provisional themes for the Symposium include, among others: extreme maritime weather; SOLAS Convention requirements; end-user requirements; ship observations for met-ocean information; use of available and emerging technology for improved navigation; and Earth-ocean prediction capability and forecasts at sea.

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC)

Global Ocean Science Report

354 The first Global Ocean Science Report (GOSR-I), was launched on 8 June 2017 and

assessed for the first time the status and trends in ocean science capacity around the world. It offered a global record of how, where and by whom ocean science is conducted. The report is about generating knowledge, helping to protect ocean health and empowering society to support sustainable ocean management in the framework of the United Nations 2030 Agenda.

355 GOSR-I identified and quantified the key elements of ocean science at the national, regional and global scales, including workforce, infrastructure and publications. It represents the first collective attempt to systematically highlight both opportunities and capacity gaps to advance international collaboration in ocean science and technology. The report is a resource for policymakers, academics and other stakeholders seeking to harness the potential of ocean science to address global challenges.

356 In Decision IOC-XXIX/5.1, the IOC Assembly requested the IOC Executive Secretary to present a proposed implementation plan for conducting the second edition of the GOSR to the Executive Council at the 51st session (Paris 3–6 July 2018) and to invite Member States through a Circular Letter to convey their views on lessons learned from the implementation of GOSR-I, including areas where the process could be improved.

357 GOSR-II will be published in concomitance with the second UN Ocean Conference in 2020. The IOC Secretariat aims to expand the national and regional information assessed and analysed, supported by an online questionnaire and data portal. Indeed, a more frequent mechanism for collecting and delivering the requested information will be needed. This is achieved through the development of a GOSR data portal. Data submission by Member States is expected to take place every two years, on the basis of a dedicated questionnaire. This data portal will feature all types of data presented in GOSR-I; additional data from relevant existing databases and other relevant published reports will be relied on as appropriate for quality assurance and quality control purposes. This repository is the foundation for a data portal. The fully developed data portal will allow submission and retrieval of ‘raw data’, metadata and literature. The collection of new data will be organized at regular time intervals—i.e. every two years. The development of a user-friendly interface and multiple visualization possibilities will allow multiple stakeholders, including scientists, civil society, policymakers and politicians, to use and communicate the results of the first and subsequent editions of the GOSR according to their specific needs.

358 As acknowledged by the Inter-agency Expert Group on SDG Indicators of the UN Statistical Commission (IAEG-SDG), part of the information provided in the GOSR contains the data needed to report on SDG target 14.A (14.A.1 indicator: Proportion of total research budget allocated to research in the field of marine technology), which deals with increasing scientific knowledge, developing research capacity and the transfer of marine technology. At its sixth session in November 2017, IAEG-SDG further agreed that the related indicator 14.A.1 methodology should be tested and upgraded it from Tier III^f to Tier II^g (see also [IOC/EC-LI/2 Annex 6](#)).

UN Decade of Ocean Science for Sustainable Development

359 Building on the efforts of IOC Member States and the IOC Secretariat, the United Nations General Assembly proclaimed in December 2017 the UN Decade of Ocean Science for Sustainable Development from 2021 to 2030. The period 2018–2020 will focus on the preparation of the implementation plan for the Decade, which will encompass a science plan as well as an engagement and communication plan, a business plan and a resource mobilization plan. IOC was tasked by the General Assembly at its 72nd session with the preparation of the implementation plan “in consultation with Member States, specialized agencies, funds, programmes and bodies of the United Nations, as well as other intergovernmental organizations, non-governmental organizations and relevant stakeholders”.

360 The strategic approach to the Decade will be transformative. The ocean science community and other relevant stakeholders should be willing to think beyond ‘business as usual’ and to aspire for real change, whether in relation to the depth of knowledge related to the ocean or in the way cooperation and partnerships are leveraged in support of sustainable development and a healthy ocean. The IOC Secretariat, supported by the IOC governing bodies, developed the first draft road map document (IOC-INF-1353 prov.), which provides an initial guide for the steps and processes needed to develop an implementation plan for the Decade. It also proposed governance and structural arrangements in the form of an

^f Tier III: No internationally established methodology or standards are yet available for the indicator, but methodology/standards are being (or will be) developed or tested.

^g Tier II: Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.

Executive Planning Group that was established by the IOC Executive Council at its 51st session and will take over the overall responsibility of guiding the preparation of the implementation plan. The road map was circulated to IOC Member States in February 2018 and widely disseminated to institutional partners. In this context, IOC also invited relevant United Nations bodies with a focus on the ocean to contribute to the development of the implementation plan. IOC hosted the meeting of UN-Oceans, the United Nations inter-agency mechanism on ocean affairs, at UNESCO Headquarters on 26–28 March 2018 to discuss United Nations system-wide contributions to the Decade.

Main activities undertaken or foreseen for 2018–2020

Support governance arrangements and specifically the activities and meetings of the Executive Planning Group

361 The Terms of Reference of the Executive Planning Group were adopted by the 51st IOC Executive Council in July 2018. The Secretariat will guide the work of the group, which is supposed to meet twice in the course of the preparation phase. A stakeholder forum consisting of institutional members should also be established following a call for expressions of interest and a subsequent invitation from the IOC Executive Secretary. It is expected that United Nations bodies, non-United Nations bodies, NGOs, science-focused organisations, donors/foundations and representatives from industry will be included. Membership will be open-ended.

Support engagement and consultation with the ocean and sustainable development community, including targeted regional and global topical workshops and participation in selected other forums and meetings that are aligned with the Decade strategy

362 Several regional workshops are foreseen to take place from the second half of 2019. These meetings will be an integral part of the Decade design process. The Executive Planning Group will provide guidance on the organization and structure of these workshops, and the IOC Secretariat will guide and coordinate the organization of each workshop. Ideally, as a minimum, five regional workshops would be needed to cover the main ocean basins. Regional Seas and Polar Regions will also be invited to contribute to the Decade design process. Two global planning meetings are envisioned for early 2019 and early 2020. The first meeting, which took place in May 2019, aimed to assess the status of ocean research *vis-à-vis* the 2030

Agenda requirements and scope the development of an outline of research to be conducted under the Decade. The second meeting would aim to consolidate inputs from various consultations, including the regional workshops referred to above, into a draft implementation plan.

Preparation of the resource, science, capacity development and communication/engagement plans and over-arching implementation plan

363 The preparation of the implementation plan will be a complex exercise, requiring the integration of several inputs from the regional and global consultation workshops. It will also require the development of specific components—for example, on capacity development, where a longer-term strategy to facilitate improved scientific knowledge transfer to wider segments of society and regional/national governments will be required. External assistance and expertise will be required, as well as the possible formation of targeted expert groups.

Engagement and consultation within the United Nations system and, in particular, reporting to the General Assembly

364 During the preparatory phase, IOC will need to engage actively with several United Nations constituencies that may benefit and contribute to the Decade. These will include FAO on fisheries aspects, IMO on shipping and related environmental issues, the International Seabed Authority in relation to seabed exploration, UNEP with regards to marine policies and regional governance, among others. To do so, a number of information sessions, events and workshops will be organized in various United Nations forums (e.g. FAO, IMO, OceanObs' conference, Our Ocean conferences, etc.). In addition, regular information sessions are foreseen to brief United Nations Member States on the progress with the Decade, and a task force dedicated to the Decade was established under UN-Oceans.

Support communication activities such as a brochure, the website, networking with scientists and production of outreach materials.

365 Digital marketing activities will also be initiated to communicate about the Decade using digital supports (Facebook, Twitter). A dedicated Decade website will be established to inform the different stakeholders about the Decade and its preparatory process.

366 This communication campaign will be organized to inform Member States, potential partners and other stakeholders of the preparatory phase under way, with the aim of inviting contributions and communicating the purpose and expected results of the Decade

367 Finally, the IOC Executive Secretary formally wrote to the Chair of GESAMP to invite GESAMP to join forces with many partners and contribute to the UN Decade planning. GESAMP was invited to:

- .1 identify suitable candidates for possible nomination to the Executive Planning Group, keeping in mind that they will serve in their personal capacity, capitalizing on their professional experience and knowledge;
- .2 contribute through the planned regional consultation workshops to be organized in all major ocean basins, which will communicate the purpose and expected results of the Decade to all stakeholders but also engage and consult with the ocean community concerning the implementation plan for the Decade, and the design of transformative projects;
- .3 contribute to the global planning meetings foreseen in 2019 and 2020, which will assess the status of ocean research *vis-a-vis* the requirements of the 2030 Agenda, scope and eventually validate the research plan of the Decade, building on thematic and regional workshops inputs;
- .4 participate in the stakeholder forum that is expected to be established to capture institutional inputs from providers and end-beneficiaries of the Decade;
- .5 contribute to the science plan;
- .6 support the task force established under UN-Oceans; and
- .7 link to the United Nations '[Revised Roadmap for the UN Decade of Science for Sustainable Development](#)'.

Ocean acidification

368 In view of the growing urgency and recognition of ocean acidification as one of the major stressors for the marine environment, improved observation and research are needed to help scientists and governments implement related mitigation and adaption measures.

369 IOC-UNESCO actively provided technical support to Member States to report against SDG indicator 14.3.1, focusing on ocean acidification in the framework of sustainable development. IOC provides the methodology to guide scientists and countries to carry out measurements following the best practices established by the ocean

acidification community. In this way, IOC and its networks, including the Global Ocean Acidification Observing Network (GOA-ON), directly contribute to the achievement of SDG target 14.3.

370 During its 51st session, the IOC Executive Council welcomed the methodology for SDG target indicator 14.3.1 and recommended to the IOC Secretariat, as the custodian agency for this indicator, to propose its upgrade from Tier III to Tier II. In November 2018 this application was brought forward, and IAEG-SDG agreed on the proposed upgrade. During an expert workshop organized by IOC in October 2018, experts agreed on the outline and timeline for the production of a manual focusing on the 14.3.1 methodology, to be published in the third quarter of 2019.

371 GOA-ON now has more than 632 members, from 96 countries (2015: 150 scientists from 31 countries) and is constantly growing. Currently 17 SIDS and 23 African countries are represented. This is also thanks to IOC engagement and involvement in ocean acidification projects in the Caribbean, the Middle East and East Africa.

372 Work to develop a 14.3.1 data portal continued. A beta version of the portal is expected to be available in August 2019, facilitating the collection and quality control of ocean acidification data.

373 IOC was further invited to submit a contribution on ocean acidification to the WMO annual statement on the state of the global climate. This is only the second year that ocean acidification has been included in the statement. A preliminary statement was published by WMO in December 2018, just ahead of the opening of COP 24 to the UNFCCC. The full statement was published in February 2019. The IOC Secretariat also contributed to a community White Paper for the upcoming OceanObs'19 conference, highlighting the 14.3.1 methodology. IOC co-organized the annual GOA-ON Executive Council meetings in 2018 (Sopot, Poland) and 2019 (Hangzhou, China), and further actively participated and supported the 4th international GOA-ON workshop (14–17 April 2019 in Hangzhou, China).

Blue Carbon Initiative

374 The Blue Carbon Initiative, established in 2011 by IOC, IUCN and Conservation International, works to develop management approaches, financial incentives and policy mechanisms for ensuring the conservation, restoration and sustainable use of coastal blue carbon ecosystems. IOC is highly involved in the

Blue Carbon Scientific Working Group, which provides the scientific foundation for the Blue Carbon Initiative by synthesizing current and emerging science on blue carbon and by providing a robust scientific basis for coastal carbon conservation, management and assessment. Priority research of the Scientific Working Group functions in close partnership with the Initiative's Policy Working Group.

375 IOC is also a coordinating member of the International Blue Carbon Partnership, a unique body that brings together governments, NGOs, intergovernmental organizations and United Nations agencies.

376 IOC co-organized and co-sponsored the International Blue Carbon Initiative annual meeting in China in August 2018. It also supported three side events during the UNFCCC COP24, highlighting the potential of blue carbon ecosystems as a nature-based solution to be applied in Nationally Determined Contributions to mitigate climate change, and provided coordinated input to the WMO 'Climate Change Bulletin 2018' addressing blue carbon. In collaboration with the Blue Carbon Partnership, these events were an opportunity to connect high-level representatives and scientists to raise awareness of the central role of these ecosystems for carbon sequestration.

Deoxygenation

377 Deoxygenation is a global problem in coastal and open regions of the ocean; it has led to expanding areas of oxygen minimum zones and coastal hypoxia. In the coastal ocean, the number of reported dead zones has increased exponentially since the 1960s, to more than 600 now. The recent expansion of hypoxia in coastal ecosystems has been primarily attributed to global warming and enhanced nutrient input from land and atmosphere. The global extent and threat to human health and marine ecosystem services of ocean deoxygenation are just beginning to be appreciated; the social and economic consequences have yet to be determined but are likely to be significant.

378 To raise awareness of the impacts of deoxygenation on marine life, an IOC Working Group, the Global Ocean Oxygen Network (GO2NE), published a technical brief 'The ocean is losing its breath' in 2018. IOC organized the annual meeting of the group on 1–2 September 2018, just before the international conference 'Ocean Deoxygenation: Drivers and Consequences—past—present—future' in Kiel, Germany, on 3–7 September 2018. The conference concluded with the Kiel Declaration, signed by 502 experts as of 18 December 2018.

The Secretariat also organized a joint GlobalHAB/GO2NE workshop on 11–12 June 2019, which discussed the interaction of deoxygenation and HABs. This workshop was followed by the 2019 GO2NE meeting, which focused on the work plan for the next two years, including the GO2NE summer school in September 2019, which is supported by the Scientific Committee on Oceanic Research (SCOR), and the development of the Ocean Oxygen Data Portal. The IOC Secretariat further coordinated input to the WMO 'Climate Change Bulletin 2018' (published in February 2019) addressing deoxygenation in the ocean.

Time series

379 Since 2013 the establishment of an interdisciplinary IOC Working Group, the International Group for Marine Ecological Time Series (IGMETS), has offered the possibility to provide new scientific insights to improve model projections and forecasts needed to understand open ocean and coastal changes. The information collected addresses new scientific questions and serves a well-established community of practice related to ship-based time series. IGMETS met on 7–9 November 2018 at IOC Headquarters to develop the scope of its second report.

380 Since 2016 an affiliated Working Group (TrendsPO) has worked specifically to investigate climate change and global trends of phytoplankton in the ocean, in particular the coastal ocean. It continues the comparative analysis and synthesis of long time-series data sets compiled by SCOR WG 137, and expands the focus not only to the continental shelf and open oceans but also to estuarine and upstream freshwater ecosystems where perturbations from terrestrial, atmospheric, oceanic sources and human activities converge to cause changes that ramify across local and global scales. The Working Group examines the land and sea connectivity using long time-series of available data.

Harmful algal blooms

381 A number of Task Teams, Working Groups and activities are operating and reporting to the IOC Intergovernmental Panel on HABs (IPHAB). Several of the groups contribute to the development of a 'Global HAB Status Report' with the aims of: compiling an overview of HAB events and their societal impacts; providing a worldwide appraisal of the occurrence of toxin-producing microalgae; and assessing the status and probability of change in HAB frequencies, intensities and range resulting from environmental changes at the local and global scale. The development of this report is intimately linked with the systematic compilation of HAB data in the

Ocean Biogeographic Information System (OBIS) and the IOC Harmful Algal Event Database (HAEDAT). It is funded by Flanders and cosponsored by the IAEA.

382 Another key activity under IPHAB is on ciguatera fish poisoning, which is the most extensive human illness caused by harmful algae. IPHAB has initiated the development of a United Nations Coordinated Ciguatera Strategy involving FAO, IAEA and WHO.

383 The long-term focus of the IOC HAB programme is on improved understanding of the factors controlling HAB events and thereby improving management and mitigation options. The key scientific questions have for more than a decade been addressed jointly with SCOR through research programmes. The current decadal IOC-SCOR research programme to meet societal needs in a changing world is titled [GlobalHAB](#); it launched its science and implementation plan in 2017.

384 GlobalHAB and GESAMP (as decided at GESAMP 45) are jointly preparing for an open science meeting on sargassum to identify the main research challenges to understand the driving forces behind sargassum mass occurrences and, based on this, identify additional management and mitigation options.

IOC joint action with ICES and IMO on ballast and other ship vectors

385 The ICES-IOC-IMO Working Group on Ballast and Other Ship Vectors (WGBOSV) reviews and reports on the status of shipping vector research, with an emphasis on new developments in ballast water treatment technology; risk assessment; ballast water sampling devices; selection of ballast water exchange zones; consideration of appropriate discharge standards of organisms in ballast water; and hull fouling regulations and treatment options to reduce the risk of introducing non-native species. The Working Group also discusses and evaluates sampling strategies to ensure that international guidelines are based on accurate scientific information, thereby helping to achieve consensus on difficult and technical issues.

386 WGBOSV submits documents to and participates in meetings at IMO to ensure that international guidelines are based on accurate scientific information, thereby helping to achieve consensus on difficult and technical issues. The Working Group meets annually and functions through extensive collaboration by expert

scientists from all over the world, representing leading knowledge and expertise on this topic.^h

Research into coastal impacts of nutrients

387 Nutrient over-enrichment of coastal ecosystems is a major environmental problem globally, contributing to problems such as HABs, dead zone formation and fishery decline. Yet quantitative relationships between nutrient loading and ecosystem effects are not well defined. The IOC Nutrients and Coastal Impacts Research Programme (N-CIRP) is focusing on integrated coastal research and coastal eutrophication, and linking nutrient sources to coastal ecosystem effects and management in particular. As part of the implementation strategy for N-CIRP, IOC also actively participates in the UNEP-led GPNM with intergovernmental organizations, NGOs and governments. GPNM has an online information portal to enable its partners to monitor progress on implementing activities related to the sustainable use of nutrients. The platform provides a knowledge hub and networking opportunities and promotes global discussions on sustainable nutrient management. Concern over the impacts of altered nutrient inputs, N, P and Si, to coastal waters has led the United Nations to include an Index for Coastal Eutrophication Potential (ICEP) as an indicator for SDG 14.1.1 on eutrophication. To implement ICEP, we need a dissolved silica model and evaluate the effectiveness of ICEP in predicting coastal impacts at the global scale. With UNEP being the custodian agency for 14.1.1, IOC is aiming to contribute by developing ICEP. This will require two postdoctoral scholars and an expert workshop to validate models.

Multiple stressors

388 At its 51st session, the IOC Executive Council agreed to establish a new Working Group focusing on multiple stressors. A draft policy brief introducing the issue of multiple stressors on marine ecosystems prepared in collaboration with SCOR Working Group members—with the working title ‘Ocean under Stress: A changing ocean at all locations’—was presented to the 30th Session of the IOC Assembly in June 2019. The final publication will be available during the 4th quarter of 2019.

^h Full reports are available at <http://www.ices.dk/community/groups/Pages/WGBOSV.aspx>.

Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socio-Economic Aspects (World Ocean Assessment)

United Nations World Ocean Assessment

389 IOC continues to provide scientific and technical support to the WOA process established under the United Nations General Assembly. A second cycle of assessment (2017–2020) was initiated under the Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects, starting with the holding of five regional workshops in 2017 to build capacity, support the development of assessments and facilitate outreach and awareness-raising. Two of these workshops were organized by IOC: the regional workshop covering the North Pacific was hosted by WESTPAC together with the Government of Thailand (29–30 November 2017), while IOCARIBE and the Government of Brazil hosted the workshop for the Wider Caribbean and South Atlantic. These considered how assessments produced by the Regular Process can be structured to help policymakers most effectively with their tasks, and how to improve arrangements for networking among various group of experts and organizations involved in the Regular Process. Both workshops further emphasized the importance of capacity-building to achieve the integrated assessment of marine environment. This is possibly an element to pursue as part of the IOC Capacity Development Strategy. A second round of regional workshops took place in 2018 to, *inter alia*, inform the collection of regional-level information and data for the preparation of WOA II. IOC nominated experts to several of these.

390 In 2019, a multi-stakeholder dialogue and capacity-building partnership event was held on 24–25 January at United Nations Headquarters in New York. The event aimed to increase awareness of the importance of the Regular Process and more generally the science–policy interface at all levels. It also sought to highlight the importance of capacity-building in support of the Regular Process, including regarding the preparation of integrated assessments which are important to inform decision-making by policymakers and other relevant stakeholders. In-depth multi-stakeholder dialogues on current opportunities, gaps and needs in capacity took place. IOC Vice-Chairperson Ariel Troisi delivered a keynote on the contribution of ocean science in global policy processes. Several Member States recognized IOC’s contribution in supporting capacity development through its dedicated Capacity Development Strategy, and its work on ocean literacy.

Data management

391 The IOC International Data Exchange (IODE) programme published the ‘[IOC Strategic Plan for Data and Information Management \(2017–2021\)](#)’ and the ‘[IOC Communication and Outreach Strategy for Data and Information Management](#)’ as IOC Manuals and Guides 77 and 79, respectively. The World Ocean Database (WOD), maintained by the NOAA National Centers for Environmental Information (NCEI), is the world’s largest collection of ocean data available internationally without restriction. WOD was first released in 1994 but established as an IODE project in 2000. A mirror copy was established in January 2018 at the IOC Project Office for IODE in Ostend, Belgium.

392 To enhance the role of marine information management, IODE adopted the concept of ‘[IODE Associate Information Units](#)’ (AIUs) at its 25th session, and an application form and associated review criteria are now available. By the end of February 2019, three marine libraries had joined the IODE network as AIUs.

393 The First Session of the Intersessional Working Group to Develop a Concept Paper for an Ocean Data and Information System (ODIS, 5–8 March 2018, Ostend, Belgium) decided to pursue a federated approach, leveraging connections between existing systems, to improve semantic and technical interoperability between systems, and to connect data providers with limited capacity to established repositories for securing and making data accessible. The initial output will be a register of known marine data and information sources, including discovery and technical-level metadata that will support federated access across these systems in the future. Over time, additional sources will be added that are aligned with the [FAIR Data Principles](#), a set of guiding principles to make data Findable, Accessible, Interoperable and Re-usable (FAIR).

394 Between May 2017 and 9 April 2018, OBIS grew with 269 new data sets, adding 7,700 new species and 3.1 million observations, resulting in a total of 50.9 million records of 118,000 marine species. Two new national OBIS nodes were established: in Colombia (hosted by INVEMAR) and in the UK (hosted by MBA). The OBIS Secretariat is supporting the implementation of the OBIS-ENV-DATA standard through the development of [new quality control tools](#), available as web services and as an R package.

395 OBIS is undergoing a major reengineering of its platform (OBIS2.0), which is urgently needed to drive new innovations in science and technology, to meet the increasing demands for services from global drivers (such as

GOOS, the Group on Earth Observations - Biodiversity Observation Network (GEO BON), the Convention on Biological Diversity, the International Seabed Authority, WOA and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services—IPBES) and to support the regional focus of several OBIS nodes (e.g. USA/OBIS, Europe/EMODnet).

396 The information collected on oceanographic cruises that have been undertaken in the Large Marine Ecosystem (LME) regions around Africa will be incorporated in the African node of the Ocean Data Portal that is currently being developed under the coordination of IOCAFRICA.

397 IODE launched the [Ocean Data and Information System Catalogue of Sources \(ODISCat\)](#), which aims to be a browsable and searchable online catalogue of existing ocean-related web-based sources/systems of data and information, products and services. It will also visualize the landscape (entities and their connections) of ocean data and information sources. It currently welcomes 16 different types of resources. By the end of February 2019, 345 online sources had been described in the catalogue. ODISCat is the first product developed within the context of ODIS and will facilitate the further deployment of the system based on existing data and information.

398 The 25th Session of the IODE Committee was held in Tokyo, Japan, on 20–22 February 2019 (cf. IOC/IODE-XXV/3s). The session was preceded by a two-day scientific conference, which welcomed 150 participants from 40 countries. The [35 presentations](#) focused on: i) the UN Decade; ii) how IODE is collaborating in ongoing major initiatives and activities that may contribute to the UN Decade; iii) regional developments; iv) capacity development; and v) emerging opportunities for the future of IODE, including vi) cooperation with partners. To maximize accessibility to the conference, all sessions were live-streamed.

FOOD AND AGRICULTURE ORGANIZATION (FAO)

Joanna Toole

FAO mourns the terrible and tragic loss of Joanna Toole, who perished in the Ethiopian Airlines crash on 10 March 2019. In early 2019, Joanna had been appointed as FAO's Technical Secretary to the newly formed GESAMP Working Group on sea-based sources of marine litter, including fishing gear and other shipping-related litter. Joanna, a core team member of FAO's

Responsible Fishing Operations Programme within the Fishing Operations and Technology Branch, was known as a true, passionate and dedicated champion for the protection of aquatic wildlife.

Marine litter and microplastics

399 FAO continues to consider the issue of marine litter and microplastics from the perspectives of: i) reducing marine litter that originates from the fishing industry, in particular ALDFG; ii) assessing the ecological impact of microplastics on fisheries resources; iii) assessing the implications of microplastics for aquaculture products; and iv) assessing food safety risks from marine litter, in particular microplastics, on human health.

400 FAO collaborates with many organizations, including relevant United Nations agencies and programmes, NGOs and academic institutions, in addressing and building knowledge on marine litter and microplastics, including: UNEP and GPML, IMO, ICES, GESAMP and the Global Ghost Gear Initiative (GGGI).

401 FAO contributes to the discussions of the UNEP Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics.

FAO progress in addressing abandoned, lost or otherwise discarded fishing gear

402 FAO members have recognized ALDFG as a significant component of marine litter and have raised concerns about its impacts on habitats, fish stocks and marine wildlife, particularly through 'ghost fishing', and as a navigational hazard and risk to safety at sea.

403 The 33rd Session of FAO's Committee on Fisheries (COFI33), held on 9–13 July 2018 in Rome, endorsed the '[Voluntary Guidelines for the Marking of Fishing Gear](#)'.ⁱ They are considered an important tool in minimizing the impact of ALDFG and ghost fishing, and in combatting illegal, unreported and unregulated fishing.

ⁱ These Voluntary Guidelines are dedicated to the memory of Joanna Toole, who worked tirelessly to reduce and manage ALDFG in the ocean and to stop ghost fishing by such gear worldwide. She played a key role in the preparatory process for the formulation of the Voluntary Guidelines. Joanna died tragically in the Ethiopian Airlines Flight 302 crash on 10 March 2019, en route from Addis Ababa, Ethiopia, to Nairobi, Kenya. She was on her way to participate in UNEA4, representing FAO. She would have spoken about marine litter and microplastics in general and especially on some key points contained in this publication.

404 COFI33 encouraged FAO to conduct further work on quantifying the impacts of ALDFG and developing and documenting best practices for addressing it, including the recovery and recycling of gear, the use of biodegradable gear to minimize its contribution to marine plastic pollution, and the reduction of ghost fishing.

405 COFI33 further supported the development of a comprehensive global strategy to address ALDFG and encouraged the involvement of small-scale and artisanal fisheries and relevant regional fisheries management organizations and international bodies.

406 FAO is now planning for the development of a global 'umbrella' programme to support the implementation of the 'Voluntary Guidelines on the Marking of Fishing Gear' and other actions that are required to address ALDFG at a global scale. The programme will comprise a partnership framework with projects tailored to meet the specific needs of countries requiring support. It is expected that the programme will increase the opportunity for FAO to collaborate with partners on the issue of ALDFG and that its implementation will need to be supported by ongoing scientific advice.

407 FAO and IMO are actively supporting the initial activities of GESAMP WG 43 on sea-based sources on marine litter, including fishing gear and other shipping-related litter. The Working Group's Chair and members and the Technical Secretaries of IMO and FAO have already had online discussions. The first physical (face-to-face) meeting of WG 43 will be held in Rome on 28–30 October 2019.

Microplastics

408 In an effort to summarize issues, findings and recommendations of [previous publications on microplastics, developed by FAO and GESAMP](#), FAO has published a [short brief](#) (available in English, Arabic, Chinese, French and Spanish) for policymakers and the general public on the topic.

409 FAO contributed to the identification of participants and the preparations for the GESAMP international workshop on assessing the risks associated with plastics and microplastics in the marine environment, held on 21–23 May 2019 in Geneva, and gratefully acknowledges the generous support of the Government of Norway and the active coordination of GESAMP's Chair and UNEP staff.

410 Moreover, the FAO EAF-Nansen Programme that is supported by a research vessel, the *R/V Dr. Fridtjof Nansen*, includes a dedicated research theme in its science plan with

the objective of assessing the occurrence of microplastics and marine litter on the surface and in the water column in the areas where the research vessel operates, identify hotspots and study the composition and presence of chemicals associated with them. Systematic sampling of microplastics and marine litter has been done off West Africa and in the Indian Ocean since 2017, and resulting samples/data are being analysed with partner institutions. Capacity-building activities are also planned to strengthen skills on processing samples and data analysis in participating countries.

411 Other steps for FAO to take on microplastics include building on the information compiled in the Technical Paper and using it to develop appropriate risk profiling tools to assess food safety impacts of microplastic pollution in collaboration with interested partners. FAO would also welcome collaboration on microplastics and aquaculture, as well as on ecological impacts on fisheries resources.

412 FAO hopes that the Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics will carefully consider sea-based sources of marine litter, in particular ALDFG, within the framework of a holistic global response to the overall marine litter issue. FAO also hopes that the work of the Ad Hoc Expert Group will be able to support efforts to fill knowledge gaps relating to the impacts of microplastics on fisheries resources and aquaculture.

413 COFI33 expressed concern about the effects of pollution, including microplastics, on aquatic resources, and encouraged FAO to continue collecting information on its impacts on aquaculture and fishery resources, and implications for food safety, both in marine and freshwater systems, building on the work of the EAF-Nansen Programme.

Recent developments on methylmercury

414 FAO has been providing scientific advice on mercury-related matters based on a risk-benefit exercise carried out during the Joint FAO–WHO Expert Consultation on the Risks and Benefits of Fish Consumption since 2010. Since then, FAO has supported Codex Alimentarius on mercury-related issues and has provided scientific advice to the Codex Committee on Fish and Fishery Products and the Codex Committee on Contaminants in Foods (CCCF). The Codex Alimentarius Commission has recently adopted new maximum limits for methylmercury in fish, with reservations from several countries that expressed their disagreement with the change from 1 mg/kg for predatory fish to 1.2 mg/kg for all tuna, 1.5 mg/kg for Alfonsino, 1.7 mg/kg for all

marlin and 1.6 mg/kg for shark. CCCF had previously agreed to discontinue work on the maximum limits for amberjack and swordfish and to establish an Expert Working Group chaired by New Zealand and co-chaired by Canada to prepare a discussion paper on the establishment of maximum limits for additional fish species. A footnote on the importance of consumer advice was left in the document. CCCF could consider revising the maximum limits for tuna in the light of additional data after three years.

Recent developments on harmful algal blooms

415 FAO, together with IOC-UNESCO, IAEA and WHO, will start working together on food safety early warning systems for toxic HABs and toxins. A joint FAO–IAEA–IOC–UNESCO route map will be developed for this purpose.

416 In addition, the FAO collaboration with IAEA, IOC-UNESCO and WHO that started with the inter-agency meeting on ciguatera fish poisoning in December 2015 will continue. After the technical meeting for the development of an Inter-Agency Global Ciguatera Strategy that took place at the IAEA Environment Laboratories in Monaco in April 2018, the four agencies have developed a coordinated strategy to address ciguatera fish poisoning. The strategy will cover the following elements: i) improving the detection and monitoring of organisms contaminated with ciguatoxins, as well as risk forecasting; ii) improving the detection of toxins in dinoflagellate cells and fish tissue; and iii) improving epidemiological data collection, reporting and assessments.

The State of World Fisheries and Aquaculture 2018

417 FAO's flagship publication on fisheries and aquaculture '[The State of World Fisheries and Aquaculture](#)' (SOFIA) 2018 was presented to COFI33 and includes a discussion on ALDFGs and microplastics (see the section on selected ocean pollution concerns on pp. 154–157). A [SOFIA in brief booklet](#) and a [SOFIA 2018 flyer](#) were also produced.

The State of the World's Aquatic Genetic Resources for Food and Agriculture

418 FAO has published the [first assessment on the state of the world's aquatic genetic resources \(AqGR\) for food and agriculture](#), with the scope of this first report limited to cultured AqGR and their wild relatives, within national jurisdiction.

Global review on rebuilding of marine fisheries

419 The '[Global review on rebuilding of marine fisheries](#)' was also published by FAO in 2018, providing a review of the emergence of the rebuilding paradigm, its key concepts, the trends in fishery resources, and the empirical evidence available on stocks depletion, collapse and rebuilding.

Strengthening the science–policy nexus in fisheries

420 FAO is organizing, in collaboration with many international partners, the [International Symposium on Fisheries Sustainability](#), to be held in Rome on 18–21 November 2019.

UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)

Introduction

421 UNDP's operational ocean governance portfolio, valued at about USD200 million in grant funding, primarily mobilized from various vertical funds (Global Environment Facility, Green Climate Fund, Adaptation Fund, Least Developed Countries Fund) and bilateral sources, covers a range of programmes and projects, including the Large Marine Ecosystems and Regional Fisheries Programme, Greening the Shipping Industry, and Ridge-to-Reef Integrated Water Resources and Coastal Area Management. In late 2019, UNDP will also be launching a new Ocean Innovation Facility. Summaries of initiatives active in the 2018–2019 reporting period follow.

Large Marine Ecosystems and Regional Fisheries Programme

Catalysing implementation of a Strategic Action Programme for the Sustainable Management of shared Living Marine Resources in the Humboldt Current System

422 The project objective is to facilitate ecosystem-based fisheries management and ecosystem restoration in the Humboldt current system for the sustainable and resilient delivery of goods and services from shared living marine resources, in accordance with the Strategic Action Programme (SAP) endorsed by Chile and Peru. Main project components include:

- .1 recovery and maintenance at optimal population biomass levels of the majority of fisheries resources while maintaining ecosystem health and productivity under climate change scenarios;

- .2 improving the environmental quality of the marine and coastal ecosystems through integrated management considering the various sources of pollutants;
- .3 restoring and maintaining the habitat and biodiversity of marine and coastal systems at sustainable levels;
- .4 diversifying and adding value by creating productive opportunities inside and outside the fisheries sector with people socially organized and integrated; and
- .5 contributing to the population's food security and food safety.

Implementation of the Yellow Sea Large Marine Ecosystem Strategic Action Programme for Adaptive Ecosystem-Based Management

423 The objective of the regional project is to achieve adaptive ecosystem-based management of the Yellow Sea Large Marine Ecosystem (YSLME) bordered by China, the Republic of Korea and the Democratic People's Republic of Korea by fostering long-term sustainable institutional, policy and financial arrangements for effective ecosystem-based management of the Yellow Sea in accordance with the YSLME SAP adopted by China and the Republic of Korea in 2009. To achieve this objective, the project will support the formation of the YSLME Commission to oversee the implementation of the SAP, innovate institutional arrangements and improve management capacity and quality of function. This includes developing robust governmental coordination mechanisms; strengthening regulatory mechanisms while strengthening the incentive structure to promote environmental protection; and developing mechanisms to link land and sea and resource use to carrying capacity, and systems for the participation of a range of stakeholders. The key benefits of the project include recovery of depleted fish stocks and improved mariculture production and quality; improved ecosystem health; maintenance of habitat areas; strengthened stakeholder participation in management and improved policymaking; and the significant development of skills and capacity for region-wide ecosystem-based management

Implementation of Global and Regional Oceanic Fisheries Conventions and Related Instruments in the Pacific Small Island Developing States (with FAO)

424 This project supports Pacific SIDS in meeting their obligations to implement and effectively enforce global, regional and

subregional arrangements for the conservation and management of transboundary oceanic fisheries, thereby increasing sustainable benefits derived from these fisheries. The project includes five components: i) regional actions for ecosystem-based management; ii) sub-regional actions for ecosystem-based management; iii) national actions for ecosystem-based management; iv) stakeholder participation and knowledge management; and v) project management. The project supports Pacific SIDS, as the major bloc at the Western and Central Pacific Fisheries Commission, to adopt regional conservation and management measures, supports the innovative approaches being developed by Pacific SIDS at subregional level as they collaborate in fisheries of common interest, and assists SIDS to apply measures nationally in their own waters and to their fleets.

Catalysing Implementation of the Strategic Action Programme for the Sustainable Management of Shared Living Marine Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+)

425 CLME+ is a five-year project that specifically aims to facilitate implementation of the 10-year politically endorsed Strategic Action Programme for the Sustainable Management of the Shared Living Marine Resources of the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+ SAP). The project seeks to achieve this by facilitating ecosystem-based management/an ecosystem approach to fisheries within the CLME+ region, in such a way that a sustainable and climate-resilient provision of goods and services from the region's living marine resources can be secured. Given its regional and comprehensive nature, the CLME+ project is uniquely positioned to address the root causes of environmental degradation, in particular the gaps and weaknesses in transboundary and cross-sectoral governance arrangements. In this same context, the project will assist stakeholders in achieving improved coordination, collaboration and integration among the wide array of ongoing and newly planned projects and initiatives that are of relevance to the wider objectives of the CLME+ SAP.

Western Indian Ocean Large Marine Ecosystems - Strategic Action Programme Policy Harmonization and Institutional Reforms (SAPPHIRE) Project

426 This project builds on the previous work completed under the UNDP-supported, GEF-financed Agulhas and Somali Current Large Marine Ecosystems (ASCLME) Project in close collaboration with a number of partners. The ASCLME Project delivered the intended regional

transboundary diagnostic analysis and ministerially endorsed SAP for the western Indian Ocean LMEs as well as individual marine ecosystem diagnostic analyses for each participating country. The ASCLME Project also created the Western Indian Ocean Sustainable Ecosystem Alliance (WIOSEA). The SAPPHIRE Project aims to support and assist the appropriate and formally mandated government institutions and intergovernmental bodies in the region to implement the required activities to deliver the SAP and to ensure sustainability of efforts and actions towards long-term management of activities within the LMEs as well as the sustainability of associated institutional arrangements and partnerships.

Timor/Arafura Seas Strategic Action Programme Implementation

427 The ATSEA-2 Project is the second phase of the GEF-financed, UNDP-supported ATSEA programme, and is designed to enhance regional collaboration and coordination in the Arafura and Timor Seas (ATS) region. ATSEA-2 will specifically focus on supporting the implementation of the endorsed SAP, a 10-year vision for the ATS region with the long-term objective “to promote sustainable development of the Arafura-Timor Seas region to improve the quality of life of its inhabitants through restoration, conservation and sustainable management of marine-coastal ecosystems”.

Improving Ocean Governance and Integrated Management in the Benguela Current Large Marine Ecosystem

428 The Benguela Current Large Marine Ecosystem (BCLME) Programme, co-funded by GEF, has promoted the integrated management and sustainable use of marine resources of the BCLME since 2002. Over the past years, BCLME has accomplished several achievements in the three countries (Angola, Namibia and South Africa), among which the establishment of the Benguela Current Commission and the signing of the Benguela Current Convention were milestones. Building on the strong political commitment of the three countries to sustainable management of the BCLME and on the past GEF investment in the region, the project aims to: i) promote further policy, legal, institutional and management reform at both regional and national levels to implement the SAP and Convention; ii) promote the engagement of communities and the private sector in stress reduction demonstration activities and in the implementation of the SAP and Convention; and iii) strengthen institutional and human capacity-building through, among other means, South–South cooperation.

Towards joint integrated, ecosystem-based management of the Pacific Central American Coastal Large Marine Ecosystem

429 The Pacific Central-American Coastal LME (PACA) extends from southern Mexico to northern Peru. Nine countries share PACA (from north to south): Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Colombia and Ecuador. The objective of the PACA project is to promote ecosystem-based management of the PACA through the strengthening of regional governance, improvement of governance instruments for joint management at regional level, implementation of initial on-the-ground pilot actions to address common key issues and advance collaborative work and replication, and knowledge management.

Strengthening of the enabling environment, ecosystem-based management and governance to support implementation of the Strategic Action Programme of the Guinea Current Large Marine Ecosystem (with UNEP, UNIDO, FAO)

430 The project objective is to strengthen the enabling environment, ecosystem-based management and governance to support implementation of the ministerially endorsed SAP of the Guinea Current LME. UNDP will lead on Component 3: Assessments, stakeholder and inter-ministerial consultations

Scaling up the Implementation of the Sustainable Development Strategy for the Seas of East Asia

431 The project seeks to reduce pollution and rebuild degraded marine resources by scaling up the implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA) in Cambodia, People’s Republic of China, Indonesia, Lao PDR, Philippines, Thailand, Timor Leste and Viet Nam—countries that share six LMEs and related catchment areas. It represents a transformation process, culminating in a self-sustaining, country-owned regional organization (PEMSEA) and continuing commitments of funding and support for the implementation of SDS-SEA over the longer term. It also makes a stronger link between sustainable development of river basins, coastal and marine areas and local, national and regional investment processes by the public and private sectors in support of a ‘blue economy’.

Global Sustainable Supply Chains for Marine Commodities

432 Overexploitation of marine fisheries is a major global issue and a key driver of changes in the marine environment. Excessive fishing is

caused by a variety of interacting factors, including the growing global demand for seafood. This project contributes to address key aspects of the market forces that drive overfishing. The project will add to the transformation of the seafood market by mainstreaming sustainability in the value chain of important commodities from developing countries; improving emerging tools such as corporate sustainable purchase policies, sustainable marine commodities platforms and fisheries improvement projects; developing national capacities; and generating learning to be shared worldwide. The project target fisheries include tuna, mahi mahi (dorado) and other pelagic fish in the Eastern Pacific Ocean; tuna in the Western Pacific Ocean; small pelagic in Ecuador; Filipino octopus; and blue swimming crab fisheries in Indonesia and Philippines.

Coastal Fisheries Initiative—Latin America component

433 The project objective is to demonstrate holistic, ecosystem-based management and improved governance of coastal fisheries in the South-East Pacific. The project is the Latin American component of the GEF Coastal Fisheries Initiative (CFI) programme, which aims to motivate a shift towards an integrated, inclusive and sustainable approach to fisheries management and development. The project addresses the key issue of weak fisheries governance in coastal fisheries in Ecuador and Peru, focusing mainly on artisanal and small-scale fisheries. The project strategy is to: i) establish communities of practice with fishers, stakeholders and authorities of both countries; ii) implement hands-on trials in fishery-specific (seven fisheries) and area-specific cases (two sites); iii) systematically document, exchange and disseminate experience and lessons within each country, between both countries and among CFI participants; and iv) apply lessons to improve existing fisheries governance schemes or implement new ones.

Strengthening Global Governance of Large Marine Ecosystems and Their Coasts through enhanced sharing and application of LME/ICM/MPA knowledge and information tools (LME:LEARN)

434 LME:LEARN is a programme to improve global ecosystem-based governance of LMEs and their coasts by generating knowledge, building capacity, harnessing public and private partners and supporting South–South and North–South learning. A key element of this improved governance is mainstreaming cooperation between LME, MPA, MSP and integrated coastal management (ICM) projects in overlapping areas, for both GEF and non-GEF projects. The project

plans to achieve a multiplier effect using demonstrations of learning tools and toolboxes, to aid practitioners and other key stakeholders, in conducting and learning from GEF projects.

Greening the Shipping Industry

Transforming the Global Maritime Transport Industry towards a Low Carbon Future through Improved Energy Efficiency

435 Global Maritime Energy Efficiency Partnerships (GloMEEP) is a GEF-UNDP-IMO project aiming to support the uptake and implementation of energy efficiency measures for shipping, thereby reducing GHG emissions from shipping. GloMEEP supports 10 Lead Pilot Countries (LPCs) of the project to implement these measures, through legal, policy and institutional reforms, awareness-raising and capacity-building activities, and establishment of public–private partnerships to support low-carbon shipping. The project's LPCs Argentina, China, Georgia, India, Jamaica, Malaysia, Morocco, Panama, Philippines and South Africa.

Building Partnerships to Assist Developing Countries to Reduce the Transfer of Harmful Aquatic Organisms through Biofouling (GloFouling Partnerships)

436 The overall objective of the GloFouling Partnerships Project is to build capacity in developing countries for implementing the IMO Biofouling Guidelines and other relevant guidelines for biofouling management and to catalyse overall reductions in the transboundary introduction of biofouling-mediated invasive aquatic species with additional benefits in the reduction of GHG emissions from global shipping. The GloFouling Project is divided into five major components: i) legal, policy and institutional reforms in participating countries, developed and implemented to minimize the risk of invasive aquatic species transferred through biofouling; ii) capacity-building and technical support for the implementation of the 2011 Biofouling Guidelines and best practices for biofouling management in other ocean industries; iii) public–private partnerships to bring active about private-sector participation at global, regional, national and local levels to support the development of innovative technological and other solutions and financial sustainability for the control and management of biofouling; iv) knowledge management systems and enhanced stakeholder and institutional cooperation for research, monitoring and evaluation of biofouling management and control measures; and v) monitoring and evaluation.

Ridge-to-Reef Integrated Watershed and Coastal Area Management

Implementing a Ridge-to-Reef approach to Preserve Ecosystem Services, Sequester Carbon, Improve Climate Resilience and Sustain Livelihoods in Fiji

437 This ridge-to-reef (R2R) approach in priority catchments will bolster Fiji's national system of MPAs through an enhanced, representative and sustainable system of locally managed marine areas, including greater protection of threatened marine species. Negative impacts of land-based activities on these MPAs will be reduced through the development and implementation of integrated catchment management plans, including mangrove protection, the adoption of appropriate sustainable land use practices and riparian restoration in adjoining upstream watersheds, as well as terrestrial protected areas, restored and rehabilitated forests. The R2R planning and overarching management approach is comprehensive; it aims to cover all activities within a catchment and out to the sea to ensure natural resource sustainability and biodiversity. The selected priority catchments are Ba River, Tuva River and Waidina River/Rewa Delta on Viti Levu, and Labasa River, Vuniviva River and Tunuloa district on Vanua Levu

Reimaanlok - Looking to the Future: Strengthening natural resource management in atoll communities in the Republic of Marshall Islands employing integrated approaches (RMI R2R)

438 As a SIDS, the Republic of Marshall Islands (RMI) has a strong dependence on natural resources and biodiversity, not only for food and income. The Marshallese relationship with the islands forms the basis of its culture and way of life which has developed in harmony over thousands of years. In the face of global threats, RMI still has pristine waters and coral reefs that contribute to ecosystem services and livelihoods. In recognition of the importance of its natural assets, RMI and other SIDS responded to global conservation targets through the Micronesia Challenge. Specifically for its part, it prepared Reimaanlok (the National Conservation Area Plan) to serve as a clear road map for the way forward. This project aims to support the operationalization of Reimaanlok, adopted in 2008 to effectively conserve at least 30 percent of the nearshore marine resources and 20 percent of the terrestrial resources across Micronesia by 2020. The project objective is to sustain atoll biodiversity and livelihoods by building community and ecosystem resilience to threats and degrading influences through integrated management of

terrestrial and coastal resources. The principles and processes outlined in Reimaanlok will be implemented in five islands/atolls, the lessons from which will guide replication in other sites

Implementing a Ridge-to-Reef approach to protect biodiversity and ecosystem functions in Tuvalu (R2R Tuvalu)

439 The objective of the Tuvalu R2R Project is "to preserve ecosystem services, sustain livelihoods and improve resilience in Tuvalu using a 'ridge-to-reef' approach". To achieve this objective, the project focuses on: enhancing and strengthening conservation and protected areas; rehabilitating degraded coastal and inland forests and landscapes and supporting the delivery of integrated water resources management (IWRM) and integrated coastal management (ICM) at a national scale while piloting hands-on approaches at the island scale (on three selected pilot islands); enhancing governance and institutional capacities at national, island and community levels for enhanced inland and coastal natural resource management; and improving data and information systems to enable improve evidence-based planning, decision-making and management of natural resources in Tuvalu.

Application of Ridge-to-Reef Concept for biodiversity conservation, and for the enhancement of ecosystem service and cultural heritage in Niue

440 This project will enhance Niue's capacities to effectively create and manage its protected areas, focusing on the expansion of its protected area estate on land and on its marine areas through a combination of community conservation areas and government-led protected areas. In the community conservation area, strict protection and sustainable use zones will be identified and planned carefully, recognizing that tenure over most land areas are vested in local communities. This project has been designed to engineer a paradigm shift in the management of marine and terrestrial protected area sites from a site-centric approach to a holistic R2R management approach, whereby activities in the immediate production landscapes adjacent to marine and terrestrial protected areas will be managed to reduce threats to biodiversity stemming from key production activities (tourism and agriculture). Additionally, the project also introduces the concept of connectivity in landscape and seascape in Niue. The terrestrial protected area will include a landscape that links strictly protected community areas (Tabu) to each other to enhance their integrity and to form a corridor between them. Similarly, the creation of a protected area in Beveridge Reef is expected to sustain recruitment of clams and other marine

species for Niue's coral reefs and vice versa.

ASEAN IWRM: Reducing Pollution and Habitat Loss and Preserving Environmental Flows to the East Asian Seas through the Implementation of Integrated River Basin Management

441 The project objective is to improve governance and management responsiveness and capacities in integrated water resources management (IWRM), pollution load reduction from nutrients and other land-based activities, protection and conservation of freshwater environmental flows, and alleviation of climate vulnerability through demonstrations, planning and strengthening of integrated river basin management (IRBM) in selected countries in the East Asian Seas. The project consists of three components: i) baseline assessment of source to sea management continuum; ii) IRBM pilot projects for improved governance and management of river basins/sub-basins and associated coastal areas; and iii) knowledge management and learning.

Restoring marine ecosystem services by rehabilitating coral reefs to meet a changing climate future (Seychelles/Mauritius)

442 The objective of the project is to scale up and mainstream the rehabilitation of coral reefs degraded by coral bleaching, to restore essential ecosystem services in the face of climate change threats and generate knowledge about the most effective solutions for dissemination to SIDS and countries within the wider region. The project will contribute to demonstrating where, when and how healthy or restored coastal ecosystems can contribute to cost-effective solutions that address current and growing risk from natural hazards and climate change. The project will demonstrate innovations in adaptation finance for transformational impact by using new technologies and different financial models to create cost-effective solutions to sustain these adaptation measures beyond the project lifespan. By adopting the regional approach, it is expected that the stakeholders involved will develop the technical and scientific partnerships as well as a common political understanding and will promote the use of effective natural solutions in adaptation and disaster risk reduction.

Implementing Integrated Land, Water & Wastewater Management in Caribbean SIDS: IW-ECO (with UNEP)

443 The overall project objective is to contribute to the preservation of Caribbean ecosystems that are of global significance and the sustainability of livelihoods through the application of existing proven technologies and approaches

that are appropriate for SIDS through improved fresh and coastal water resources management, sustainable land management and sustainable forest management that also seek to enhance resilience of socio-ecological systems to the impacts of climate change. UNDP's roles include responsibility for support to strengthen livelihood opportunities in the development and execution of small-scale community investments associated with the national subprojects in the eight countries through the GEF Small Grants Programme, as well as execution of activities under Regional Subproject 4 on knowledge management.

Ridge to Reef - Testing the Integration of Water, Land, Forest & Coastal Management to Preserve Ecosystem Services, Store Carbon, Improve Climate Resilience and Sustain Livelihoods in Pacific Island Countries

444 The purpose of the regional project is to test the mainstreaming of R2R, climate-resilient approaches to integrated land, water, forest and coastal management in Pacific Island Countries through strategic planning, capacity-building and piloted local actions to sustain livelihoods and preserve ecosystem services. This regional project provides the primary coordination vehicle for the national R2R STAR Projects that are part of the Pacific R2R Programme, by building on nascent national processes from the previous GEF IWRM project to foster sustainability and resilience for each island by reforming policy, institutions and coordination; building capacity of local institutions to integrate land, water and coastal management through on-site demonstrations; establishing evidence-based approaches to ICM planning; and improving consolidation of results monitoring and information and data required to inform cross-sector R2R planning approaches. This project will also focus attention on harnessing support from traditional community leadership and governance structures to improve the relevance of investment in ICM, including MPAs, from 'community to cabinet'.

UNDP Ocean Innovation Facility

445 In late 2019, UNDP will be launching its Ocean Innovation Facility (OIF). The OIF is a unique new mechanism that has been designed to accelerate progress on SDG14 through the identification, financing, advising and mentoring of truly innovative, entrepreneurial and creative approaches to restoring and protecting oceans and coastal areas that sustains livelihoods and advances the 'blue economy'. To maximize and catalyse impact, the Ocean Innovation Challenge (OIC) seeks innovations that are transferable, replicable and scalable. It will issue a series of staggered requests for proposals, each focused on a specific SDG 14 target. Initial concepts may

be submitted by public or private entities, including governments, private companies (including start-ups), NGOs, United Nations entities, academic institutions and intergovernmental organizations. The OIF will also work to develop, disseminate and provide easy access to information and resources on successful ocean innovations, both of these funded by the OIC and others. This will be primarily done through the OIC website and the [Ocean Action Hub](#), an established knowledge platform which aims to connect experts and practitioners. The OIC will coordinate and share information with related initiatives such as the World Bank's ProBlue, Sustainable Ocean Fund, Sustainable Ocean Alliance and others.

ANNEX V - Current Working Groups and their terms of reference

WORKING GROUPS

WG 1: Evaluation of the hazards of harmful substances carried by ships

Lead Agency: IMO

Co-Sponsors: None

Chair: Thomas Höfer (Germany)

Members: Stéphane le Floch (France), Thomas Höfer (Germany), Wenxin Jiang (China), Richard Luit (Netherlands), Bette Meek (Canada), Michael Morrissette (United States), Patricio H. Rodriguez (Chile), Haito Saito (Japan)

Terms of Reference for WG 1

The Terms of Reference of the GESAMP EHS Working Group, as amended at its 45th session in 2018, are:

The GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships is an expert group to provide best available scientific assessment of the environmental, occupational and safety hazards of chemicals, in particular to:

- 1 provide scientific advice on the hazards of chemicals transported by ships as may be requested, particularly by IMO;
- 2 evaluate safety data and test reports on specific chemicals submitted by industry in accordance with the rationale approved by GESAMP for this purpose and create a GESAMP Hazard Profile for such chemicals accordingly;
- 3 maintain a list of hazard evaluations ('Composite List' of GESAMP Hazard Profiles) for use by IMO and keep it up to date based on available scientific data; and
- 4 observe the developments concerning the international harmonization of hazard classification by the United Nations and scientific guidance on hazard assessment published by international organizations to improve the GESAMP hazard evaluation procedure and GESAMP hazard ratings.

Planning and outputs: Publication of the Revised methodology (GESAMP Reports and Studies No. 64). The 57th session of WG 1 will tentatively be held in May 2020.

WG 34: Review of applications for 'Active Substances' to be used in ballast water management systems

Lead Agency: IMO

Co-Sponsors: None

Chair: Jan Linders (Netherlands)
Vice-Chair: Annette Dock (Sweden)

Members: Teresa Borges (Portugal), Barbara Werschkun (Germany), Shinichi Hanayama (Japan), Kitae Rhie (Republic of Korea), David J. D. Smith (United Kingdom), Gregory Ziegler (United States), Claude Rouleau (Canada), Flavio da Costa Fernandes (Brazil), Assad Ahmed Al-Thukair (Saudi Arabia)

Consultants: Annette Dock (dual function)

Terms of Reference for WG 34

- 1 Consideration of development of necessary methodologies and information requirements in

accordance with the 'Procedure for approval of ballast water management systems that make use of Active Substances (G9)' adopted by the Marine Environment Protection Committee (MEPC) in resolution MEPC 169(57);

- 2 For Basic Approval, the Group should review the comprehensive proposal submitted by the Member of the Organization along with any additional data submitted as well as other relevant information available to the Group and report to the Organization;

In particular, the Group should undertake:

- .1 scientific evaluation of the data set in the proposal for approval (see paragraphs 4.2, 6.1, 8.1.2.3 and 8.1.2.4 of Procedure (G9));
 - .2 scientific evaluation of the assessment report contained in the proposal for approval (see paragraph 4.3.1 of Procedure (G9));
 - .3 scientific evaluation of the risks to the ship and personnel to include consideration of the storage, handling and application of the Active Substance (see paragraph 6.3 of Procedure (G9));
 - .4 scientific evaluation of any further information submitted (see paragraph 8.1.2.6 of Procedure (G9));
 - .5 scientific review of the risk characterization and analysis contained in the proposal for approval (see paragraph 5.3 of Procedure (G9));
 - .6 scientific recommendations on whether the proposal has demonstrated a potential for unreasonable risk to the environment, human health, property or resources (see paragraph 8.1.2.8 of Procedure (G9)); and
 - .7 preparation of a report addressing the above-mentioned aspects for consideration by MEPC (see paragraph 8.1.2.10 of Procedure (G9)).
- 3 For Final Approval, the Group should review the discharge testing (field) data and confirm that the residual toxicity of the discharge conforms to the evaluation undertaken for Basic Approval and that the previous evaluation of the risks to the ship and personnel, including consideration of the storage, handling and application of the Active Substance, remains valid. The evaluation will be reported to MEPC (see paragraph 8.2 of Procedure (G9)); and
 - 4 The Group should keep confidential all data, the disclosure of which would undermine protection of the commercial interests of the applicant, including intellectual property.

Planning and outputs: Two meetings scheduled in November and mid-December 2019 (exact dates to be confirmed). Additional meetings before GESAMP 47 to be confirmed.

WG 38: Atmospheric input of chemicals to the oceans

Lead Agency: WMO

Co-Sponsors: IMO, US National Science Foundation, SCOR, SOLAS, University of East Anglia

Chairs: R. Duce (United States), T. Jickells (United Kingdom)

Members: Alex Baker (United Kingdom), Robert A. Duce (United States), Tim Jickells (United Kingdom), Manmohan Sarin (India), additional members to be

confirmed **Terms of Reference for WG 38**

Atmospheric input of chemicals to the ocean—management implications

- 1 Test the most appropriate approaches for scientists to engage with policymakers and managers in order to evaluate scientific evidence of environmental trends and their associated uncertainties related to the atmospheric input of certain chemicals to the ocean.
- 2 Use current information and/or modelling on the atmospheric deposition of the nutrients nitrogen and iron in the regions of the Southwest Indian Ocean as an example of an area where such deposition may be particularly important to biological productivity.
- 3 Have extensive involvement of students and early career scientists from the local region as part of a significant capacity-building effort.
- 4 Evaluate what type of additional scientific information might be necessary for managers and policymakers to feel comfortable about recommending specific actions in response to the identified trends.
- 5 Publish the outcomes of the workshop in a science- and policy-focused journal, as well as a document in the GESAMP Reports and Studies series, with recommendations for good practice in these areas of science and policy engagement.

Planning and outputs: Submit scientific papers as peer-reviewed publications from the WG 38 workshop on 'Impact of Ocean Acidification on Fluxes of non-CO₂ Climate-Active Species' (University of East Anglia in 2017) and publish a report in the GESAMP Reports and Studies series by late 2020 or early 2021.

WG 38 plans a new workshop ('Atmospheric Input of Chemicals to the Ocean—Management Implications') that will take place in late 2020. We expect to publish the outcomes of this new workshop in a science- and policy-focused journal, as well as a document in the GESAMP Reports and Studies series, with recommendations for good practice in these areas of science and policy engagement.

WG 40: Sources, fate and effects of plastics and micro-plastics in the marine environment

Lead Agencies: UNESCO-IOC and UNEP

Co-Sponsors: To be determined in the intersessional period

Chair: Peter Kershaw (United Kingdom)

Members: Alexander Turra (Brazil), Francois Galgani (France), other WG members to be selected (working on the principle of >40 percent women and >50 percent from outside North America and Europe)

Product(s): Report: Proceedings of the GESAMP 'International Workshop on assessing the risks associated with plastics and microplastics in the marine environment', 21–23 May 2019, Geneva

Planning: Fourth phase, 2019 onwards
 2019: Publication of the risk assessment workshop proceedings in the Reports and Studies series
 2019–2020: Securing funding to undertake the revised Terms of Reference

Proposed Terms of Reference for fourth phase of WG 40

(ToRs 1–5 to include social, environmental and economic aspects)

- 1 Review and further develop risk assessment methods for marine litter and microplastics, and identify data needs, based on the outcome of the 2019 GESAMP risk workshop.
- 2 Assess the effects of marine litter and macro-plastics—for example, human well-being, biodiversity and animal welfare, food security, direct and indirect cost to different sector, risk perception and communication.

- 3 Assess the effects of nano- and micro-plastics—for example, chemical contaminants, biodiversity, human health, risk perception and communication.
- 4 Assess the effects of transfer of biota by marine litter and microplastics—for example, human welfare, biodiversity, direct and indirect costs, pathogens, risk perception and communication.
- 5 Carry out initial risk assessment (based on ToRs 1–4).

WG 41: Marine geoengineering

Lead Agency: IMO

Co-Sponsors UNESCO-IOC and WMO

Chairpersons: Chris Vivian (United Kingdom), Philip Boyd (Australia)

Members: Richard Lampitt (United Kingdom), Andreas Oschlies (Germany), Greg Rau (United States), Katherine Ricke (United States), Fei Chai (United States), Ros Rickaby (United Kingdom), Timo Goeschl (Germany), John Cullen (Canada), Miranda Boettcher (Australia) to be confirmed

Terms of Reference for WG 41 to be revised and approved intersessionally

- 1 Providing an initial high-level review of a wide range of proposed marine geoengineering techniques, based on published information, addressing:
 - .1 the main rationale, principle and justification of the techniques;
 - .2 their potential scientific practicality and efficacy for climate mitigation purposes;
 - .3 the potential impacts of different marine geoengineering approaches on the marine environment and the atmosphere where appropriate; and
 - .4 identifying those techniques:
 - i. that appear unlikely to have the potential for climate mitigation purposes; and
 - ii. that appear to be likely to have some potential for climate mitigation purposes and that bear further detailed examination.
- 2 Providing a detailed, focused review of a limited number of proposed marine geoengineering techniques that are likely to have some potential for climate mitigation purposes, addressing:
 - .1 the potential environmental and social/economic impacts of those marine geoengineering approaches on the marine environment and the atmosphere where appropriate;
 - .2 an outline of the issues that would need to be addressed in an assessment framework for each of those techniques, using the London Protocol Assessment Framework for Scientific Research Involving Ocean Fertilization as a template;
 - .3 their potential scientific practicality and efficacy for climate mitigation purposes;
 - .4 an assessment of monitoring and verification issues for each of those marine geoengineering techniques; and
 - .5 identification of significant gaps in knowledge and uncertainties that would require to be addressed to fully assess implications of those techniques for the marine environment and the atmosphere where appropriate.

WG: 42: Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining

Lead Agency: IMO

Co-Sponsors: UNEP, ISA

Chairperson: Tracy Shimmield

Members: Bronwen Currie (Namibia), Raymond Mepstad (Norway), Cindy Van Dover (United States), James Hein (United States), Stuart Simpson (Australia), Andrew Sweetman (United Kingdom), Gi Hoon Hong (Republic of Korea), Hannah Grant (United Kingdom)

Terms of Reference for WG 42

The Working Group on the impacts on tailings from mining operations on the marine environment is requested to undertake a literature review on the following aspects:

- 1 Identify and provide a better understanding of potential environmental impacts of marine disposal of tailings and associated wastes from land-based mining operations (hereinafter referred to as 'mine tailings'), taking into account potential linkages between deep water ecosystems at the disposal site and other (e.g. ecological, biological) resources in the water column. The impacts could include, but are not limited to, those identified in the report of the workshop on mine tailings provided to GESAMP at its last meeting (GESAMP 42/7/1).
- 2 Review the extent and suitability of baseline assessments (prior to any construction or discharge) conducted to date, and identify the key elements for comprehensive surveys of baseline conditions from which abiotic and biotic impacts can be assessed, taking into account the latest detection technologies of marine pollution and its impact on the organisms.
- 3 Review and identify the best practices in modelling the physical and chemical behaviour of discharged mine tailings (e.g. slurries), including the shearing and upwelling of both the solids and soluble fractions, as well as the significance of tidal dispersion and potential for long-range transport of fine materials, and determine whether existing models are adequate or further development is needed.
- 4 Review and evaluate the processes of exposure and effect and the pathways for mine tailings disposal operations, including those related to the physical presence of the wastes, exposure to associated contaminants, their accumulation, and the potential effects at community level.
- 5 Identify implications arising from the fact that marine organisms normally used for toxicity testing are from upper layers of marine water, not the deep sea.
- 6 Review and identify physical and ecological models to estimate the recovery processes of deep sea ecosystems around the possible impacted area.
- 7 Produce a report on the above work under a time-frame and any other reporting requirements to be agreed between LC/LP and GESAMP.

Planning and outputs: Produce a report addressing the first ToR to be published by the end of 2019. This will be followed by a review of the remaining ToR to allow for further work on the issue.

WG 43: Sea-based sources of marine litter, including fishing gear and other shipping-related litter

Lead Agency: FAO, IMO

Co-Sponsors: UNEP

Chairperson: Kirsten Gilardi (United States)

Members: P. He (United States), K. Antonelis (United States), L. Wang (China), S. N. Thomas (India), K. Richardson (Australia), E. Grilly (Australia), P. Van Den Dries (Belgium), D. Santillo (United Kingdom), R. Piermarini (Italy), Olof Linden (Sweden), François Galgani (France)

Terms of Reference for WG 43

The Working Group has two concurrent work streams:

Work stream 1, with an overarching scoping study which would, amongst other objectives, support the initial information requirements of IMO's 'Action plan to address marine litter from ships' and help identify priorities within this overarching scope.

Work stream 2, with recognition that some types of sea-based sources of marine litter, such as ALDFG, are further progressed in terms of available information but require more focused scientific attention to inform interventions. The work stream will focus on specific areas of research to fulfil this requirement. ALDFG will be the focus, based on the existing knowledge that this is a major source of marine litter from ships and the fishing sector specifically. It is also already identifiable as a key area of work for both FAO and IMO, whose members have highlighted an urgent need to address this issue.

Work stream 1: Global overview

A global overview of sea-based sources of marine litter, including fishing gear and other shipping-related litter, which should include:

1. An identification of sources of marine litter from sea-based sources, including but not limited to:
 - a. fishing operations (e.g. gear, packaging material, strapping bands);
 - b. aquaculture (e.g. cages, buoys, netting, packaging materials structures);
 - c. shipping (garbage, hull scrapings, containers, spoilt cargo, grey water, ropes and cargo nets);
 - d. dumping of waste and other matter at sea, derelict fibreglass (FRP) vessels; and
 - e. other (e.g. recreational boating, recreational fishing).
2. An estimate of the relative contribution and impacts of different sea-based sources of marine litter.
3. An analysis of how much plastic is produced and used by the fishing and shipping industries. This would include what kind of plastic is manufactured and used by these industries, as well as an overview of the existing waste management streams for these plastics and how these vary by region.
4. An assessment of data gaps, as identified under ToR 1–3 above, and prioritization for further work.

Work stream 2: ALDFG

Phase 1: Distribution, trends and impacts

5. Identification of ALDFG hotspots, using data collected in various platforms, including the GGGI data portal, and building on work done in the CSIRO gear loss study (pending publication).
6. Quantification of the environmental, social and economic impacts of ALDFG.

Phase 2. Interventions

7. Review and comparison of options for solution delivery by way of analysis of results of all available data from existing sources, including quantification of benefits, mapping of solution 'hubs' against ALDFG hotspots and identifying common themes and gaps that have emerged through recommendations.

Planning and outputs: Workshop (28–30 October) and its outcome.

WG 44: Biofouling management

Lead Agency: IOC-UNESCO

Co-Sponsors: IMO, UNDP

Chairperson: To be confirmed

Members: To be confirmed

Terms of reference for WG 44

- 1 Comprehensive identification and description of both primary and secondary pathways for the transfer of non-indigenous species (NIS), including, but not limited to:
 - a. fishing (e.g. ships, gear, lines);
 - b. aquaculture (e.g. structures, cages, buoys, netting);
 - c. shipping (e.g. hulls, niche areas, propellers, ropes, anchors);
 - d. other shipping (e.g. recreational boating, recreational fishing, Aids to Navigation);
 - e. marine offshore operations (e.g. offshore platforms and structures);
 - f. ocean renewable energy generation (e.g. underwater turbines, shafts);
 - g. ocean monitoring (e.g. measuring instruments); and
 - h. coastal industry infrastructure (e.g. ports, marinas, cooling towers, water purifying units)
- 2 Description and assessment of impacts on biodiversity (alteration of biodiversity) of the introduction and/or spread of NIS via the identified pathways.
- 3 Description and assessment of impact of and costs resulting from the introduction and/or spread of NIS via the identified pathways (economic loss and/or alteration of assets; management costs, including cost of preventative and reactive measures/mitigation strategies) on human health, social activities and the economy (such as fisheries, aquaculture, fish processing, tourism and related activities and businesses).
- 4 Provision of an analysis of best management approaches within impacted industries, including the use of emerging technologies, techniques and methods to prevent or reduce the introduction and/or spread of NIS and water contamination resulting from cleaning activities.
- 5 Provision of recommendations to reduce or prevent the introduction or spread of NIS.
- 6 Identification of data gaps, in relation to ToR 1–4 above, and prioritization for further work:
 - a. Consider additional work that may be useful to be carried out by the Working Group beyond what is listed above;
 - b. Peer review of the draft report required; and
 - c. Provisions for publication, dissemination and outreach.

Planning and outputs: Deliver the interim report in May 2020 and the final report by the end of 2021.

TASK TEAMS

Task Team on causes and impacts of massive accumulations of the brown macro-algae *Sargassum* in the nearshore environment of the Caribbean and West Africa

Lead: Peter Kershaw

Members: Jan Linders (Netherlands), others to be confirmed

Purpose: The initial focus of the Task Team will be to join SCOR-IOC GlobalHAB in organizing an Open Science Meeting (OSM) on *Sargassum*. This will involve contacting the technical secretaries of the sponsoring agencies that have indicated an interest in this topic (IOC, UNEP, FAO, UNDP, WMO, IAEA), and compiling an update of relevant

activities undertaken in the period since the initial Scoping Report was presented to the 44th Session of GESAMP (document 44/7/2). It is intended that the results of the OSM will be published in some form (e.g. White Paper, peer-reviewed papers). This will form the basis for further discussion on GESAMP's role as a mechanism in supporting and coordinating the work of the sponsoring agencies, with the potential to form a Working Group as appropriate.

Outputs: Contributing to a peer-reviewed paper or other meeting report.
Recommendations to GESAMP on options for future coordination and assessment.

Task Team on Exhaust Gas Cleaning Systems (EGCS)

Lead: Jan Linders

Member: Jan Linders (Netherlands), others to be confirmed

Purpose: Assess the available evidence relating to the environmental impact of discharges of exhaust gas cleaning system effluent, including the studies and analyses submitted to MEPC 73, PPR 6 and MEPC 74, other analyses and results from research projects that are accessible to the Task Team, as well as the results of available simulations for predicting the environmental concentrations of target substances.

Outputs: Produce a written report by the end of 2019 to be presented to the 7th session of IMO's Prevention and Pollution Response Sub-Committee in February 2020.

CORRESPONDENCE GROUPS

Correspondence Group to update the information on sources of the main pollutants impacting the global marine environment—'The 80:20 Conundrum'

Lead: David Vousden

Correspondence Group on sand and gravel mining in the marine environment—new insights on a growing environmental problem

Lead: Chris Vivian (United Kingdom)

Correspondence Group on relevance of inputs of disinfection by-products (DBPs) into the marine environment

Lead: Thomas Hofer (Germany)

Co-Lead: Mattias Grote (Germany)

CG7: Correspondence Group on impact of armed conflicts on the marine environment and sustainable development

Lead: Ahmad Abu Hilal

CG8: Correspondence Group to support the UN Decade of Ocean Science for Sustainable Development

Lead: Mike Huber

ANNEX VI - Template for new GESAMP Working Groups

Background and context

The subject:

Brief description subject of the study

The nature of the issue:

Why the subject is of concern or interest to the international community from the perspective of marine environmental protection

The justification:

Why a GESAMP study is needed (e.g. synthesis of scattered information, assessment of environmental status/impacts, development of new methodologies, establishment of standards or guidelines, identification of requirements for research, monitoring, management and/or policy development)

Terms of Reference

The Terms of Reference should:

1. Be specific, concrete, point-by-point tasks to be carried out by the Working Group and/or specific information to be included in the report
2. Define the scope: what will and will not be included
3. Avoid being open-ended: focus on a specific product to be produced (usually a report)
4. Focus on the specific task being proposed
5. Identify the expertise required for the Working Group.

Work plan

Describe the proposed work programme and methods to carry it out, such as workshops, intersessional activities, electronic communications and online platforms.

Devise a provisional timeline, including:

1. Meeting dates
2. Milestones (drafts, reviews, revisions, etc.)
3. Deliverables and delivery date (usually publication of a report)
4. Provisions for peer review
5. Provisions for publication, dissemination and outreach (public relations)

Alignment with Sustainable Development Goals

Proposals for the establishment of new Working Groups should indicate how the proposed Working Group will support specific SDGs and their targets.

Conflicts of interest

GESAMP depends on members of Working Groups to act in an independent capacity, and for the assessment and advice they provide to be reliable, authoritative and independent of any interest groups. To ensure that this process is transparent, it is necessary for each agency, in consultation with the Working Group Chair, to identify potential conflicts of interest and devise suitable steps to address them, if required.

Administrative arrangements

The following information should be provided:

1. Sponsoring Organization(s)
2. Additional supporting organizations
3. Proposed budget and funding sources
4. Working Group Chair(s) and members if available at time of proposal
5. Proposed Technical Secretary for the Working Group.

ANNEX VII - GESAMP Reports and Studies publications

The following reports and studies have been published so far. They are available from the GESAMP website: <http://gesamp.org>.

1. Report of the seventh session, London, 24–30 April 1975. (1975). Rep. Stud. GESAMP, (1):pag.var. Available also in French, Spanish and Russian.
2. Review of harmful substances. (1976). Rep. Stud. GESAMP, (2):80 p.
3. Scientific criteria for the selection of sites for dumping of wastes into the sea. (1975). Rep. Stud. GESAMP, (3):21 p. Available also in French, Spanish and Russian.
4. Report of the eighth session, Rome, 21–27 April 1976. (1976). Rep. Stud. GESAMP, (4):pag.var. Available also in French and Russian.
5. Principles for developing coastal water quality criteria. (1976). Rep. Stud. GESAMP, (5):23 p.
6. Impact of oil on the marine environment. (1977). Rep. Stud. GESAMP, (6):250 p.
7. Scientific aspects of pollution arising from the exploration and exploitation of the seabed. (1977). Rep. Stud. GESAMP, (7):37 p.
8. Report of the ninth session, New York, 7–11 March 1977. (1977). Rep. Stud. GESAMP, (8):33 p. Available also in French and Russian.
9. Report of the tenth session, Paris, 29 May to 2 June 1978. (1978). Rep. Stud. GESAMP, (9):pag.var. Available also in French, Spanish and Russian.
10. Report of the eleventh session, Dubrovnik, 25–29 February 1980. (1980). Rep. Stud. GESAMP, (10):pag.var. Available also in French and Spanish.
11. Marine Pollution implications of coastal area development. (1980). Rep. Stud. GESAMP, (11):114 p.
12. Monitoring biological variables related to marine pollution. (1980). Rep. Stud. GESAMP, (12):22 p. Available also in Russian.
13. Interchange of pollutants between the atmosphere and the oceans. (1980). Rep. Stud. GESAMP, (13):55 p.
14. Report of the twelfth session, Geneva, 22–29 October 1981. (1981). Rep. Stud. GESAMP, (14):pag.var. Available also in French, Spanish and Russian
15. The review of the health of the oceans. (1982). Rep. Stud. GESAMP, (15):108 p.
16. Scientific criteria for the selection of waste disposal sites at sea. (1982). Rep. Stud. GESAMP, (16):60 p.
17. The evaluation of the hazards of harmful substances carried by ships. (1982). Rep. Stud. GESAMP, (17):pag.var.
18. Report of the thirteenth session, Geneva, 28 February to 4 March 1983. (1983). Rep. Stud. GESAMP, (18):50 p. Available also in French, Spanish and Russian.
19. An oceanographic model for the dispersion of wastes disposed of in the deep sea. (1983). Rep. Stud. GESAMP, (19):182 p.
20. Marine pollution implications of ocean energy development. (1984). Rep. Stud. GESAMP, (20):44 p.
21. Report of the fourteenth session, Vienna, 26–30 March 1984. (1984). Rep. Stud. GESAMP, (21):42 p. Available also in French, Spanish and Russian.
22. Review of potentially harmful substances. Cadmium, lead and tin. (1985). Rep. Stud. GESAMP, (22):114 p.
23. Interchange of pollutants between the atmosphere and the oceans (part II). (1985). Rep. Stud. GESAMP, (23):55 p.
24. Thermal discharges in the marine environment. (1984). Rep. Stud. GESAMP, (24):44 p.
25. Report of the fifteenth session, New York, 25–29 March 1985. (1985). Rep. Stud. GESAMP, (25):49 p. Available also in French, Spanish and Russian.
26. Atmospheric transport of contaminants into the Mediterranean region. (1985). Rep. Stud. GESAMP, (26):53 p.

27. Report of the sixteenth session, London, 17–21 March 1986. (1986). Rep. Stud. GESAMP, (27):74 p. Available also in French, Spanish and Russian.
28. Review of potentially harmful substances. Arsenic, mercury and selenium. (1986). Rep. Stud. GESAMP, (28):172 p.
29. Review of potentially harmful substances. Organosilicon compounds (silanes and siloxanes). (1986). Published as UNEP Reg. Seas Rep. Stud., (78):24 p.
30. Environmental capacity. An approach to marine pollution prevention. (1986). Rep. Stud. GESAMP, (30):49 p.
31. Report of the seventeenth session, Rome, 30 March to 3 April 1987. (1987). Rep. Stud. GESAMP, (31):36 p. Available also in French, Spanish and Russian.
32. Land-sea boundary flux of contaminants: contributions from rivers. (1987). Rep. Stud. GESAMP, (32):172 p.
33. Report on the eighteenth session, Paris, 11–15 April 1988. (1988). Rep. Stud. GESAMP, (33):56 p. Available also in French, Spanish and Russian.
34. Review of potentially harmful substances. Nutrients. (1990). Rep. Stud. GESAMP, (34):40 p.
35. The evaluation of the hazards of harmful substances carried by ships: Revision of GESAMP Reports and Studies No. 17. (1989). Rep. Stud. GESAMP, (35):pag.var.
36. Pollutant modification of atmospheric and oceanic processes and climate: some aspects of the problem. (1989). Rep. Stud. GESAMP, (36):35 p.
37. Report of the nineteenth session, Athens, 8–12 May 1989. (1989). Rep. Stud. GESAMP, (37):47 p. Available also in French, Spanish and Russian.
38. Atmospheric input of trace species to the world ocean. (1989). Rep. Stud. GESAMP, (38):111 p.
39. The state of the marine environment. (1990). Rep. Stud. GESAMP, (39):111 p. Available also in Spanish as Inf.Estud.Progr.Mar.Reg.PNUMA, (115):87 p.
40. Long-term consequences of low-level marine contamination: An analytical approach. (1989). Rep. Stud. GESAMP, (40):14 p.
41. Report of the twentieth session, Geneva, 7–11 May 1990. (1990). Rep. Stud. GESAMP, (41):32 p. Available also in French, Spanish and Russian.
42. Review of potentially harmful substances. Choosing priority organochlorines for marine hazard assessment. (1990). Rep. Stud. GESAMP, (42):10 p.
43. Coastal modelling. (1991). Rep. Stud. GESAMP, (43):187 p.
44. Report of the twenty-first session, London, 18–22 February 1991. (1991). Rep. Stud. GESAMP, (44):53 p. Available also in French, Spanish and Russian.
45. Global strategies for marine environmental protection. (1991). Rep. Stud. GESAMP, (45):34 p.
46. Review of potentially harmful substances. Carcinogens: their significance as marine pollutants. (1991). Rep. Stud. GESAMP, (46):56 p.
47. Reducing environmental impacts of coastal aquaculture. (1991). Rep. Stud. GESAMP, (47):35 p.
48. Global changes and the air-sea exchange of chemicals. (1991). Rep. Stud. GESAMP, (48):69 p.
49. Report of the twenty-second session, Vienna, 9–13 February 1992. (1992). Rep. Stud. GESAMP, (49):56 p. Available also in French, Spanish and Russian.
50. Impact of oil, individual hydrocarbons and related chemicals on the marine environment, including used lubricant oils, oil spill control agents and chemicals used offshore. (1993). Rep. Stud. GESAMP, (50):178 p.
51. Report of the twenty-third session, London, 19–23 April 1993. (1993). Rep. Stud. GESAMP, (51):41 p. Available also in French, Spanish and Russian.
52. Anthropogenic influences on sediment discharge to the coastal zone and environmental consequences. (1994). Rep. Stud. GESAMP, (52):67 p.

53. Report of the twenty-fourth session, New York, 21–25 March 1994. (1994). Rep. Stud. GESAMP, (53):56 p. Available also in French, Spanish and Russian.
54. Guidelines for marine environmental assessment. (1994). Rep. Stud. GESAMP, (54):28 p.
55. Biological indicators and their use in the measurement of the condition of the marine environment. (1995). Rep. Stud. GESAMP, (55):56 p. Available also in Russian.
56. Report of the twenty-fifth session, Rome, 24–28 April 1995. (1995). Rep. Stud. GESAMP, (56):54 p. Available also in French, Spanish and Russian.
57. Monitoring of ecological effects of coastal aquaculture wastes. (1996). Rep. Stud. GESAMP, (57):45 p.
58. The invasion of the ctenophore *Mnemiopsis leidyi* in the Black Sea. (1997). Rep. Stud. GESAMP, (58):84 p.
59. The sea-surface microlayer and its role in global change. (1995). Rep. Stud. GESAMP, (59):76 p.
60. Report of the twenty-sixth session, Paris, 25–29 March 1996. (1996). Rep. Stud. GESAMP, (60):29 p. Available also in French, Spanish and Russian.
61. The contributions of science to integrated coastal management. (1996). Rep. Stud. GESAMP, (61):66 p.
62. Marine biodiversity: patterns, threats and development of a strategy for conservation. (1997). Rep. Stud. GESAMP, (62):24 p.
63. Report of the twenty-seventh session, Nairobi, 14–18 April 1997. (1997). Rep. Stud. GESAMP, (63):45 p. Available also in French, Spanish and Russian.
64. The revised GESAMP hazard evaluation procedure for chemical substances carried by ships. (2002). Rep. Stud. GESAMP, (64):121 p.
65. Towards safe and effective use of chemicals in coastal aquaculture. (1997). Rep. Stud. GESAMP, (65):40 p.
66. Report of the twenty-eighth session, Geneva, 20–24 April 1998. (1998). Rep. Stud. GESAMP, (66):44 p.
67. Report of the twenty-ninth session, London, 23–26 August 1999 (1999). Rep. Stud. GESAMP, (67):44 p.
68. Planning and management for sustainable coastal aquaculture development. (2001). Rep. Stud. GESAMP, (68):90 p.
69. Report of the thirtieth session, Monaco, 22–26 May 2000. (2000). Rep. Stud. GESAMP, (69):52 p.
70. A sea of troubles. (2001). Rep. Stud. GESAMP, (70):35 p.
71. Protecting the oceans from land-based activities - Land-based sources and activities affecting the quality and uses of the marine, coastal and associated freshwater environment. (2001). Rep. Stud. GESAMP, (71):162p.
72. Report of the thirty-first session, New York, 13–17 August 2001. (2002). Rep. Stud. GESAMP, (72):41 p.
73. Report of the thirty-second session, London, 6–10 May 2002. (2002). Rep. Stud. GESAMP, (73)
74. Report of the thirty-third session, Rome, 5–9 May 2003. (2003). Rep. Stud. GESAMP, (74):36 p.
75. Estimations of oil entering the marine environment from sea-based activities. (2007). Rep. Stud. GESAMP, (75):96 p.
76. Assessment and communication of risks in coastal aquaculture. (2008). Rep. Stud. GESAMP, (76):198 p.
77. Report of the thirty-fourth session, Paris, 8–11 May 2007. (2008). Rep. Stud. GESAMP, (77):83 p.
78. Report of the thirty-fifth session, Accra, 13–16 May 2008. (2009). Rep. Stud. GESAMP, (78):73 p.
79. Pollution in the open oceans: a review of assessments and related studies. (2009). Rep. Stud. GESAMP, (79):64 p.
80. Report of the thirty-sixth session, Geneva, 28 April to 1 May 2009. (2011). Rep. Stud. GESAMP, (80):83 p.
81. Report of the thirty-seventh session, Bangkok, 15–19 February 2010. (2010). Rep. Stud. GESAMP, (81):74 p.

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