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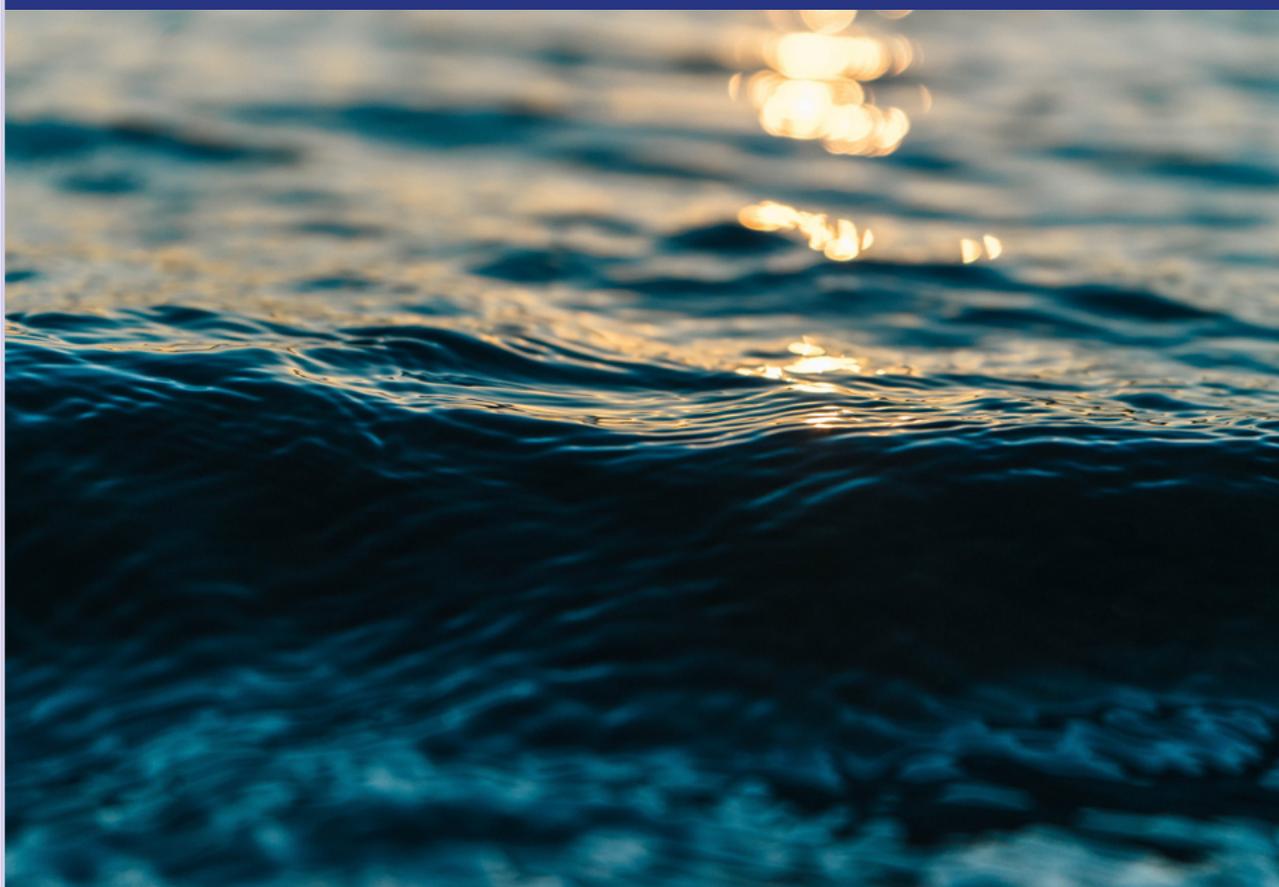
GESAMP

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

REPORT OF THE 49th SESSION OF GESAMP

5 to 9 September 2022

Hosted by IMO, London, United Kingdom



REPORTS AND STUDIES



IMO



FAO



UNESCO



IOC



WMO



UNIDO



IAEA



UN



UNDP



ISA



UN environment programme

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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 49th session from 5 to 9 September 2022, at the International Maritime Organization (IMO) Headquarters in London, United Kingdom. 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 issues, 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): WG 1 met once since GESAMP 48 via a combination of correspondence and virtual plenary sessions due to the COVID-19 restrictions. Data on ten new substances were evaluated and full GESAMP Hazard Profiles (GHPs) were assigned to all substances. The Group also considered requests for the re-assessment of three substances for which new ratings were assigned.

0.3 Review of applications for 'active substances' to be used in ballast water management systems (WG 34): WG 34 convened once since GESAMP 48 to evaluate three Ballast Water Management Systems. GESAMP noted the need to provide clarity on the peer-review process of the reports, to safeguard the confidentiality of the reviews and enhance their consistency, and agreed to revise the process in the intersessional period.

0.4 Atmospheric input of chemicals to the ocean (WG 38): A publication on the atmospheric transport of microplastics to and from the ocean, resulting from a virtual workshop organized by WG 38 in cooperation with WG 40 titled "Microplastics and nanoplastics in the marine-atmosphere environment" was published by Nature this year. The development of a workshop on the ocean management and policy implications of the air/sea exchange was continuing and would be held later in the year. The WG had also organized a session on the atmospheric input of chemicals to the ocean during the European Geosciences Union meeting in Vienna, Austria in April, and continued its efforts to publish the results of its activities.

0.5 Sources, fate and effects of plastics and microplastics in the marine environment (WG 40): GESAMP discussed ways to strengthen the transfer of the science synthesized to policy processes and how the working group can track policy use of its products. GESAMP also reiterated the link between WG 40 and WG 43, and encouraged continued dialogue.

0.6 Ocean interventions for climate change mitigation (WG 41): The WG met twice during the intersessional period to discuss the Integrated Assessment Framework, a version of which would be ready by the end of 2022. The WG had provided advice to assist the London Protocol parties in identifying marine geoengineering techniques that they may want to include in Annex 4 of the Protocol. The Working Group continued its representation in international fora, including at the UN Ocean Conference in Lisbon, Portugal.

0.7 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining (WG 42): GESAMP noted the progress made regarding the publication of the report which had been split in two volumes. The first volume was near completion while the second volume would require some updating. On finalisation of the two volumes of the report, the next stage for the WG 42 would be a decision on how to progress the next section of the Terms of Reference (TOR), and to seek funding for the next phase of the work.

0.8 Sea-based sources of marine litter including fishing gear and other shipping related litter (WG 43): GESAMP noted that since GESAMP 48, the Working Group convened a webinar to present the findings of its first report published in October 2021. Since then, the working group had presented the report's findings in several international conferences and meetings. GESAMP approved the new TORs for the next phase of the WG's work, with a first meeting planned for early 2023. GESAMP also tasked the WG 43 Chair with reconfiguring WG member composition to best address the new TORs.

0.9 Biofouling management (WG 44): GESAMP noted the group's progress, which had held monthly virtual meetings and was planning to complete its work with the publication of its report at the end of 2023. To facilitate the work within the set timeframes a consultant had been hired by IOC-UNESCO and GloFouling Partnership Project to assist the Chair.

0.10 Climate change and greenhouse gas related impacts on contaminants in the ocean (WG 45): Since last year the group had met once virtually. GESAMP noted the group's progress, including the production of a peer-reviewed publication, consolidation of the work of the thematic subgroups and a literature review. In the intersessional period, the group will expand the list of sources of contaminants to the marine environment and refine their classification.

0.11 Contribution to other UN processes: GESAMP noted the current state of the Regular Process and reiterated its readiness to support the Sponsoring Organizations. It also discussed the possibility for GESAMP's contributions to the Ocean Pavilion of COP 27 and there was agreement to continue discussions on how GESAMP can best contribute to the UNEA negotiation process for the new plastics treaty.

0.12 The United Nations Decade of Ocean Science for Sustainable Development: GESAMP agreed to continue its efforts to support the Decade and to formalize its contribution through the Decade Advisory Board, encourage Members to register with the Decade Expert Roster and to support the Decade in its strategic ambition setting process. The Chair would outline the proposed way forward in a letter to the Executive Secretary of IOC-UNESCO.

0.13 Scoping activities: GESAMP considered the progress of its Correspondence Groups that had been developing scoping papers in the intersessional period, including: 1) Sand and gravel mining in the marine environment: new insights on a growing environmental problem; 2) Update the information on sources of the main pollutants impacting the global marine

environment (The 80/20 Conundrum); 3) Causes and impacts of massive accumulations of the brown macroalgae *Sargassum* in the nearshore environment of the Caribbean and West Africa; 4) Relevance of inputs of disinfection by-products (DBPs) into the marine environment; 5) Impact of armed conflicts on the marine environment and sustainable development; and 6) Task Team on Climate Change.

0.14 Identification of new and emerging issues: GESAMP discussed the following new and emerging issues: 1) marine environmental threats due to the decarbonisation agenda and ways to support the strengthening of evidence base on the issue through a more strategic approach and by communicating the impacts of these changes; and 2) effects of a changing

ocean on human health, which led to the formation of a correspondence group developing a scoping paper on the issue.

0.15 Strategic review of GESAMP: Following consideration of an updated draft plan for a strategic review of GESAMP, it was decided to establish a Review Task Team, under the lead of the Chair of GESAMP which would provide a first report in March 2023.

0.16 GESAMP side-event: During the annual session, GESAMP organized a side-event together with IMO as the host of the session, on “Environmental economics and its role in marine environmental protection”, with invited speakers from academia, intergovernmental organizations and the financial sector.

1 INTRODUCTION

1.1 The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) held its 49th session from 5 to 9 September 2022, hosted by IMO, the first in person meeting of GESAMP since its 46th session in 2019. The session was chaired by Mr. David Vousden, with Ms. Wendy Watson-Wright as Vice-Chair (joining remotely where feasible). The session was preceded by the GESAMP Executive Committee (ExCom) meeting in the morning of 5 September 2022, and an informal meeting of the GESAMP Members, held prior to the opening of the annual session on 6 September.

1.2 Mr. Arsenio Dominguez, Administrative Secretary of GESAMP and Director of the Marine Environment Division, IMO, welcomed participants, emphasizing that for IMO, as the secretariat of GESAMP, it was a special pleasure to host this meeting, as it was the first

time for IMO to host an annual session at its headquarters since 2002. He also stated that, following the many delays and postponements of meetings during the pandemic, this session was an excellent time to take stock and re-connect in person, in particular given the number of crucial events for the ocean, including the UN Ocean Conference in Lisbon, the negotiations of the new treaty on biodiversity in areas beyond national jurisdiction, COP 15 of the Convention on Biological Diversity, COP 27 of the UNFCCC, to mention a few.

Adoption of the agenda

1.3 GESAMP adopted 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.

2 REPORT OF THE CHAIR OF GESAMP

2.1 The Chair of GESAMP introduced document 49/2, providing a report of the work of GESAMP in the intersessional period. He outlined the meetings that he and other GESAMP Members had been involved in, as well as the outcome of the two virtual intersessional Members’ meetings in the reporting period.

2.2 The Chair reported that GESAMP had held two intersessional meetings, in November 2021 and in July 2022. Both sessions served as opportunities to progress work in the intersessional period.

2.3 In the intersessional period, GESAMP had welcomed three new Members, Mr. Alexander Girvan, Mr. Mario Tamburri (new Chair of WG 44) and Ms. Vanessa Hatje (new Chair of WG 45). This served to fill gaps in expertise related to economics, environmental valuation, non-indigenous species transmission, biofouling, and the effect of impacts from climate change on contaminants in the ocean.

2.4 It was also recalled that in May 2022, Ms. Tracy Shimmield announced that she would step down as Vice-Chair of GESAMP due to other commitments, while continuing her duties as Chair of WG 42 and as a Member of GESAMP.

2.5 The Chair also highlighted outreach activities during the year by the Chair, Vice-Chairs and Members, including the participation in UNFCCC COP 26, the UN Ocean Conference in Lisbon, the Red Sea EcoConference, the UN Decade Laboratory on a predicted ocean, a meeting of the Global Environment Monitoring System for Ocean and Coasts (GEMS Ocean), the Bay of Fundy Ecosystem Partnership/ Atlantic Canada Coastal and Estuarine Science Society (BoFEP/ACCESS) Annual conference on ocean issues, as well as a UNEP-led webinar on the science-policy panel on chemicals, waste and pollution prevention.

Action by GESAMP

2.6 In the discussion that followed, GESAMP:

- .1 sincerely welcomed the three new Members, namely Mr. Alexander Girvan, Mr. Mario Tamburri (new Chair of WG 44) and Ms. Vanessa Hatje; and
- .2 expressed its appreciation to Ms. Tracey Shimmield for her dedication and input over the previous years as joint Vice-Chair.

3 REPORT OF THE ADMINISTRATIVE SECRETARY OF GESAMP

3.1 The Administrative Secretary of GESAMP introduced document 49/3. GESAMP noted that the ExCom had met on 22 March 2022, to discuss working groups and correspondence groups, as well as the arrangements for GESAMP 49, among other matters.

3.2 ExCom had also met on Monday 5 September 2022, to discuss preparations for the annual session, support arrangements from the Sponsoring Organizations, and the status of the GESAMP Members.

3.3 GESAMP noted the report of the activities and achievements of the Sponsoring Organizations since GESAMP 48, as reported in detail in annex IV to this report.

3.4. GESAMP recognized a number of changes among the Technical Secretaries in the intersessional period, and subsequently:

- .1 thanked Ms. Oskana Tarasova, who had moved to other duties within WMO, and welcomed Mr. Lorenzo Labrador as the new WMO Technical Secretary;
- .2 thanked Ms. Alice Hicuburundi, who had moved to other duties within DOALOS, and welcomed Ms. Charlotte Salpin as the new DOALOS Technical Secretary; and
- .3 thanked Mr. Uwe Barg, who had retired from FAO, and welcomed Mr. Jon Lansley as the new FAO Technical Secretary.

4 PLANNING OF GESAMP ACTIVITIES

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

4.1.1 The Chair of Working Group 1 (WG 1), Mr. Richard Luit, introduced document 49/4, providing a report of the Working Group.

4.1.2 Since GESAMP 48, the WG had met once (EHS 59) via a combination of correspondence and virtual plenary sessions due to the COVID-19 restrictions, from 16 March to 13 May 2022. The full report had been published as EHS 59/9 and circulated as IMO circular PPR.1/Circ.12. The main work carried out at the last session concerned the evaluation of substances. Data on 10 new substances were evaluated and full GESAMP Hazard Profiles (GHPs) were assigned to all substances. The Group also considered requests for the re-assessment of three substances for which new ratings were confirmed.

4.1.3 GESAMP also noted that the Working Group had discussions on the estimations of acute dermal toxicity, and had agreed to consider these matters further at its next and subsequent sessions. In this regard, the Working Group noted that if any future work on estimation of acute dermal toxicity significantly altered the current methodology of the Group and/or impacted the ratings of existing entries, it would keep the relevant

IMO bodies (i.e. ESPH Technical Group, the PPR Sub-Committee, and MEPC) informed and seek their advice, as appropriate.

4.1.4 The Working Group also had extensive discussions on vegetable oils used as feedstock for biofuel production, and agreed that, should it consider it necessary to initiate work in future that could potentially change the names and/or groupings of vegetable oils in the Composite List, it would inform and seek the advice of the relevant IMO bodies (i.e. ESPH Technical Group, the PPR Sub-Committee, and MEPC), as appropriate, at an early stage.

4.1.5 The Working Group had further discussed the assessment of formulated mixtures (preparations) and how to deal with these in the assessment process.

4.1.6 Finally, the Working Group had agreed to keep an internal list of decisions and a record of recurring or ongoing classification issues that required consideration over several sessions, with the aim of ensuring consistency and facilitating future revisions of Reports and Studies No. 102.

4.1.7 In the discussion that followed, GESAMP requested the WG to include a list of the substances assessed as an annex to its report to GESAMP.

Action by GESAMP

4.1.8 GESAMP noted with great appreciation the progress made by the Working Group in the intersessional period and thanked the Chair and the WG members for their dedication and efforts.

4.2 Report of the GESAMP Ballast Water Working Group (WG 34)

4.2.1 The Chair of Working Group 34 (WG 34), Mr. Jan Linders, introduced document 49/4/1, providing a report of the Working Group.

4.2.2 The Chair of WG 34 presented the outcome of the WG meeting held since GESAMP 48 and noted that three Ballast Water Management Systems (BWMS) had been evaluated. Of these four BWMS, two received a recommendation for Final Approval, and one was not recommended for Basic Approval. The next session of MEPC is scheduled for December 2022 (MEPC 79).

4.2.3 GESAMP noted that the ninth stock-taking workshop for the WG had been held from 24 to 28 January 2022, which had resulted in several outcomes:

- .1 the preparation of draft guidelines for re-evaluations in cases where modifications had been made, for consideration by the Committee at a future session, as requested by MEPC 75;
- .2 a review of the WG's position on TRO sensors, including required properties of amperometric TRO sensors used in BWMS; and
- .3 a recommended not to include new test organisms, e.g. bacteria for laboratory ecotoxicity testing and WET test in WG 34's Methodology.

4.2.4 In the ensuing discussion, GESAMP noted that the number of applications for BWMS did not seem to decline, and that the work of the WG would be relevant for many years to come. The Chair of the WG took the opportunity to express his appreciation to all the GESAMP members for peer-reviewing the report of the 42nd meeting of BWWG.

4.2.5 GESAMP recalled that in its informal discussion on Monday morning, the issue had been raised that the peer review process for the WG 34 reports was too complex and not fully suitable for the purpose.

4.2.6 The Group, therefore, agreed that it would be beneficial to provide more clarity on where to focus the reviews, and to emphasize that the review should ensure that the arguments by the WG to reach its decisions were correct and reasonable. It was also suggested that there may be no need for all Members to peer-review the WG 34 reports and that these should depend on their expertise.

4.2.7 It was therefore suggested that a revised review template for the purpose of WG 34 should be developed to ensure a better process, safeguard the confidentiality of the reviews and enhance the consistency of the reviews.

Action by GESAMP

4.2.8 Following discussion, GESAMP decided to prepare a revised peer review procedure for WG 34, under the lead of the Chair of the WG, in dialogue with the GESAMP Office and the IMO secretariat.

4.2.9 In summary, GESAMP noted with great appreciation the progress made by the Working Group in the intersessional period and thanked the Chair and the WG members for their dedication and efforts.

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

4.3.1 The Co-Chair of Working Group 38 (WG 38), Mr. Robert Duce, introduced document 49/4/2, providing a report of the Working Group. He informed GESAMP of a publication on the atmospheric transport of microplastics to and from the ocean, resulting from a virtual workshop organized by WG 38 in cooperation with WG 40 and titled "Workshop on the atmospheric transport of microplastics to and from the ocean" on 17 to 19 November 2020. A detailed review paper resulting from the workshop, entitled "Microplastics and nanoplastics in the marine-atmosphere environment", was published by Nature Reviews – Earth Environment in May 2022.

4.3.2 The paper indicates that atmospheric transport may indeed be an important, and previously little considered, route by which microplastics reach the ocean. The sources of these atmospherically transported microplastics are both direct emissions and also the fragmentation, resuspension and redeposition (possibly many times) of plastics already released into the environment, meaning that emission control alone will not address this issue.

4.3.3 Mr. Duce highlighted the benefits of a future international research effort aimed at identifying the key locations, processes, and sources of microplastics that affect the marine environment. This research will also demonstrate the influence and relative importance of emissions from the marine environment that influences the terrestrial atmospheric microplastics burden. This improved understanding of the microplastics flux and the global plastics cycle will be vital for evaluating the success of urgently needed mitigation strategies against plastic pollution.

4.3.4 Mr. Duce informed on WG 38's continuing development of a workshop on the ocean management and policy implications of the air/sea exchange of chemicals and entitled "Potential role of atmospheric deposition in driving ocean productivity in the Southwest Indian Ocean". The workshop, to be held in early October 2022 at Nelson Mandela University, Gqeberha (formerly Port Elizabeth), South Africa, will include international and local scientists, managers, and policymakers, and it will evaluate the atmospheric inputs and impacts of nutrients from biomass burning and industrial emissions to the Mozambique Channel and the southwest Indian Ocean. Mr. Duce thanked the different funding agencies from the UN system and SOLAS for their support in making the workshop possible.

4.3.5 Regarding other activities of WG 38, Mr Duce informed that, for the ninth year in a row, WG 38 organized a session on the atmospheric input of chemicals to the ocean for the 2022 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. Likewise, members of WG 38 organized and carried out a session at the American Geophysical Union Fall Meeting in December 2021 in New Orleans, LA entitled “Microplastics in the Atmosphere and Ocean”.

4.3.6 WG 38 continues its effort to publish the results of its activities and workshops in the peer-reviewed scientific literature. Publications in 2021 and 2022 include a paper in the Science Advances on Changing atmospheric acidity as a modulator of nutrient deposition and ocean biogeochemistry, one on Microplastics and nanoplastics in the marine-atmosphere environment published on Nature Reviews (mentioned in 4.3.1), as well as GESAMP Reports and Studies No. 109, “The Changing Acidity of the Global Atmosphere and Ocean and its Impact on Air/Sea Chemical Exchange”.

Action by GESAMP

4.3.7 GESAMP expressed its great appreciation towards the progress made by the Working Group in the intersessional period, and period and thanked the Co-Chairs and the WG members.

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

4.4.1 The Chair of Working Group 40 (WG 40), Mr. Peter Kershaw, introduced document 49/4/6, providing a report of the Working Group since the last annual session as well as an overview of the planned activities.

4.4.2 GESAMP discussed the limitations of aspects WG 40 can cover, including the financial implications of plastics and microplastics in the ocean and the interaction between current effects of plastics and microplastics in the ocean and a changing climate. The Chair of WG 40 responded that the WG cannot deal with economic impacts in depth but can give examples. Likewise, the discussion regarding the impact of climate change concluded that it is premature with such assessments and that the impact of plastics and microplastics in the ocean on people and environment here and now is higher priority to address than further research into for example how those effects are influenced by climate change.

4.4.3 GESAMP reiterated the link between WG 40 and WG 43 and encouraged continued dialogue between the Chairs of the two working groups, and noted that two experts were members of both groups, and that the two WGs with advantage could consider presenting jointly or include each other’s work in such presentations at meetings and conferences.

4.4.4 GESAMP discussed how to strengthen the transfer of the science synthesized to policy processes and how and if the WG can follow or track policy use of WG products. It was recognized that it is a challenge to follow what industry, finance, etc does and if and how they make use of WG 40 products (and in general). However, the participation of WG 40 in G7 and G20 processes is one mechanism, and communication at UNEA another and there are known examples of application at national level in marine action plans (e.g. Japan). The GESAMP Office commented that the sponsoring agencies have an important role in the transfer and communication of GESAMP products to its respective member states and national focal points and that this is part of the GESAMP communication strategy.

Action by GESAMP

4.4.5 GESAMP noted the good progress of WG 40 and in particular, the need for additional funding for coming WG meetings and that at the lack of financial resources may eventually impact the ability of the WG to deliver as planned.

4.5 Ocean interventions for climate change mitigation (WG 41)

4.5.1 Mr. Chris Vivian, Co-Chair of Working Group 41 (WG 41), introduced document 49/4/8, providing a report of the Working Group.

4.5.2 Since the last GESAMP session in September 2021, the WG had recruited two additional members, one from Germany and one from China, bringing the WG membership to nine male members and seven female members, with nine members from Western/Europe/North America and seven from other parts of the world.

4.5.3 The WG had held two meetings in the intersessional period (November 2021 and March 2022) with the main focus of discussions being the proposed Integrated Assessment Framework (IAF). Good progress has been made in developing the framework with the aim to have a draft version available for external review/discussion by the end of 2022.

4.5.4 The WG provided a submission to the London Convention/London Protocol (LC/LP) Scientific Groups meeting held in March/April 2022, to assist the London Protocol Parties in identifying marine geoengineering techniques that it might be prudent to consider for listing in the new Annex 4 of the Protocol. The LC/LP Scientific Groups agreed that the marine geoengineering techniques identified by WG 41 as highest priorities merited urgent consideration by the Scientific Groups, namely:

- .1 fertilization for fish stock enhancement;
- .2 macroalgae cultivation for sequestration including artificial upwelling;
- .3 microbubbles/reflective particles/material;
- .4 marine cloud brightening;

- .5 alkanization of the ocean by adding alkaline material directly to the ocean or by electrochemistry;
- .6 mineralization of CO₂ in rocks under the seabed; and
- .7 extraction of CO₂ from seawater.

4.5.5 GESAMP noted that the LC/LP Scientific Groups had re-established its correspondence group on marine geoengineering, and that dialogue between this group and WG 41 would continue in the future.

4.5.6 At the invitation of the Carnegie Climate Governance Initiative¹ (), GESAMP WG 41 co-sponsored a side event at the UN Oceans Conference on 1 July 2022 on 'Marine Cloud Brightening – A Governance Dilemma'. Chris Vivian introduced GESAMP and C2G and Miranda Boettcher, a member of WG 41, was the moderator for the event. A recording of the event is available at <https://www.c2g2.net/un-ocean-conference-2022/>.

Action by GESAMP

4.5.7 Following discussion, GESAMP noted with great appreciation the progress made by the Working Group in the intersessional period and thanked the Co-Chairs and the WG members for their dedication and efforts.

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

4.6.1 Ms. Tracy Shimmield, Chair of Working Group 42 (WG 42), introduced document 49/4/7, providing a report of the Working Group.

4.6.2 GESAMP noted that the internal and external peer-review had been completed in 2021. However, following further discussion among the Lead Agencies, and in particular taking into account comments by ISA highlighting the fact that the report contained both impacts by mine tailings discharge to the deep ocean and deep-sea mining, and to ensure better clarity it had been agreed that the original, peer reviewed report would be split into two reports: Report Vol. A, 'Impacts of mine tailings waste matter in the marine environment from mining operations'; and Report Vol. B, 'Impacts of deep sea mining in the marine environment from mining operations'. The report has been separated, with Vol. A near completion, however, Vol B. will require some further work as it needs to be updated to ensure it is current.

4.6.3 GESAMP noted that the WG members had been active in scientific cruises and research submissions. It was also noted that the Chair had been contacted by the Environment Programme Director for European Academies Science Advisory Council, as they were going to consider whether EASAC would undertake work related to deep sea mining and policy.

4.6.4 GESAMP noted that of the original WG membership, three members were no longer available, and that new members would need to be recruited.

Action by GESAMP

4.6.5 GESAMP noted the progress made towards publication of the report, and thanked the Chair and the WG members for their dedication and efforts.

4.6.6 GESAMP agreed with the decision by the Chair to split the report into two volumes, and reiterated that following the finalization of the WG 42 reports, the next stage for the WG 42 would be a decision on how to progress the next section of the ToRs and to seek funding for the next phase of the work.

4.6.7 GESAMP agreed on the need to identify new experts for the next phase of the WG.

4.7 Sea-based sources of marine (WG 43)

4.7.1 Ms. Kirsten Gilardi, Chair of Working Group 43 (WG 43), introduced document 49/4/3, providing a report of the Working Group activities since the last session.

4.7.2 Since GESAMP 49, the Working Group presented an online webinar to present an overview and the main conclusions of their first technical report. The webinar was delivered to the Sponsoring Organizations, as well as Member State delegations, partnering organizations and observers. The report was published and posted on the GESAMP website on 21 October 2021 as GESAMP Reports and Studies Series No. 108.

4.7.3 In addition, the WG 43 Chair presented the WG findings to the Lighthouse Lofoten Conference 22, held from 5 to 6 April 2022 and hosted by the Norwegian Centre Against Marine Litter, and at the 2nd International Conference of the African Marine Waste Network, held from 23 to 27 May 2022 in South Africa. The Chair also presented at the World Agriculture Society meeting and a session of the Abidjan Convention.

4.7.4 Chair of WG 43 presented the revised and updated WG 43 TOR for GESAMP review and approval and outlined the next steps which included inviting new members with relevant ALDFG and scientific expertise to the group and advised that participation in the upcoming 7IMDC would provide an ideal scouting opportunity for this purpose.

4.7.5 GESAMP was informed that WG 43 would meet informally in the margins of 7IMDC, and a formal physical meeting was planned for early 2023 to kick-start work on the new TOR.

4.7.6 GESAMP noted the commitment from FAO and IMO as co-sponsors to continue the work of WG 43 with the revised TOR through a second phase and noted that UNEP were unfortunately not able to attend the annual session.

¹ C2G, see <https://www.c2g2.net>

4.7.7 In the discussion that followed, GESAMP generally agreed to the proposed TOR, but noted that item 5 in the proposed TOR (see document GESAMP 49/4/3, annex 2) would require some additional consideration intersessionally prior to inclusion in the TOR for phase 2. Consequently, this item was held in abeyance awaiting additional consultation between the WG Chair and FAO.

Action by GESAMP

4.7.8 GESAMP thanked the Chair of the WG and its members for their dedication and hard work and achievements achieved through a difficult period where no physical meetings were possible.

4.7.9 Following discussion, GESAMP approved the proposed TOR as set out in annex VII, and agreed that any further necessary changes to the TOR could be discussed and approved intersessionally if so required.

4.7.10 GESAMP tasked the WG 43 Chair with reconfiguring WG member composition to best address the new Terms of Reference.

4.8 Biofouling management (WG 44)

4.8.1 Mr. Henrik Enevoldsen, GESAMP Technical Secretary at IOC UNESCO, introduced document 49/4/5 on behalf of the Chair of Working Group 44 (WG 44), Dr. Mario Tamburri, providing a report of the Working Group activities since the last session. He presented the main objectives of the group, namely, to provide a global overview of the impact of biofouling and its role in the introduction and spread of non-indigenous species as well as identifying mitigation concepts and strategies.

4.8.2 GESAMP noted that WG 44 has held and continues to hold monthly virtual meetings and that it was working towards completion of its comprehensive report before the end 2023. To facilitate work and considering the workload within the timeline of the GEF funded GloFouling Partnership project, a consultant has been hired by IOC UNESCO / GloFouling Partnership Project to assist the chair in the organizing and editing process. A face-to-face meeting of the WG is foreseen for November 2022.

4.8.3 The GloFouling Partnership Project Coordination Unit at IMO commended the WG 44 for its work and reiterated the importance of the independent advice and scientific synthesis provided by the WG 44 to the GloFouling Partnership project.

Action by GESAMP

4.8.4 Following discussion, GESAMP noted with great appreciation the progress made by the Working Group in the intersessional period and that the Lead Organization of the WG (IOC-UNESCO) had been successful in identifying a new WG Chair in consultation with the outgoing Chair Ms. Broeg and the Vice-Chairs, in accordance with the Rules of Procedure. GESAMP thanked the Chair and the WG members for their continued dedication and efforts despite the challenges in the intersessional period.

4.9 Climate change and greenhouse gas related impacts on contaminants in the ocean (WG 45)

4.9.1 Ms. Vanessa Hatje, Chair of Working Group 45 (WG 45), introduced document 49/4/4, providing an overview of the WG scope of work, a report on its activities carried out since the last session and the 2022-2023 work plan.

4.9.2 During the past year, GESAMP WG 45 held a virtual meeting and had focused its attention on three main activities: (i) production of a peer-reviewed publication; (ii) consolidation of four thematic sub-groups (metals, organic pollutants, nutrients, and radionuclides) to work in parallel; and (iii) literature review focusing on the effects of climate change on the pollution of coastal systems (e.g., bays, estuaries, blue carbon ecosystems).

4.9.3 The thematic sub-groups were actively communicating and meeting virtually and were able to achieve good progress despite a number of changes to membership.

4.9.4 The 2022 annual group meeting will be held 28-30 September 2022, hosted by IAEA in Monaco, being the first opportunity for WG 45 to convene in person. Achievements obtained so far by the thematic subgroups will be reviewed by the WG and the expansion of the initial focus of the WG on coastal ecosystems to include open ocean will be discussed.

4.9.5 GESAMP noted that WG 45 will further expand the list of sources of contaminants to the marine environment and refine their classification.

4.9.6 GESAMP also noted that the WG had agreed to an approach similar to that of WG 38, namely, to first publish findings in the peer reviewed journals, and thereafter as a GESAMP Reports & Studies. The WG Chair noted that this was an important incentive for the WG members, as scientific publications are crucial for those active in the academic world.

4.9.7 In the ensuing discussion, GESAMP highlighted the importance of finding an appropriate approach for each of the WGs, and that they sometimes would differ. Publishing in the peer reviewed journals was seen as an important opportunity and should be strongly encouraged. However, it was also emphasized that it is important to stress that the publications in the scientific journals are presenting the scientific findings, and that the reports in the GESAMP Reports & Studies series provides the advice from GESAMP to the Sponsoring Organizations on how this could be of relevance to their respective mandates.

4.9.8 GESAMP Members also availed themselves, as relevant, to provide comments on manuscripts, as and when appropriate.

Action by GESAMP

4.9.9 GESAMP noted with great appreciation the progress made by WG 45 since the previous session, and congratulated WG 45 for having already in its first year published an overview of its intended work.

5 CONTRIBUTION TO OTHER UN PROCESSES

5.1 The United Nations Decade of Ocean Science for Sustainable Development

5.1.1 The Chair reported that in the intersessional period, he had, as requested by GESAMP in the previous annual session, communicated with the Executive Secretary of IOC, Mr. Vladimir Ryabinin, regarding the potential role that GESAMP could play in the Decade of Ocean Science. As a consequence, two representatives of the Decade Secretariat, Mr. Julian Barbieri and Ms. Alison Clausen, joined the session to continue this important dialogue.

5.1.2 Mr. Barbieri provided a presentation titled “GESAMP and the Ocean Decade: Discussion on potential engagement”, with a focus on updating GESAMP on the latest developments on the Decade’s activities, and on discussing potential engagement strategies with GESAMP. On the topic of the Decade’s activities and current status, the salient points were:

- .1 There is a strong thematic and geographical diversity of Decade Actions, although notable gaps in leadership exist;
- .2 There is a unique window of opportunity to deliberately design the ‘science we need’ before Decade actions become too dispersed; and
- .3 There is a strong demand from the Decade community to shape a collective vision for the next 8 years and enhance collective impact.

5.1.3 On discussing potential avenues of collaboration between GESAMP and the Decade, Mr. Barbieri noted that there were indeed opportunities for collaboration, and that the potential contributions of GESAMP could include:

- .1 an advisory role on main knowledge gaps;
- .2 an advisory role on emerging issues;
- .3 monitoring and review of challenges; and
- .4 and input to the Decade expert roster.

5.1.4 At the individual expert level, this could be achieved through GESAMP’s provision of direct input or by including some of GESAMP Members into the Expert Roster itself. It was also suggested that GESAMP members could play a role in the soon to be established Decade Working Groups and structures (e.g. NDCs, regional groups), lead/engage in Decade actions and act as advocate for the Decade within home institutions and countries.

5.1.5 With respect to GESAMP as a whole, it was suggested that GESAMP could: engage in the Decade’s strategic ambition setting process through the convening of joint GESAMP-Decade working groups for one or more Ocean Decade Challenges as part of the overall process. An indicative working group structure was proposed whereby up to five GESAMP nominated experts would participate in select working groups for

one or more of the Decade Challenges as part of the overall process. It was further noted that GESAMP could ;

- .1 support communications and outreach;
- .2 propose representatives to working groups;
- .3 use the GESAMP WGs as incubators for Decade Actions; and
- .4 engage with the DCU/DCC/DCOs.

5.1.6 Following Mr Barbieri’s presentation, a discussion followed on how GESAMP could best contribute to, and engage with, the Decade to provide advice. It was noted that GESAMP has established a Task Team to support the Decade and to advise and update GESAMP on the Decade’s activities. The designation of a possible dedicated point of contact person from the GESAMP Task Team to liaise with the Decade Secretariat was also discussed.

5.1.7 The issue of costs of participation in Decade working groups, including by GESAMP nominated experts was discussed, and the Decade secretariat informed that this was still under discussion but would most likely entail a mix of funding.

5.1.8 It was noted that for some of the GESAMP Sponsoring Organizations, GESAMP’s involvement in the Decade was an important contribution from their perspective, and that there may be a willingness from those agencies to sponsor the participation of GESAMP in the Decade working groups or other activities. From the Decade secretariat side, this was seen as an important way of also engaging the GESAMP Sponsoring Organizations.

5.1.9 The Decade secretariat further informed that Decade Conferences were planned for 2024, 2027 and 2030.

Action by GESAMP

5.1.10 Following extensive discussion, GESAMP agreed to continue its efforts to further formalize its contributions to the Decade, and in particular to:

- .1 explore the possibility for GESAMP to become a member of the Decade Advisory Board;
- .2 encourage GESAMP Members to register with the Decade Expert Roster; and
- .3 explore options to support the Decade secretariat in the strategic ambition setting process.

5.1.11 GESAMP also agreed that Ms. Rosemary Rayfuse would serve as the focal point for the GESAMP Task Team to support the Decade, and invited other Members to join the Task Team. The TORs of the Task Team can be found at annex VII.

5.1.12 GESAMP also requested the Chair to respond to the Executive Secretary of the IOC-UNESCO outlining GESAMP’s proposed way forward.

5.2 Other UN processes

The UN Regular Process

5.2.1 GESAMP noted the current state of the Regular Process and reiterated its readiness to contribute and support the Sponsoring Organizations as appropriate.

The 2030 Agenda for Sustainable Development and SDGs

5.2.2 GESAMP discussed the mapping carried out recently by GESAMP, and agreed to re-circulate the latest version for comments, whereafter the GESAMP Office would ensure that this information was incorporated into the website.

UNFCCC and COP 27

5.2.3 GESAMP discussed the preparations for the United Nations Framework Convention on Climate Change (UNFCCC) COP 27 in late 2022, and its possible contributions in this regard, including the possible involvement at COP 27's Ocean pavilion. To that end, it was agreed that more information was needed about the Pavilion's structure and activities to be in a better position to contribute to its activities.

UNEA

5.2.4 GESAMP noted the agreement at UNEA 5 to work towards a legally binding, global plastics agreement by 2024, and noted the input that GESAMP's working groups had in the work leading up to this decision. It was agreed to continue the discussion on how GESAMP can best contribute to the negotiation process, if so required by the Sponsoring Organizations, and in particular UNEP.

Action by GESAMP

5.2.5. In conclusion, GESAMP agreed to:

- .1 invite DOALOS to provide an update for the next session on the Regular Process;
- .2 find out more about the COP27 Ocean Pavilion's structure and activities to be in a better position to contribute to its activities; and
- .3 continue the discussion intersessionally on how to best move forward to with GESAMP's activities related to the establishment of a Global Plastics Agreement.

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. In the period leading up to the annual session, several new and emerging issues had been discussed among the Members. During the informal meeting of GESAMP Members, held on Monday, 5 September 2022, the following topics had been selected for presentation to the annual session:

Marine environmental threats due to the decarbonization agenda

6.2 It was noted that this topic was of relevance to several of the current working groups, and that GESAMP could consider how to support the strengthening of the evidence base on this matter. It was agreed that GESAMP needs a more strategic approach to this changing context, and not least on how to communicate the impacts of these changes. The Chair of WG 41 noted that there was a clear link to the discussions on carbon credits that is currently ongoing, but that these financial mechanisms were actually dealing with scientific processes that are not yet mature.

Effects of a changing ocean on human health

6.3 GESAMP noted that as discussed in previous sessions, this could provide an opportunity to liaise with WHO and invite them to re-join as a Sponsoring Organization.

Action by GESAMP

6.4 In conclusion, GESAMP agreed to review the issue of marine environmental threats due to the decarbonization agenda in light of the GESAMP side-event, held on 8 September (see section 9 and annex VIII), and revisit the issue intersessionally.

6.5 GESAMP also agreed to the formation of a Correspondence Group to prepare a scoping paper on the effects of a changing ocean on human health and the marine environment, under the lead of Ms. Watson-Wright and Ms. Gilardi.

Other matters raised in the informal session

6.6 In the informal session GESAMP also had also discussed the issue of deep-sea mining and the experiences with providing advice to ISA on the Regional Environmental Management Plan for the Mid-Atlantic Ridge and was informed of the Chair's discussion

with ISA on this matter, where ISA had expressed its appreciation for GESAMP's comments. In conclusion, GESAMP re-iterated that it was clear that as in any of its recommendations, GESAMP will provide the best advice to the Sponsoring Organizations, and it is then up to the Sponsoring Organizations how to make best use of it.

6.7 GESAMP discussed the updating of the draft communications strategy, and the importance of this for GESAMP's visibility. It was agreed that this discussion would form part of the strategic review process (see item 8), and GESAMP requested Ms. Watson-

Wright, Ms. Gilardi and Mr. Girvan to work closely with Ms Kolia in the GESAMP Office to prepare a revised, draft communications strategy for discussion at a future session.

6.8 Finally, the Members noted that this year's arrangement on the first day, with the Members' informal session held in parallel with the ExCom meeting was not an optimal solution, since it would be preferable to have all Members, including the Chair and Vice-Chair, in the informal session. It was therefore agreed to stagger these parts of the meeting at next year's session.

7 SCOPING ACTIVITIES

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

7.1.1 The coordinator of the Correspondence Group, Mr. Chris Vivian, updated GESAMP on the scoping paper. The paper was finalized in 2020, and had recently been re-circulated to ExCom, so a decision should be made on the next steps. However, in light of a recent UNEP report, as well as additional questions from UNEP, it may be advisable to solicit further assistance to update and complete the report. It was suggested to involve external experts for its updating as well as to divide the report into two sections: one on the intertidal area and dunes and another focusing on offshore mining.

7.1.2 GESAMP noted the need for further dialogue with UNEP, and also suggested that publication in a journal may be a suitable way forward.

7.1.3 It was also suggested that the lead approaches Robert Young, Western Carolina University, who had attended the side-event on this matter at the annual session in 2016 (GESAMP 43) in order to pursue further engagement on the issue.

Actions by GESAMP

7.1.4 In conclusion, GESAMP noted that further work was needed, and agreed to discuss with UNEP regarding the way forward. In the meantime, Mr. Vivian would initiate the necessary updating of the scoping paper.

7.2 Update the information on sources of the main pollutants impacting the global marine environment (The 80/20 Conundrum)

7.2.1 The coordinator of the Correspondence Group, Mr. Andrew Hudson provided an overview of the update of the "80/20 Conundrum". It was recalled that the main issue was not only the inaccuracy of the 80/20 figure, but more its lack of usefulness as a definite fig-

ure since there are such a wide range of marine pollutants that are by nature not comparable in 'size' or types of impact.

7.2.2 GESAMP agreed that an 'inventory' of the land versus sea-based fluxes of selected major and minor pollutants would be more instructive and could help position GESAMP as an informed source on the relative contribution of the various priority land vs sea-based pollutants. The overall aim would be to reframe the global figure, and thereby make it more scientifically defensible, while halting the continued use of the previously inaccurate figure of 80:20.

Action by GESAMP

7.2.3 Following discussion, GESAMP agreed that Mr. Hudson would provide a draft, full analysis along the lines discussed in this and previous sessions, before GESAMP considers the next steps.

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

7.3.1 The coordinator of the Correspondence Group, Mr. Peter Kershaw, presented document GESAMP 49/7, providing an update on the "Causes and Impacts of massive Sargassum accumulations in Caribbean and West Africa".

7.3.2 GESAMP discussed its future role on this matter, noting the links to the UN Decade for Ocean Science, as well as the current state of activities by other bodies. The IOC Technical Secretary indicated that the plans to hold an Open Science Meeting had not yet materialised, but that once this takes place the meeting would further explore the possibilities of a research program towards answering fundamental questions surrounding the blooms.

Action by GESAMP

7.3.3 In conclusion, GESAMP agreed to maintain watching brief on the matter, if possible co-sponsor or otherwise support the Open Science Meeting and then decide on future steps.

7.3.4 In addition, GESAMP stressed that this issue was one example of observed significant changes in ecosystems dominated by macro-algae, particularly in the occurrence or abundance of macro-algae. These phenomena may reflect changes in the ocean environment at a global scale.

7.4 Relevance of inputs of disinfection by-products (DBPs) into the marine environment

7.4.1 Mr. Jan Linders reported on the work on the finalization of the report on “Relevance of inputs of disinfection by-products (DBPs) into the marine environment”, explaining that the lead author, Mr. Matthias Grote had informed him that the manuscript still needed some additional revision before it was ready for publication.

Action by GESAMP

7.4.2 GESAMP noted that the report was undergoing additional revisions, with the expectation that it would be ready for publication in the GESAMP Reports & Studies series by the end of 2022. It was also agreed that a more policy oriented summary should be prepared, once the coordinator had finalized the manuscript.

7.4.3 GESAMP agreed that following the publication of the report the scoping issue will be removed from the agenda.

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

7.5.1 GESAMP noted that the scoping paper on “Impacts of Armed Conflict on the Marine Environment” had recently been circulated to ExCom for comments.

7.5.2 However, in the ensuing discussion it was clear that not all new Members, including some with highly relevant expertise on the matter, had seen the report, and that it would benefit from further review. It was also suggested to seek further guidance from the ExCom on the matter.

Action by GESAMP

7.5.3 In conclusion, GESAMP agreed that the scoping paper would be circulated to Members for further input and that the matter would be revisited at the next intersessional meeting.

7.6 Task Team on climate change

7.6.1 In the absence of Ms. Elisabeth Holland, coordinator of the Task Team, Mr. Alexander Girvan gave an update on the team’s work, including the outcome of the recent discussion to define the terms of reference and workplan for the Task Team.

Action by GESAMP

7.6.2 GESAMP noted the proposed timeline and approved the TOR and work plan as outlined in annex VII.

7.7 Other matters

7.7.1 Mr. Jan Linders informed GESAMP regarding progress made towards the production of a scoping paper on CO₂ scrubbers. He noted that IMO had agreed to share information on the issue within the next few weeks, and that there was a wealth of information already available. It was agreed that Mr. Linders, together with Mr. Luit would continue the work, and that a first draft of the paper could be expected by the second Member’s intersessional in the spring of 2023.

8 STRATEGIC REVIEW OF GESAMP

8.1 GESAMP recalled that the ExCom intersessional February 2021 the IMO Technical Secretary presented a proposal to conduct a strategic review of GESAMP. Following discussion, the ExCom agreed that there could be merit in a review process, but that a more concrete proposal would be necessary, initially focusing on an internal review. At the ExCom intersessional in March 2022, the ExCom considered a revised proposal, and agreed to proceed along the lines of the revised proposal and invited ExCom to submit comments on it within two weeks of the meeting, whereafter

the Chair of GESAMP and the GESAMP Office would prepare a full proposal for submission.

8.2 GESAMP considered document GESAMP 49/8, providing the full draft plan for the review. In the ensuing discussion, Members noted that the review would consist of several steps, with the first phase being an internal evaluation, which would determine the indicators and how to measure GESAMP’s impacts.

8.3 GESAMP also noted that the workload could be extensive, and that it could benefit from a facilitator, to support the Review Task Team. Furthermore, the Members emphasized that this is a process entirely owned by GESAMP itself, and that it may evolve during the process. The nature and extent of involvement of external consultant(s) would be up to GESAMP and the ExCom, and would be agreed when considering the outcomes of phase 1 of the review.

Action by GESAMP

8.4 Following extensive discussion, GESAMP:

- .1 agreed to initiate the review, based on the work plan and initial methodology set out in annex V to this report;
- .2 agreed to the indicative timeline and responsibilities as set out in annex V to this report; and
- .3 established the Review Task Team, under the lead of the Chair of GESAMP (see annex VII for membership of the Task Team), and requested it to provide a first report in March 2023.

9 SIDE EVENT

9.1 GESAMP organized a special side event on environmental economics and its role in marine environmental protection as part of the annual session. The event, which was attended by approximately 40 participants, was moderated by Kirsten Gilardi (GESAMP member). The programme (annex VIII) including the following five speakers who provided an overview of key issues related to blue economy discussions from public and private sector perspectives:

9.2 Mr Alexander Girvan (GESAMP member) provided an overview of the role of environmental economics in the science/policy interface and introduced concept of economic valuation, which attempts to put a value to ecosystem goods and services and natural capital, and how values can be used in decision-making:

9.3 Dr Nick Hardman-Mountford (Commonwealth Secretariat) introduced the Commonwealth Blue Charter, an agreement by all fifty six Commonwealth countries to actively cooperate to solve ocean-related problems and meet commitments for sustainable ocean development. Opportunities for science, particularly social science, to support the blue economy polices were highlighted.

9.4 Dr Gaetano Grilli (University of East Anglia) focused on natural capital accounting (NCA) and valuation of marine and coastal ecosystem services, how NCAs provide information such as value of assets (e.g., mangroves), the resulting beneficiaries and the blue economic activities involved with each ecosystem service.

9.5 Mr Simon Dent (Mirova Natural Capital) provided a perspective from the public sector and introduced the Sustainable Ocean Fund which supports sustainable blue economy investments to make positive impact on the environment and society and deliver economic returns.

9.6 In the discussion that followed the participants considered how environmental economics and natural capital management approaches can be applied to marine environmental science and highlighted the value of further integrating social sciences into the work of GESAMP to promote the sustainable use of the ocean.

10 DATE AND PLACE OF GESAMP 50

10.1 GESAMP accepted with appreciation the offer by the ISA to host the 50th session of GESAMP at the ISA Headquarters in Kingston, Jamaica, in 2023 and agreed that the exact dates would be confirmed by the Executive Committee as soon as possible.

11 FUTURE WORK PROGRAMME

11.1 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 terms of reference set out at annex VII.

12 ANY OTHER BUSINESS

12.1 No other business was raised.

13 ELECTION OF CHAIRPERSONS

13.1 GESAMP agreed to re-elect Mr. David Vousden as Chair of GESAMP and Ms. Wendy Watson-Wright for another year and expressed its great appreciation for their unwavering commitment and service to GESAMP.

14 CONSIDERATION AND ADOPTION OF THE REPORT OF GESAMP 49

14.1 The report of the forty-ninth session of GESAMP was considered and approved.

15 CLOSURE OF THE SESSION

15.1 The Chair of GESAMP, Mr. David Vousden, closed the forty-ninth session of GESAMP on Friday, 9 September 2022 at 14:00 hrs.

ANNEX I – AGENDA

49th session of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP)

Hosted by the International Maritime Organization (IMO) from 5 to 9 September 2022

- 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)
 - .3 Atmospheric input of chemicals to the ocean (WG 38: WMO leading)
 - .4 Sources, fate and effects of micro-plastics in the environment – a global assessment (WG 40: IOC-UNESCO and UNEP co-leading)
 - .5 Ocean interventions for climate change mitigation (WG 41: IMO, IOC-UNESCO and WMO co-leading)
 - .6 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining (WG 42: IMO leading)
 - .7 Sea-based sources of marine litter (WG 43: FAO and IMO co-leading)
 - .8 Biofouling management (WG 44: IOC-UNESCO leading)
 - .9 Climate change and greenhouse gas related impacts on contaminants in the ocean (WG 45: IAEA leading)
- 5 Contributions to other UN processes
- 6 Identification of new and emerging issues regarding the degradation of the marine environment of relevance to governments and sponsoring organizations
- 7 Scoping activities (Correspondence Groups and Task Teams)
- 8 Strategic review of GESAMP
- 9 GESAMP side event: “Environmental economics and its role in marine environmental protection”
- 10 Date and place of GESAMP 50
- 11 Future work programme
- 12 Any other business
- 13 Elections of chairpersons
- 14 Consideration and adoption of the report of GESAMP 49

ANNEX II – LIST OF DOCUMENTS

Agenda item 1

- 49/1 Provisional Agenda
- 49/1/1 Annotations to the Provisional Agenda
- 49/INF.1 Provisional List of Participants
- 49/INF.2 Provisional list of Documents

Agenda item 2

- 49/2 Report of the Chair of GESAMP

Agenda item 3

- 49/3 Report of the Administrative Secretary of GESAMP

Agenda item 4

- 49/4 Evaluation of the hazards of harmful substances carried by ships – Report of the Chair of WG 1
- 49/4/1 Review of applications for ‘active substances’ to be used in ballast water management systems – Report of the GESAMP Ballast Water Working Group (WG 34)
- 49/4/2 The atmospheric input of chemicals to the oceans – Report of Co-Chairs of WG 38
- 49/4/3 Sea-based sources of marine litter – Report of Chair of WG 43
- 49/4/4 Climate Change and Greenhouse Gas Related Impacts on Contaminants in the Ocean – Report of Chair of WG 45
- 49/4/5 Biofouling management – Report of the Chair of WG 44
- 49/4/6 Sources, fate and effects of marine plastics and microplastics – Report of co-Chairs of WG 40
- 49/4/7 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining – Report of the Chair of Working Group 42
- 49/4/8 Ocean intervention for climate change mitigation – Report of the co-Chairs of WG 41

Agenda item 7

- 49/7 Causes and impacts of massive accumulations of the brown macro-algae *Sargassum* in the nearshore environment of the Caribbean and West Africa – Report of the Correspondence Group
- 49/8 Draft plan for the strategic review of GESAMP

ANNEX III – LIST OF PARTICIPANTS

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ANNEX IV – ACTIVITIES AND ACHIEVEMENTS OF THE SPONSORING ORGANIZATIONS OF GESAMP

1 This annex provides a summary of the Sponsoring Organizations' achievements since GESAMP 48 (held from 6 to 10 September 2021) from IMO, and UN-DOALOS, WMO, IOC of UNESCO, ISA, IAEA, UNEP, FAO and UNDP.

GESAMP Office

2 Since September 2021, the main activities of the GESAMP Office have been the following:

- .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 updating the website.

International Maritime Organization (IMO)

Implementation of the Ballast Water Management Convention

3 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 Parties is currently 92 representing 92.40% of the world tonnage (status as of 29 July 2022).

Matters directly related to the GESAMP-BWWG

4 In total there are over 70 type-approved ballast water management systems (BWMS) available, including over 40 BWMS type-approved in accordance with the *Code for Approval of Ballast Water Management Systems* (BWMS Code) which is in effect since 13 October 2019.

5 At its 77th session, the Marine Environment Protection Committee (MEPC) granted one Basic Approval and two Final Approvals to BWMS that make use of Active Substances, based on the recommendations of the 41st meeting of the GESAMP Ballast Water Working Group (WG 34). MEPC 78 did not receive any applications for such approvals. Three applications (one Basic Approval and two Final Approvals) submitted to MEPC 79 were considered by the 42nd meeting of WG 34 (18 to 22 July 2022) and the respective decisions of MEPC 79 based on the recommendations of that meeting will be reported to the next annual session of GESAMP.

6 Following a request of MEPC 75, the 41st meeting of WG 34 also conducted a further consideration of an application for which the recommendation of WG 34

had been that Final Approval should not be granted but the relevant Administration had submitted a commenting document requesting the MEPC to agree that Final Approval be granted. The outcome of this re-evaluation was considered by MEPC 77, which agreed with the renewed recommendation of WG 34 not to grant Final Approval.

7 In light of procedural and other concerns relating to this occurrence, the MEPC agreed to consider developing procedures for conducting future re-evaluations in such cases. In this regard, MEPC 78 endorsed the view that for re-evaluations of BWMS which make use of Active Substances to be conducted in cases where the recommendation of WG 34 may be challenged in the Committee:

- .1 the Administration requesting a re-evaluation should provide sound scientific justification and clear rationale for the Committee's consideration;
- .2 the re-evaluation should not require substantial new information (in such a case a new application would instead need to be submitted); and
- .3 an additional fee of USD 20,000 would be payable if the recommendation of WG 34 does not change as a result of the re-evaluation and is subsequently endorsed by the Committee.

8 On other matters relating to the submission of applications for Basic or Final Approval, MEPC 77 noted the views of WG 34 that:

- .1 the relevant Administration should check that the Operations, Maintenance and Safety Manual (OMSM) and other relevant information is adequately updated to incorporate proposed changes, and that any changes from the original BWMS should be clearly indicated in the application; and
- .2 submitting Administrations should conduct a careful completeness check to ensure that the application satisfies all the provisions contained in Procedure (G9) (paragraph 2.3.4 of the *Methodology for information gathering and conduct of work of the GESAMP-Ballast Water Working Group* (BWM.2/Circ.13/Rev.4)).

9 MEPC 77 also noted the view of WG 34 that a Stocktaking Workshop was necessary, and the suggested terms of reference, and invited Member States to submit relevant data to the Secretariat for consideration by WG 34 in its evaluation of TRO sensors at its next Stocktaking Workshop. Having considered the outcome of the Ninth Stocktaking Workshop on the activity of the GESAMP-BWWG (STW 9), which was held virtually from 24 to 28 January 2022, MEPC 78:

- .1 endorsed the encouragement of WG 34 for rigorous scientific studies based on reliable

methods of total residual oxidant (TRO) measurement in variable natural waters;

- .2 noted the conclusion of WG 34 that it would recognize amperometric TRO sensors as practical alternatives to DPD colorimetric sensors for use in the online monitoring of TRO in future BWMS applications, provided the method used is part of a control system which reliably monitors and regulates the TRO dose during the uptake of ballast water and also controls the neutralizer dose at discharge to maintain the maximum allowable discharge concentration (MADC) at all times;
- .3 endorsed the recommendation of WG 34 that, when amperometric sensors are employed in a BWMS, there should be a manual DPD meter provided for the periodic verification of the effective operation of such sensors to control the appropriate TRO concentrations; and
- .4 noted the conclusion of WG 34 that bacteria should not be introduced as a new test organism at this time.

10 Furthermore, the MEPC had requested WG 34 to develop guidelines for conducting re-evaluations of BWMS which make use of Active Substances in cases where modifications have been made to a BWMS. Having considered the outcome of STW 9, which developed such guidelines, MEPC 78 approved the guidelines for re-evaluations in cases where modifications have been made to a BWMS, which were incorporated as a new chapter 12 in the revised *Methodology for information gathering and conduct of work of the GESAMP-Ballast Water Working Group (BWM.2/Circ.13/Rev.5)*. In this regard, MEPC 78 also noted that the revised Methodology incorporating these guidelines would be applicable to all cases where modifications are made after that session to an already approved BWMS. As the existing parts of the Methodology (chapters 1 to 11), relating to new applications for Basic or Final Approval, were not affected by this revision, the revised Methodology retains the applicability of BWM.2/Circ.13/Rev.4 with regard to such applications, namely it is applicable to all submissions for Basic Approval to MEPC 74 and onwards, and subsequent submissions for Final Approval of those systems.

Other matters

11 A summary of the most important outcomes from MEPC 77, MEPC 78, the 9th session of the Sub-Committee on Pollution Prevention and Response (PPR 9) and the 8th session of the Sub-Committee on Implementation of IMO Instruments (III 8) is provided in this section.

Experience-building phase associated with the BWM Convention

12 In light of the very limited data submitted in the context of the experience-building phase (EBP) by early

2021, the Secretariat had entered into an agreement with the World Maritime University (WMU) to facilitate data gathering and analysis, and the data analysis report was submitted to MEPC 78. The same session also received a submission (MEPC 78/4/10 by Australia et al.) proposing a Convention Review Plan (CRP), for which there was overwhelming support in principle as the most effective way forward with a view to a holistic review of the BWM Convention.

13 MEPC 78 agreed in principle to develop a BWM Convention Review Plan (CRP), using the text set out in the annex to document MEPC 78/4/10 as the basis for further intersessional work with a view to its finalization. MEPC 78 also established a Correspondence Group on Review of the BWM Convention, under the coordination of the United Kingdom, which was tasked to finalize the CRP taking into consideration the outcome of the data gathering and analysis stages of the EBP and the relevant documents, comments and discussions at MEPC 78. The Correspondence Group will report to MEPC 80 (where the CRP is expected to be approved), and the broader convention review phase (including the expected re-establishment of the Correspondence Group) is expected to continue until 2026 culminating in the adoption of a package of amendments to the BWM Convention and other associated instruments.

Unified interpretations to provisions of the BWM Convention

14 MEPC 77 approved a unified interpretation of regulations E-1.1.1 and E-1.1.5 of the BWM Convention concerning a common date to be used for determining the implementation of mandatory commissioning testing of individual BWMS in accordance with resolution MEPC.325(75) adopting the amendments to the aforementioned regulations and taking into account the *2020 Guidance for the commissioning testing of ballast water management systems (BWM.2/Circ.70/Rev.1)*. Furthermore, MEPC 78 approved a unified interpretation of appendix I to the BWM Convention (Form of International Ballast Water Management Certificate), concerning the principal ballast water management method(s) employed on the ship. These unified interpretations were incorporated into BWM.2/Circ.66/Rev.3, consolidating all existing unified interpretations to the BWM Convention.

Development of a protocol for verification of ballast water compliance monitoring devices

15 Following overwhelming support at PPR 6 and MEPC 74 for a proposal by Denmark (PPR 6/4 and MEPC 74/4/11) for the development of a protocol for verification of ballast water compliance monitoring devices, there has been extensive consideration of the matter at PPR 7, PPR 8 and PPR 9. However, the scope and extent of comments and proposals contained in the numerous documents submitted to those sessions did not allow the finalization of, and agreement on, the proposed protocol at those sessions, and the further consideration of this matter has been ongoing in the Correspondence Group on Development of a Protocol for Verification of Ballast Water Compliance Monitoring Devices, under the coordination of the United Kingdom, which was initially established by PPR 8 and subse-

quently re-established by PPR 9. Significant progress was achieved on the development of the protocol at the latter session including an updated draft of the protocol, which is being used as the basis for further work in the Correspondence Group, focusing only on the few remaining outstanding issues with a view to finalization of the protocol at PPR 10.

Application of the BWM Convention to specific ship types

16 Due both to the lack of consensus and to time constraints, MEPC 74 had deferred the consideration of 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, to MEPC 75. However, due to time constraints not allowing the detailed consideration of such a contentious matter, subsequent sessions also deferred the consideration of these proposals, along with subsequent documents MEPC 75/4/7 (Australia et al.), MEPC 75/4/8 and MEPC 78/4/9 (both Russian Federation), which is now expected to take place at MEPC 79.

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

17 The output on revised guidance on methodologies that may be used for enumerating viable organisms was scheduled to complete at PPR 6 but it had been extended as there was ongoing validation of analytical methods for enumerating organisms in the 10 to 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). PPR 7 agreed to draft text for the revision of the Guidance and, noting that the Netherlands advised that it expected to submit further information, kept this text in abeyance, for consolidation at PPR 8, with a view to approval at MEPC 77. However, due to the virtual nature of PPR 8, this matter was deferred and the Netherlands subsequently advised that it did not expect to submit further information at present; this output was therefore completed at PPR 9 and the revised Guidance, as had been agreed by PPR 7, was disseminated by means of BWM.2/Circ.61/Rev.1.

Application of the BWM Convention to ships operating at ports with challenging water quality

18 MEPC 76 had for its consideration a number of documents addressing the issuance of guidance for ships operating at ports with challenging water quality rendering the operation of BWMS problematic (MEPC 76/4 and Corr.1 (Liberia), MEPC 76/4/4 (China), MEPC 76/4/5 (Republic of Korea), MEPC 76/4/6 (Norway), MEPC 76/4/7 (INTERTANKO) and MEPC 76/4/8 (Marshall Islands)), which, due to time constraints in light of the virtual nature of the session, had been deferred to MEPC 77, where they were considered together with subsequent relevant submissions MEPC 77/4/8 (Denmark and Germany) and MEPC 77/4/10 (Brazil). Due to the large number of issues to resolve, MEPC 77 was not able to finalize

a circular on guidance for this matter, and focused on fundamental elements that could form the basis for future deliberations with a view to finalizing it.

19 Subsequently, MEPC 78 had for its consideration several further documents (MEPC 78/4/3 (BEMA), MEPC 78/4/6 (Republic of Korea), MEPC 78/4/8 (China), MEPC 78/4/12 (Liberia et al.), MEPC 78/4/14 (India) and MEPC 78/INF.17 (INTERTANKO)). In this connection, several relevant points were discussed, on some of which the views remained split. As the matter required further consideration, but fundamental issues needed to be resolved and agreed first before it could be considered how exactly the matter could be addressed, MEPC 78 invited further proposals focusing on the fundamental and overarching issues relating to this matter.

Form of the Ballast Water Record Book

20 Due to time constraints in light of the virtual nature of the sessions, MEPC 76 and MEPC 77 had deferred the consideration of documents MEPC 76/4/2 (Liberia et al.) and MEPC 77/4/9 (India), proposing a review of the implementation of the Ballast Water Record Book (BWRB) including a potential revision of the form of the BWRB. These documents were considered by MEPC 78 along with a further related document (MEPC 78/4/4 by India). There was broad support for the need to review the form, while there were different views with regard to whether this matter should be addressed urgently or under the convention review phase. As this matter could not be concluded at this session, MEPC 78 invited concrete proposals for amendments to appendix II to the BWM Convention (Form of Ballast Water Record Book) to MEPC 79 with a view to approval at that session.

Ballast water reporting form

21 Owing to time constraints, MEPC 78 was not able to consider document MEPC 78/4/7 (China) proposing amendments to the appendix of the *2017 Guidelines for ballast water exchange* (G6) (Example ballast water reporting form); this proposal is expected to be considered by MEPC 79.

Temporary storage of treated sewage and grey water in ballast tanks

22 MEPC 78 had for its consideration documents MEPC 78/4 (IACS) and MEPC 78/4/13 (India), addressing the matter of the temporary storage of treated sewage and grey water in ballast tanks. Diverse views were expressed on various aspects of this matter, including whether it should be addressed under the BWM Convention or under MARPOL Annex IV as had previously been agreed by MEPC 63. In this regard, MEPC 78 agreed that the relevant scope and objective for the consideration of this matter under the ballast water agenda item should be to ensure that ballast water discharges from ballast tanks used also for other purposes would be compliant with the BWM Convention, while other issues associated with this matter should be addressed in the context of MARPOL. In addition, MEPC 78 invited concrete proposals on additional aspects for guidance on the temporary

storage of treated sewage and grey water in ballast tanks under the BWM Convention, and noted the need to consider what further action may be needed with respect to MARPOL in connection with this matter.

Inclusion of PSC guidelines in the IMO PSC Procedure

23 Since 2014 there are stand-alone Guidelines for port State control (PSC) under the BWM Convention. However, normal current practice is that PSC procedures for all IMO conventions are consolidated in the Procedures for port State control (PSC Procedures), which is an Assembly resolution updated as required at every Assembly session. In this regard, having considered a relevant recommendation by III 7, MEPC 77 authorized the III Sub-Committee to review the *Guidelines for port State control under the BWM Convention* (resolution MEPC.252(67)), with a view to it being added as a new appendix to the PSC Procedures in its future version. Consequently, III 8 referred this matter to the Correspondence Group on Measures to Harmonize Port State Control (PSC) Activities and Procedures Worldwide, which will review the Guidelines with a view to its inclusion as a new appendix to the PSC Procedures, taking into account the 2018 and 2020 amendments to the BWM Convention; the outcome is expected to be agreed by III 9 (July 2023) with a view to incorporation in the revised PSC Procedures to be adopted by A 33 (December 2023). In this regard, recognizing that MEPC 78 established a Correspondence Group on Review of the BWM Convention, which is expected, inter alia, to review the substance of the Guidelines based on the experience gained thus far, it was noted that further revision of the aforementioned new appendix to the PSC Procedures is likely to be required after the completion of that work.

Future work

24 MEPC 79 (scheduled from 12 to 16 December 2022) is expected, inter alia, to consider the following matters related to the BWM Convention:

- .1 applications for Basic and Final Approval of BWMS that make use of Active Substances, based on the recommendations of the 42nd meeting of the GESAMP Ballast Water Working Group;
- .2 proposals on the application of the BWM Convention to ships operating at ports with challenging water quality, focusing on the fundamental and overarching issues relating to this matter;
- .3 proposals on the application of the BWM Convention to specific ship types;
- .4 proposals for amendments to appendix II to the BWM Convention (Form of Ballast Water Record Book), with a view to approval of a revised appendix;
- .5 proposals for amendments to the appendix of the 2017 Guidelines for ballast water exchange (G6) (Example ballast water reporting form); and

- .6 proposals on additional aspects for guidance on the temporary storage of treated sewage and grey water in ballast tanks under the BWM Convention.

25 MEPC 80 (tentatively scheduled from 3 to 7 July 2023) is expected, inter alia, to consider the following matters related to the BWM Convention:

- .1 any applications for Basic and Final Approval of BWMS that make use of Active Substances that may be submitted to that session, based on the recommendations of the 43rd meeting of the GESAMP Ballast Water Working Group that would be held accordingly to consider such applications;
- .2 the report of the Correspondence Group on Review of the BWM Convention, with a view to approval of the BWM Convention Review Plan (CRP); and
- .3 any other matters relating to ballast water management submitted to that session, including the relevant outcome of PPR 10.

26 PPR 10 (tentatively scheduled from 24 to 28 April 2023) is expected, inter alia, to consider the following matters related to the BWM Convention:

- .1 the report of the Correspondence Group on Development of a Protocol for Verification of Ballast Water Compliance Monitoring Devices, with a view to approval of such a protocol; and
- .2 any proposals for unified interpretations to provisions of the BWM Convention.

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 92 representing 96.11% of the world tonnage (status as of 29 July 2022).

28 Initially, Annex 1 to the AFS Convention prohibited the use of organotin compounds acting as biocides in anti-fouling coatings used on ships, and had not been amended until recently. However, the Convention has a mechanism for introducing controls on 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 had been approved by MEPC 71 and considered in the PPR Sub-Committee since PPR 5. Following extensive discussions and compromise, PPR 7 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, which were subsequently approved by MEPC 75 and adopted by MEPC 76, and will enter into force on 1 January 2023.

29 Consequentially, there was a need for the revision of relevant guidelines, namely on the survey and certification, inspection, and sampling of AFS. This was done at PPR 9, which approved revised guidelines that were subsequently adopted by MEPC 78 as follows:

- .1 resolution MEPC.356(78) on 2022 *Guidelines for brief sampling of anti-fouling systems on ships*;
- .2 resolution MEPC.357(78) on 2022 *Guidelines for inspection of anti-fouling systems on ships*; and
- .3 resolution MEPC.358(78) on 2022 *Guidelines for survey and certification of anti-fouling systems on ships*.

30 In this connection, MEPC 78 also instructed the III Sub-Committee to review the 2022 *Guidelines for inspection of anti-fouling systems on ships* (resolution MEPC.357(78)), with a view to it being added as a new appendix to a future version of the Procedures for port State control, similarly to what was outlined in the previous section regarding the BWM PSC Guidelines above. In this regard, III 8 also referred this matter to the Correspondence Group on Measures to Harmonize Port State Control (PSC) Activities and Procedures Worldwide, which will review the Guidelines and, similarly to BWM, the outcome is also expected to be agreed by III 9 (July 2023) with a view to incorporation in the revised PSC Procedures to be adopted by A 33 (December 2023).

31 In addition, in light of the introduction of controls on cybutryne, MEPC 75 had requested the governing bodies of the London Convention and Protocol to consider a revision of the guidance on best management practices for removal of AFS from ships, and the PPR Sub-Committee to consider an update to the list of items in the Inventory of Hazardous Materials under the Hong Kong Convention to include cybutryne when the respective controls enter into force.

32 With regard to the guidance on best management practices for removal of AFS from ships, LC/SG 45 established a Correspondence Group, under the lead of the First Vice-Chair, to prepare draft revisions to the *Revised guidance on best management practices for removal of anti-fouling coatings from ships, including TBT hull paints* (LC-LP.1/Circ.31/Rev.1), which is expected to be approved by the next joint session of the Scientific Groups in 2023. It is noted that this guidance is also issued as an AFS circular (currently AFS.3/Circ.3/Rev.1).

33 As for the Inventory of Hazardous Materials under the Hong Kong Convention, PPR 9 agreed that there is no need for an update to the list of materials therein to include cybutryne when the respective controls enter into force, as the existing relevant text in appendix I of the Hong Kong Convention is generic enough. On the other hand, PPR 9 noted that there might be a need to consider amending the 2015 Guidelines for the development of the Inventory of Hazardous Materials (resolution MEPC.269(68)), which contains more specific guidance currently limited to organotin compounds.

34 Finally, MEPC 76 had received a submission (MEPC 76/13/1 by the World Coatings Council), expressing concerns over the type approval schemes for anti-fouling paint products by recognized organizations which are causing confusion and unnecessary

administrative and financial burden on the maritime industry, and proposing that flag State Administrations' International Anti-fouling System Certificates for ships flying their flag should be issued without any additional procedures for anti-fouling paints that are not required under the AFS Convention. Consideration of this document had been deferred owing to time constraints, and MEPC 78 instructed the III Sub-Committee to consider the information and proposals in this document and advise the Committee accordingly. In this regard, III 8 confirmed that under the AFS Convention there is no such requirement for type approval as pre-qualification for anti-fouling paint products for issuance of International Anti-fouling System Certificates, but recognized that it should be at the discretion of the Administration to decide if more than what is required under the provisions of the Convention is needed; this view will be considered by MEPC 79.

Review of the 2011 Biofouling Guidelines

35 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, in order 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.

36 There is a mechanism for the Biofouling Guidelines to be improved and, 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, based on the principles of the aforementioned guidance. Following extensive discussions, PPR 7 had agreed to a set of identified key elements of the Biofouling Guidelines that required further attention and discussion, and the corresponding areas for potential revision of the Guidelines, and had established the Correspondence Group on Review of the Biofouling Guidelines, under the coordination of Norway, which had been re-established by PPR 8.

37 Through this ongoing work, it had been agreed that the Biofouling Guidelines would be revised and the Correspondence Group has therefore been working on preparing a revised draft. Following consideration of the Correspondence Group's report, along with several other submitted documents, PPR 9 re-established the Correspondence Group on Review of the Biofouling Guidelines, instructing it to finalize the draft revised Biofouling Guidelines with a view to approval by PPR 10. If the PPR Sub-Committee concludes this work and agrees to revised Biofouling Guidelines at PPR 10, this will be forwarded to MEPC 80 for adoption as a new MEPC resolution.

38 To support the implementation of the Biofouling Guidelines, particularly in developing countries, IMO is implementing the 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, having started in September 2018 initially for a period of five years and extended by a further 18 months until May 2025. 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 revision of the Guidelines, which aims to enhance the uptake and effectiveness of the Guidelines. In addition, through this project IMO engages directly in the work of WG 44 on Biofouling Management.

39 Moreover, IMO is also launching a major project titled "TEST (Transfer of Environmentally Sound Technologies) Biofouling Project" (TEST Biofouling), which is funded by the Norwegian Agency for Development Cooperation (Norad). This project will run for four years (2022-2025) and will complement the GloFouling Partnerships project by providing pilot projects in developing countries in order to demonstrate technical solutions for biofouling management. This will focus on demonstrating technical solutions in the GloFouling partner countries including some of the latest advances in technological solutions for managing biofouling, such as remote operated vehicles for in-water cleaning and underwater cameras for monitoring anti-fouling coating status. Additionally, the project will provide capacity-building courses in developing countries.

Reduction of GHG emissions from ships

40 MEPC 70 approved a Roadmap for developing a Comprehensive IMO strategy on reduction of GHG emissions from ships, which foresaw an initial GHG reduction strategy to be adopted in 2018.

41 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).

42 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.

43 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 to reduce the total annual GHG emissions by at least 50% 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".

Initiation of Revision of the Initial IMO Strategy

44 MEPC 77 agreed to initiate the revision of the Initial Strategy, recognizing the need to strengthen the ambition during the revision process. The move came in the wake of the United Nations Climate Change Conference (COP 26), held in Glasgow, United Kingdom, (1-12 November) and in view of the urgency for all sectors to accelerate their efforts to reduce GHG emissions. MEPC 77 agreed that a final draft Revised IMO GHG Strategy would be considered by MEPC 80 (scheduled to meet July 2023), with a view to adoption.

45 MEPC 78 (6-10 June 2022) had for its consideration a number of documents submitted by Member States and observer organizations providing concrete proposals and comments related to the revision of the Initial IMO GHG Strategy, including, inter alia, the level of ambition for 2050, intermediate GHG reduction targets, and how to ensure a "just and equitable" transition that addresses the interests of developing States, in particular SIDS and LDCs, often also the most climate vulnerable States.

46 Having made further progress with the discussions towards the revision of the Initial GHG Strategy, MEPC 78 reiterated its commitment to adopt a revised and strengthened IMO GHG Strategy by MEPC 80 (July 2023). Thereto, the Committee invited further submissions containing concrete proposals, including possible text proposals, as appropriate, addressing all relevant sections of the Initial Strategy, taking into account the discussions during MEPC 78.

47 Further work will continue in an intersessional GHG working group (ISWG-GHG 13) before the next session of the Committee (MEPC 79, 12-16 December 2022) and further sessions of the working group, including two meetings of intersessional GHG working group are planned prior to MEPC 80 so that the revised strategy can be adopted at MEPC 80 as planned.

Mandatory measures to cut shipping carbon intensity

48 At MEPC 76 (June 2021) IMO adopted amendments to IMO's MARPOL Annex VI on reducing the carbon intensity of the global fleet. This 'short-term GHG reduction measure', composed of mandatory technical and operational requirements, will enter into force in November 2022 and is designed to ensure reducing the carbon intensity of international shipping in 2030 by at least 40%, compared to 2008 levels in accordance with the level of ambition identified in the in 2018 adopted Initial Strategy on the reduction of GHG from ships.

49 MEPC 78 finalized a set of 12 guidelines supporting the consistent implementation of various elements of the short-term measure (Energy Efficiency Existing Ship Index (EEXI), enhanced Ship Energy Efficiency Plan (SEEMP), Carbon Intensity Indicator (CII) rating). The guidelines include those relating to method of calculation of the EEXI, the revised SEEMP and possible correction factors for CII.

50 MEPC 78 also agreed (for adoption by MEPC 79) to draft amendments to MARPOL Annex VI to require additional reporting by flag States to the IMO Ship Fuel Oil Consumption Database (DCS) on the ship's carbon intensity performance values (EEXI and CII).

51 The Committee further agreed to include a new workstream on further revision of the IMO DCS in the agenda of ISWG-GHG 13, which will largely focus on possible reporting of cargo related information to more accurately reflect the carbon intensity of a ship.

52 Meanwhile, the intersessional working group (ISWG-GHG 13) is also instructed to complete the lessons-learned exercise of the comprehensive impact assessment of the short-term measure and in particular finalize the review of the Procedure for assessing impacts on States of candidate measures (MEPC.1/Circ.885), to be approved by MEPC 79.

Consideration of concrete proposals for mid-term measures

53 MEPC 76 had an initial consideration of proposals for mid- and long-term GHG reduction measures for international shipping including different proposals for technical measures as well as economic measures, such as market-based-measures (MBMS). In order to conduct discussions on these complex matters in a structured manner, the Committee approved a Work plan which consists of three phases which will entail a number of assessments, prioritization and decision steps, with a view to enable international shipping to further reduce its GHG emissions.

54 In accordance with Phase I of the Work plan, ISWG-GHG 12 considered in detail the various proposals for mid-term measures and welcomed the proposals, their initial impact assessments, and other relevant documents (22 submissions to ISWG-GHG as well as submissions referred from the MEPC). ISWG-GHG 12 recognized that all these proposals contained valuable elements.

55 Following the initial consideration by ISWG-GHG 12, MEPC 78 supported, in general, the further development under Phase II of the Work plan of a "basket of candidate mid-term GHG reduction measures", integrating both various technical and carbon pricing elements while recognizing the necessary flexibility.

56 In accordance with Phase II of the Work plan, the Committee agreed to continue its work by means of assessing the various proposed measures, in particular, their (1) feasibility, (2) effectiveness to deliver the long-term levels of ambition and (3) potential impacts on States, with a view to further developing the "basket of candidate mid-term measures".

57 MEPC 78 also noted the need for additional information on the proposed mid-term measures. It encouraged proponents of measures to work together intersessionally with a view to exploring how different elements of these proposals could be combined in the context of the 'basket of candidate mid-term measures'. Member States and international organizations were invited to submit new documents to a future session of ISWG-GHG, including refined proposals to that purpose.

58 The intersessional working group (ISWG-GHG 13) will further consider the proposed measures.

Lifecycle GHG assessment guidelines

59 Lifecycle GHG/carbon intensity assessment (LCA) of marine fuels is a key element supporting the uptake of alternative marine fuels for international shipping by adequately calculating the overall GHG/carbon footprint of those fuels.

60 MEPC 78 noted the discussion at ISWG-GHG 11 on the progress made and established a correspondence group to further develop draft guidelines on lifecycle GHG intensity of marine fuels (LCA Guidelines). The Correspondence Group will work on various issues such as main initial fuel production pathways, sustainability criteria issues, Well-to-Tank, Tank-to-Wake and entire Well-to-Wake emission calculation methodologies, third-party verification, etc.

61 The Global Industry Alliance to Support Low Carbon Shipping (Low Carbon GIA), a partnership under the IMO-Norway GreenVoyage2050 Project, has released a report on sustainability criteria and life cycle GHG emission assessment methods and standards for alternative marine fuels, which was considered by ISWG-GHG 11.

GHG TC Trust Fund

62 New pledges were made by Governments to support the work of the IMO in supporting the implementation of the Initial GHG Strategy in developing countries, in particular SIDS and LDCs, through technical cooperation and capacity building through the IMO GHG TC Trust Fund. These pledges will enhance IMO's work on energy efficiency technology cooperation and demonstration ensuring nobody is left behind in implementing the Initial Strategy.

63 The GHG TC-Trust Fund has funded, inter alia, the Fourth IMO GHG Study 2020, the comprehensive impact assessment of the short-term measure and a new study on maritime transport costs in the Pacific Islands region

Marine litter and microplastics

Strategy to address marine plastic litter from ships

64 MEPC 77 adopted resolution MEPC.341(77) on Strategy to address marine plastic litter from ships to guide the implementation of the Action Plan to Address Marine Plastic

Litter from Ships (resolution MEPC.310(73)) through the establishment of a timeline and identification of appropriate modalities for achieving the expected outcomes of the Action Plan.

65 In this regard, MEPC 77 noted the updated status of each action contained in the Action Plan in the form of an annotated table set out in annex 2 to document MEPC 77/WP.9 and encouraged submissions to future

sessions regarding those actions which required proposals to progress the work.

IMO Study on Marine Plastic Litter

66 MEPC 77 requested the Secretariat to engage a consultant, using financial contributions received to date, to review the terms of reference for the IMO Study on Marine Plastic Litter, taking into consideration the outcomes of the GESAMP WG 43 report, and to advise MEPC 78 on how the Study could progress, such that MEPC 78 could make adjustments to the terms of reference as required. MEPC also encouraged Member States and international organizations to make financial contributions to support the initiation of the IMO Study on Marine Plastic Litter.

67 Subsequently, after noting an update by the Secretariat on efforts to engage a consultant to review the terms of reference for the IMO Study on Marine Plastic Litter, MEPC 78 noted that the report on the review of the terms of reference for the IMO Study on Marine Plastic Litter from Ships would be submitted to MEPC 79.

Garbage Record Book – draft amendments to MARPOL Annex V

68 MEPC 78 approved draft amendments to MARPOL Annex V to make the Garbage Record Book mandatory also for ships of 100 gross tonnage and above and less than 400 gross tonnage, as prepared by PPR 9, and requested the Secretary-General to circulate them in accordance with MARPOL Article 16(2), with a view to adoption at MEPC 79.

Marking of fishing gear

69 In relation to proposals concerning the marking of fishing gear, MEPC 78 recalled that it had instructed PPR 9 to consider the potential regulatory (mandatory and recommendatory) options for promoting marking of fishing gear, taking into account the work of FAO, with a view to the Sub-Committee advising MEPC on how to proceed in relation to relevant proposals and comments that has been submitted.

70 In this connection, MEPC 78 noted the agreement reached at PPR 9 that an MEPC circular could be developed by the Sub-Committee as a short-term measure to promote the implementation of fishing gear marking systems and the FAO Voluntary Guidelines for the Marking of Fishing Gear, taking into account additional work by FAO, such as the technical manual on marking of fishing gear being developed by FAO.

71 MEPC 78 also noted that divergent views on the potential regulatory options with regard to marking of fishing gear and on the feasibility of making marking of fishing gear mandatory had been expressed at PPR 9.

72 Furthermore, MEPC 78 noted the need for clarity on high-level policy for the Sub-Committee to progress its future work in this regard in an effective manner and that it had been invited by PPR 9 to provide further advice to the Sub-

Committee on possible regulatory options for addressing marking of fishing gear, taking into account:

- .1 the proposed mandatory goal-based approach to be developed under the framework of MARPOL Annex V, as proposed in document MEPC 75/8/4 (Vanuatu) and further elaborated in document PPR 9/15 (Cook Islands et al.);
- .2 the alternative voluntary approach as described in document MEPC 77/8/2 (Japan and United Kingdom), focusing on enhanced cooperation with FAO and regional fisheries management organizations (RFMOs);
- .3 the legal advice provided by the Secretariat on available options (PPR 9/15/6); and
- .4 relevant information provided by FAO, including the statement by FAO annexed to the report of PPR 9 and the report of MEPC 77.

73 Having considered the views expressed on this matter, MEPC 78:

- .1 agreed with the approach proposed in document MEPC 75/8/4, namely that a goal-based requirement under MARPOL Annex V for the mandatory marking of fishing gear should be developed;
- .2 instructed the PPR Sub-Committee to develop draft amendments to MARPOL Annex V and associated guidelines accordingly; and
- .3 invited Member States to submit information on the implementation of fishing gear marking systems, including how the diversity of fisheries and fishing gear had been accommodated, specific technical or legal considerations that had been taken into account, and other relevant experience regarding fishing gear marking to help inform the process of developing a mandatory goal-based requirement.

74 Recognizing the importance of also taking action in the near-term with regard to abandoned, lost or otherwise discarded fishing gear, MEPC 78 also instructed the PPR Sub-Committee to develop an MEPC circular to promote the implementation of fishing gear marking systems and the FAO Voluntary Guidelines for the Marking of Fishing Gear, taking into account additional work by FAO, such as the technical manual on marking of fishing gear being developed by FAO.

Reporting of lost or discharged fishing gear

75 Work on the development of draft amendments to MARPOL Annex V to provide for the reporting mechanisms, their modalities and the information to be reported to Administrations and IMO to facilitate and enhance reporting of the loss or discharge of fishing gear is continuing in a correspondence group established by PPR 9.

Reducing the environmental risk of plastic pellets transported by ships

76 With regard to the reduction of the environmental risk of plastic pellets transported by ships, MEPC 77 considered the following documents:

- .1 MEPC 77/8/1 (FOEI et al.), highlighting the need for further investigation into the prevalence and impact of microplastics from paints and anti-fouling coatings used on ships, as marine plastic pollution remains a grave threat to all marine environments, and urging the Committee to prioritize within the Action Plan to Address Marine Plastic Litter from Ships (resolution MEPC.310(73)) the need for further investigation and for action;
- .2 MEPC 77/8/3 (Sri Lanka), discussing the impacts of the MV X-Press Pearl spill of 11,000 tonnes of plastic pellets off the shore of Colombo, Sri Lanka in May 2021, whose ensuing pollution has caused an overwhelming economic, social and environmental impact, and a legacy of pollution that will continue to have profound and enduring impacts for generations to come, and highlighting the hazardous nature of plastic pellets and the need to establish, inter alia, international guidelines and requirements for loading, unloading, packaging, and emergency response protocols, with clear labelling of containers carrying pellets, and improved stowage instructions; and
- .3 MEPC 77/8/4 (FOEI et al.), commenting on documents submitted to MEPC 75, MEPC 76 and MEPC 77 concerning marine plastic litter, requesting an update on progress against all measures contained in resolution MEPC.310(73), adequate time for discussion and identification of next steps, and an update on engagement with the UNEP-led work related to global governance on plastic pollution and a potential negotiating mandate for a new global agreement on plastic pollution.

77 Having noted the information in documents MEPC 77/8/1 and MEPC 77/8/4, MEPC 77 referred document MEPC 77/8/3 to PPR 9 and instructed the Sub-Committee to further consider the proposals, including requesting the input of the CCC Sub-Committee as appropriate, with a view to advising the Committee on how best to proceed.

78 Subsequently, MEPC 78 noted that:

- .1 interested Member States and international organizations had been invited by PPR 9 to submit documents with draft guidelines on best practices related to response to and the clean-up of plastic pellet spills to a future session of the PPR Sub-Committee; and
- .2 document MEPC 77/8/3, together with other relevant documents submitted to

PPR 9, would be further considered by a correspondence group and all possible options on how to reduce the environmental risk of plastic pellets transported by ships would be reviewed by PPR 10.

Fishing vessel personnel training on marine environmental awareness

79 MEPC 78 noted that provisions to ensure that all fishing vessel personnel receive appropriate training on marine environmental awareness, focused on marine plastic litter and abandoned, lost or otherwise discarded fishing gear, had been included by HTW 8 in the draft new STCW-F Code, as instructed by MEPC 74.

Ship recycling

80 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, 17 States, i.e. Belgium, Republic of the Congo, Croatia, Denmark, Estonia, France, Germany, Ghana, India, Japan, Malta, the Netherlands, Norway, Panama, Serbia, Spain and Türkiye, have ratified or acceded to the Convention, whose combined merchant fleets constitute 29.77% of the gross tonnage of the world's merchant fleet, and whose combined ship recycling volumes constitute 14 million gross tonnage (about 2.44% of the gross tonnage of 40 percent of the world's merchant fleet)².

Safety and pollution hazards of chemicals carried by ships in bulk

81 With regard to the categorization of liquid substances, MEPC 78:

- .1 concurred with the evaluation of products and their respective inclusion in lists 1, 2, 3 and 5 of MEPC.2/Circ.27 (issued on 1 December 2021), with validity for all countries and with no expiry date, where appropriate;
- .2 noted that advice on how to assess mixtures against the criteria for the discharge requirement in regulation 13.7.1.4 of MARPOL Annex II had been provided by GESAMP/EHS 58 (as set out in paragraph 5.4 of the report of GESAMP/EHS 58 that had been disseminated as PPR.1/Circ.11) and would be taken into consider-

² The Hong Kong Convention will enter into force 24 months after the date on which 15 States have ratified or acceded to it, representing 40 per cent of world merchant shipping by gross tonnage. Furthermore, the combined maximum annual ship recycling volume of those States must, during the preceding 10 years, constitute not less than 3 per cent of their combined merchant shipping tonnage. The third condition means about 17.7 million GT of ship recycling volume.

ation by the PPR Sub-Committee and the ESPH Technical Group, on a case-by-case basis, when assessing mixtures to which special requirement 16.2.7 of the IBC Code might be applicable;

- .3 concurred with the evaluation of cleaning additives and their inclusion in annex 10 to MEPC.2/Circ.27;
- .4 noted that prior to MEPC.2/Circ.27 being issued, a review had been undertaken by ESPH 27 and amendments had been made, including the deletion of products that had reached their expiry dates, or were no longer shipped, or had been re-evaluated and met the criteria for complex mixtures in paragraph 9.2 of the Guidelines for the provisional assessment of liquid substances transported in bulk (MEPC.1/Circ.512/Rev.1); and
- .5 urged reporting countries that had products listed in list 2 or list 3 of the MEPC.2 circular on Provisional categorization of liquid substances in accordance with MARPOL Annex II and the IBC Code to contact the respective manufacturers and request them to review their products for the purpose of assessing whether any changes in the carriage requirements were necessary, taking into account the revised chapter 21 of the IBC Code, the latest GESAMP Hazard Profiles for the components, MEPC.1/Circ.512/Rev.1 and PPR.1/Circ.10.

Draft amendments to MARPOL and associated guidelines to allow States with ports in the Arctic region to enter into regional arrangements for port reception facilities

82 MEPC 78 approved draft amendments to MARPOL Annexes I, II, IV, V and VI, concerning regional reception facilities in the Arctic and requested the Secretary-General to circulate them in accordance with MARPOL Article 16(2), with a view to adoption at MEPC 79.

83 In this connection, MEPC 78 approved, in principle, associated draft amendments to the 2012 Guidelines for the development of a regional reception facility plan (resolution MEPC.221(63)) along with the associated draft MEPC resolution and requested the Secretariat to submit the draft amendments together with the associated draft MEPC resolution to MEPC 79, with a view to adoption in conjunction with the adoption of the relevant amendments to MARPOL Annexes I, II, IV, V and VI.

London Convention and Protocol (LC/LP)

84 Since its 48th session, the following developments may be of interest to GESAMP. The LC/LP Scientific Groups met for their joint annual session (LC/SG 45) from 28 March to 1 April 2022, the session was held remotely by virtual means.

Sewage sludge

85 The Scientific Groups were informed that, following the agreement at the LC/LP governing bodies meeting in 2021 to proceed towards an amendment of the London Protocol annex 1 to remove sewage sludge from the list of permissible wastes, a proposal for the amendment had now been formally submitted by the Republic of Korea and Mexico, in line with the six-month rule for amendment proposals. The governing bodies will therefore be invited to consider the amendment proposal with a view to its adoption at their next meeting in October 2022.

Disposal of fibreglass vessels

86 The Scientific Groups were informed that the Secretariat (IMO) is working with UNEP and a consultant to develop guidance on the end-of-life management of fibre-reinforced plastic (FRP) vessels and alternatives to at-sea disposal. A first draft of the guidance, along the lines of the joint guidelines for the placement of artificial reefs published in 2009, will be presented to the next joint session of the Scientific Groups in 2023 for review.

Best management practices for removal of anti-fouling coatings from ships

87 The Scientific Groups initiated a review of the *Revised guidance on best management practices for removal of anti-fouling coatings from ships, including TBT hull paints*, in response to a request by MEPC. In 2021, MEPC 76 adopted the amendments to the Anti-fouling Systems (AFS) Convention by way of resolution MEPC.331(76) to introduce controls on cybutryne, which will enter into force on 1 July 2023. The Groups established a Correspondence Group to prepare draft revisions to the Revised guidance for consideration at the next joint session in 2023.

Marine geoengineering

88 The Scientific Groups were informed about progress made by the GESAMP Working Group 41 on Ocean Interventions for Climate Change Mitigation and noted a list of seven highest priority techniques that WG 41 suggested should be considered for listing in the new annex 4 of the Protocol. Following extensive discussion and acknowledging the importance of the work, given the increased emphasis on mitigation techniques, the Groups re-established the Correspondence Group on Marine Geoengineering to provide recommendations on the possible inclusion of marine geoengineering activities in the new annex 4, focusing on the priority techniques identified by WG 41.

CO₂ sequestration in sub-seabed geological formations

89 The Groups were informed that since the last joint session the IMO Secretariat had seen a clear, increasing interest in the issue of CO₂ sequestration from a number of countries and regions and from industry, in particular relating to the 2009 amendment, the 2019 agreement on provisional application, and the content and nature of future agreements for trans-boundary transport of CO₂. The Groups agreed that it was important to strengthen the sharing of relevant and up-to-date information on all scientific, technical as well as legal aspects of CO₂ sequestration projects.

Marine litter and microplastics

90 The Scientific Groups reviewed the report of GESAMP WG 43 on Sea-based sources of marine litter and, after some consideration, invited WG 43 to take into account the following proposed scope of work, in its second phase:

- .1 conduct a literature review of the best methodologies and technologies to measure and reduce the presence, type, origin and quantity of marine litter and microplastics in LC/LP waste streams;
- .2 identify and if applicable assess the feasibility of suitable methodologies and technologies, including source control options, to reduce marine litter and microplastics content in LC/LP waste streams;
- .3 identify and quantify waste dumped containing marine litter including microplastics, focusing in particular on inputs from non-LC/LP Parties;
- .4 provide additional information on the amount and type of microplastics from anti-fouling paint and hull coatings including their respective type and place of application or removal; and
- .5 provide additional information on the scraping of leisure boats and abandonment of FRP vessels including their respective type, number and spatial and temporal distribution.

91 The Groups also considered an update on progress made by the Correspondence Group on marine litter and microplastics and re-established the Correspondence Group, under the co-lead of Germany and Nigeria, to review the inventory of the work carried out by the LC/LP bodies on the issue, identify relevant aspects of the LC/LP regulatory framework in relation to marine litter and microplastics and develop an overview of possible source control options to reduce the presence of marine litter in LC/LP waste streams.

Science Day 2022

92 As part of the joint session, Science Day 2022 was held as a virtual symposium on the topic of “Alternative uses of waste”. The Science Day programme included

high level presentations from a range of speakers from academia, scientific and government agencies, who shared experiences gained, lessons learned, research activities in relation to the alternative uses of wastes as they related to the beneficial uses of dredged materials, habitat modification and enhancement, and experience on reuse of waste materials in view of a circular economy. Further information on the event and the presentations are available on the LC/LP website at: <https://www.imo.org/en/OurWork/Environment/Pages/ScienceDay-default.aspx#:~:text=Science%20Day%20under%20the%20Scientific,in%20a%20more%20informal%20setting>.

Next joint session of the Scientific Groups

93 The next meeting of the governing bodies of the LC/LP will be held in person at IMO Headquarters from 3 to 7 October 2022. The next joint session of the LC/LP Scientific Groups is tentatively scheduled for March 2023, also at IMO Headquarters.

UN DOALOS

40th anniversary of the adoption and opening for signature of UNCLOS

94 This year is marked by celebratory events to commemorate the 40th anniversary of the adoption and opening for signature of the United Nations Convention on the Law of the Sea. These celebrations will culminate with two days of General Assembly plenary meetings on 8 and 9 December 2022.

95 To mark the occasion, UN-Oceans, the inter-agency mechanism on ocean and coastal issues, made a new Voluntary Commitment in the context of the 2022 UN Ocean Conference entailing the issuance of a publication entitled “The United Nations Convention on the Law of the Sea at 40: Successes and Future Prospects”. The publication is expected to reflect on the Convention’s successful contribution to the promotion of the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment. It will highlight the importance of the Convention and related instruments for the sustainable use of the ocean and its resources, both living and non-living, and ocean-related actions by States under the three pillars of sustainable development – economic, environmental, and social – and outline how the Convention’s provisions, and their effective implementation, have assisted States in realizing their goals, including by facilitating the development of national ocean-related policies. It will also illustrate how the legal framework of the Convention has contributed to the development of other international instruments, including rules, standards and recommended practices and procedures, in ocean-related fields that are under the purview of organizations which are members of UN-Oceans.

Informal Consultative Process

96 The twenty-second meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea was held from 6 to 10 June 2022 and focused on “Ocean observing”. The meeting highlighted the importance of the data generated through ocean observing tools worldwide in providing a scientific basis for understanding the ocean and making informed decisions relating to its use. This data is essential in supporting the sustainable development of the ocean and its resources, including understanding and responding to climate change, protecting and preserving the marine environment and supporting various sectors of the blue economy. The panelist presentations at the meeting focused on technical issues related to ocean observations and not legal issues. The material pertaining to the meeting, including the report of the Secretary-General on the topic of focus of the meeting (A/77/68) and links to the webcast and the panel presentations, is available at: https://www.un.org/depts/los/consultative_process/consultative_process.htm.

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

97 The Regular Process completed its second cycle (2016-2020). The main outputs of the second cycle included three process-specific technical abstracts of the *First Global Integrated Marine Assessment* (World Ocean Assessment I, WOA I) which were issued in June 2017, and, most importantly, the *Second World Ocean Assessment* (WOA II), which was launched on 21 April 2021. WOA II evaluated trends since the release of WOA I in 2015 and identified current gaps in knowledge and capacity-building, which will inform policies and actions worldwide for the future of the ocean.

98 The third cycle of the Regular Process (2021-2025) began in January 2021 and foresees new assessment(s) of the state of the marine environment, including socioeconomic aspects, strengthened support for and interaction with other ocean-related intergovernmental processes and a coherent programme on capacity-building to strengthen the ocean science-policy interface.

99 Since the start of the third cycle, four brief documents of WOA II are being developed, providing syntheses of relevant information from WOA II as it is relating to, respectively: (i) climate change; (ii) marine biodiversity; (iii) the United Nations Decade of Ocean Science for Sustainable Development and the United Nations Decade on Ecosystem Restoration; and (iv) Sustainable Development Goal 14. Regional workshops to support the implementation of the third cycle of the Regular Process (workshop on the scoping of the next assessment) and on capacity-building for strengthening the ocean science-policy interface will be held during the third cycle, with the first one of such workshops held in Dar es Salaam, Tanzania, from 19 to 27 July 2022.

Intergovernmental Conference on an international legally binding instrument

100 Concerning the Intergovernmental Conference on an international legally binding instrument under the Convention on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, convened pursuant to resolution 72/249 (the “Intergovernmental Conference”), the fourth session, which was postponed from 2020 due to the pandemic, took place from 7 to 18 March 2022. The Conference continued to focus on the elements of the package set out in resolution 72/249, i.e. 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. The Conference also continued to consider a number of cross-cutting issues such as institutional arrangements. The discussions focused on the revised draft text of an agreement prepared by the President of the Intergovernmental Conference with the assistance of DOALOS.

101 Since the fourth session was the last one initially called for by the General Assembly in resolution 72/249, the Intergovernmental Conference considered that an additional session was required as soon as possible and requested the President to prepare a further revised draft text of an agreement, with a view to facilitating the prompt finalization of the work of the Conference. Following a decision of the General Assembly, the fifth session of the Intergovernmental Conference will take place from 15 to 26 August 2022. All the documentation for the Conference is available at <https://www.un.org/bbnj/>.

Sustainable fisheries

102 The fifteenth round of Informal Consultations of States Parties to the *United Nations 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* was held from 17 to 19 May 2022 and focused on the topic “Implementation of an ecosystem approach to fisheries management”. All documentation for this meeting is available at: https://www.un.org/depts/los/convention_agreements/fish_stocks_agreement_states_parties.htm.

103 In November 2022, the General Assembly will undertake a further review of the actions taken by States and regional fisheries management organizations and arrangements to address the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks, focused on the implementation of relevant provisions of General Assembly resolutions. This review will be informed by a dedicated report of the Secretary-General, as well as the outcome of a two-day multi-stakeholder workshop scheduled from 2 to 3 August 2022. The reports of the Secretary-General on relevant actions taken by States and regional fisheries management organizations and arrangements (A/77/157 and A/77/155), as well as the material pertaining to this workshop, are available at: https://www.un.org/depts/los/bottom_fishing_workshop.htm.

World Oceans Day

104 Pursuant to General Assembly resolutions 63/111 and 76/72, the United Nations celebrated World Oceans Day 2022, with a focus on the theme 'Revitalization: Collective Action for the Ocean', at United Nations Headquarters and online on 8 June 2022. The event highlighted the need to work together to create a new balance with the ocean that no longer depletes its bounty but instead restores its vibrancy and brings it new life. The programming featured over 30 global thought-leaders, celebrities, community voices, private sector and cross-industry experts, and ocean managers who shed light on the ideas, solutions, and communities that are working together to help revitalize the ocean and everything it sustains. Information on World Oceans Day, including a video of the event, can be found at www.unworldoceansday.org

World Meteorological Organization (WMO)

105 The World Meteorological Organization (WMO) is the authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the land and ocean, the weather and climate it produces and the resulting distribution of water resources. WMO contributes to ocean-related issues through the observation and monitoring of the ocean and climate; research on the climate and connected Earth systems; development and delivery of services for disaster risk reduction (DRR), including marine hazards; capacity development and training; and the provision of science-based information and tools for policymakers and the general public at regional and global levels.

106 Sustained oceanographic and marine meteorological observations and their free and unrestricted exchange are critical to addressing meteorological hazards, strengthen resilience in the face of climate change and variability, and build the scientific knowledge base for sustainable development. The WMO's Congress adopted in October 2021 a unified policy³ on the international exchange of Earth system data to help its Members meet the explosive growth in demand for weather, climate and water services as the world grapples with the dual challenges of climate change and the increasing frequency of extreme weather events.

107 WMO continues strengthening the global observing systems through implementation of the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) and observing networks with partners. Effort has been dedicated to registering ocean metadata from all observing networks in OSCAR (Observing Systems Capability Analysis and Review tool).

108 WMO reinforced its support to OceanOPS (WMO-IOC Joint Centre for Oceanography and Marine Meteorology in situ Observations Programmes Support) under the guidance of the Observations Coordination Group – under the framework of GOOS (the Global Ocean Observing System) by hiring the OceanOPS manager and three other staffs who were until now on short term contracts.

109 OceanOPS annually coordinates and publishes the Ocean Observing System Report Card (www.ocean-ops.org/reportcard). The Report Card 2021

(published July 2021) was the fifth edition of this communication effort providing a deep insight on the state, capacity and societal value of the ocean observations. 2021 release focused on oxygen observations, advances in emerging networks such as the animal borne ocean sensors network, and the impact of the COVID pandemic on the observing system. 2022's edition will be released early September 2022, and will focus on ocean carbon, coastal inundations, and phytoplankton observations.

110 OceanOPS recalls several challenges that GOOS has to resolve including: a strong North-South imbalance, a difficulty to achieve a multidisciplinary turn (5% of marine platform carry a biogeochemical sensor) and a difficulty for implementation in the areas under national jurisdiction. OceanOPS strongly advocates for practical and multilateral solutions to facilitate the routine deployments of ~1000 observing platforms per year in Member's Exclusive Economic Zones

111 The Argo program is a masterpiece of the global ocean observing infrastructure with 4000 profiling floats delivering key data for climate analysis and short to long range weather forecasts. It appears to be very difficult to upgrade the array with biogeochemical sensors, float with deeper capacity and enhance the coverage in some regions. These expansions are not firmly funded by Members and are done very slowly through flat budgets impacting the core mission. A sustainable, solid funding of monitoring activities is needed.

112 OceanOPS is leading the UN decade project "Odyssey" aiming to unlock the potential of civil society and private sector in providing marine observations (shipping, sailing, fishing, tourism, etc). Project was launched aside of the One Ocean summit in Brest, France in February 2022. WMO has engaged discussions with major shipping companies for sustained contributions to the GOOS.

113 The WMO-IOC Data Buoy Coordination Panel (DBCP) continues to lead efforts to reduce data buoy vandalism, including an annual reporting of vandalism events on data buoys to track progress toward implementation of the vandalism preventative measures. WMO continues to encourage Members to actively engage, support and collaborate in the efforts of the DBCP to collect existing education and outreach materials related to national or regional mitigation of data buoy vandalism efforts.

114 A significant body of ocean research is spearheaded and coordinated by the World Climate Research Programme, which is co-sponsored by WMO. WCRP has established two new Core Projects: Earth System Modelling and Observations (ESMO) and Regional Information for Society (RIfS). These two projects ensure that modelling and observational efforts are well integrated across WCRP and that the climate information from all WCRP activities is accessible, useful and useable by society at large. The WCRP community also established five new Lighthouse Activities, which will tackle critical issues over the next decade. The ocean will focus in several of these, looking at topics that include local to regional climate risk, sea level rise, and education and training.

115 One of the main WCRP activities is the coordination and setup of the Coupled Model Intercomparison Project (CMIP) to better understand past, present and

³ https://library.wmo.int/doc_num.php?explnum_id=11256

future climate changes arising from natural, unforced variability or in response to changes in radiative forcing in a multi-model context. CMIP has now a dedicated International Project Office (IPO), hosted by the European Space Agency in the UK. The CMIP IPO, under the guidance of the WCRP Working Group on Coupled Modelling (WGCM), the CMIP Panel and the WGCM Infrastructure Panel (WIP) recently conducted a survey for the CMIP community in preparation for the next phase of the project, CMIP7.

116 CLIVAR (Climate and Ocean: Variability, Predictability and Change) is one of the six Core Projects of WCRP. It aims to understand the dynamics, interaction, and predictability of the climate system with an emphasis on ocean-atmosphere interactions. Its priorities include examining the ocean's role in the energy, heat, water and carbon budgets; the role of the ocean in transient climate sensitivity; physical and biogeochemical interactions in the open and coastal ocean; and changes to regional sea level under a changing climate.

117 WMO is committed to participating in the United Nations Decade of Ocean Science for Sustainable Development (Ocean Decade). WCRP is involved in several Ocean Decade activities, mainly through the CLIVAR Core Project. These include the Digital Twins of the Ocean (DITTO) and the CLIVAR Southern Ocean Regional Panel. In addition to these, a few of upcoming CLIVAR workshops such as the 'CLIVAR-GOOS Workshop: From global to coastal: Cultivating new solutions and partnerships for an enhanced Ocean Observing System in a decade of accelerating change' have been endorsed by the UN Ocean Decade.

118 A WCRP Grand Science Challenge on "Regional Sea Level Change and Coastal Impacts" focused on addressing the imperative need for an integrated interdisciplinary approach to establish a quantitative understanding of regional to local sea level variability, to foster the development of sea level predictions and projections that are of increasing benefit for coastal zone management. The Grand Challenge, which will finish its work at the end of 2022, organized a major sea level conference in Singapore in July 2022 with the main theme 'Advancing Science, Connecting Society'. For the first time, it brought together scientists and practitioners to share the latest climate-related sea-level research and focus on applying sea-level science for adaptation and stakeholder needs.

119 The WMO State of the Global Climate 2021⁴ was launched in May 2022 by the United Nations Secretary General and WMO Secretary General. This report showed that four key climate indicators broke new records in 2021 – sea level rise, ocean heat, ocean acidification and greenhouse gas concentrations. The report includes contributions from dozens of partners and informs decision-makers and UN climate change negotiations.

120 WMO released its 17th Greenhouse Gas Bulletin⁵ in October 2022 that demonstrated that globally-averaged surface mole fractions from the Global Atmosphere Watch (GAW) surface network for carbon

dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) reached new highs in 2020, with CO₂ at 413.2±0.2 ppm, CH₄ at 1889±2 ppb and N₂O at 333.2±0.1 ppb (149%, 262% and 123% of pre-industrial levels respectively). The Integrated Global Greenhouse Gas Information System⁶ (IG3IS) expands the observational capacity for GHGs, extending it to the regional and urban domains, and develops the information systems and modelling frameworks to provide information about GHG emissions to society.

121 WMO has been a long-time sponsor of GESAMP's Working Group on The Atmospheric Input of Chemicals to the Ocean (WG 38). WG 38 produced several peer-reviewed publications in 2021 and 2022 and published a GESAMP Reports and Studies document on the results from the WG 38 workshop on the changing acid/base character of the global atmosphere and ocean and the impact of these changes on certain air/sea chemical exchange processes and on the atmospheric transport of microplastics to and from the ocean. See the report from the co-chairman of Working Group 38 for details.

Intergovernmental Oceanographic Commission (IOC of UNESCO)

UN Decade of Ocean Science for Sustainable Development

122 The first 18 months of implementation of the Ocean Decade has represented a period of intense activity. After a successful launch in January 2021, in June 2021 the first results of the first Call for Decade Actions (No. 01/2020) that solicited close to 250 potential Decade were announced, with other announcements following throughout the period as submissions were analysed and endorsement decisions made. The second Call for Decade Actions No. 02/2021 was launched in October 2021 and closed on 31 January 2022. This Call solicited programmes contributing to Ocean Decade Challenges related to marine pollution, ecosystem management and restoration, and the ocean-climate nexus and solicited projects for 25 endorsed Programmes. In addition, funding streams from the AXA Research Fund and the MeerWissen Initiative were integrated into the Call for Decade Actions via a sponsored Call for Decade Actions mechanism. 38 Programme submissions and 134 project submissions from lead partners in 33 countries were received in response to this Call. Approximately 70 additional submissions were received in response to the sponsored elements of the Call. To date, over 240 Decade Actions have been endorsed through the first Call for Decade Actions. These Actions cover all ten Ocean Decade Challenges and are being implemented by lead partners from over 40 countries.

123 The third Call for Decade Actions No. 03/2022 was launched on 15 April 2022 and is soliciting programmes contributing to Ocean Decade Challenges related to sustainable blue food and sustainable ocean economy, as well as projects for 16 endorsed Decade programmes. This Call also solicits in-kind or financial contributions to support Decade Actions in Africa and

⁴ https://library.wmo.int/doc_num.php?explnum_id=11178

⁵ https://library.wmo.int/doc_num.php?explnum_id=10904

⁶ <https://ig3is.wmo.int/>

Pacific SIDS.

124 The newly formed Decade Advisory Board was convened in January 2022 for an initial briefing session and then met in-person for its first operational meeting in March 2022. At this meeting, the Board discussed recommendations related to the endorsement of Decade programmes from Call for Decade Actions No. 02/2021 and discussed a range of strategic issues related to measuring progress of the Decade, resource mobilisation, the role of indigenous and local knowledge in the Decade, and the means of increasing engagement of Small Island Developing States and Least Developed Countries.

125 28 National Decade Committees have been created and six regional taskforces are convening partners in the development and operationalisation of regional Action Plans and programmes. An African regional taskforce is being established to oversee implementation of the Ocean Decade Africa Roadmap. Five Decade Collaborative Centres have been endorsed as decentralized coordination hubs for the Decade.

126 Meetings of informal working groups on communications, technology and innovation, and monitoring and evaluation provided valuable input during this period. A Data Coordination Group was established in December 2021 to support development and operationalisation of the data, information and knowledge strategy for the Decade. The Ocean Decade Expert Roster has been established to create a pool of experts to assist the IOC Secretariat with the identification of strategic targets for Ocean Decade Challenges, in the review of Decade programme submissions, and in regular review processes of the Decade.

127 There were intensive stakeholder engagement and outreach efforts during this period. In-person or hybrid events focusing on different aspects of the Ocean Decade were held at the IUNC World Conservation Congress (Marseille, September 2021), UNFCCC COP 26 (Glasgow, November 2021), and Monaco Ocean Week (Monaco, March 2022). The Ocean Decade had a central role in the One Ocean Summit in Brest, February 2022 and the 2022 UN Ocean Conference (Lisbon, June 2022). The revamped Ocean Decade website was launched in October 2021 and incorporates the Global Stakeholder Forum, an online community platform for exchange and collaboration which has over 4000 registered users. The GenOcean communications campaign was launched on 4 April 2022 and is the public facing communications campaign of the Decade that aims to incite the general public to take action based on enhanced ocean knowledge.

128 Mobilisation of resources remains a key challenge for the Decade during the transition from the planning phase to the action phase. The Ocean Decade Alliance has grown during this period and now numbers nine Patrons and fifteen institutional members. There have been significant efforts to engage philanthropic Foundations during this period, and an in-person meeting of the Foundations Dialogue was held from 1 – 3 June 2022 in Rabat, Morocco hosted by the Foundation Mohamed VI for the Protection of the Environment.

Ocean acidification

129 IOC actively supports ocean acidification science and observation at multiple levels. It hosts one part of the GOA-ON secretariat and co-organizes the activities under the GOA-ON Ocean Decade programme OARS. IOC has consolidated its role as leader in the field of research and observations underpinning the science base of SDG Target 14.3 - Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels. IOC has developed the indicator methodology for SDG 14.3.1, through collaboration with GOA-ON experts. Currently the indicator is classified as Tier II, however through activities such as continuous training of experts and capacity development among the responsible governmental bodies, it is expected that the number of datasets collected will increase and the indicator be upgraded. Together with its partners and the IOC sub-commissions, IOC will pursue the advancement of global OA observations and research, particularly in the areas in which such efforts are sparse, be it because of a lack of awareness, capacities, or access to technical resources. The Commission continues to foster capacity development and technical training in Member States using the newly developed OTGA introduction to ocean acidification. Furthermore, IOC will continue developing a federated data system to harvest data from relevant national and international data centres, facilitating the data collection for the SDG indicator 14.3.1 and enabling experts to access data located in different places. In addition, IOC is co-leading the Informal preparatory working group for the Interactive Dialogue focusing on ocean acidification during the UN Ocean Conference. Additionally, multiple side events there and at the UNFCCC COP27 are envisaged. Another main activity will be the support to the 5th International Symposium on Ocean in a High CO₂ World, planned for September 2022.

Blue Carbon

130 Coastal blue carbon ecosystems provide multiple ocean services, including long term carbon sequestration and food. However, destruction and degradation can make these ecosystems carbon dioxide emitters – turning them into carbon sources. IOC continues to support the Scientific Working Group of the Blue Carbon Initiative (BCI) in order to close existing knowledge gaps with regard to blue carbon ecosystems' carbon sequestration rates and storage, the spatial coverage of mangroves, seagrasses and tidal marshes, and new emerging blue carbon ecosystems, particularly species summarized under the term seaweed. The work of this WG will be complemented by the Policy WG and other awareness activities led by IOC's partners in the BCI, IUCN and Conservation International, as well as via the IOC's coordinating role in the International Partnership for Blue Carbon. IOC further engages in the development of a Blue Carbon Ocean Decade programme, which is expected to start in mid 2022. Topics addressed by this global endeavour will include: improved understanding of the net carbon removal potential of blue carbon habitats; support to evidence-based science-policy action for blue carbon habitat protection, restoration and creation, including

the carbon sequestration and biodiversity aspects; improved understanding of land-sea connections for blue carbon ecosystem functioning and management; and emerging challenges as methane emissions and seaweed.

Harmful Algal Blooms

131 The IOC is coordinating and developing its work on HAB through the IOC Intergovernmental Panel on HABs (IPHAB). A number of Task Teams, working groups and activities are operating and reporting to the IPHAB. A core activity is the development of a 'Global HAB Status Report' which is 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 OBIS and the IOC Harmful Algal Event Data base HAEDAT and is funded by Flanders and cosponsored by the IAEA. The first Global HAB Status Report was launched June 2021. Data is compiled annually and online data updated.

132 The long-term focus of the IOC Harmful Algal Bloom (HAB) programme is on improved understanding of the factors controlling HAB events and thereby improving management and mitigation options. The scientific key 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, entitled GlobalHAB, launched its science and implementation plan in 2017 (www.globalhab.info).

133 The IOC Science and Communication Centre on Harmful Algae at the University of Copenhagen serves as an implementation mechanism and fundraising partner for HAB and GlobalHAB activities.

De-oxygenation

134 Deoxygenation is a global problem in coastal and open regions of the ocean, which 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, with more than 600 systems catalogued now. The recent expansion of hypoxia in coastal ecosystems has been primarily attributed to global warming and enhanced nutrient input from land and atmosphere. In order to improve the data availability and data quality of ocean oxygen data the members of the IOC working group the Global Ocean Oxygen Network (GO2NE) contributed to planning of an ocean oxygen data portal and a corresponding white paper, which was published in December 2021. Further IOC continues to organize together with the members of GO2NE monthly webinars featuring young and senior scientists presenting the latest science on ocean and coastal deoxygenation. This webinar series continues to be a huge success with on average more than 100 participants. Over the past year scientists and other stakeholders from 95 countries

joined. In addition, the IOC WG GO2NE successfully submitted a proposal for an Ocean Decade Programme – Global Ocean Oxygen Decade (GOOD). The planning of related activities started, such as stakeholder engagement and capacity development. A first GOOD newsletter was published in July 2022. In addition, GO2NE contributed to a new OceanOPS report card focused on ocean oxygen, which was published in July 2021. The annual meeting was organized in May 2022 and meeting report was delivered. Furthermore, IOC supported the organization of the 53rd Liege Colloquium and co-organized one session and one panel discussion. Besides this IOC together with the GO2NE group is currently preparing the publication of 2-4 best practices papers and seeks to coordinate the data collection and data management of ocean oxygen data. A Steering Committee for the initiative is currently under construction. The IOC Secretariat together with GO2NE experts successfully submitted a session application for the ECCWO5 focusing on ocean deoxygenation.

Integrated Ocean Carbon Research

135 The world ocean plays a critical role in the storage of carbon, including a very large portion of CO₂ human-induced emissions. In addition to the role of plankton in the removal of seawater carbon into the deep ocean through the process referred to as the "biological pump", there is a need to understand and quantify the role of microbial processes in forming refractory dissolved carbon (r-DCO) and how this acts as a sink or a source of carbon, depending on location and conditions. The IOC working group on Integrated Ocean Carbon Research investigates all dimensions of ocean carbon, in support of the work of IOCCP, SOLAS, IMBeR, WCRP-CLIVAR, the Global Carbon Project, IPCC, and UNFCCC.

136 It further includes the science underpinning sustainable management solutions in support of the UN Decade of Ocean Science for Sustainable Development's Challenge 5. IOC-R has already provided the theoretical science basis to develop a global network of surface ocean C observations, and additional similar efforts are planned for the deeper ocean and coastal areas. In the biennium, the IOC-R initiative will result into a Decade programme, reaching out further to other stakeholders than the scientific community.

Multiple Stressors

137 The IOC working group, with leading contributions by members of the SCOR WG149, which now is a SCOR project, focusing on multiple stressors, established in 2018 met for the first time in March 2020 (online, due to the COVID-19 pandemic). The policy brief introducing the issue of multiple stressors on marine ecosystems – working title: 'Ocean under Stress: A changing ocean at all locations' is currently under preparation and was published in March 2022.

OBIS

138 Since last year (May 2020- May 2021) OBIS published 21.55 million new taxon occurrence records from 409 new datasets, 17 million new measurements and 4,900 new marine species. OBIS now has a total of 100 million records, 180 million measurements or facts, 4,471 datasets and 160,000 marine species. A large part of this (exponential) growth can be assigned to the new capability at OBIS to deal with DNA derived data, which accounts for 14.6 million records.

139 The OBIS secretariat grew from 3 to 5 staff members and now has dedicated capacity to (i) support the various OBIS task teams, (ii) develop more training resources, (iii) actively support science capacity building on the ground with two eDNA projects (one in Pacific Islands to monitor marine invasive species and a global one in UNESCO's World Heritage marine sites to monitor biodiversity and vulnerability to climate change) and (iv) support the Global Ocean Observing System by providing a portal and helpdesk to monitor the status of the biological ocean observing system. These extrabudgetary projects also provide necessary resources for further technological developments of the global data system, such as a bioinformatics pipeline to manage species occurrences based on DNA sequences.

International Seabed Authority (ISA)

Introduction

140 In accordance with the United Nations Convention on the Law of the Sea (the "Convention") and the 1994 Agreement relating to the implementation of Part XI of the Convention, the International Seabed Authority (ISA) is the organization through which, the States parties to the Convention administer the mineral resources of the International Seabed Area (the "Area") and promote, control and organize current exploration and future mining activities for the benefit of humankind as a whole.

141 At the core of ISA's mandate lies also its duty to take all necessary measures to ensure effective protection of the marine environment from harmful effects which may arise from activities in the Area. Article 145 of the Convention requires ISA to adopt appropriate rules, regulations and procedures for, inter alia, the prevention, reduction and control of pollution and other hazards to the marine environment, the protection and conservation of the natural resources of the Area, and the prevention of damage to the flora and fauna of the marine environment.

142 To this end, Article 165 of the Convention assigns the Legal and Technical Commission (LTC) of ISA the responsibility to make recommendations to the Council on the protection of the marine environment, with respect to relevant rules, regulations and procedures, as well as a monitoring programme on the risks and impacts on the marine environment resulting from activities in the Area. In addition, the LTC is also responsible for keeping under review the rules, regulations and procedures on activities in the Area. In the

exercise of its functions, the LTC may take into account the views of recognized experts in that field, and may consult with, inter alia, any international organizations with competence in the subject matter.

143 As the organization exclusively mandated to manage activities in the Area, ISA is required to promote and encourage the conduct of marine scientific research in the Area, as well as coordinate and disseminate the results of scientific research and analysis, when available.⁷ Accordingly, the ISA Assembly adopted in December 2020 a dedicated Action Plan in support of the UN Decade of Ocean Science for Sustainable Development structured around six strategic research priorities (see below). ISA also has the duty to encourage the development and implementation of appropriate programmes for strengthening the research capabilities of developing States and technologically less-developed States.

144 The work of ISA related to the protection of the marine environment focuses on the following four areas, providing for a comprehensive system for environmental management and planning at the scale of contract areas as well as regional scales:

- .1 continued development of the regulatory framework (the Mining Code), including environmental standards and guidelines;
- .2 review and development of regional environmental management plans (REMPs) in priority areas where mineral exploration is taking place;
- .3 review and synthesis of data collected from environmental baseline studies, monitoring and assessment undertaken by the contractors, providing the scientific information for environmental impact assessments; and
- .4 promotion and encouragement of the conduct of marine scientific research with respect to activities in the Area, with particular emphasis on research related to the environmental effects of such activities.

145 The following sections provide an overview of the ongoing activities related to the abovementioned areas of work, including progress and achievements during the reporting period, from September 2021 to September 2022.

Development of the regulatory framework

146 Based on Part XI of the Convention and the 1994 Agreement, ISA has developed detailed and substantive provisions, regulations and recommendations related to the assessment of possible environmental impacts arising from exploration for marine minerals in the Area, which define the sort of activities that require an environmental impact assessment (EIA), the form and content of such EIAs when required, as well as guidance on baseline studies, monitoring and reporting, including of the environmental impacts on the seabed as well as in the water column above it.

⁷ UNCLOS, art.143(3).

147 In 2020 and 2022, the LTC reviewed and updated the recommendations for the guidance of contractors for the assessment of the possible environmental impacts arising from exploration for marine minerals in the Area.⁸ Based on these recommendations, for the exploration phase, an application for approval of a plan of work must be accompanied by an assessment of the potential environmental impacts of the proposed activities and by a description of a programme for oceanographic and baseline environmental studies.

148 Activities requiring an EIA include, inter alia, test-mining and testing of mining components, use of sediment disturbance systems, drilling and certain sampling activities, and taking of large samples to test land-based processes. The recommendations also include guidance for the collection and annual reporting of data required for environmental baseline studies and monitoring, which include, inter alia, data on physical oceanography, chemical oceanography, geological properties, and biological communities. The recommendations also outline the process for the review of annual reports and EIAs by the LTC.

149 All the data and information submitted by contractors every year are collected, organized and compiled in the ISA DeepData database by the secretariat. The environmental data are made accessible to the public through the DeepData portal on the ISA website.⁹ To further enhance quality assurance and quality control procedures, the LTC endorsed updated templates for ISA contractors to report geological and environmental data and a new template for the submission of metadata in September 2021. Further details on recent activities and initiatives related to improving interoperability between DeepData and other relevant databases are described below.

150 ISA is also developing draft regulations for exploitation of mineral resources in the Area, which include detailed provisions relating to EIA, environmental monitoring and report. The draft exploitation regulations are being considered by the Council. The exploitation regulations will be supported by detailed standards and guidelines. As decided by the Council, these are being developed in a three-phased approach with specific standards and guidelines needed by the time of adoption of the draft regulations on exploitation (phase 1), prior to the receipt of an application of a plan of work for exploitation (phase 2) and before commercial mining begins (phase 3). Standards and guidelines undergo a four-stage process: development by the LTC, stakeholder consultations, approval by the LTC and submission to the Council for approval.

151 During 2020 and 2021, the LTC has prepared 10 draft standards and guidelines under phase 1, which include¹⁰:

- Draft guidelines for the establishment of baseline environmental data
- Draft standard and guidelines for environmental impact assessment process

- Draft guidelines for the preparation of an environmental impact statement
- Draft guidelines for the preparation of an environmental management and monitoring plans
- Regional Environmental Management Plans (REMPs)

152 REMPs are an instrument of environmental policy and contribute to fulfilling ISA's mandate on ensuring the effective protection of the marine environment from harmful effects that may arise from activities in the Area, in accordance with Article 145 of the Convention and the ISA's strategic plan. REMPs are established to provide the relevant organs of ISA, as well as contractors and their sponsoring States, with environmental management measures and tools, including area-based management tools, to support informed decision-making that balances resource development with conservation at regional scale. REMPs are prepared by the LTC, with inputs from recognized experts, and adopted by the Council, in accordance with articles 162 and 165 of the Convention.

153 ISA has established an environmental management plan for the Clarion-Clipperton Zone (CCZ) and is in the process of establishing REMPs in other regions where exploration activities are taking place, including the northern Mid-Atlantic Ridge, the Indian Ocean triple junction, the Northwest Pacific and the South Atlantic Ocean.

154 The environmental management plan for the CCZ was adopted in 2012 and included the designation of a network of nine "areas of particular environmental interest" (APEIs). These APEIs are established to protect biodiversity and ecosystem structure and functions, and initially covered a total of 1.4 million km² of seabed of the CCZ fully protected from future exploitation of mineral resources. In 2021, following a comprehensive review of the implementation of the CCZ environmental management plan, supported by an independent scientific process, the LTC recommended further actions to advance the implementation of the plan. These included the establishment of four additional APEIs to enhance the effectiveness of the overall network. The Council endorsed this recommendation in December 2021.¹¹ As a result, the network of APEIs in the CCZ now comprises 13 APEIs covering a total area of 1.97 million km² of protected seabed.

155 During 2021 and 2022, the LTC drafted the REMP for the area of the northern Mid-Atlantic Ridge based on the results of three dedicated international expert workshops that have taken place since 2018. A stakeholder consultation took place on the draft REMP during April-June 2022. A total of 27 stakeholder submissions were received from ISA member States, observers and other entities. The LTC revised the draft REMP in its meeting in July 2022, taking into consideration the comments received through the stakeholder consultation, and recommended the revised REMP to the Council. During 2021 and 2022, in response to the request from the Council, the LTC has also developed a standard procedure for the development, approval and review of REMPs, including a general template for

⁸ ISBA/25/LTC/6/Rev.2

⁹ <https://www.isa.org.jm/deepdata>

¹⁰ For details, please refer to <https://isa.org.jm/mining-code/standards-and-guidelines> and <https://isa.org.jm/node/20798/session/council#block-media-2>

¹¹ ISBA/26/C/58

REMPs, and recommended the standard procedure to the Council in July 2022. The revised REMP and standard procedure will be considered by the Council in its meeting in October 2022.

156 Further expert workshops are being planned by the secretariat in discussion with host governments and institutions, to advance the development of REMPs for the Northwest Pacific and Indian Oceans. Further information about past REMP workshops can be found at <https://www.isa.org.jm/minerals/environmental-management-plan-clarion-clipperton-zone>.

Promotion and encouragement of Marine Scientific Research (MSR) in the Area

157 To maximise the contribution of ISA in support of the implementation of the UN Decade of Ocean Science for Sustainable Development 2021-2030, the Assembly has adopted in 2020 a dedicated Action Plan (MSR Action Plan)¹², in line with the Strategic Plan¹³ and High-level Action Plan¹⁴ for the period of 2019-2023. The MSR Action Plan identifies the following six strategic research priorities, contributing to the objectives of the UN Ocean Decade: 1) advancing scientific knowledge and understanding of deep-sea ecosystems, including biodiversity and ecosystems functions, in the Area; 2) standardizing and innovating methodologies for deep-sea biodiversity assessment, including taxonomic identification and description, in the Area; 3) facilitating technology development for activities in the Area, including ocean observation and monitoring; 4) enhancing scientific knowledge and understanding of potential impacts of activities in the Area; 5) promoting dissemination, exchange and sharing of scientific data and deep-sea research outputs and increasing deep-sea literacy; and 6) strengthening deep-sea scientific capacity of Authority members, in particular developing States.

158 The active contribution of ISA is also reflected through its participation in the UN Decade Advisory board, the UN Decade Alliance and the UN Decade Monitoring and Evaluation working group as well as in the Decade Communications Advisory Group.

159 ISA also actively engaged in the UN Ocean Conference on the theme “Scaling up ocean action based on science and innovation for the implementation of Goal 14: stocktaking, partnerships and solutions,” held in Lisbon, Portugal, from 27 June to 1 July 2022. On that occasion, ISA participated in the plenary and in Interactive Dialogues 5, 6, 7 and 8. In addition, ISA organised five high-level events during the Conference¹⁵.

160 The secretariat has established several strategic, technical and financial partnerships to promote cooperation and coordinate MSR efforts among contractors, scientific and academic communities, national agencies and international and regional organizations with respect to activities in the Area. The importance of data and information sharing was reinforced through strengthened strategic alliances with sectoral bod-

ies and specialised entities including IOC-UNESCO and the International Hydrographic Organization (IHO), allowing for the exchange of biological and high-resolution bathymetric data, respectively.

161 In 2021, ISA became the first UN-related agency to serve as a node for the Ocean Biodiversity Information System (OBIS) with over 46 thousand records of species occurrences in areas currently under exploration. Subsequently, in March 2022, ISA signed a letter of collaboration with the World Register of Marine Species (WoRMS) with a view to help ensuring the quality of deep-sea taxonomic information and data contained in the ISA DeepData database including through periodic scientific reviews between DeepData and WoRMS’ thematic subregister, the World Register of Deep-Sea Species (WoRDSS).

162 Building on the agreement of cooperation signed in 2017, ISA and IHO are partnering through the AREA2030 initiative¹⁶, launched on World Oceans Day (8 June 2022), to facilitate the voluntary contribution of bathymetric data by contractors for a consolidation of seabed mapping of the Area. The high-resolution bathymetric data from four ISA contractors provided a total of 120,000 km² of seabed in the CCZ and for 188,500 km² of seabed along the Indian Ocean ridges.

163 The secretariat also organized a series of meetings and workshops during the reporting period to actively engage the international scientific community in establishing collaborative knowledge-sharing platforms in different areas. One of such platforms is being developed under the ISA’s Sustainable Seabed Knowledge Initiative (SSKI)¹⁷, officially launched during the UN Ocean Conference in Lisbon, June 2022. SSKI aims to create an interdisciplinary nexus between governments, scientific communities, international organizations, and relevant private industries to facilitate the generation, access and use of deep-sea biodiversity data and information. As part of its support for the implementation of SSKI, the European Commission signed a grant agreement with the secretariat in May 2022 to support the taxonomic knowledge component of SSKI and initiate the development of innovative tools to facilitate species identification and description in the Area. An inception workshop will be convened in December 2022 in the Republic of Korea to develop the implementation and monitoring plan for the achievement of the two-year project objectives.

164 In 2020 and 2021, the secretariat organized two virtual workshops in collaboration with the Ministry of Oceans and Fisheries (MOF) of the Republic of Korea and the National Marine Biodiversity Institute of Korea (MABIK), on taxonomic standardization (September 2020), and on enhancing image-based biodiversity assessments to advance deep-sea taxonomy (October 2021). Participants at the workshops identified a list of activities to be implemented in the short, medium and long term in the form of a road map aimed at facilitating the integration of deep-sea taxonomic knowledge into ISA’s work on protection of the marine environment. Building on this, the secretariat, together with MOF and MABIK will organize a third workshop in November

¹² ISBA/26/A/17

¹³ ISBA/24/A/10

¹⁴ ISBA/25/A/15

¹⁵ <https://isa.org.jm/event/isa-at-unoc-2022>

¹⁶ <https://isa.org.jm/area2030>

¹⁷ www.isa.org.jm/sski

2022 in the Republic of Korea. The workshop will be focused on standardizing methodologies for collecting and sharing genetic sequence data and information in support of improved observation and biodiversity monitoring capacities in the Area.

165 The secretariat and the National Oceanography Centre of the United Kingdom are partnering to advance technology development and innovation in support of the sustainable development of mineral resources, including in relation to environmental protection and the monitoring of activities carried out in the Area. In November 2021, the secretariat organized an online expert scoping meeting, to take stock of existing technologies and gaps and identify existing and potential actors. Drawing on the results of this meeting, the secretariat, in collaboration with other relevant actors from the mining and technology industry, will organize a workshop in 2022 to analyse progress, identify necessary developments and explore mutual interests and benefits between the land- and seabed-based industries through the advancement of intelligent technologies in support of the effective transition from exploration to exploitation.

166 The secretariat also initiated discussions with potential partners in relation to the design of a pilot project for long-term ocean observation in the CCZ involving a wide range of relevant stakeholders, including scientific institutions and contractors. The main objective is to undertake an assessment of existing ocean observing capabilities and monitoring programmes, as well as a compilation and synthesis of available oceanographic data from the CCZ collected by contractors and scientific entities. It is expected that, building on the findings of this first phase, the secretariat will be in a position to organize an expert meeting in 2023 to identify further the specific scope of project activities, including methodologies and approaches for collaboration and resource mobilization.

167 The secretariat has also joined the advisory board of two international scientific research projects, namely, the Seabed Mining and Resilience to Experimental impact (SMARTER)¹⁸ and the Conservation and restoration of deep-sea ecosystems in the context of deep-sea mining (DEEP REST)¹⁹ with a view to aligning the outcomes of scientific activities and maximizing their contribution towards the strategic research priorities identified in the MSR Action Plan.

168 Lastly, ISA will host two workshops from 5 to 14 September 2022 on capacity building aimed at strengthening the science-policy interface and on the scoping of the next assessment(s) of the Regular Process. The Workshops will cover the Wider Caribbean and North Pacific region. The Workshops are convened by ISA, in collaboration with the Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations (DOALOS) and with the assistance of members of the Group of Experts, as appropriate.

¹⁸ <https://noc.ac.uk/projects/smartex>

¹⁹ <https://deep-rest.ifremer.fr/>

International Atomic Energy Agency (IAEA)

169 IAEA Marine Environment Laboratories (NAML) report on activities at its three laboratories: Marine Environmental Studies Laboratory (MESL), Radioecology Laboratory (REL) and Radiometrics Laboratory (RML).

170 IAEA hosted and organized the GESAMP 48 Session (6-10 Sept 2021) and organised a side-event on “Marine contamination incidents: scientific support to emergency response”, attended by GESAMP experts, cosponsoring by UN Agencies and UN-Oceans members (UNEP, IMO, IOC-UNESCO and WMO).

171 IAEA Marine Environment Laboratories ensured collaboration within the UN system, through the Environmental Management Group and the UN-Oceans mechanisms, in particular on ocean acidification and marine litter issues, and participated actively in the UNOC (Lisbon, June 2022) by hosting side events and co-convening the High-level Dialogue on Ocean Acidification, the IAEA Director General being a panelist.

Marine Environmental Studies Laboratory (MESL) activities

Production of Certified Reference Materials (CRMs) and Interlaboratory Comparison (ILC) exercises

172 IAEA’s 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. Two new CRMs for trace elements and persistent organic pollutants such as polychlorinated biphenyls (PCBs), organochlorine pesticides and polybrominated diphenyl ethers (PBDEs) in tuna fish samples (IAEA 407A and IAEA-435A respectively) have been released.

173 A new characterization exercise for the certification of mass fractions of trace elements in marine sediment (IAEA-128A) has been organised and the final certification report is under preparation. Also, a new characterization exercise for the certification of mass fractions of PCBs, organochlorine pesticides, PBDEs, aliphatic hydrocarbons and PAHs in a sediment sample is being organized.

174 The IAEA participated in the proficiency tests for trace elements and organic pollutants in marine samples organised by Quasimeme. It also participated in the round robin test on oil spill identification organized by the Bonn-OSINet network of oil spill identification. The IAEA participated in two CCQM Pilot and Key comparison studies for trace element in marine samples. The pilot and key comparison studies are organised by the International Bureau of Weights and Measures (BIPM), CCQM Inorganic Analysis Working Group for the Laboratories of the National Metrology Institutes and for laboratories with demonstrated measurement performances.

175 One worldwide interlaboratory comparison on the determination of trace elements and methyl mercury (ILC-IAEA-MESL-2021-01-TE-BIOTA) in a fish sample was finalised. The report with obtained results was disseminated to the participating in the ILC laboratories (123 laboratories from 59 countries). The final report of the worldwide interlaboratory comparison on the determination of organochlorine compounds, polybrominated diphenyl ethers and polycyclic aromatic hydrocarbons (ILC-IAEA-MESL-2019-01-OC) in a fish sample is now available. In total 51 laboratories from 28 countries reported results.

Technical Cooperation and IAEA Emergency responses

176 Peru TC INT0098 - oil spill emergency response to assist Peru in the assessment of the oil spill impact on the marine environment. After freak waves from a volcanic eruption near Tonga caused an oil spill from a refinery on the Peruvian coast in January 2022, the IAEA, following Government Peru's emergency request, sent experts for a fact-finding mission. Based on the mission findings, the IAEA is currently providing targeted nuclear-related technology for the development of a comprehensive long-term, post spill monitoring programme in the affected coastal areas.

177 Mauritius TC MAR7006 - oil spill emergency response to assess effects on coral reef ecosystems and seafood safety. After an oil spill from a grounded cargo ship at the southeast tip of Mauritius in the Indian Ocean, the IAEA, on the Government of Mauritius request, initiated an emergency response to assist alleviating negative environmental effects. The Agency support to Mauritius has focused on enhancing the national capabilities for the establishment of a dedicated laboratory facility for oil spill monitoring and toxicity assessment. Further expert missions and training are being organised to consolidate the methodologies on the analysis of petroleum hydrocarbons. This will allow the Member State to assess the status of the oil pollution and evaluate the environmental risk of the oil-derived toxic compounds to valuable coral ecosystems and local seafood safety for human consumption.

178 Sri Lanka TC project RAS0081 - emergency response to mitigate the environmental pollution caused by a container cargo ship that ran aground off the coast of Sri Lanka in May 2021 and sank causing enormous environmental damage to the marine life. The ship's cargo included many chemicals, such as, highly corrosive nitric acid, sodium hydroxide, bunker- and gas oil all of which leaked into the sea waters. Other lubricants, cosmetics and dangerous plastic pellets (nurdles) were washed ashore or surfaced in the ocean. The IAEA support is focusing on long-term monitoring of post-spill contamination and associated impact on marine and coastal ecosystems at risk. The assistance includes the provision of analytical equipment to monitor organic compounds, microplastics and radionuclides; and expert advice in setting up its monitoring of post-spill contamination and assessment of impact on marine and coastal ecosystems

179 IAEA/RCA RAS7037 - Enhancing Wetland Management and Sustainable Conservation Planning (RCA). The program brings together represen-

tatives of 14 nations in the Asia Pacific Region: Australia, Bangladesh, China, Indonesia, Laos, Malaysia, Mongolia, Myanmar, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam with a common interest in the wise management of wetlands supported by the application of stable isotope techniques to wetland management. A manual for the use of stable isotopes in Wetlands Science is under development to support the training.

180 Other national IAEA Technical Cooperation (TC) projects, where MESL is assisting in the development and implementation includes the TC projects (BZE7002/BZE7003) to build capacity to monitor pesticides in the environment of Belize; d) TC projects (BRA7012/BRA7014) to provide training and capacity for compound specific stable isotopes to identify triggers of harmful algal blooms, and address the impact of oil spill and plastic debris in the coastal environment of Brazil; f) 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 to Determination of Threats to Health and the Environment from Toxic Pollution in the Reservoir Cerrón Grande Ecosystem; TC project BAH7002 in Bahrain for Inductively Coupled Plasma Techniques in Environmental Analyses.

Strengthening data quality assurance of Regional Seas laboratories participating in marine monitoring programmes

181 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. Designated national monitoring laboratories in Mediterranean countries benefit by being able to use the analytical support of NAML in the development in their quality assurance programs for the determination of trace elements and organic contaminants in the marine environment.

182 The IAEA participated in the virtual UNEP MAP Integrated Meeting of the Ecosystem Approach Correspondence Groups on Pollution Monitoring (CORMON) from 27 to 30 May 2022.

183 The IAEA organised two virtual training courses on the analysis of contaminants in marine samples in collaboration with UN Environment/MAP MEDPOL:

- .1 Training workshop on the analysis of Trace Elements in marine samples for laboratory practitioners in MEDPOL countries, 6-10 December 2021 (6 trainees from 6 Mediterranean Member States); and
- .2 Training workshop on the analysis of organochlorinated pesticides and PCBs in marine environmental samples for laboratory practitioners in MEDPOL countries, 6-10 December 2021 (5 trainees from 5 Mediterranean Member States).

184 The IAEA organized virtual mission visits to two Mediterranean MEDPOL laboratories (Croatia and Morocco) to assist and evaluate their measurement capability on the determination of organic contaminants and trace metals.

185 One Lebanese fellow was trained in the laboratories of MESL on the analysis of per- and polyfluorinated alkyl substances (PFAS).

186 One fellow from Poland was trained on the determination of trace elements and methyl mercury in sediments and biota samples for monitoring studies.

187 One analytical procedure dealing with the determination of ultra-low level silver nanoparticles in marine biota samples has been recently validated and published in peer review journal.

188 A collaboration between IAEA/NAML and UNEP/MAP under 2022/2023 agreement continues the efforts for strengthening data quality assurance in marine pollution monitoring in the Mediterranean region. Preparation of monitoring guidelines/protocols related to IMAP Common Indicators for contaminants, eutrophication and bioindicators (CI 13, 14, 17 and 20) have been finalized.

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

189 The IAEA continued the development and validation of analytical methods for monitoring and further understanding the marine environment, which were published in peer reviewed journals and presented in International Conferences: i) analytical procedures for legacy and emerging per- and polyfluorinated alkyl substances derived from microplastics and other sources in seafood; ii) effects of exposure to perfluorinated substances with increasing temperature in a tropical coral species; iii. analytical procedure for accurate determination of uranium isotope ratios in sediment and in seawater samples vi) analytical procedure for determination of americium in sea water and marine sediments.

190 Analytical methodologies, research and monitoring studies performed in 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) use of stable isotopes and chemical markers to assess the hydrocarbon pollution studies ii) use of lead isotopes to assess lead pollution origin, iii) use of strontium isotopes and their ratios to assess seafood traceability

191 The IAEA contributed to the baseline monitoring studies in a) Sri Lanka to assess hydrocarbon pollution and understand the history of the Negombo Lagoon; b) in a North African ecosystem to assess legacy and emerging per- and polyfluorinated alkyl substances in seafood; Western African coast and Caribbean region for trace elements and new emergency pollutants as well as the pollution history investigations in both regions.

192 A Special issue on seafood safety and environmental pollution in a changing environment, which includes ~10 scientific manuscripts with a wide array of topics and connects seafood safety within the larger framework of environmental pollution, global environmental change, environmental toxicology, and public health has been disseminated.

193 The investigation on the use of sponges as coastal bioindicators of rare earth elements bioaccumulation in the French Mediterranean Sea was performed and obtained results published in peer review journal.

194 One project on the implementation of Minamata convention in Caribbean region was started and obtained results prepared for publication in a peer review journal. In the frame of the same project the seafood safety, related with the presence of mercury and other priority trace elements in the most used in the human diet fish species was carefully investigated and obtained results prepared for further dissemination.

Radioecology Laboratory (REL) Activities

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

195 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. 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. 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.

196 The IAEA continues to organize and host fellowships and internships to transfer the RBA technology to IAEA Member States. 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.

197 The Philippine Nuclear Research Institute (PNRI) is being re-designated as an IAEA Collaborating Centre to work on HABs in the context of environmental and global change and continues to collaborate actively with the IAEA to expand the use of nuclear techniques for HABs management. PNRI has assessed the performance of the CTX-RBA using a brevetoxin as standard matrix.

198 With the support of an IAEA 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) to prepare fish matrix reference material for Pacific ciguatoxins.

199 NAEL is continuing to advance the inter-Agency Global Ciguatera Strategy which is now in the last phase of approvals.

200 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.

201 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 Agency marine interests.

202 The IAEA continues to use radiotracers to investigate bioaccumulation of contaminants and essential elements in diverse marine organisms. The focus for this period was on: i) environmental factors affecting bioaccumulation 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 co-contaminants to fish and shellfish. The IAEA has also been investigating exposure routes for radiocaesium in select marine organisms.

203 The IAEA in Monaco is running a new research and development project that facilitates Blue Carbon assessments for interested Member States. Using nuclear techniques, these coastal and marine samples are being analysed to investigate aspects of the marine carbon cycle, including carbon flux and storage estimates under changing climate conditions. As the topic of Blue Carbon is gaining interest worldwide, IAEA assesses the potential of coastal vegetated ecosystems (mangroves, seagrass and saltmarshes) as well as seaweed farms as relevant tools for climate change mitigation. The work commenced in 2021 and efforts are mainly on a) in the establishment of the capacity for geochronology studies at the IAEA Marine Environment Laboratories in Monaco, and b) to assess the potential of coastal vegetated ecosystems as relevant tools for climate change mitigation worldwide. At the end of 2021, collaborations were established with 25 countries, and several others are currently in discussion. These developments have placed the IAEA in a central position to participate in the research on Blue Carbon, as well as in assisting through technical training, analyses and advice to Member States worldwide.

Technical Cooperation

204 The IAEA Environment Laboratories Radioecology Laboratory in Monaco assist Agency Member States

in the implementation of national, regional and inter-regional Technical Cooperation Programme projects by providing expert technical oversight and guidance on such topics as: climate change and ocean change impacts, ocean acidification, marine pollution, eutrophication, marine radioactivity, seafood safety and marine plastics. Through these projects, many recipient Member State countries are able to report directly on relevant 2030 Agenda targets, such as for example, Sustainable Development Goal 14.3 (Ocean Acidification) or 14.1 (Marine Pollution).

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

205 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.

206 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 pre-COVID-19, 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.

207 The OA-ICC participates with IOC-UNESCO to develop a methodology for Member States to report on SDG target 14.3, that specifically addresses ocean acidification. 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.

208 The OA-ICC co-leads the SDG 14 Communities of Ocean Action on Ocean Acidification. A series of webinars has been organized, and the group has provided input to several conferences and online fora.

209 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 Earth & Environmental Science information system Pangaea, hosted by AWI and MARUM in Germany.

210 New tools for estimating uncertainties for ocean acidification variables were developed through a consultancy. Uncertainty propagation add-ons are now available for four main software packages commonly used to calculate carbonate chemistry parameters used in ocean acidification research.

211 The OA-ICC collaborated with the Ocean Acidification international Reference User Group (OA-iRUG) to organize several events pre-COVID-19. These meetings brought together scientists, policy-makers and the aquaculture industry to develop a Latin American action plan to better understand and address ocean acidification.

212 Despite the global challenges faced by the OA-ICC due to COVID-19, the Centre continued to work closely with partners throughout the year to provide support to several Member States related to ocean acidification, including by supporting the development and needs of emerging regional ocean acidification networks in Latin America and Africa. For example, in collaboration with OA-Africa, the OA-ICC co-organized a regional meeting in Monrovia, Liberia to highlight new science and capacity building efforts that are underway in west Africa. Scientists and community stakeholders from around the world participated in this combined in-person and virtual event. This event was followed up by a virtual event that engaged the global OA community and included presentations that shared updates on new research and thoughts on future directions for the region. Such local meetings are important avenues for strengthening regional collaborations and for adapting to challenges posed by the COVID-19 pandemic.

213 The OA-ICC also collaborated in a number of meetings and workshops to support participants from IAEA Member States to present their results and network with peers. For example, the OA-ICC supported the participation of students from Member States to attend the Surface Ocean Lower Atmosphere Study (SOLA) summer school and 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. The OA-ICC also supported the Global Ocean Acidification Observing Network (GOA-ON) in the organization of a virtual Ocean Acidification Conference which included ten sessions, fifty speakers, and hundreds of participants from around the world.

214 The OA-ICC participated in a webinar on “Implementing SDG 14 with the Communities of Ocean Action”, providing an update and overview of the Communities of Ocean Action – Ocean Acidification process. Updates on COA voluntary commitments (VCs), lessons learned, and achievements were also presented. The meeting was led by Ambassador Peter Thomson, Secretary General’s Special Envoy for the Ocean.

215 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 received more than 57,236 visitors from 175 countries in 2020.

Radiometrics Laboratory (RML) Activities

IAEA’s project for “Marine Monitoring: Confidence Building and Data Quality Assurance”

216 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 the marine radioactivity

monitoring data and to prove the comparability of the results. A project on ‘Marine Monitoring: Confidence Building and Data Quality Assurance’ was initiated in 2014 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. Eleven sampling missions and interlaboratory comparisons (ILCs) and nine proficiency tests (PTs) were organized during this project. Project reports can be found at Marine Monitoring: Confidence Building and Data Quality Assurance - Reports | IAEA, 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.

217 In April 2021 Japan announced the Basic Policy on handling of the treated water stored at the Fukushima Daiichi Nuclear Power Station (FDNPS), which is to discharge the treated water into the sea surrounding the plant, subject to domestic regulatory approvals. Soon after, the Japanese authorities requested assistance from the IAEA to monitor and review those plans and activities related to the discharge of the treated water to ensure they will be implemented in a safe and transparent way. The IAEA is conducting this review against the IAEA Safety Standards, which constitute harmonized high levels of safety worldwide and, as such, a global reference for protecting people and the environment. The IAEA Marine Environment Laboratories are supporting the corroboration of source and environmental monitoring related to treated water at FDNPS and the review of relevant sampling and analytical methods used by Japanese laboratories involved in source and environmental monitoring.

Technical Cooperation

IAEA Regional Technical Cooperation project RCA RAS7028 (Asia-Pacific)

218 The IAEA Regional Technical Cooperation 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”, 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) 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 2017-2022, 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 Technical Cooperation project RAF7017 (Africa)

219 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 world-wide 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 Technical Cooperation project MHL7003

220 The project “Developing 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, besides building sampling and analytical capacity, is to assist the Marshall Islands’ technical personnel in addressing concerns and a current lack of understanding by the public regarding the nuclear weapons testing-related legacy issues.

Analytical quality services

221 In 2022 the Marine Environment Laboratories obtained ISO 17034 accreditation for the production of Certified Reference Materials (CRM) for gamma emitting radionuclides in marine matrices. This accreditation endorses the high quality of the analytical support services offered by the IAEA to Member States.

222 A new CRM for radionuclides in Baltic Sea sediment (IAEA-465) was released and is available through IAEA’s webpages at Reference Materials - Home (iaea.org). Another IAEA CRM is in production and is expected to be available in 2023: Radionuclides in shrimp tissue.

223 Proficiency Testing: Elven world-wide Proficiency Tests (PTs) for radionuclides in seawater were organised between 2012 and 2022. Over 100 participants registered in the 2022 PT. These PTs are essential to testing the comparability of marine radioactivity monitoring data worldwide, required for transboundary pollution events and emergency situations.

MARIS database

224 The IAEA’s Marine Radioactivity Information System (MARIS) is an open-access global database for marine radioactivity measurements that is accessible online at maris.iaea.org. MARIS - Marine Radioactivity Information System (iaea.org). The database and the website underwent major re-development and update in 2019-2021. MARIS is a central part of the data collection effort of IAEA’s Coordinated Research Project (CRP) K41017 “Behaviour and Effects of Natural and Anthropogenic Radionuclides in the Marine Environment and their Use as Tracers for Oceanography Studies”. In response to the increasing need to educate the wider general audience on the topic of marine radioactivity, a new FAQ page has been published on the MARiS website. The volume of data in MARiS has been substantially increased, in August 2022 MARiS containing over 815,000 individual measurement results of radionuclides in seawater, suspended matter, bottom sediment and biota.

Coordinated Research

IAEA CRP K41015

225 The CRP “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 upon 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 (0–5000 yBP) with emphasis on the more recent time period (0–1500 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 (years before present)). The project is expected to be finalised in 2023.

IAEA CRP K41016 project

226 GESAMP suggested that the IAEA supports 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.

227 The main aim of the CRP was 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 harmonised environmental archive dating tools to evaluate sources and temporal trends of pollutants, which will enable them to sustainably manage their coastal marine environ-

ment. 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 radioactive isotopes. The CRP resulted in a streamlined, harmonised 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. The project has spurred a very active collaboration, producing many scientific publications and will be finalised in 2022.

IAEA CRP K41017

228 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 determination of spatial and temporal patterns, behaviour and effects of radionuclides in the marine environment in order to provide Member States with methodological guidance, data and information on levels, trends, 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 radio-tracer techniques to oceanographic research. The CRP started in 2017 and is due for completion in 2024. A comprehensive data compilation of global marine radioactivity measurements covering approximately the last decade completed as part of the CRP will provide the data required for the assessment phase of the CRP. The dataset is also 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

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

United Nations Environment Programme (UNEP)

230 The 1972 United Nations Conference on the Human Environment in Stockholm, Sweden, was the first-ever UN conference with the word “environment” in its title. The creation of the UN Environment Programme (UNEP) was one of the most visible outcomes of this conference of many firsts. UNEP was created quite simply to be the environmental conscience of the UN and the world. Activities taking place through 2022 will look at significant progress made as well as what’s ahead in decades to come. For 50 years UNEP has coordinated a worldwide effort to confront the planet’s biggest environmental challenges. UNEP’s convening power and rigorous scientific research has provided a platform for countries to engage, act boldly and advance the global environmental agenda. “UNEP at 50” is a time to reflect on the past and envision the future. Half century later, unsustainable patterns of consumption and production have led to the triple planetary crises of climate change, nature and biodiversity loss, and pollution and waste. As the UN Secretary-General recently noted, “This triple crisis is our number one existential threat.” It threatens human health, prosperity, equality, and peace – as we have seen only too clearly in COVID-19.

231 In this moment of truth, we need to urgently transform our economies and societies. The science is clear. The data is here. The solutions are known. We need whole-of-society action for a whole-of-society problem. UNEP stands ready to support Member States and all stakeholders to ensure strong, coordinated, and ambitious action now, using science as the basis. Activities taking place through 2022 will look at significant progress made as well as what’s ahead in decades to come.

232 The United Nations General Assembly declared on Thursday 28th July 2022, that everyone on the planet has a right to a healthy environment, a move backers say is an important step in countering the alarming decline of the natural world. In a resolution passed, the General Assembly said climate change and environmental degradation were some of the most pressing threats to humanity’s future. It called on states to step up efforts to ensure their people have access to a “clean, healthy and sustainable environment.” The resolution is not legally binding on the 193 UN Member States. But advocates are hopeful it will have a trickle-down effect, prompting countries to enshrine the right to a healthy environment in national constitutions and regional treaties, and encouraging states to implement those laws. Supporters say that would give environmental campaigners more ammunition to challenge ecologically destructive policies and projects.

233 Heads of State, Ministers of environment and other representatives from UN Member States endorsed a historic resolution at the UN Environment Assembly (UNEA-5) on Nairobi, 2 March 2022 – to End Plastic Pollution and forge an international legally binding agreement by 2024. The resolution addresses the full lifecycle of plastic, including its production, design, and disposal. The resolution, establishes an Intergovernmental Negotiating Committee (INC), began its work in 2022, with the ambition of completing a draft

global legally binding agreement by the end of 2024. It is expected to present a legally binding instrument, which would reflect diverse alternatives to address the full lifecycle of plastics, the design of reusable and recyclable products and materials, and the need for enhanced international collaboration to facilitate access to technology, capacity building and scientific and technical cooperation. In response to resolution 5/14, the UNEP Executive Director convened an ad hoc open-ended working group to prepare for the work of the intergovernmental negotiating committee. The meeting was held from 30 May to 1 June 2022 in Dakar, Senegal in a hybrid format. Outcome Summary.

Global Environment Monitoring System for the Ocean and Coasts (GEMS/Ocean)

234 UNEP convenes the innovative Global Environment Monitoring System for the Ocean and Coasts (GEMS Ocean) Programme. Building on information from existing monitoring initiatives on national, regional, and global scale, and working closely across the UN and with the Earth Observation, monitoring and modelling communities through a co-design process, GEMS Ocean aims to support the sustainable management, inform about state and trends of ocean and coastal environments, and trigger action at scale.

235 To this end, the GEMS Ocean Programme promotes a transdisciplinary partnership approach involving international institutions and experts such as: the Intergovernmental Oceanographic Commission of UNESCO (IOC), the Global Ocean Observing System (GOOS), Mercator Ocean International (MOI), GRID-Arendal, GRID-Geneva, the G7 Future of the Seas, and Oceans Initiative (FSOI), the World Conservation Monitoring Center (WCMC), the World Resources Institute and Future Earth. GEMS Ocean uses UNEP's World Environment Situation Room (WESR) platform as well as other relevant partner portals, which provide data, data analytics and story maps to inform policy makers, scientists, and the public. Key is to provide value-added services to policymakers at global, regional, and national (and even sectoral) levels, including nature-based solutions along the land - air - sea continuum. In addition, it is of the utmost importance to avoid any duplication of existing initiatives and monitoring efforts.

236 The ocean monitoring and marine data landscape is already densely populated in some parts of the world with various monitoring and observing systems that set and define standards, collect data, and provide useful information on the state of the marine environment. But there are still many gaps that need to be filled especially in Small Island Developing States (SIDS) and Developing countries and there is a general lack of capacity and integration that would facilitate more effective decision-making at multiple scales. The focus would be on bringing together information to address challenges such as coastal erosion, sea level rise, marine pollution, habitat degradation and overfishing in a more coherent and impactful way leading to improved conservation, management and sustainable use of ocean and coastal resources. Special emphasis will be given to the land-sea interface and the Source to Sea (S2S) system, which refer to the biophysical

continuum between land and sea environments, connected through riverine systems and that influence continental shelves as well as the open ocean.

237 The GEMS Programme was represented and participated in the Twenty-second meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea 6-10 June 2022, in its deliberations on the Report of the Secretary-General on oceans and the law of the sea, discussions were focused on the theme "Ocean observing". The GEMS Ocean Partnership organized an official side event during the UN Ocean Conference (26 June – 1 July) in Lisbon where Member States, Regional Seas and Data providers came together to discuss gaps, opportunities, and way forward. The engagement of GESAMP within the on-going GEMS Ocean Partnership development would be mutually beneficial and constructive.

GESAMP activities in UN Environment Programme

238 The GESAMP Executive Committee intersessional meeting has been held by teleconference on 22 March 2022. The meeting reviewed progress of work by Working Groups and Correspondence Groups, Follow-up actions from GESAMP 48 and the upcoming preparations for GESAMP 49 to be hosted by the IMO 5 to 9 September, in London.

239 The WG 40 on *Sources, Fate and Effects of plastics and micro-plastics in the marine environment* sponsored by UNEP and IOC UNESCO has planned the next workshop to be held back-to-back with the 7IMDC 26-30 September 2022 in Busan, Korea.

240 UNEP and the IAEA together with the Intergovernmental Oceanographic Commission, IOC-UNESCO, and the International Maritime Organisation, IMO, are co-sponsoring a GESAMP working group on climate change impacts on contaminants in the ocean. The next meeting for Working Group (WG45) will be held at the premises of IAEA's Marine Environment Laboratories in Monaco, 28-30 September 2022.

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

241 As a member of UN-Oceans, UNEP continues to participate in activities related to the decade for ocean science for sustainable development. The Ocean Decade offers scope for UNEP to engage in new strategic and technical collaborations to address and innovate marine and coastal sustainable development challenges and solutions, utilizing and advancing its science-policy work across several focal areas in new partnerships with many actors and capacities in relevant fields (including governments, public and private actors). The Decade aligns well with UNEP objectives to evolve, share, and apply science-based policy and decision-making. Like the Decade on ocean science, the UN Decade on Ecosystem Restoration (2021-2030) is also running under the theme, "Prevent, halt and reverse the degradation of ecosystems worldwide". The Decade unites the world behind a common goal: preventing, halting, and reversing the degradation of

ecosystems worldwide. Forests, grasslands, croplands, wetlands, savannahs, and other terrestrial to inland water ecosystems, marine and coastal ecosystems, and urban environments—all of them are in dire need of some level of protection and restoration. UNEP is participating in both programmes. The Science Division is participating in the UN Decade on Ocean Science Data Coordination Group which is currently developing a strategy framework, including the overarching vision, mission, and strategic objectives of the strategic plan.

Regional Seas Programme²⁰

242 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.

243 A major role of the Programme is to support regions to fulfil their responsibilities towards the priorities identified in relevant UN Environment Governing Council decisions and resolutions of the United Nations Environment Assembly, to contribute to reaching global targets such as the Sustainable Development Goals.

244 UN Environment Programme administers regional seas conventions and action plans in West Africa, Caribbean, Mediterranean, Northwest Pacific, East Asian Seas, 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.

Regional Seas Strategic Directions 2022-2025

245 The Regional Seas Conventions and Action Plans (RSCAPs) aim to strengthen the capacity within the

regions to enable countries to implement the action plans, work programmes and COP Decisions through policy and legal guidance, technical support, education, training, communication, and institution-building. Regional Coordination Units (RCUs), often aided by Regional Activity Centers (RACs), service and facilitate countries' implementation of agreed actions under the conventions and action plans. The RSCAPs draw in partnering institutions for delivering key functions, including **knowledge management** and **pollution monitoring**. In addition to functioning as an effective mechanism for regional marine **cooperation**, testing of protocols and methodologies and setting of common indicators and targets at the regional level help to inform global responses. The RSP therefore plays an important facilitative and normative role.

246 It is these roles that have provided the focus of the Regional Seas Strategic Directions (RSSD) 2022-2025, the selection of three core goals and the development of a first set of targets and indicators to track progress across the 18 RSCAPs and the RSP as a whole.

247 The objective of the Regional Seas Strategic Directions 2022-2025 is to achieve a diverse, resilient, and pollution-free ocean that supports equitable sustainable livelihoods. This includes climate stability, living in harmony with nature, ocean sustainability and operating within planetary boundaries. The Regional Seas Strategic Direction (2022-2025) was developed through a consultative process with the RSCAP and the support of the University of Wollongong.

248 The RSSD 2022-2025 provides three overarching purposes: Guide RSCAP activities towards achieving ocean-related components of the three primary global goals of addressing climate change, biodiversity loss and pollution, as well as sustainable livelihoods, by working towards achievement of UNEP's Medium-Term Strategy (MTS) 2022-2025 and Programme of Work (Pow) 2022-2023, but also targeting ocean-related components of the SDGs and the Post-2020 Global Biodiversity Framework. Provide an initial 3-year framework to track RSP achievements and the national and inter-regional levels, building a preliminary baseline towards a more robust and impact-oriented set of indicators, and providing comparative reporting to assist RSP reporting, but allowing for individual RSCAP achievements to be highlighted. Generate information to promote improved advocacy to raise the profile of the RSP within UNEP and UNEA, particularly as an implementing framework for ocean-related goals.

249 **RSSD Roles and Responsibilities:** The RSSD 2022-2025 aims to be very specific on the different roles, functions and mandates of the entities involved in it follow up and implementation: Eighteen RSCAPs, each with its own autonomous governing body consisting of the countries/Parties in the region, decision-making processes, work plans and budgets to which the Parties/countries contribute to through assessed or voluntary contributions. For seven of these eighteen RSCAPs, the United Nations Environment Programme (UNEP) is designated as the secretariat, six being administered through the Ecosystems Division and one through UNEP's Europe Office. UNEP provides overall coordination and facilitation of work, including conven-

²⁰ <http://www.unep.org/regionalseas/>

ing the Global Annual Meetings of Regional Seas and Action Plans to facilitate dialogue between RSCAPs, endeavoring to harmonize and strengthen regional approaches thus helping to deliver as one. The UN Environment Assembly (UNEA) with its universal membership is uniquely positioned to provide overarching global policy guidance, helping to bring together work of RSCAPs, including facilitating partnering with relevant intergovernmental organizations and other stakeholders.

250 The RSSD will contribute to the implementation of the 2030 Agenda on Sustainable Development, Goal 14 to conserve and sustainably use the oceans, seas, and marine resources and other related SDGs. More specifically, the RSSD 2022-2025 will contribute to and strengthen the delivery of UNEP's Medium-Term Strategy (MTS) 2022-2025 and Programme of Work (Pow) 2022-2023, particularly regarding activities that address ocean-related components of the identified priority areas of climate action, nature action, chemical and pollution action, science-policy, environmental governance, finance and economic transformations and digital transformations. In addition, the RSSD 2022-2025 promotes and provides further clarity on the contribution of RSCAPs to UN Decades on Ecosystem Restoration (2021-2030) and Ocean Science for Sustainable Development (2021-2030). The RSSD 2022-2025 outlines how UNEP's Regional Seas Programme will deliver on regional and global goals and agreements to protect and sustainably use the oceans. The aim is to increase the visibility and strategic involvement of RSCAPs in key processes at global and regional levels, while ensuring that UNEP delivers on its mandate in relation to the marine environment.

Activities in the regions:

Abidjan Convention (West, Central and Southern Africa)

251 Signed in 1981, The 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, known as the Abidjan Convention, covers a marine area of just over 14,000 km. From Mauritania to South Africa, the Convention provides an overarching legal framework for all marine-related programs in West, Central, and Southern Africa.

252 **Ongoing activities:** For over 6 years, the Abidjan Convention has been accelerating the process of developing regional cooperation instruments. These cooperation agreements include the additional protocols to the Abidjan Convention on: Pollution from land-based sources and activities; Environmental norms and standards related to offshore oil and gas activities; Integrated coastal zone management; and Sustainable mangrove management. These protocols have been signed by the Convention countries in Abidjan during the plenipotentiary meeting held on July 2019.

253 **Awareness-raising activities for parliamentarians:** as part of the implementation of the strategy for the ratification of additional protocols, the

Abidjan Convention Secretariat, in collaboration with the Project Management Unit of the West Africa Coastal Areas Management Program (WACA) Benin and the Ministry of the Living Environment and sustainable development, organized from September 2 to 4, 2021 in Grand Popo, an awareness workshop for parliamentarians from Benin. A total of fifteen parliamentarians, mobilized under the aegis of the network of parliamentarians for the environment and climate change, took part in the workshop, in the presence of three committee chairmen, namely the Committee on Laws, Administration and Human Rights, the Finance and Trade Commission and the Planning, Production and Equipment Commission which oversees environmental issues. During work marked by the presentations of additional protocols of the Abidjan Convention, the stakes of the management of the Beninese coast and the guided field visit which followed, the deputies were engaged in discussions to imbue the benefits of the ratification of these protocols for Benin.

254 Support-Advice to the 6 WACA ResIP countries to ensure the adequacy between the Convention and the national legal corpuses and support for the preparation of draft laws with a view to transposition: within the framework of the study on the review of the political, legal and institutional framework for the management of the marine and coastal environment in Senegal in relation to the Abidjan conventional system, the Secretariat of the Abidjan Convention worked closely with the PMU of Senegal, as member of the study's pre-validation committee. Observations and comment to improve the interim and final reports were produced and made available to the PMU. The PMUs of Togo and Benin have prepared draft implementing texts for their respective coastal laws and requested the review of the Abidjan Convention in terms of aligning these texts with the provisions of the additional protocols of the Abidjan Convention. At the regional level, the Abidjan Convention has been involved in the process of developing four draft WAEMU community regulations that align with the additional protocols to the Abidjan Convention, thus strengthening the regulations in the field of coastal and marine environment.

255 **Marine plastic pollution:** The Secretariat of the Abidjan Convention has organized, within the framework of the ACP MEAs III program financed by the European Union and UNEP, a series of webinars from April to July 2021 to characterize the state of plastic pollution and the means to effectively address it. The resulting booklet will be used to develop a regional framework to combat plastic pollution. The Contracting Parties will then be provided with national frameworks to fight against plastic pollution.

256 In addition, a new protocol on plastic pollution is being developed to ensure common standards in the region for all Contracting Parties in the fight against plastic pollution. A working group has been set up for this purpose.

257 Finally, on this chapter, with the collaboration of GIZ, the Abidjan Convention has actively contributed to the campaign for the adoption by UNEA 5 of a resolution for a global legally binding treaty against plastic pollution. Several member countries of the Abidjan Convention sponsored the resolution present-

ed by Rwanda and Peru. The Secretariat of the Abidjan Convention is campaigning for its Contracting Parties to participate in the INC negotiations.

258 The exponential increase in the use of plastic in modern society and the inadequate management of the resulting waste have led to its accumulation in the marine environment. There is increasing evidence of numerous mechanisms by which marine plastic pollution is causing effects across successive levels of biological organization. This will unavoidably impact ecological communities and ecosystem functions. A remaining question to be answered is if the concentration of plastic in the ocean, today or in the future, will reach levels above a critical threshold leading to global effects in vital Earth-system processes, thus granting the consideration of marine plastic pollution as a key component of the planetary boundary threat associated with chemical pollutants. Marine plastic pollution is irreversible and globally ubiquitous, and thus meets two of the three proposed essential conditions for a chemical pollution planetary boundary.

259 Regarding the fight against the loss of biodiversity, the Abidjan Convention will have an additional protocol on Marine Protected Areas. A working group has been set up for this purpose and the plan of the future protocol has been drafted and presented during events such as the COP13 of the Abidjan Convention in December 2021, the PRGM Forum in March 2022, the APAC congress in Kigali in July 2022.

260 In addition, the Abidjan Convention will strengthen the network of marine protected areas in the region either through the creation of new MPAs or the operationalization of existing MPAs.

261 The Secretariat has assisted some Contracting Parties in the preparation of their first **Status Report of the Marine and Coastal Environment**. A Draft Decision CP13/10 invited the Contracting Parties of the Abidjan Convention area to prepare and/or update their Status Report of the Marine and Coastal Environment.

262 **Marine Spatial Planning (MSP):** The Secretariat and its Partner GRID Arendal joined efforts in the implementation of this CoP12 Decision, by organizing training courses on MSP for the benefit of French and English-speaking countries and in particular the countries of the WACA Resip project. The pilot countries that have received funding from the German Ministry of the Environment were invited to finalize the process of developing their Marine Spatial Planning and to continue, in conjunction with the Convention Secretariat, efforts to mobilize resources for the implementation of the plan; urges the other Contracting Parties to draw on the experience of Benin, Côte d'Ivoire, Ghana and South Africa to develop their marine spatial planning systems; In doing so, request that work on marine environmental assessment in the context of large marine ecosystems and deliberate on the description of ecologically or biologically significant marine areas be linked to ongoing marine spatial planning initiatives.

263 **Coastal Fisheries Initiatives (CFI)** Result of a collaboration between FAO and UNEP, the CFI project is implemented in Cabo Verde, Côte d'Ivoire and Senegal, the project aims to strengthen fisheries governance, management, and value chains, through the

implementation of an ecosystem approach to fisheries, relevant international instruments, and innovative governance partnerships. UNEP has entrusted the Abidjan Convention Secretariat with the implementation of Output 1.2.2. of Component 1 which deals with fisheries governance and management. Through a participatory approach involving the various actors (state, civil society, private sector, and researchers) at national and local level, the Secretariat of the Abidjan Convention ensures the sustainable conservation and rational use of mangrove resources such as enacted by its additional protocol relating to the sustainable management of mangroves and its implementation action plan.

264 It was expected from the Secretariat of the Abidjan Convention, over 3 years, the conservation of 700 ha of mangroves in Senegal and Côte d'Ivoire. The areas of Ivorian mangroves visited are estimated at 11,635 ha., including 8,772 ha. accessible, 2,863 ha non-accessible and 3,750 degraded ha that can be restored. Almost all the mangroves of Côte d'Ivoire are in the south along the lagoons, the lower courses of the rivers or along the mouths. Almost all the mangroves identified in Côte d'Ivoire are found in protected areas such as National Parks or Ramsar sites. However, the lack of management of these sites due to the lack of funding and equipment exposes them to attacks from local populations except the mangroves of the Ehotile islands National Parc and the Azagny National Park. The main factors contributing to the degradation of mangroves identified are the cutting of wood for smoking of fishery products; climate change combined with certain infrastructures such as dams modify hydrodynamics and water balances and urban development. The main solutions consist at raising awareness among local populations, protecting priority mangroves area, restoring degraded mangroves, and developing income-generating activities for women and youth. Finally, to reduce the pressure of local populations on the mangroves, by encouraging the construction of wood parks by local communities, encouraging the use of improved smokehouses and the use of smart energy sources.

265 **Development of the Abidjan Convention Resource Center:** The structuring already includes the country profile, access gateways to the websites of the partners of the Convention, the integration of the coastal erosion problem, as well as the reference institutions with useful resources for the understanding of coastal and marine zone issues. The test phase began with the introduction of data mobilized within the framework of WACA ResIP by sub-component 1.2.

The Coordinating Body on the Seas of East Asia (COBSEA)

266 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, the Philippines, Thailand, Singapore, and Viet Nam) in the sustainable development and protection of the marine environment and coastal areas of the East Asian Seas. The COBSEA Secretariat is hosted by Thailand and administered by

UNEP in Bangkok, Thailand. COBSEA supports participating countries to address priority issues in line with the COBESA 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 the achievement of relevant SDGs and Aichi Targets. A Voluntary Commitment on how COBSEA addresses relevant SDGs was submitted during the UN Ocean Conference in 2022.

267 Marine Litter: The 24th Intergovernmental Meeting (IGM 24) of COBSEA adopted the revised Regional Action Plan on Marine Litter (RAP MALI) in June 2019 and formally established the Working Group on Marine Litter (WGML) to guide its implementation. The RAP MALI guides regional action to prevent and reduce marine litter from land-based and sea-based sources, strengthen marine litter monitoring and assessment, and create an enabling environment for implementation. The 25th Intergovernmental Meeting of COBSEA (IGM 25) took place in two parts, with a virtual meeting held on 29-30 June 2021 and an in-person meeting to be held on October 2022. The meeting provided an update on ongoing marine litter activities, including SEA circular, and presented projects and initiatives in the pipeline, as well as updates on relevant regional and global processes. WGML focal points provided further input to the biennial work plan for implementation of the RAP MALI and the Regional Guidance on Harmonized National Marine Litter Monitoring Programmes, established the Expert Group on Monitoring to support the application of Regional Guidance, and recommended the Terms of Reference of the East Asian Seas Regional Node of the Global Partnership on Marine Litter (GPML) for adoption by part one of IGM 25. The Fourth Meeting of WGML is planned in person in Viet Nam, preceding part two of IGM 25 on October 2022.

268 The Regional Guidance for Harmonized Marine Litter Monitoring Programmes was developed in collaboration with the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The RAP MALI recognizes that the absence of adequate science-based monitoring and assessment programmes is a significant barrier to addressing marine litter. The Guidance builds on existing monitoring efforts and capacities in the region and provides targeted recommendations for monitoring methods, data standards and core objectives to strengthen national monitoring programmes in line with globally established guidelines, including GESAMP Guidelines, to promote data comparability for transboundary cooperation. COBSEA is providing national training on marine litter monitoring and assessment in 2021 and 2022, building on the 2019 Training of Trainers held with support from the GPML and Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA). Training of Trainers on Monitoring and Assessment of Marine Plastic Litter and Microplastics will be held in Phuket, Thailand on 25 July to 3 August 2022.

269 The regional marine litter project SEA circular ('Reducing marine litter by addressing the management of the plastic value chain in South-East Asia'), implemented jointly by COBSEA and UNEP Regional Office for Asia and the Pacific with support from the Government of Sweden, supports the implementation of the RAP MALI. SEA circular promotes market-based solutions and enabling policies to transform plastic value-chain management, strengthens the science base for informed decision making, creates outreach and awareness, and leverages COBSEA's regional mechanism to tackle the transboundary challenge of marine litter. The project promotes a human rights-based approach to protect informal waste workers and coastal communities most vulnerable to the impacts of plastic pollution. The project is implemented from August 2018 to December 2022.

270 Under the SEA circular project, UNEP and COBSEA host the annual regional plastic pollution partnership event SEA of Solutions bringing together stakeholders from national and local governments, the private sector, academia, civil society, and development partners. The first SEA of Solutions was held in November 2019 in Bangkok, Thailand, with around 500 participants. SEA of Solutions 2020 was held as a hybrid event in Viet Nam and online in November 2020 with over 700 participants. The SEA of Solutions 2021 took place as a virtual event, co-hosted by the Government of Malaysia with UNEP and COBSEA on 16-18 November 2021.

271 Under the United States Environmental Protection Agency (USEPA) and UNEP 'Cooperation on Global Environmental Programs' umbrella agreement and in line with the RAP MALI biennial work plan, COBSEA is developing pilot activities in the East Asian Seas to demonstrate integrated waste management good practices to reduce and prevent plastic waste leakage into rivers and the coastal and marine environment. COBSEA is implementing three pilot projects to develop a more integrated and cohesive approach to solid waste and marine litter management. The three pilots engage and cater to the needs of the local communities, which are an archipelago and a fishing village, as well as disadvantaged groups such as unemployed women. The implementation of the pilots will be finalised in August 2022. The pilots will be documented through videos that will be prepared as case study guiding videos as well as social media short videos.

272 In July 2022, COBSEA was granted funds from the Canadian government Ghost Gear Fund. The project has two outputs. The first output is a regional capacity-building event for national Ministries of Fisheries and the Environment and relevant municipal/local authorities and fisheries representatives on gear marking toward a regionally coherent approach that is appropriate. The two-day event will be held in Bangkok, Thailand from February – March 2023. The second output aims at building scuba diving shops' capacity to recover lost gear through the initiative Green Fins through Reef World. This will include a Steering group to develop a guideline for ghost gear recovery by dive centres, and an information-gathering exercise on the recycling aspect of broken or recovered nets.

273 **Nutrients:** In 2020 and 2021, COBSEA conducted a desk review on nutrient pollution as a transboundary challenge in the East Asian Seas region in cooperation with the Global Partnership on Nutrient Management (GPNM) of the GPA. The review compiled available information on the main sources and impacts of nutrient pollution in the coastal and marine environment; prevention and reduction commitments, targets, and measures; and related monitoring and assessment in COBSEA countries; to support the development of further actions in line with COBSEA Strategic Directions 2018-2022.

274 COBSEA cooperated with Blue Solutions Initiative and UNEP to build capacity and a conducive policy environment for ecosystem-based marine and coastal spatial planning (MCSP) including Marine Protected Areas (MPAs) in the East Asian Seas region. This resulted in a review of national and regional legal and policy frameworks relevant to marine and coastal spatial planning in the region, which is to be presented during part two of IGM 25 in Hanoi in October 2022. Following the virtual training on MCSP held last November 2020, a second part on Sustainable Blue Ocean Economy Training was held in September 2021 which provided participants with the skills in determining the value of different ocean economic activities and how these can be used towards a sustainable future.

275 **Marine and Coastal Ecosystems:** COBSEA conducted a desk review of the MPA and MPA Network situation of the East Asian Seas. This desk study was presented to COBSEA countries during a webinar held on 17 February. The purpose of the desk study is to analyse the need and opportunity towards developing a regional network of MPAs in the East Asian Seas that is to be facilitated by COBSEA. The desk study will be finalized and presented during part two of IGM 25 in Hanoi.

276 COBSEA is developing a marine and coastal ecosystems governance framework that integrates and harmonizes all efforts on the marine and coastal environment, including MCSP, MPA and Networks of MPAs, different marine and coastal habitats, and several relevant cross-cutting mechanisms such as community of practice, data management, and blue economy. This framework aims to increase COBSEA's work on the conservation and governance of the environment in line with the SDGs and upcoming Post-2020 Global Biodiversity Framework targets.

277 COBSEA plays a coordinating role in the implementation of the UNEP GEF '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. The inception workshop took place on 1 July 2021, and the project will be implemented until 2023.

The Cartagena Convention-Caribbean Environment Programme

278 **Governance:** The UNEP Cartagena Convention Secretariat and Caribbean Environment Programme continues to cooperate with the Secretariat of the Convention for the Protection of the Marine

Environment of the North-East Atlantic (OSPAR), the Gulf and Caribbean Fisheries Institute (GCFI), Institute of Marine and Coastal Research (INVEMAR), The Ocean Foundation and the Caribbean Regional Fisheries Mechanism, through Memoranda of Understanding (MOU). A draft MOU was developed with the International Whaling Commission and the Memorandum of Cooperation with the Mesoamerican Reef Fund was extended to 2026.

279 During the Tenth Ordinary Steering Committee Meeting of the Regional Marine Pollution Emergency, Information and Training Centre – Caribe (RAC REMPEITC-Caribe) which convened in May 2022, focal points of the Cartagena Convention's Oil Spills Protocol endorsed a 2022-2023 work plan that includes various thematic workshops to bolster oil spill preparedness and response. The Steering Committee also adopted Recommendations regarding the Centre's Strategic Plan, ballast water management, Oil Spill National Contingency Plans, and the International Convention for the Prevention of Pollution from Ships (MARPOL), to be presented to the 17th Conference of Parties in March 2023 for approval.

280 In June 2022, the Secretariat launched a commemorative video that highlights the importance of the Cartagena Convention to addressing the marine environmental challenges faced by the governments in the Wider Caribbean. The production was financed by the European Union-funded ACP MEAs III project. Subtitled versions in Spanish and French will be available in the coming weeks.

281 At the UN Ocean Conference in June 2022, the Secretariat was represented in-person by UNEP's Regional Seas Coordinator, and by staff members virtually, at several side events focused on good governance, climate change, marine pollution and partnerships. In the lead-up to the Conference, the Secretariat also participated in an interview about the work of the Convention and a podcast series on Barbados and the blue economy, featuring the innovative work being done through the GEF IWeco national sub-project.

282 At the 16th Conference of Parties (COP) to the Cartagena Convention held in July 2021, the Secretariat presented an information paper on sustainable blue economy, pursuant to the request made by the 15th COP. The 16th COP further encouraged the Secretariat to formulate the necessary work under the Convention to support and arrive at sustainable blue economies.

283 The Cartagena Convention Secretariat is providing additional support for the establishment of a Coordinating Mechanism (CM) and Sustainable Financing Plan (SFP) for ocean governance in the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+) region. A Memorandum of Understanding has been signed by participating agencies, including UNEP, and Contracting Parties to the Cartagena Convention have been requested to provide feedback on the possibility of the Mechanism being hosted by the Secretariat.

284 In May 2021, the Government of Nicaragua became the 18th country to ratify the Cartagena Convention's Specially Protected Areas and Wildlife Protocol (SPA/W).

285 The Governments of Guatemala, Mexico and Suriname received technical support to assist them with becoming Parties to the Protocols (and the Convention in the case of Suriname), which they have not yet ratified. Saint Kitts and Nevis also received support and a request was submitted to its Cabinet of Ministers for ratification of the LBS and SPAW Protocols. Two virtual workshops were convened in English and Spanish in November 2021 with Non-Contracting Parties to the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS). The sessions aimed to promote ratification, identify barriers to ratification, and develop a list of capacity-building needs.

286 The 2021-2030 Strategy for the Cartagena Convention Secretariat is being updated and will enable response and action on new and emerging issues impacting the successful implementation of the Cartagena Convention and its Protocols.

287 Working Groups have been established to support the implementation of obligations by Caribbean countries under the LBS and SPAW Protocols and related global MEAs on marine biodiversity and marine pollution. Regional experts were nominated to participate in the Ad Hoc Working Groups on protected areas, species, exemptions and Sargassum. The LBS Open-Ended Working Group has been instrumental in the Secretariat's efforts to strengthen environmental monitoring and assessment and has been expanded at the request of Contracting Parties to include sub-groups on standards and criteria for nutrients and wastewater discharges, emerging issues, and information management.

288 The Cartagena Convention Secretariat is engaged in the development of the PROCARIBE+ project 'Protecting and Restoring the Ocean's natural Capital, building Resilience and supporting region-wide Investments for sustainable Blue socio-economic development' which is a follow up to the UNDP GEF CLME+ project. PROCARIBE+ aims to develop sustainable and resilient ocean-based economies through marine spatial planning, marine conservation, sustainable fisheries and addressing land-based sources of pollution, while also considering issues such as gender and climate change.

289 **Marine Pollution:** The first regional State of the Cartagena Convention Area (SOCAR) Report on marine pollution, co-financed by the GEF IWECO and GEF CLME+ projects, was published and reflects pollution monitoring data collected from 16 countries of the Wider Caribbean. Summaries of the SOCAR report for 3 stakeholder groups – policymakers, civil society and the private sector and an integrated brief on SOCAR and the State of Marine Habitats (SOMH) were published in English, Spanish and French and will support improved knowledge management and public education.

290 The Secretariat is partnering with the University of Geneva on the development of a regional environmental monitoring platform to support the periodic development of the State of Marine Biodiversity and State of Marine Pollution reports for the Caribbean Sea, and improved reporting on SDGs 6 and 14. This platform will be finalised by December 2022 and inte-

grated into UNEP's World Environment Situation Room, allowing regional information to be more accessible to stakeholders for national and/or regional decision-making. Funding is being provided under the Global Environment Facility-funded CReW+ project (GEF CReW+) 'An integrated approach to water and wastewater management in the Wider Caribbean Region using innovative solutions and sustainable financing mechanisms.'

291 Through funding from the Swedish Government, the Regional Activity Centres (RACs) for the LBS Protocol hosted a regional Workshop on the Index of Coastal Eutrophication Potential (ICEP) and Harmful Algal Blooms (HABs) in July 2022. The workshop aimed to inform policy makers and build regional capacity on the incidence of coastal eutrophication potential (ICEP) indicator and facilitate reporting of SDG indicator 14.1.1a in the Wider Caribbean Region (WCR). To reflect on the linkages between eutrophication and sargassum, as well as the impacts of nutrient pollution on marine biodiversity, the workshop received support from the RAC for the Protocol Concerning Specially Protected Areas and Wildlife for the WCR (SPAW RAC). This collaboration supported the Decision of Contracting Parties for enhanced collaboration among all RACs.

292 The first Regional Nutrients Pollution Reduction Strategy and Action Plan for the Wider Caribbean Region was adopted by Contracting Parties at their 16th COP. The strategy and action plan will enable an integrated approach to addressing pollution from major sources of sewage and agrochemical runoff. The strategy has catalysed efforts to develop National Nutrients Reduction Strategies for Barbados and Jamaica, aimed at not only reducing nutrients pollution but also developing a more holistic approach that ensures nutrients efficiency and improved food security.

293 The Cartagena Convention Secretariat's efforts to strengthen water and wastewater management in the Wider Caribbean are ongoing. Several partnerships have been formalized under the GEF CReW+ project to support the implementation of wastewater pollution prevention activities. In partnership with the United Nations University Institute for Water Environment and Health (UNU-INWEH), national Water Information Management Systems (WIMS) in six Caribbean countries are currently being developed.

294 The Secretariat has continued to strengthen capacities throughout the region on the management of freshwater resources and reducing nutrient pollution. Under GEF CReW+, the Ocean Sewage Alliance, The Nature Conservancy and RARE will develop joint capacity building activities on behaviour change relating to the control, reduction, and prevention of marine pollution from domestic wastewater. In addition, the Caribbean Water and Sewerage Association Inc. (CAWASA) will conduct a training exercise for water and wastewater operators.

295 The RACs for the LBS Protocol are supporting the development of guidelines for domestic wastewater classifications, recommendations for amendments to the LBS Protocol to facilitate increased reuse

of domestic wastewater, management of freshwater resources, and the development of nutrient reduction strategies. This is being undertaken through financial support from the SIDA grant, and the GEF CReW+ and the European Union-funded ACP MEAs III projects.

296 From March – June 2022, the GEF IWEco project delivered a laboratory training series aimed at building capacity amongst participating countries in environmental quality monitoring. The training focused on areas such as methods of water quality analysis and control as well as nutrient analysis methodologies with focus on surface waters.

297 The Secretariat continues to support the CReW+ Academy, a free platform that brings together all training initiatives within GEF CReW+ and provides knowledge on water and sanitation solutions in the region. In 2021, the CReW+ Academy organized two webinar blocks on “Reuse of treated effluent” (Block 2) and “Methods to develop the blue economy and the good use of wastewater” (Block 3). Currently, Block 4 is underway and will cover topics such as pre-feasibility and selection of innovative wastewater nature-based technologies, irrigation systems with treated wastewater, and Shit Flow Diagrams (SFD) for the design and management of future sanitation infrastructures.

298 Under the first joint UN Human Security project in Jamaica “Strengthening Human Resilience in Northern Clarendon and West Kingston, Jamaica”, which concluded in December 2021, the Secretariat implemented rainwater harvesting systems and strengthened the capacity of schools and communities to adopt sustainable practices such as composting, wastewater reuse and recycling systems. Efforts are ongoing to replicate this project in other Caribbean Small Island Developing States (SIDS).

299 **Solid Waste and Marine Litter Management:** The Cartagena Convention Secretariat, in collaboration with the Gulf and Caribbean Fisheries Institute, continued to work on marine litter activities through the Caribbean Regional Marine Litter Node. Several projects and activities were guided by technical information from GESAMP publications on marine litter. These included a Regional Harmonized Approach to monitoring Marine Litter along with an Action Plan which are being piloted in selected countries in the region. The Secretariat also supported the 74th annual conference of the Gulf and Caribbean Fisheries Institute (GCFI) in November 2021 and moderated a special technical session on marine litter. Communication and outreach activities have included recurring social media campaigns in July (Plastic Free July) and December (Plastic Free Christmas) as well as the continued update of an interactive map on the status of plastic bans in the Caribbean region.

200 Technical input was provided to a recently published research article entitled Sources and Leakages of Microplastics in Cruise Ship Wastewater for the Frontiers in Marine Science website. The article highlights the sources of microplastics in cruise ship wastewater and provides recommendations to cruise lines on how to address and mitigate the issue.

301 Activities for reducing fishing gear loss into the Caribbean’s marine environment were completed in

Jamaica, Grenada, and Belize with plans to expand to Mexico and other Caribbean islands. The Global Ghost Gear Initiative (GGGI) also recently developed a Caribbean Regional Action Plan to Prevent Abandoned, Lost or Otherwise Discarded Fishing Gear which complements the Secretariat’s Regional Marine Litter Strategy and Action Plan.

302 The Cartagena Convention Secretariat contributed to the Marine Litter Action Plan for the Northeast Pacific 2022 – 2026 that was launched virtually in June 2022. The Secretariat provided expert advice during the development of the Action Plan which was led by MarViva.

303 The Government of Saint Lucia is currently developing a Marine Litter/Plastic Reduction Strategy and Action Plan under the ACP MEAs III project and with support from the UNEP Science Division.

304 The Secretariat through the ACP MEAs III project will develop a technical brief on plastics within the Caribbean, focusing on sources, quantities, presence, and impacts. The brief aims to better inform the region’s negotiators participating in the Intergovernmental Negotiating Committee to develop an international legally binding instrument on plastic pollution as per UNEA-5.2 resolution 5/14.

305 The following are recently developed projects on marine litter:

- a. The Prevention of Marine Litter in the Caribbean Sea (PROMAR) project, financed by the Government of Germany, will support the Dominican Republic, Costa Rica, Colombia, British Virgin Islands, Guyana, Suriname, Saint Kitts and Nevis, and Trinidad and Tobago, to reduce the flows of plastic waste (mainly packaging) from terrestrial sources into the Caribbean Sea and its coastal areas.
- b. The ‘Reduce marine plastics and plastic pollution in Latin American and Caribbean cities through circular economy’ project, financed by the GEF, aims to reduce regional marine plastics and plastic pollution in three (3) countries, namely, Panama, Colombia and Jamaica, by facilitating circular actions at the city-level to accelerate the transition to a circular economy through improved waste management. The project directly responds to national, regional and global marine litter and plastics-related action plans, resolutions and commitments, such as the Regional Action Plan for Marine Litter (RAPMaLi) for the Wider Caribbean Region.

306 As a follow up to the UNEP Global #CleanSeas campaign launched in Bali in February 2017, the Cartagena Convention Secretariat supported the launch of a regional Caribbean Clean Seas Campaign in 2019. The campaign is ongoing and was built on the annual International Coastal Clean-up (ICC) activities with support from the Caribbean Youth Environment Network (CYEN).

307 **Marine Biodiversity:** A Manual for the Ecological Restoration of Mangroves in the Mesoamerican Reef System and the Wider Caribbean was produced with technical and financial support from the UNDP GEF CLME+ project, Integrated Ridge-to-Reef Management of the Mesoamerican Reef Ecoregion Project - MAR2R/CCAD/WWF-GEF and the Mesoamerican Reef Fund. The manual was launched in December 2021.

308 With support from the UNDP GEF CLME+ Project, a Regional Strategy and Action Plan for key marine habitats was developed and approved by the Contracting Parties for the SPAW Protocol.

309 **Marine Protected Areas:** The Secretariat's continued work to strengthen the management and networking of marine protected areas (MPAs) and protected species included the incorporation of the Cotubanama National Park in the Dominican Republic as a SPAW-listed site.

310 Capacity-building initiatives on marine protected areas (MPAs) focused on specific activities such as the development of a functional network of SPAW-listed protected areas that cover interconnected marine habitats. Activities implemented thus far include:

- a. Steps to establish a SPAW MPAs Networking Group to lead the inter-regional network of MPAs through a coordination mechanism for MPA management effectiveness and improved MPA networking (including enhancement of the Caribbean Marine Protected Area Network and Forum (CaMPAM). CaMPAM has been restructured and expanded to include information on 1069 marine and coastal marine protected areas (MPAs) from 44 countries throughout the Wider Caribbean.
- b. Development new planning tools to link SPAW-listed MPAs based on the ecological connectivity between the sites, an Assessment of the Impact and Effectiveness of the Caribbean Marine Protected Area Network and Forum (CaMPAM) and Strategic Directions and Network Development Plan for the Caribbean Marine Protected Area Network and Forum (CaMPAM).
- c. The Secretariat also completed:
 - i. Protected Areas Management Effectiveness (PAME) survey report of 35 SPAW sites;
 - ii. Guidelines on How to conduct Protected Areas Management Effectiveness Assessment;
 - iii. An analysis of proposed species for inclusion within the proposed ecological network development for the SPAW-listed PAs and the Gulf of Mexico (GoM) MPAs.
 - iv. SPAW MPA booklet and protected areas brochure; and
 - v. A Caribbean MPA Network brochure.

311 The Secretariat is also participating in the development of the GEF-funded project 'Implementation of the Strategic Action Program of the Gulf of Mexico Large Marine Ecosystem' (GoM LME), with particular focus on executing activities related to Marine Protected Areas (MPAs).

312 **Ecosystem-Based Management:** Building on the previous work of the UNDP GEF CLME+ project, the Secretariat through funding from the ACP MEAs III project will support the implementation of an Ecosystem-based Management projects promoting an integrated approach to pollution reduction and marine habitat restoration in Suriname and Guyana.

313 **Stony Coral Tissue Loss Disease:** The Cartagena Convention Secretariat's White Paper on Stony Coral Tissue Loss Disease, produced in collaboration with the GCFI in July 2021, was officially launched in October 2021. It provides best management practices, communication techniques and possible interventions that countries in the region can implement to respond to the disease. An interactive dashboard was also developed to record and track sightings of the disease in the region.

Nairobi Convention (Western Indian Ocean)

314 Working with the 10 Contracting Parties and other partners, the Nairobi Convention is currently implementing five projects and programmes as follows: (i) Implementation of the Strategic Action Programme for the protection of the Western Indian Ocean from land-based sources and activities' (WIOSAP) Project, whose goal is to reduce impacts from land-based sources of pollution in the Western Indian Ocean (WIO) region and sustainably manage coastal and river ecosystems, (ii) Western Indian Ocean Large Marine Ecosystems Strategic Action Programme Policy Harmonisation and Institutional Reforms (SAPPHIRE Project), executed to achieve effective, long-term ecosystem management in the WIO Large Marine Ecosystems, (iii) the EU funded Programme on African, Caribbean, and Pacific Countries Capacity Building of Multilateral Environmental Agreements (ACP-MEAs 3) in the Nairobi Convention area, (iv) Partnership Project for Marine and Coastal Governance and Fisheries Management for Sustainable Blue Growth in the Western Indian Ocean (NC-SWIOFC PP) and, (v) the project on Integrated Management of the Marine and Coastal Resources of the Northern Mozambique Channel (NoCaMo). The Nairobi Convention is also supporting in the implementation of the Western Indian Ocean Governance Initiative, (WIOGI) in partnership with GIZ for the effective protection and sustainable use of marine and coastal biodiversity.

315 Revision is underway for the amendment of the Nairobi convention Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region. From a series of legal and technical negotiations by the contracting parties, the legal framework of the Protocol will be strengthened to make it more effective at conserving biodiversity, managing marine and coastal ecosystems, and addressing current and emerging threats. A training of negotiators is planned for October 2022 at the time when the negotiated text

of the ICZM Protocol will be submitted to a Conference of Plenipotentiaries for adoption.

316 From 27-29 January 2020 in Nairobi, Kenya, the Nairobi Convention supported IOC-UNESCO and other partners in organizing a regional consultation workshop for Africa and the Adjacent Island States on the UN Decade of Ocean Science for Sustainable Development (2021-2030). The workshop was an opportunity for African States to co-design mission-oriented research strategies and actions in line with the 2030 Agenda and continental and regional initiatives such as Africa's Integrated Maritime Strategy 2050.

317 Building on the regional cooperation in response to marine pollution incidents, the Nairobi convention in collaboration with Western Indian Ocean Marine Science Association (WIOMSA) has undertaken three regional assessments on the status of marine litter and microplastics and their ecological, human health and economic impacts; assessment of measures undertaken by different institutions to address the challenges of marine litter pollution; and highlighted opportunities which can be harnessed for more impact. These assessments will support technical negotiations under the UNEA 5.2 Resolution 14 on an internationally legally binding legal agreement on plastic being coordinated by the International Negotiations Committee (INC).

318 Sustainable Port Development: In realizing the unprecedented pace of large-scale developments in the WIO region ranging from ports, mining, roads and railways, agriculture and oil & gas among others, the Nairobi convention has committed to assess the environmental impacts of operational, planned, and proposed ports in the WIO region. On 17 March 2022, a virtual meeting was held to create awareness on the scope and environmental impacts of ports development in the region, as well as to discuss options available to foster sustainability in port development. The process is envisaged to lead to the development of different scenarios for future development, produce policy briefs and a Toolkit for Green Port Development through targeted stakeholder approach that will contribute to sustainable port development in the region.

319 The Nairobi convention is currently supporting an economic valuation of the Trans-boundary Conservation Area (TBCA) between Kenya and Tanzania to serve as a basis for a business case towards the establishment of a collaboratively managed area between the two countries. The economic valuation presents a standardized approach to valuation techniques through demonstration sites in Tanzania, Mozambique, and Madagascar.

320 In August 2020, the Nairobi Convention began supporting the demonstration of Marine Spatial Planning (MSP) within a Blue Economy framework in Kenya for further replication and transfer of lessons. The project at County level seeks to prioritize key maritime sectors that can help Kilifi County Government to provide policy and regulatory direction towards the realization of the blue economy promise. Thus far, a Marine Spatial Planning Framework has been developed in partnership with Nelson Mandela University and a regional MSP Technical Working Group established. The Framework captures regional experiences and pathways through which MSP can be imple-

mented. The Regional Framework also has potential to inform national-level actions especially for countries still at the early MSP implementation phases.

321 The Convention has supported through the ACP-MEAs programme the completion of the status report on Western Indian Ocean sharks and rays and roadmap for their conservation through a commitment secured in 2021 with WCS (South Africa) who worked with TRAFFIC. The report is undergoing validation processes by Partners. It will form an important constituent during the negotiations for amending the Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region and its annexes in 2022.

Cooperation/Partnerships:

322 The Nairobi Convention is partnering with the Western Indian Ocean Governance Initiative (WIOGI) on collaboration in the protection and sustainable use of marine and coastal biodiversity in the WIO, by supporting development of a WIO Ocean Governance Strategy. A multi-stakeholder Task Force of 24 experts held virtual discussions in April 2022 for the development of a Western Indian Ocean Governance Strategy, expected to be finalized by mid-2023. The Nairobi Convention is also partnering with the WIOGI to foster sustainable blue economy in the Western Indian Ocean region. The initiative is known as 'Our Blue Future' contributes to the process of developing an Ocean Governance Strategy for the WIO region.

323 In 2020 and 2021, and in support of the Nairobi Convention's commitment to making all data and information products as open and as accessible as possible via the Nairobi Convention's Clearinghouse Mechanism, capacity building was provided for nine national data centres housing national Marine Ecosystem Diagnostic Analysis data. A further collaboration was established with Swedish Agency for Marine and Water Management (SwAM) through the WIO Symphony project to enhance the collation of spatial data on human activities to assess their cumulative impacts on marine ecosystems. The WIO Symphony (WIO Sym) is a co-developed decision support web tool that supports marine spatial planning for ecosystem-based MSP in the Western Indian Ocean by assessing environmental impact of human activities. Cooperation with WIO-C continued including with WCS in development of national action plans and regional roadmap for conservation of sharks and rays in the WIO.

324 The cooperation with WIOMSA and collaboration with SwAM for capacity development of MPA managers, including through the MPA network WIOMPAN (launched in June 2021), organised a capacity building webinar (24 June 2021) on design, implementation, and adaptive management of regional networks of MPAs.

325 The Nairobi Convention has also partnered with Council for Scientific and Industrial Research (CSIR) in the development of a regional framework for coastal and marine water quality management. Four outputs have been finalized: a Situational Assessment Framework; a Water Quality Monitoring Framework; and Water Quality Monitoring Guidelines.

326 A virtual Partnership Meeting in April 2021 brought together Regional Economic Communities (RECs), Commissions and key partners in the Western Indian Ocean Region to strategize on developing a Regional Ocean Governance Strategy for the Western Indian Ocean. The strategy is expected to contribute to the process of developing AMCEN/AU led African strategy for Ocean governance. The process of developing an Ocean Governance Strategy for the WIO region will be informed by the background document on the State of Ocean Governance in the Western Indian Ocean region that was launched on 16 September 2020. In addition to Ocean Governance, the Nairobi Convention will further engage with RECs and support initiatives on blue economy, and climate change adaptation.

327 Between September – December 2021, the SAPPHIRE project supported the facilitation of a virtual women's leadership workshop with WIOMSA. This was the third in a series of leadership workshops and built up on lessons learned during the previous iterations in 2019 and 2020. The participant-focused workshop sought to empower leaders and promote networking to influence marine policy formulation, decision making and implementation. The workshop's intent was to enhance women's existing leadership capacity to help them reach a higher level of relevance and impact. Participants from nine organizations were equipped with skills for improved advocacy on the use of integrated approaches for the management of the coastal and marine resources in the region.

328 During the World Environment Day on 5 June 2022, the Nairobi Convention commemorated by sharing how contracting parties and stakeholders are working to protect, conserve, and manage the Western Indian Ocean region; from sustainably managing shallow marine habitats in the Comoros, to the development of a spatial planning plan in Kilifi County in Kenya, to partnering to develop a regional Ocean Governance Strategy for the region- which will eventually feed into an Africa-wide Ocean Governance Strategy, to collaborating to sustainably manage fisheries in the Southwest Indian Ocean region.

Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Commission)

329 The OSPAR Commission is the mechanism by which fifteen western European governments and the European Union [1] cooperate to protect the marine environment of the north-east Atlantic. 2021 was an important year for OSPAR. The OSPAR Ministerial Meeting took place in Cascais, Portugal on 1 October. This was the first Ministerial Meeting since 2010. The Ministers of the 15 OSPAR countries and the Commissioner for Environment, Oceans and Fisheries of the European Union met to recommit to their obligations under the OSPAR Convention. The key product from the meeting was the agreement of the new North-East Atlantic Environment Strategy 2030. The Strategy sets out OSPAR's collective objectives to tackle the triple challenge of biodiversity loss, pollution and climate change including many of the issues that GESAMP is working on.

330 Much of OSPAR's activity over the last year or so has been focused on producing the evidence and assessments for OSPAR's next major product: its Quality Status Report in 2023. This will provide a holistic assessment of the state of the marine environment in the North-East Atlantic over the period 2009 -2021. A total of more than 130 assessments will be delivered in the framework of the QSR 2023, ranging from common indicator assessments to more strategic thematic assessments that bring together information from a wide evidence base including a socioeconomic dimension. The assessments are being made available on the OSPAR Assessment Portal (Quality Status Report 2023) as and when they have been completed. In relation to the work of GESAMP, OSPAR's thematic assessments and the underpinning indicator assessments on hazardous substances and marine litter will be of particular interest.

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

331 The GPA continues to focus its efforts mainly on the three pollution source categories of nutrients, wastewater, and marine litter, through establishment and management of global partnerships, in response to the Manila Declaration. The GPA held its the 5th Intergovernmental Review Meeting on 15 February 2022. Among the main decisions, Member States decided to hold no further IGRs. They also recognized that UNEA can continue to provide guidance on priorities and activities to address marine pollution from land-based activities. It also emphasized the need for continuing supporting the work of the three partnerships on marine litter, nutrient management, and wastewater.

332 The project titled "Protecting the Marine Environment from Land-Based Pollution through Strengthened Coordination of Global Action" continues to be implemented on a global level by the GPA and includes partners such as international organizations, the private sector, and NGOs. It aims to strengthen responses to land-based pollution, enhance co-operation and foster action to tackle the issues related to wastewater pollution, nutrient management, and marine litter also through the key role of global partnerships, such as the Global Partnership on Marine Litter (GPML), the Global Partnership on Nutrient Management (GPNM) and the Global Wastewater Initiative (GW²I).

Wastewater and the Global Wastewater Initiative (GW²I)

333 On 19 November 2020, on the occasion of the World Toilet Day, the Global Wastewater Initiative launched the publication Faecal sludge management in Africa: Socio-economic aspects, human and environmental health implications. Jointly developed by UNEP and the International Water Management Institute (IWMI), the report highlights the current trends of faecal sludge management and how poor management practices worsen human and environmental health across

Africa. At the end, the authors make recommendations on how to enhance wastewater management and sanitation services delivery. Overall, the publication presents some solutions to improve faecal sludge management and how this is fundamental to tackle the global sanitation crisis and achieve Sustainable Development Goal (SDG) 6.

334 In December 2020, another publication was launched. Jointly developed by UNEP and IWMI, the report *Water pollution by plastics and microplastics: A review of technical solutions from source to sea*, composed of a toolkit and catalogue, presents a range of solutions to reduce plastic and microplastic pollution from the source to the sea while focusing on wastewater as a main pathway. The publication also encourages policymakers and practitioners to set priorities and select those that are more cost-effective and suitable for their local context. Finally, it stresses the importance of having technical solutions in addition to appropriate legislation, economic instruments, education, and awareness that force real change on the ground. An interview by IWMI was recently released on *Smart Water Magazine*. Further outreach activities are planned to trigger further attention and action based on the findings of the publication.

335 The *Sanitation and Wastewater Atlas of Africa* was launched on 2 February 2021. The product is the flagship result of a four-year project implemented jointly by UNEP, GRID-Arendal, and the African Development Bank (AfDB) to better understand the current situation related to wastewater management and sanitation across the African continent. The Atlas consists of different chapters focusing on various aspects of wastewater management, including for example ecosystems, human health, policies, and circular economy, and has a section with detailed country profiles. It is a tool that will help policymakers and the wide public across Africa and beyond to better understand and address the current gaps, and opportunities in this sector. Overall, more attention and investments are needed to foster the changes that will lead to the completion of the SDG 6 on water and sanitation for all. Outreach initiatives such as infographics, webinars and an online workshop are foreseen during the second half of the year. The first webinar, held on 2 March 2021, discussed the process that led to the creation of the Atlas and presented its main findings and key messages.

336 On 22 March 2021, World Water Day, UNEP and the Stockholm Environment Institute, a member of the Global Wastewater Initiative, launched the second edition of the book *“Sanitation, Wastewater Management and Sustainability: From Waste Disposal to Resource Recovery”* which aims to discuss how improved sanitation and wastewater management can benefit both humans and the environment. The first edition of the book was launched in 2016. The second edition features an updated preface, new sub-sections on circular economy, new boxes, figures and two new case studies related to the closed-loop wastewater system in Hamburg, Germany, and off-grid sanitation services converting faecal sludge into charcoal briquettes in Kenya. This second edition has also been translated into Spanish. Check out the press release.

337 UNEP has assisted the County Government of Vihiga, in Kenya, to address the issue of pollution from solid and liquid waste through a joint initiative of GW²I and GPNM. During the past six months, the County Environmental Action Plan, and other relevant documents such as the County Waste Management Strategy and a draft Waste Management Policy were developed. Moreover, the implementing partner identified in the construction of an ablution block a measure to tackle improper sanitation and consequent wastewater pollution. Most of the residents in the area use pit latrines, and this leads to severe water pollution. The construction of the ablution block in a selected site nearby a market will provide for sustainable sanitation provision and will result in reduced pollution from wastewater and better health condition for the people. The project will be going on until the end of the year, with additional measures for nutrient management in the pipeline as well as a training for stakeholders on sustainable solid and liquid waste management and a final workshop.

338 ACT Malaysia, one of the youngest members of the Global Wastewater Initiative, has teamed up with UNEP to tackle the issue of untreated wastewater released in and around the Sabah Marine National Park located in North-Eastern Malaysia. The goal of the project was to empower water villagers in sustaining their livelihoods and avoiding water-borne diseases. The project was successfully concluded in April 2021 and was selected as one of the SDG Good Practices for 2021 by United Nations Department of Economic and Social Affairs (UN DESA). Check out the video of the project! UNEP has also released a story about the project. You can find it out here! Finally, ACT Malaysia together with UNEP and other partners of the Global Wastewater Initiative is also planning a virtual conference on sanitation issues, in conjunction with the UN World Toilet Day (19th November 2021).

339 UNEP, together with the Bremen Overseas Research and Development Association (BORDA), a member of the Global Wastewater Initiative, has concluded a project aimed at building the capacity of key stakeholders in the field of wastewater management in Tanzania. Building on a previous exercise concluded in 2018, the project translated into Swahili the *Guidelines for Application of Small-Scale, Decentralized Wastewater Treatment Systems* that was published at the end of 2018. Furthermore, between 8 and 11 June 2021 in Dar es Salaam, BORDA and UNEP organized training for key stakeholders from Tanzania to disseminate the guidelines and build their capacity on decentralized wastewater treatment systems.

340 UNEP, through the GPA/Wastewater and the Law Division, has continued the implementation of demonstration projects for biodiversity conservation and local community development through tree planting supported the use of treated wastewater. As of July 2021, the implementation of project activities in Ghana have been completed. The wastewater project has contributed to increase forest cover by 55% of degraded lands of the Sakumo Ramsar site and to conserve it biodiversity, through coconuts tree planting using treated wastewater while generating income for local communities.

341 UNEP through the GPA/Wastewater continues to provide support in the implementation of the UNEA3 and UNEA4 resolutions on water pollution, marine litter and microplastics, protection of the marine environment from land-based activities, sustainable nitrogen management and other resolutions.

342 A Massive Open Online Course (MOOC) titled “From Source to Sea to Sustainability. Integrated Cycle in Wastewater and Nutrient Management” was developed by UN Environment/GPA, Concordia University, and the Loyola Sustainability Research Centre to raise awareness and build capacity on the two pollution streams. The MOOC was launched last year and has been rolled out in April 2019. UNEP and the developers are currently discussing the possibility to upgrade the MOOC and integrate the content with new findings and topics, including microplastics, pharmaceuticals, antimicrobial resistance.

343 Since 2018, UNEP, through the GPA/Wastewater and the Global Wastewater Initiative (GW²I) has been organizing a series of webinars to enhance the understanding and recognition of wastewater as a resource as well as to expand knowledge generation, awareness raising and outreach on crucial issues related to sustainable wastewater management. The webinars also serve as an opportunity for the members of the Global Wastewater Initiative to share their expertise and experiences regarding critical issues related to sustainable wastewater management. In 2020, the Global Wastewater Initiative organized three webinars on emerging pollutants, wastewater and COVID-19 and wastewater and nature-based solutions (NbS). It also contributed to organize a mini-series on the water-energy-food nexus, with four events focusing on each area of the nexus and one concluding debate with recommendations on the way forward to implement it widely. Many members of the Global Wastewater Initiative have contributed to the discussion and organization of these online events.

344 The Global Wastewater Initiative has organized its Steering Committee Meeting on 17 March 2021. The meeting was an opportunity for members to come together, update each other on the progress made by their organizations, discuss the activities undertaken by the Initiative over the past year and look at the future in terms of possible joint projects and funding opportunities. The following day, on 18 March 2021, the Initiative and the Global Partnership on Nutrient Management (GPNM) met for the third time also with the goal to review the progress made over the past year and discuss possible activities and initiatives to be implemented jointly. One member put forward a proposal to join forces on a project that involves faecal sludge management and nutrient recovery in India.

345 As a direct response to Resolution 3/10 “Addressing water pollution to protect and restore water-related ecosystems,” the Pollution-Free Ecosystems Unit provided technical and financial support to the County Government of Vihiga, Kenya, to address pollution from wastewater and nutrients. This project took place during October 2020 – December 2021 and has now been concluded. The project aimed at developing and finalizing important normative documents such as the County Environmental Action Plan,

the County Waste Management Strategy, and a draft Waste Management Policy and the construction of an ablution block to tackle improper sanitation and consequent wastewater pollution. The goal was to reduce pollution from wastewater and improve the health condition of the people.

346 After completing a successful first demonstration project that focused on tackling wastewater pollution in the Sabah Marine National Park in Northern Malaysia, UNEP and ACT Malaysia started working on a follow-up project that aims to build the capacity of the local community on wastewater management and sanitation provision at the Lok Urai Village, Gaya island in Sabah, Malaysia, with a special focus on women. The first phase of the project aimed at testing the feasibility of ISTP wastewater treatment technologies in a water settlement located at Sabah Marine National Park in Malaysia. The results of this project are now contributing to phase two namely to empower local communities (with a focus on women) to stop wastewater pollution into their natural environment. By reducing wastewater pollution, better quality water can sustain marine-related economies. Ultimately, the project is expected to contribute to the development of policies for the long-term conservation of coastal water quality as well as for tackling wastewater pollution.

347 In June 2021, UNEP, together with the Bremen Overseas Research and Development Association (BORDA), a member of the Global Wastewater Initiative, organized a workshop to build the capacity of key stakeholders in the field of wastewater management in Tanzania. Building on a previous project concluded in 2018, the Guidelines for Application of Small-Scale, Decentralized Wastewater Treatment Systems is now translated into Swahili. Following the good outcomes of these initiatives, UNEP and BORDA continued the efforts to disseminate the guidelines on decentralized wastewater treatment systems as well as on building the capacity of relevant stakeholders. From 4-6 April 2022, the partners have organized, together with Tanzanian and international stakeholders, the Maji Week, and a one-day scientific conference to this end. The Maji (Water) Scientific Conference took place on the 4th and 5th of April 2022 in Dar es Salaam, Tanzania, and was facilitated by the Water Institute of the Ministry of Water. The main theme was “Water resource management for sustainable water supply and sanitation services”. Maji Week was also an opportunity for UNEP to disseminate the Sanitation and Wastewater Atlas of Africa.

348 On 6th April, BORDA and UNEP facilitated a one-day conference to evaluate the progress of wastewater and faecal sludge management in Tanzania since 2018 and to provide a platform for key sector actors to exchange on and align the next steps. Stakeholders discussed the topics of financial arrangements, capacity development, institutional arrangements, private sector participation, environmental compliance and effluent standards, and technologies. One conclusion of the conference was that given that valuable and important data is limited and scattered among different institutions, a central data collection hub is required. While decentralized sanitation solutions are well known and seen as a feasible option, awareness of the Guidelines is still low, and follow-up activities

are required. Major achievements which followed their dissemination are the development of Guidelines for Faecal Sludge Management, a review of the national water policy, and a review of the Ministry of Water manual for the design, construction, operation, and maintenance of water supply and sanitation projects.

349 UNEP, along with the Sustainable India Trust, is implementing a demonstration project focused on nutrient recovery from wastewater to prevent eutrophication in Delhi. This will be achieved by assessing nutrients lost through wastewater in Delhi/New Delhi and their recovery potential, mapping the current nutrient recovery, recycling, and reuse practices in Delhi/New Delhi against available options, technologies, and best practices. One of the expected results is an ecosystem health card based on water quality parameters to monitor the revival of selected water bodies by regulating nutrient loading from wastewater. This project is due to conclude in October 2022 with great potential for upscaling.

350 Under this project, research is being carried out by UNEP and the Asian Institute of Technology (AIT) to discuss the impact of COVID-19 on the water sector, and specifically on wastewater. This project, focusing on the Asia-Pacific region, and will inform decision-makers and relevant stakeholders of the lessons learned from the past two and half years of COVID-19 and its impact on the water sector. It will provide recommendations for practitioners and policymakers on how to address some of the issues encountered during the pandemic, i.e., shifts in demand and supply, impact on sanitation provision and wastewater management. Two webinars already took place in May and June to discuss the content of the report and more in general, the link between COVID-19 and the water sector. This project is also due to conclude in October 2022 with a hybrid workshop to disseminate the findings of the assessment report on 'COVID-19 and the Water Sector'.

351 The Sanitation and Wastewater Atlas of Africa is the flagship product with the African Development Bank (AfDB), GRID-Arendal, and the United Nations Environment Programme (UNEP) joining forces in 2016 and launching a four-year project aimed at better understanding the current situation related to wastewater management and sanitation across the African continent. The Atlas, launched on 2 February 2021, consists of different chapters focusing on various aspects of wastewater management, including for example ecosystems, human health, policies, and circular economy, and has a section with detailed country profiles. To share the key messages and findings of the Atlas, on Wednesday 13 and Thursday 14 October 2021, the African Development Bank, GRID-Arendal, United Nations Environment Programme, and the African Ministers' Council on Water collaborated to host a two-day workshop on the Sanitation and Wastewater Atlas of Africa. This event had a live translation in English, French, and Arabic using the Interaction online platform. Over 200 stakeholders, including government representatives, NGOs, research institutes, UN agencies, and partners of the Global Wastewater Initiative, participated in the workshop, which encompassed presentations around the features of the Atlas, as well as a panel discussion on how on matters related to

stakeholder engagement and the way forward to meet the targets set under Agenda 2063 and the Sustainable Development Goals for water and sanitation. Overall, the participants acknowledged the importance of the Atlas and the need for boosting sustainable wastewater management and sanitation provision across the African continent.

352 The United Nations World Toilet Day celebrated annually on the 19th of November, draws the world's attention to the importance of accessible toilets and inspires action to tackle the global sanitation crisis and achieve Sustainable Development Goal (SDG) 6: clean water and sanitation for all by 2030. While substantial progress has been made in the last decades regarding access to clean drinking water and sanitation, billions of people - mostly in rural areas - still lack these basic services. This year, the Global Wastewater Initiative (GW²I) organized a Virtual Symposium on Wastewater and Sanitation over the span of two days to discuss wastewater management and sanitation provision across the Asia-Pacific, African, and Caribbean regions. With over 100 participants attending, the event also discussed how we are dealing with the COVID-19 pandemic, wastewater, and sanitation, and detailed the topic of wastewater solutions. You can watch it here.

353 UNEP is working together with GRID Arendal on the SickWater+10 rapid assessment report. The focus of the publication will be on wastewater reuse, and specifically on the barriers and possible solutions. The publication will also take stock of where we are now, and what has been done in the 10 years since the previous SickWater report was released, together with recommendations as a way forward. It will also include the aspect of emerging pollutants such as microplastics, and anti-microbial resistance in wastewater. UNEP and GRID Arendal aim to finish the writing and review process by the end of summer, and launch it on 19 November 2022, on the occasion of World Toilet Day. One web story on the linkage between fashion and sewage was released in July 2022, and an editorial workshop is planned for 6-13 July 2022 to work on the first draft of the report.

354 The Quadripartite (the FAO, UNEP, WHO and WOA) is organizing a webinar series consisting of four webinars, with the first one having already been conducted on 14 June 2022, and the rest to follow in September, October, and November. The first webinar focused on:

- The basics of environmental AMR including global AMR risk to human and animal health, food systems, ecosystems, livelihoods, and economies.
- Overarching principles and terminologies, foundational understanding of key sources of environmental AMR and approaches to prevent and control AMR in the environment.
- Strategies to strengthen the involvement of the environment in NAPs and processes.

355 Over 500 people registered for this first webinar, and almost 200 people stayed throughout the duration of the event. You can find the link to the recordings of the first webinar in English, French and Spanish on the webpage here.

356 As part of the ongoing project with the Asian Institute of Technology (AIT), a webinar was conducted to discuss the case studies as presented in the assessment report (a deliverable of the project) on “COVID-19 and the Water Sector” focusing on the South-East Asia region. Around 80 participants were engaged throughout the duration of the webinar. You can watch the recording [here](#).

Nutrient Management and the Global Partnership on Nutrients Management (GPNM)

357 The First Meeting of the Working Group on Sustainable Nitrogen Management, as a follow-up to the United Nations Environment Assembly (UNEA) resolution UNEP/EA.4/Res.14: Sustainable Nitrogen Management was held on 8 – 9 June 2020. The objectives of the first Working Group Meeting (virtual) were to: Develop and agree on the Terms of Reference; Agree on the structure – including nominating the Chair and Co-Chairs; Share of existing policies and assessment at countries level on nitrogen management; and identify and assess the opportunities offered for sustainable nitrogen management. Further, emerging initiatives to follow on the commitments of the UNEA-4 resolution on Sustainable Nitrogen Management is the Interconvention Nitrogen Coordination Mechanism (INCOM). INCOM is the platform to facilitate better communication and coherence across nitrogen policies, consistent with mandate of existing conventions and MEAs. So far, three meetings of INCOM task Team have been organised to reflect on the function, form, and financing options. The Second Meeting of the working group on United Nations Environment Assembly (UNEA) resolution UNEP/EA.4/Res.14: Sustainable Nitrogen Management is planned in September 2021. 44 member states have nominated national focal points for this Working Group on Sustainable Nitrogen Management Resolution.

358 UNEP has partnered with the **National Centre for Sustainable Coastal Management, Ministry of Environment, Forest and Climate Change, India (NCSCM)** on a demonstration project entitled *Linking land-based activities with ecosystem dynamics and nutrient management of the Pulicat Lagoon in India*. The demonstration project has been completed in June 2021. The deliverables include **Analysis of Land use and Land cover around Pulicat lagoon; Major Land use practices and sources of nitrogen to the Pulicat lagoon; Nitrogen Use efficiency (NUE); and Nutrient management & Spatial planning using report cards**. A replica demonstration project has been initiated for *Chongming Island in Shanghai with Tongji University in China*.

359 The #Nitrogen4NetZero initiative builds on the **2019 UN Environment Assembly resolution (UNEP/EA.4/Res.14) championed by India**, and the subsequent **Colombo Declaration, championed by Sri Lanka**, highlighting how action on nitrogen offers multiple win-wins for climate, environment, health, and economy. The UK will host COP26 later this year in Glasgow. At the summit, delegates including heads of state, climate experts and negotiators will come

together to agree coordinated action to tackle climate change and the journey towards a zero-carbon economy. However, achieving this goal will not be possible without action on Nitrogen. At the same time, reducing nitrogen pollution offers multiple win-wins across sustainable development for air, water, biodiversity, stratospheric ozone depletion, soils, food, and the economy. **#NitrogenforNetZero** opens a dialogue to widen the scope for climate action and engagement at this pivotal moment. The British High Commission in Colombo and the Sri Lankan Government jointly organized the preCOP26 regional event for South Asia - ‘Nitrogen for Climate and Green Recovery’ during 27-29 April 2021. **#Nitrogen4NetZero** initiative to highlight the necessity of sustainable nitrogen management to meet climate goals in preparation for COP26.

360 The German Federal Environment Ministry and the Federal Environment Agency hosted the 8th Global Nitrogen Conference (INI 2021) on 31 May to 3 June 2021. The focus of INI 2021 was Nitrogen and the UN Sustainable Development Goals. This follows the landmark UNEA4 resolution on “Sustainable Nitrogen Management” and the “Colombo Declaration”. The outcome of the meeting was adoption of “**Berlin Declaration on Nitrogen**”. The declaration is available at: <https://ini2021.com/berlin-declaration/>

361 The 24th edition of UNEP’s Foresight Brief focuses on floating sargassum seaweed and aims to support the sargassum paradigm shift from a ‘brown tide’ hazard to a ‘golden jewel’ opportunity. GPNM has worked closely with the Abidjan Convention, Cartagena Convention, and IOC-UNESCO on mitigation of sargassum invasion in the two regions and exploring on early warning technologies. The impacts of sargassum influxes dating back to 2011 are well-known and effectively documented in various places including the Key economic sectors like tourism and fisheries are severely impacted and are often the focus of discussion, sometimes overshadowing impacts on public health and quality of life for residents and local beach users, maritime transport, as well as the quality of nearshore ecosystems. UNEP, the GPNM and partners including the GESAMP Task Team organized a series of 5 Sargassum webinars over 2020-21 which attracted over 2,000 registrations from across the globe. 1st Webinar, 2nd Webinar, 3rd Webinar, 4th Webinar, 5th Webinar.

362 UNEP through its Cartagena Convention launched a Sargassum White Paper: **Turning the Crisis into an Opportunity**. The overall purpose of this white paper is to compile background information for a strategic status update and critical situational analysis that informs and elicits feedback from key regional stakeholders. It will also form the basis for development of a draft Concept Note for a UNEP Cartagena Convention-led project targeting key issues identified. The paper is not an exhaustive review of all available knowledge on the issue. It focuses on influxes in the Caribbean, with reference to other impacted regions as appropriate. This paper is a living document intended to be regularly updated so that it remains current and relevant. This White Paper was launched during the fifth and final Sargassum Webinar on: <https://www.unep.org/events/webinar/sargassum-challenge-opportunities-collaboration-between-west-africa-and-wider>

363 The United Nations General Assembly has declared the years 2021 through 2030 the UN Decade on Ecosystem Restoration. Led by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO) of the United Nations together with the support of partners, it is designed to prevent, halt, and reverse the loss and degradation of ecosystems worldwide. It aims at reviving hundreds of millions of hectares, covering terrestrial as well as aquatic ecosystems. Meeting these goals in parallel depends on awareness of efficient N management, increased Nitrogen Use Efficiency (NUE) in food production, and thereby decreasing the surplus N and its release to the environment.

364 The UNEA-4 “Resolution on Sustainable Nitrogen Management” recommends action on N for protecting air and water quality, biodiversity, food sustainability and post-COVID economic recovery. Recently the UN member states endorsed a roadmap for actions needed to tackle N challenges and adopted the Colombo Declaration with aim to ‘halve nitrogen waste’ from all sources. This initiative can save US\$100 billion annually. On 4th June 2021 leading up to the World Environment DAY (5th June 2021), GPNM organized a Webinar on Sustainable Nitrogen Management for Ecosystem Restoration. Almost 900 participated in the webinar co-organized by the UNEP’s Global Partnership on Nutrient Management (GPNM), Ministry of Climate Change, Government of Pakistan aims at spreading awareness on Sustainable Nitrogen Management and Ecosystem Restoration, in collaboration with UNEP, South Asia Nitrogen Hub (SANH), International Nitrogen Management System (INMS), International Nitrogen Initiative (INI) and the University of Agriculture, Faisalabad (UAF).

365 On 28th July 2021 during the Pre-UN Food Systems Summit scheduled from 26-28 July 2021, UNEP Global Partnership on Nutrients Management (GPNM) jointly with International Nitrogen Initiative (INI), and Sustainable India Trust (SIT) hosted an affiliated event entitled: Sustainable Nitrogen Management for Sustainable Food Systems. Key discussions highlighted key nitrogen losses, policy blind spots, participatory and integrative approaches that can be adopted to manage nitrogen flows throughout the food system. Over 90 participants attended this 1hour webinar. The Secretary-General of the United Nations has convened a Food Systems Summit to be held in 2021. The UN Food Systems Summit aims to launch bold new actions to transform the way the world produces and consumes food, as part of the Decade of Action to achieve the Sustainable Development Goals by 2030. The Summit is scheduled to take place at the margins of the General Assembly in 2021 and will be guided by five Action Tracks that plan to bring together key players and draw on the expertise of actors from across the world’s food systems. The role of nitrogen in achieving sustainable food systems for healthy diets is quite critical. We need to balance nitrogen flows throughout the food system to make current food systems more resilient and robust. This requires the identification of the major nitrogen losses and policy blind spots originating from the currently compartmentalized food system and develop an integrated approach to manage it across regional and global nitrogen boundaries, for a sustainable and healthy diet for all.

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

367 A new resolution on Sustainable Nitrogen Management was adopted by UNEA 5.2 which adds value to the existing UNEA 4 resolution by calling for a substantial reduction in nitrogen waste, and the sharing of national action plans on sustainable nitrogen management. A strategic review of GPNM was initiated which will be shared with the GPNM Steering Committee for their consideration and guidance, including updating the roadmap on sustainable nitrogen management and developing activities on sustainable phosphorus management.

Marine Litter and the Global Partnership on Marine Litter (GPML)

368 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. UN Environment Programme 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, the Wider Caribbean Region, hosted by the Gulf and Caribbean Fisheries Institute and the Cartagena Convention Secretariat, the Mediterranean

Node, hosted by the Barcelona Convention, the South Asia Node, hosted by the South Asia Co-operative Environment Programme (SACEP) and the Pacific Node, hosted by the Secretariat of the Pacific Regional Environment Programme (SPREP). The Caspian Sea is in the process of developing a regional node, and the COBSEA will consider establishing a regional node at its next Intergovernmental Review Meeting.

369 The first meeting of the Ad Hoc Open-Ended Expert Group was held in United Nations, Nairobi, Kenya from 29 to 31 May 2018. The Ad Hoc Open-Ended 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 the United Nations Environment Assembly of the United Nations Environment Programme. The second meeting was held in Geneva, Switzerland from the 3 to 7 December 2018²¹ a summary of the GESAMP WG 40 report Overview of the Guidelines for the Monitoring and assessment of Plastic Litter in the Ocean²² was presented as technical document during the meeting and the WG chair made a presentation; the third meeting of the AHEG was held in November 2019 in Bangkok, where an outcome document²³ was adopted; the fourth and last meeting of the AHEG was held virtually in November 2020, a chair's summary²⁴ with a list of potential response options identified was adopted by participants.

370 In response to paragraph 5 of UNEA resolution 5/14 entitled "End plastic pollution: Towards an international legally binding instrument" the Executive Director of UNEP convened an ad hoc open-ended working group to hold one meeting to prepare for the work of the intergovernmental negotiating committee tasked to develop an international instrument on plastic pollution, including in the marine environment. The meeting was held from 30 May to 1 June 2022 in Dakar, Senegal in a hybrid format. The outcome summary of the meeting can be accessed here.

371 UNEP has been providing technical and logistical support to country-driven informal discussions in the lead up to UNEA 5.2 upon requests from Member States. Those include the Ministerial Conference on Marine Litter and Plastic Pollution, the Nairobi Group of Friends to Combat Marine Litter and Plastic Pollution, and the Forum on the Multi-stakeholder Platform on Marine Litter and Plastic Pollution, etc.

372 UNEP supports enhanced marine litter and microplastics management to reduce marine pollution in key regions by informing priority interventions related to sources, flows, pathways, impacts, and related priority responses and contributes to a better-defined policy arena for global coordinated response to the issue. It also targets and contributes to capacity-

building through the application of tools and best field practices.

373 Key activities included the creation of a **global plastic flow model** to simulate plastic flow using outputs from ocean circulation models. The model can be used to determine where the marine plastic released into the ocean by a given country goes and where the marine plastic found on the coastline of a given country comes from. Additionally, UNEP also contributed to the development of approaches for **hotspot identification**, including a method for marine litter hotspot assessment developed in partnership with East China Normal University. UNEP also conducted municipality-level geographic information system modelling in partnership with the United Nations Human Settlements Programme (UN-Habitat) and the University of Leeds to identify land-based point-source hotspots in Africa and South Asia, using waste management characteristics data (for example, about waste generation and dumpsite locations), geographic and meteorological data for such things as waterways, terrain and surface runoff and drainage systems, and behavioural and socioeconomic data such as GDP per capita. Lastly, GPML has supported the development of a **plastic litter load model in rivers**, which provides a seasonal forecast of simulated plastic load (tonnes/day) in the world's major rivers, both at the river outlets to the sea and sub-catchments along the river. The seasonal forecast is based on the plastic early warning system developed by the UNEP-DHI Centre in collaboration with the University of Leeds and UN Habitat, who provided estimates for plastic waste escaped to the environment, and with the Ocean Clean-up, who provided plastic observation time series. The river and hydrologic models are based on the Global Hydrologic Model developed by DHI.

383 An Expert Group Meeting (EGM) is being held jointly by UNEP, UN-Habitat, and DHI in Copenhagen in August 2022 to work towards the harmonization of the many methodologies and models that have been developed over the past few years to collect data on marine litter and plastic pollution or to model its leakages, sources, pathways, and accumulation zones. The EGM will gather mainly the technical team behind each method, model, or tool to discuss their respective scope, objective, area of specialization, and to explore possible synergies or overlaps between tools.

374 All UNEP divisions were engaged in the development of the concept of "**national source inventories**" for marine litter and microplastics to guide the development of national action plans for marine litter. Still in the pilot phase, a national source inventory consists of a comprehensive assessment of the marine litter sources, pathways, and accumulation zones within a country's national jurisdiction. The inventory considers data as far upstream as the production and importation of plastic products and the approximate quantities of plastic on the domestic market, using a material flow accounting approach. It assesses the waste management system in the country and its vulnerability to waste leaking into the environment. This approach allows the precise identification of key intervention points to reduce such leakage and thereby prevent marine litter from reaching the ocean. The inventories, coupled with methodologies identified by the Joint Group of Experts

²¹ <https://papersmart.unon.org/resolution/second-adhoc-oeeeg>

²² https://papersmart.unon.org/resolution/uploads/un_environment_science_-_marine_plastics_guidelines_synopsis_18-03553_002.pdf

²³ https://papersmart.unon.org/resolution/uploads/aheg_3_outcome_document_0.pdf

²⁴ <https://www.unep.org/environmentassembly/chairs-summary-aheg-4>

on the Scientific Aspects of Marine Environmental Protection (GESAMP), contribute to the collection of relevant data from across the plastic life cycle and from source to sea in relation to other relevant Sustainable Development Goals targets. Additionally, a data harmonization community of practice has been established to design a global framework that enables data collection and harmonization in support of the national source inventories approach.

375 UNEP has also focused on the **application of tools and methodologies for strengthened capacity to use innovative monitoring and assessment approaches in developing countries**. UNEP developed an approach for applying some of the methodologies identified in the GESAMP guidelines for the monitoring and assessment of plastic litter in the ocean and tested the approach through pilot projects in Kenya and Seychelles. In-situ monitoring was implemented through the training of 50 people for baseline setting, and relevant national and regional centres were identified to support further monitoring efforts in the region. Building on that experience, an additional five to 10 pilot projects are planned for South-East Asia and the Caribbean. A “Training of Trainers on Monitoring and Assessment of Marine Plastic Litter and Microplastics” workshop was arranged for countries of East Africa and South-East Asia in 2019 based on the guidelines.

376 The Executive Director of UNEP convened a scientific advisory committee to guide the implementation of UNEA resolution 4/6, paragraph 2, including the preparation of an assessment of sources, pathways, and hazards of litter, including plastic litter and microplastics pollution, pursuant to subparagraph 2(b). The “From Pollution to Solution: a global assessment of marine litter and plastic pollution” which was launched in October 2021 was guided by information from various GESAMP publications on marine litter including the report RS 108 on Sea based Sources of Plastics.

377 In addition, the publication “Drowning in plastics – marine litter and plastic waste vital graphics” which was developed in collaboration with the BRS Secretariat and GRID-Arendal was launched in 2021.

378 Today, plastics are the largest, most harmful, and most persistent fraction of marine litter, accounting for at least 85% of total marine waste. Addressing this complex, global problem, requires urgent and coordinated efforts among different stakeholders. The Global Partnership on Marine Litter (GPML) Digital Platform enables this coordination and informs all actors working to address the issue of marine litter and plastic pollution. It offers a single point of access for current, accurate data and information on marine litter and plastic pollution and related topics, and it provides a wide range of materials to support stakeholders’ needs, ranging from scientific research to technological innovation and public outreach, to inform decision-making, educate and raise awareness, facilitate target setting, and advance stakeholders’ cooperation and coordination.

379 As called for in paragraph 3 of UNEA resolution 4/6, this multi-stakeholder, mostly open-source Digital Platform is a one-stop-shop that compiles and crowdsources different resources, integrates data

and connects stakeholders to guide action around this pressing global issue. The GPML has a network of 1700+ stakeholders around the world and in different sectors. Additionally, the platform provides access to 2000+ global, transnational, national and subnational content including Action Plans; Policies; Technical Resources; Financing resources; Initiatives; Technologies; Events; Capacity development material; and data layers. Throughout the GPML Digital Platform’s development 40+ partners have been engaged and have supported the platform development by sharing their knowledge products, datasets, technological expertise, and funding. Additionally, the GPML Action Tracks bring together stakeholders with common interests to share and discuss problems and opportunities which encompass the full lifecycle of plastic. As part of the GPML Action Tracks Framework, a network of informal Community of Practices (or CoPs) facilitates networking, promotes knowledge exchange, and encourages collaboration among GPML members and other platform users. Some, but not all, entities supporting CoPs may evolve into more formal Centers of Excellence (CoEs). Once established the Centers of Excellence will be formal entities responsible for: establishing and promoting good practices; contributing to the development and enforcement of data governance practices; and enabling capacity building and collaboration among stakeholders. A pilot in the LAC region is supporting the creation of the first Centers of Excellence (CoEs).

380 The GPML Digital Platform efforts ties directly to UNEP’s Programme of Work (PoW) project 522.4 “Protecting the marine environment from land-based pollution through strengthened coordination of global action” within the Chemicals and Pollution Action subprogramme in the Chemicals and Action pillar of UNEP’s Medium-Term Strategy 2022-2025, with close linkages to other pillars. The resources and data on the platform can support stakeholders in taking an evidence-based approach to identifying key sources, pathways, and hazards, from source to sea and across product life cycles. Additionally, the Digital Platform development team is working with different stakeholders to co-design a Workspace to support national source inventories and action plans. Such a workspace would aim to offer a cross-cutting experience to facilitate Action Plans and national source inventories creation, implementation, reporting and updating. Through personalized experiences, the Digital Platform will help users access the most relevant resources and data, to measure progress towards set goals and indicators at national and regional levels, while providing clear linkages between policy approaches and data analysis capabilities.

381 The coordination aspect and further development of the platform will be supported by the GPML “Action Tracks”. Collaboration has continued with the University of Georgia, GRID-Arendal and the University of Wollongong in preparing a series of discussions and issue briefs on topics of interest regarding marine litter and plastic pollution with the general objective of advancing the work of the GPML Action Tracks with various webinars, workshops and side events on topics such as “mass balance”, “unnecessary, avoidable and problematic (UAP) plastics” and “Environmental Justice, Digital Transformation and Accessibility”.

382 UN Environment Programme and the Open University have created a Massive Open Online Course (MOOC) on Marine Litter²⁵. It is part of Clean Seas and contributes to the goals of the Global Partnership on Marine Litter. The MOOC on marine litter 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 like the Honolulu Strategy. The course 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, this course will benefit policymakers, practitioners, and managers who wish to connect with other professionals to enhance their knowledge of marine litter issues. More than 32,000 people have registered for the Massive Open Online Course (MOOC) on Marine Litter, since it was launched in 2015. This free, online course equips people with the knowledge and skills to take evidence-based, targeted action to help end marine litter. The MOOC is available in 10 languages, with an updated course slated for later in 2022. In addition, various masterclasses are being developed including on monitoring and assessment of plastic pollution and unnecessary, avoidable, and problematic plastic products and polymers which are planned to be released at the end of 2022.

383 13 Regional Seas Programmes have so far developed regional action plans on marine litter, namely Protection of the Arctic Marine Environment (PAME), the Baltic Marine Environment Protection Commission (HELCOM), Black Sea, the Coordinating Body on the Seas of East Asia (COBSEA), Mediterranean Action Plan (MAP), The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), Northwest Pacific Action Plan (NOWPAP), Secretariat of the Pacific Regional Environment Programme (SPREP), Regional organization for the conservation of marine environment in the Red Sea and Gulf of Aden (PERSGA), South Asia Co-operative Environment Programme (SACEP), The Permanent Commission for the South Pacific (CPPS), Nairobi Convention, and the Cartagena Convention. 3 regional seas (Caspian, Northeast Pacific, and the Abidjan Convention) are in the process of development of their regional plans.

384 UNEP has been working with Member States, upon request, to provide technical and financial support for the development of National Action Plans (NAP) to address marine litter and plastic pollution. Projects have been under way since October 2021 in 8 countries across two regions: Kenya, Uganda, Tanzania, Seychelles, Mexico, Saint Lucia, Guatemala, and Ecuador. The development of NAPs is based on the foundation of the National Source Inventory approach described in paragraph 141, which provides a robust evidence base to inform and guide the action plan. These first 8 country projects collaborate closely with Regional Seas, namely the Nairobi Convention and the Cartagena Convention (UNEP-CEP) and are expected to lead to finalized NAPs by the end of 2022 or in early 2023.

²⁵ <https://www.gpmarinelitter.org/what-we-do/training>

385 UNEP, UN-Habitat and DHI are jointly organizing a 2-day workshop in Copenhagen in August, back-to-back with the Expert Group Meeting mentioned in paragraph 140, to convene the major sponsors and backers of Action Plans related to marine litter and plastic pollution. The workshop will include several Member States, IGOs, and major NGOs working to support the development of Action Plans, with the objective to share lessons learned, increase synergies, and avoid working in silos.

Basel, Rotterdam, and Stockholm Conventions

386 The Basel, Rotterdam, and Stockholm (BRS) conventions²⁶ contribute to protect the marine environment against the adverse effects which may result from hazardous chemicals and wastes. The conventions contribute to making consumption and production patterns more sustainable and waste management more environmentally sound and hence reduce direct discharges or land runoffs of hazardous pollutants and wastes into the marine and coastal environments.

387 **Basel Convention Plastic Waste Amendments:** Adopted by the Conference of the Parties to the Basel Convention in 2019, the amendments to the entries in Annexes II, VIII and IX to the Basel Convention addressing plastic waste became effective 1 January 2021 and being implemented by the 189 Parties to the Basel Convention. To provide guidance on the environmentally sound management of plastic waste, the Conference of the Parties made progress in updating the technical guidelines on the environmentally sound management of plastic waste,²⁷ decided to update the technical guidelines on the environmentally sound management of used and waste pneumatic tyres²⁸ and to consider whether technical guidelines on the environmentally sound management of rubber wastes (entry B3040) and waste parings and scrap of rubber (entry B3080) should be developed.²⁹ In response to UNEA resolution 5/14 and decision BC-15/15 as well as decisions BC-15/25, RC-10/14 and SC-10/21, the BRS Secretariat is cooperating with UNEP in the process for the intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution.

388 **Basel Convention E-waste Amendments:** In June 2022, the Conference of the Parties to the Basel Convention adopted amendments to the entries in Annexes II, VIII and IX to the Basel Convention, making all e-waste subject to the PIC procedure.³⁰ Those amendments will become effective on 1 January 2025. E-waste is the fastest growing waste and plastics constitute 20% of e-waste. The Conference of the Parties have adopted, on an interim basis, the technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, regarding the distinction between waste and non-waste under the Basel Convention.³¹

²⁶ <http://basel.int/>; <http://pic.int/>; <http://pops.int/>.

²⁷ UNEP/CHW.15/6/Add.7.

²⁸ UNEP/CHW.10/6/Add.1/Rev.1.

²⁹ Decision BC-15/15. See UNEP/CHW.15/31/Add.1 <http://www.basel.int/tabid/8392/Default.aspx>.

³⁰ Decision BC-15/18.

³¹ UNEP/CHW.14/7/Add.6/Rev.1.

389 New persistent organic pollutants (POPs) under the Stockholm Convention: In June 2022, the Conference of the Parties to the Stockholm Convention listed perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds in Annex A to the Convention without specific exemptions. The Convention already includes two other sets of per- and polyfluoroalkyl substances (PFAS): perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF), perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds. The Conference of the Parties will consider the continued need for exemptions for PFOS, its salts and PFOSF for metal plating, fire-fighting foam and for control of leaf-cutting ants at its meeting in 2023. Furthermore, the POPs Review Committee is currently reviewing long-chain perfluorocarboxylic acids (LC-PFCAs), their salts and related compounds; chlorinated paraffins (C₁₄₋₁₇); chlorpyrifos; Dechlorane Plus; UV-328. In reviewing those chemicals, the Committee found the need for a document on long-range environmental transport (LRET). A draft document on LRET, as well as chemicals under review, will be considered at the Committee's eighteenth meeting.³²

390 The third reports on the POPs Global Monitoring: Article 16 of the Stockholm Convention provides a mechanism for effectiveness evaluation of the Convention every six years, based on POPs monitoring reports, national reports submitted by Parties and other available scientific, environmental, technical, and economic information. The third regional POPs monitoring reports have been published³³ and considered by the Conference of the Parties in June 2022.³⁴ The Global Coordination Group for the POPs Global Monitoring is preparing the third global monitoring report and updating the GMP data warehouse³⁵ to contribute to the next effectiveness evaluation to take place at the eleventh meeting of the Conference of the Parties in 2023.

391 From Science to Action: At their meetings in June 2022, the conferences of the Parties to the Basel, Rotterdam and Stockholm conventions adopted decisions BC-15/28, RC-10/17 and SC-10/24 on "From Science to Action" and took note of the information on progress in the action by Parties and others to promote the implementation of the road map³⁶ for further engaging Parties and other stakeholders in informed dialogue for enhanced science-based action in the implementation of the conventions. As requested in the decision, the Secretariat is continuing to cooperate and coordinate with UNEP and relevant organizations including GESAMP and other scientific bodies and stakeholders towards strengthening the science-policy interface, among other things, in the context of the implementation of UNEA resolution 5/8 on a science-policy panel to contribute further to the sound management of chemicals and waste and prevent pollution.

³² <http://chm.pops.int/tabid/9165/Default.aspx>.

³³ <http://chm.pops.int/tabid/525/Default.aspx>.

³⁴ See UNEP/POPS/COP.10/33/Add.1, <http://chm.pops.int/tabid/8397/Default.aspx>.

³⁵ <https://pops-gmp.org>.

³⁶ UNEP/CHW.14/INF/40–UNEP/FAO/RC/COP.9/INF/35–UNEP/POPS/COP.9/INF/44.

392 International cooperation, partnership, and network: The BRS Secretariat is cooperating with IAEA, UNEP, and IOC-UNESCO to co-sponsor GESAMP working group 45 on Climate Change and Greenhouse Gas Related Impacts on Contaminants in the Ocean. The BRS Secretariat co-published a publication "Drowning in Plastics – Marine Litter and Plastic Waste Vital Graphics"³⁷ with UNEP and Grid-Arendal and is providing inputs to the UNEP's spotlight publication on plastics and preparing reports on plastic additives and global governance of chemicals and plastics together with UNEP. Established in 2019 by the Conference of the Parties to the Basel Convention, the Plastic Waste Partnership,³⁸ a multi-stakeholder partnership for addressing plastic pollution, including in the marine environment, is delivering its activities through 4 project groups: plastic waste prevention and minimization; plastic waste collection, recycling and other recovery including financing and related markets; transboundary movements of plastic waste; outreach, education, and awareness-raising. 23 pilot projects are being implemented. As demonstrated at the 2022 UN Ocean Conference held from 27 June to 1 July 2022 in Lisbon, the Secretariat is committed to facilitate cooperation and coordination among existing organizations and mechanisms towards addressing plastic pollution, such as through the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic (ENFORCE), the platform to bring together existing resources and enhancing and improving cooperation and coordination between Parties, Basel Convention Regional Centers, World Customs Organization, INTERPOL, EUROPOL, UNEP, UNODC and others to deliver capacity-building activities and tools on preventing and combating illegal traffic.

393 Technical assistance: As called for in UNEA resolution 5/14, the BRS conventions have been increasing the actions towards preventing and reducing marine litter and microplastics and their harmful effects in cooperation with relevant organizations. The BRS Secretariat is undertaking technical assistance activities to address plastic pollution. The European Union, Canada, France, Germany, Japan, Netherlands, Norway, Sweden, Switzerland, the Norwegian Agency for Development Cooperation, and the Norwegian Retailers' Environment Fund are providing financial support to the activities related to plastics. A global map of the technical assistance projects implemented by the BRS can be found on the website of the Basel Convention.

Food And Agriculture Organization (FAO) 2022

Marine Litter and Microplastics

394 FAO continues to collaborate with many organisations, including relevant UN Agencies and Programmes, NGOs and academic institutions in addressing and building knowledge on marine litter and microplastics, including; UNEP and the Global

³⁷ <https://www.unep.org/resources/report/drowning-in-plastics-marine-litter-and-plastic-waste-vital-graphics>.

³⁸ <http://www.basel.int/tabid/8096/Default.aspx>.

Partnership on Marine Litter (GPML), the International Maritime Organization (IMO), the International Council for the Exploration of the Seas (ICES), the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) and the Global Ghost Gear Initiative (GGGI).

FAO will continue to co-sponsor of the GESAMP WG43 Sea Based Sources of Marine Litter. FAO acknowledges the important work of GESAMP Working Group 40 Sources, Fate and Effects of plastics and micro-plastics in the marine environment.

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

395 The 2021 FAO Committee on Fisheries (COFI) Declaration for Sustainable Fisheries and Aquaculture reiterates the importance of reducing the impact of ALDFG. The first report of GESAMP WG43 provides greater understanding on the extent of the impacts of ALDFG and identifies data gaps. FAO is committed to continued support to GESAMP WG43 and looks forward to future contributions achieved through the updated TOR.

396 To fill data gaps identified by WG 43 and to facilitate and standardize data collection on ALDFG, FAO designed questionnaires and is working with countries and partners such as the Global Ghost Gear Initiative (GGGI, 2021) to implement surveys and fill gaps. Data collated will provide an overview of the current status of the ALDFG issue across fisheries and geographies, support long-term trend analyses and monitoring of ghost fishing, and guide development and implementation of appropriate technologies and other mitigation measures.

397 Marking of fishing gear to enable the identification of the operator and/or owner of the gear is widely accepted as a key tool for reducing ALDFG. Following endorsement of the Voluntary Guidelines on the Marking of Fishing Gears (VGMFG) in 2018, FAO is pleased to see a growing interest for the implementation of gear marking. FAO has been progressing a number of related activities. Relevant publications in the pipeline:

.1 *A Framework for conducting a risk assessment for a system on the marking of fishing gear.* FAO is further developing the risk assessment provided in the Voluntary Guidelines for determining the need, and requirements for, developing systems for the marking of fishing gear;

.2 *Manual for marking fishing gear.* As a supplement to the Voluntary Guidelines, FAO is developing a technical manual for the marking of fishing gear; and

.3 *Operationalization of FAO Voluntary Guidelines for the Marking of Fishing Gear in the IOTC Area of Competence.* Upon request, FAO has been working with the Indian Ocean Tuna Commission to develop guidelines for the implementation of gear marking.

All three documents are to be published as FAO Fisheries Circulars and circulated before end of this year.

398 In 2022, through the IMO/FAO GloLitter Partnership Project, FAO has produced the following knowledge products aiming at identifying opportunities for the prevention and reduction of ALDFG:

- .1 *Legal aspects of abandoned, lost or otherwise discarded fishing gear (Hodgson, 2022).* The study examines legal responses to ALDFG in the context of marine fisheries;
- .2 *Reporting and retrieval of lost fishing gear: recommendations for developing effective programmes (Drinkwin, 2022).* This report describes systems for fisher-led reporting and retrieval of lost fishing gear, identifies critical elements of successful programs, and recommends next steps for countries to develop successful programs; and
- .3 *Report on good practices to prevent and reduce marine plastic litter from fishing activities (Giskes, et al 2022).* A key component to successfully manage ALDFG, is heeding lessons learned from existing projects that are in place around the world.

Responsible Fishing Technology

399 Innovations in fishing technologies can save energy use and reducing impacts on ecosystems. Such innovations contribute to SDG 14 (Life below water), and particularly SDG14.1 - prevent and significantly reduce marine pollution of all kinds, including marine debris.

400 FAO and ICES jointly support The Working Group on Fishing Technology and Fish Behaviour (WGFTFB), comprising fishing technology experts from around the globe, regularly discusses and reviews research and practices of fishing technology in relation to fishing gears, and provides guidance for management including the impacts of fishing gears on the environment. Details on the latest research and developments aimed at decreasing pollution and improving energy efficiency can be found in the WGFTFB report (ICES, 2021).

FAO Committee on Fisheries (COFI35)

401 The Committee on Fisheries (COFI), is the only global inter-governmental forum where FAO Members meet to review and consider the issues and challenges related to fisheries and aquaculture. COFI is a unique body in that it provides periodic global recommendations and policy advice to governments, regional fishery bodies, civil society organizations, and actors from the private sector and international community. The Committee has fostered the development and adoption of several binding agreements as well as non-binding instruments that have reshaped how the sector works in the interests of resource sustainability (including biodiversity conservation).

402 The 35th Session of the FAO Committee on Fisheries (COFI35), is to be held 5-9 September 2022 in Rome. Agenda items that may be of particular interest to GESAMP members include:

- .1 Addressing climate change in fisheries and aquaculture: reporting on progress and Action Plan for the implementation of the FAO Strategy on Climate Change 2022-2031;
- .2 Mainstreaming biodiversity in fisheries and aquaculture; and
- .3 Developments in global and regional processes related to fisheries and aquaculture.

403 Documents of COFI35 and subsequently the meeting report can be found of the following website link <https://www.fao.org/about/meetings/cofi/documents-cofi35/en/>

The State of World Fisheries and Aquaculture 2022

404 The latest addition of FAO's flagship publication on fisheries and aquaculture SOFIA 2022 provides a focus on blue transformation, contribution to the 2030 agenda and emerging issues such as fisheries and aquaculture adaptations to climate change <https://www.fao.org/3/cc0461en/cc0461en.pdf>.

Other environmental matters

Sargassum Seaweed

405 Under the FAO CC4FISH project extensive work has been carried out by the Centre for Resource Management and Environmental Studies of UWI (CERMES) on modelling of sargassum influxes in the Eastern Caribbean. Sargassum influxes negatively affect harvesting of fish, productivity, destroy fishing gear, engines and propellers as well as associated negative environmental impacts. CC4FISH has therefore used the models for development of bi-monthly Sargassum Outlook bulletins since October 2019 which show the expected influx of sargassum for the north, middle and south eastern Caribbean. The outlook bulletins are used by government and private sector entities from various sectors such as fisheries and tourism to better prepare for upcoming sargassum events. As CC4FISH is coming to a close the sargassum modelling work and production of the Sargassum Outlook Bulletins will be continued by CERMES through the Caribbean Biodiversity Fund (CBF) project 'Adapting to a new reality: managing responses to influxes of sargassum seaweed in the Eastern Caribbean (SargAdapt).

406 Recent activities and reports delivered under CC4FISH:

- .1 In collaboration with CERMES, CC4FISH organized a Sargassum Symposium attracting 74 participants on November 21-22 November 2018 from across the region
- .2 A best practices guide for fisherfolk to deal with sargassum has been developed, printed and distributed.

- .3 Sargassum uses guide has been finalized in 2020 and is available online (and also translated into French) <https://sargassum-hub.org/sargassum-uses-guide-now-available/>
- .4 Four Adaptive sargassum management Plans have been developed for St. Kitts and Nevis, Grenada, Saint Lucia and St. Vincent and the Grenadines.
- .5 CC4FISH policy brief: March 2021, Issue 3. Sargassum Management <https://www.fao.org/3/cb4154en/cb4154en.pdf>

Documents of interest

407 The following documents may be of interest to GESAMP:

Drinkwin, J. 2022. Reporting and retrieval of lost fishing gear: recommendations for developing effective programmes. Rome, FAO and IMO. <https://doi.org/10.4060/cb8067en>

FAO. 2019. Voluntary Guidelines on the Marking of Fishing Gear. Directives volontaires sur le marquage des engins de pêche. Directrices voluntarias sobre el marcado de las artes de pesca. Rome/Roma. 88 pp. Licence/Licencia: CC BY-NC-SA 3.0 IGO. <https://www.fao.org/3/ca3546t/ca3546t.pdf>

FAO. 2022. The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation. Rome, FAO. <https://doi.org/10.4060/cc0461en>

Giskes, I., Baziuk, J., Pragnell-Raasch, H. and Perez Roda, A. 2022. Report on good practices to prevent and reduce marine plastic litter from fishing activities. Rome and London, FAO and IMO. <https://doi.org/10.4060/cb8665en>

Hodgson, S. 2022. Legal aspects of abandoned, lost or otherwise discarded fishing gear. Rome, FAO and IMO. <https://doi.org/10.4060/cb8071en>

United Nations Development Programme (UNDP)

408 UNDP's Ocean Governance programme in 2021-2022 included about 25 active/approved projects totaling nearly \$200 m. in grant resources. Projects supported integrated, cross-sectoral, ecosystem-based management in several Large Marine Ecosystems including the Benguela Current LME, Agulhas/Somali Current LMEs, Caribbean Sea & North Brazil Shelf LMEs, Pacific/Central America LME, Humboldt Current LME, and Timor-Arafura Sea. Fisheries focused projects including the Pacific Oceanic Fisheries Management Project, the Global Marine Commodities Programme, and the GEF Coastal Fisheries Initiative (Latin America component). UNDP, GEF and IMO continued its cooperation on 'greening' the shipping sector through the GloFouling Partnerships project. UNDP also continued to support PEMSEA in the ongoing implementation of the Sustainable Development Strategy for the Seas of East Asia (SDS/SEA).

409 In 2021-2022, UNDP secured approval for several new GEF-financed projects relating to marine environmental protection totalling \$38.10 million in grant finance; these included:

- .1 Implementation of the Fanga'uta Lagoon Stewardship Plan and replication of lessons learned to priority areas in Vava'u, Tonga \$3.865 m;
- .2 Effectively Managing Networks of Marine Protected Areas in Large Marine Ecosystems in the ASEAN Region (ASEAN ENMAPS) \$12.548 m;
- .3 Global Partnership for Mitigation of Underwater Noise from Shipping (GloNoise Partnerships) \$1.95 m;
- .4 Mainstreaming Sustainable Marine Fisheries Value Chains into the Blue Economy of the Canary Current and the Pacific Central American Coastal Large Marine Ecosystems \$10.733 m; and
- .5 Supporting sustainable inclusive Blue Economy transformation in AIO SIDS \$9.004 m.

410 In 2022, UNDP's Ocean Innovation Challenge announced its second cohort of 'Ocean Innovators' representing 10 innovators selected from over 300 submissions addressing the issue of unsustainable fishing. Projects being supported include innovative technologies to reduce by-catch in Ecuador, renewable energy technologies to reduce post-harvest loss in Indonesia, innovative fisheries management and aquaculture practices for Caribbean spiny lobster, space-based maritime surveillance system for fisheries monitoring in Mauritius, ending IUU fishing in Peruvian small-scale fisheries through traceability technology, and others. The OIC's third call, on blue economy, MPAs and area-based management, received nearly 300 submissions which are presently being reviewed and short-listed for further consideration.

411 UNDP continued to work with other UN entities, bilaterals and philanthropic partners on the Global Fund for Coral Reefs, a blended finance instrument to mobilise action and resources to protect and restore coral reef ecosystems.

Communications and Outreach

412 In July 2021 UNDP was invited to present the experience of GEF-UNDP-IMO GloMEEP Project in GEF Brown Bag webinar (chaired by GEF CEO), "Learning from GEF Investments: Good Practices of Private Sector Engagement and Multi-Stakeholder Dialogues".

413 In November 2021 UNDP GESAMP Technical Secretary was an invited Panelist at the CoP26 Virtual Ocean Pavilion Event: "Ocean and Finance – Blue Economy for Ocean Health; Panel 1: Reef positive finance via the Global Fund for Coral Reefs". UNDP was also an invited panelist for the 4 November 2021 CoP26 Side Event organized by BIMCO, ICS & IOGP: "Managing Ship's Biofouling – A Win-Win Solution to Help Curb Climate Change and Preserve Ocean Biodiversity".

414 At the One Planet Summit for the Ocean held in Brest, France 9-11 February, 2022, UNDP's Ocean Innovation Challenge highlighted the work of its first cohort of Innovators on Marine Pollution and launched its third call for proposals on Blue Economy, MPAs and Area-based Management.

415 In support of the Blue Talks: Bridges to Lisbon run-up to the 2022 UN Ocean Conference, on 24 May 2022, UNDP GESAMP Technical Secretary was a panelist on the session "Addressing Marine Pollution: Towards sustainable maritime sectors in a Blue Economy".

416 UNDP GESAMP Technical Secretary served as a panelist in the "A Revitalized Ocean Economy" session of the UN World Oceans Day event, "Revitalization: Collective Action for the Ocean"

417 UNDP had a major presence at the 2022 UN Ocean Conference in Lisbon, Portugal, hosting and participating in a wide number of side events. UNDP Associate Administrator Usha Rao-Monari was a panelist on the 5th Interactive Dialogue, "Promoting and strengthening sustainable ocean-based economies, in particular for Small Island developing States and Least Developed Countries". UNDP launched its new "Ocean Promise" at the Lisbon meeting, outlining UNDP commitment to delivering on ten tangible targets for ocean restoration and protection by the year 2030.

418 UNDP launched several signature ocean publications in 2021-22, including:

- .1 The Western and Central Pacific Oceanic Fisheries Management Story 2000-2021 – Supporting the World's First 100% Sustainable Tuna Fishery (UNDP/GEF/FFA/FAO 2022);
- .2 The YSLME Story: Management and Governance for the Restoration and Protection of the Yellow Sea Large Marine Ecosystem (UNDP/GEF 2021); and
- .3 Sea Change: The PEMSEA Story – 28 years of Collaboration for the Seas of East Asia (UNDP/GEF/PEMSEA 2021).

ANNEX V – STRATEGIC REVIEW OF GESAMP

PLAN FOR THE STRATEGIC REVIEW STRATEGIC REVIEW AND DEVELOPMENT OF A LONG-TERM WORKPLAN/ROADMAP FOR GESAMP

Background

1 In March 2000, following the outcomes of the fourth session of the UN Commission on Sustainable Development in 1999, an independent review of GESAMP was proposed. Following agreement by GESAMP Sponsoring Organizations, an evaluation team was established, which submitted a report that was published in July 2001. Subsequently, in 2002 a consultant was contracted to prepare a Strategic Vision for “A New GESAMP”, which was finalized and published in 2005.

2 The 2002 independent evaluation process and the consequent new strategic vision for GESAMP led to an overhaul of GESAMP’s operating procedures, modernizing and updating the way work was done, and it has been the foundation of GESAMP’s work for the past two decades. It also led to extensive financial support from the Swedish Agency for International Development Aid (Sida), including the secondment of several officers to the GESAMP Office at IMO.

The new ocean governance landscape

3 Since then, the world in which GESAMP and its Sponsoring Organizations operate in has changed dramatically. Globally, there has been an increased focus on the marine environment and the ocean, in particular as reflected in the adoption of the 2030 Agenda for Sustainable Development and the SDGs. Several other processes have also made significant progress in the last decade, such as the UN Regular Process (World Ocean Assessment), and the development of a new international legally binding instrument for marine biodiversity in areas beyond national jurisdiction (BBNJ).

4 Of utmost importance to GESAMP and its relevance is also the UN Decade of Ocean Science for Sustainable Development 2021-2030, for which GESAMP is currently identifying its role and potential contribution.

5 At the United Nations Ocean Conference in Lisbon, June/July 2022, it was noted that Member States are ‘deeply alarmed by the global emergency facing the ocean’ and noted the need to ‘Strengthen the science-policy interface for implementing Goal 14 and its targets, to ensure that policy is informed by the best-available science’ (see <https://www.un.org/en/conferences/ocean2022/political-declaration>)

Plan for a strategic review and development of a long-term workplan/roadmap for GESAMP

6 In light of the issues raised in the submission to ExCom in 2021, and as subsequently agreed by ExCom, it would be beneficial to perform a review of GESAMP’s role and support to the United Nations system.

7 The three steps proposed in this review process would aim to deliver a ten-year road map for GESAMP’s future work. The road map provides both the Members and Sponsoring Organizations with a clear long-term work plan and vision for GESAMP within an agreed, balanced and financially sustainable approach.

8 A small Task Team/steering committee will be established to lead the work, but all Members and Technical Secretaries will be continuously involved.

Funding

9 Any costs incurred for the review will be charged to the GESAMP surplus funds held at IMO, as this is a priority for the future and viability of GESAMP. Costs may include an external consultant, meetings for the review team, and publication of the findings, if so decided.

Methodology

10 The methodology and work plan for the review and road-map development is attached at appendix 1 to this submission.

Timeline

11 The review will be carried out in accordance with the following timeline/deadlines:

Action	Timeline/deadline	Responsible
Approval of review work plan and establishment of the Review Task Team	September 2022 (GESAMP 49)	GESAMP
Review step 1: Initial internal evaluation	October 2022-February 2023	Review Task Team
Presentation of initial findings to GESAMP and ExCom	March 2023	Review Task Team
Review step 2: External review/evaluation	Presented to GESAMP 50 in September 2023	Review Task Team
Review step 3: Drafting of the ten-year road map	October to December 2023	Review Task Team
Approval and launch of the ten-year road map	Late 2023/first half of 2024	GESAMP/ExCom

12 Following approval of the road map, the GESAMP Office will be requested to prepare communications materials (leaflet, digital cards, etc.) for circulation

and communication through the website and the Sponsoring Organizations.

APPENDIX – WORK PLAN FOR A GESAMP REVIEW AND 10-YEAR ROAD-MAP

Step 1: Analysis of threats to the global ocean, impacts and GESAMP ability to respond

The following sequential activities that will take place as part of Step 1 of the review process:

- .1 **A causal chain analysis:** A Task Team to identify the most pressing issues and concerns within a Causal Chain Analysis Matrix under the headings of:
 - a. Actual/Potential threats;
 - b. Environmental impacts;
 - c. Socio-economic impacts;
 - d. Root causes; and
 - e. Barriers to removal/mitigation.
- .2 **GESAMP abilities and Sponsoring Organization priorities:** A list comparing main threats/impacts from the Causal Chain Analysis against:
 - a. Sponsoring Organization (SO) priorities/needs; and
 - b. GESAMP Membership skills and expertise.
- .3 **Assessment of GESAMP's work:** This will focus on how well the work and expertise of GESAMP supports the SOs and how effectively the SOs use GESAMP and its skillsets.
- .4 **A review of the current operational and administrative practices:** This will particularly aim to identify opportunities for improvement and streamlining, with consideration given to the amount of time invested by the Members and the various Working Groups.

Step 2: Stakeholder and SO review and evaluation of the findings of the analysis

Step 2 of the review process will entail the following steps:

- .1 **Feedback from the Sponsoring Organizations:** Circulation of the Analysis and Evaluation Document to the SOs and, through them to their relevant internal stakeholders for comment and input.
- .2 **Feedback from selected stakeholders:** Stakeholders will be asked (by way of interviews/questionnaires, as appropriate) to assess GESAMP's impact on marine environmental protection and other ocean-related processes. This will include specific feedback on impacts related to the SDGs, the Decade of Ocean Science, the

UN Regular Process and its World Ocean Assessment, as well as the evolving BBNJ legally binding instrument and the newly announced global treaty on plastic pollution, to name a few. The Review Task Team will identify relevant stakeholders and prepare a questionnaire, to be agreed in dialogue with the ExCom and GESAMP Members. Likely entities to interview are e.g. other UN entities (non-sponsors), NGOs, academia, Regional Seas Programmes, governments agencies, etc.

- .3 **A review of GESAMP's impact:** This step will complement the previous step (stakeholder impacts) by focusing on GESAMP's impact on academic, popular and 'grey' literature and within the media.

Step 3: Development of a ten-year strategic road map for GESAMP

Step 3 will consist of the following activities:

- .1 **Definition and preparation of a 10-year road map for GESAMP in collaboration and consultation with the Membership** and based on the findings for the analysis and the review and evaluation in steps 1 and 2 above. It is proposed that this will be carried out by a consultant, unless otherwise agreed.

The road map will be forward-looking and will complement the Decade of Ocean Science as well as other UN visions and targets (e.g. SDGs) but will also be flexible to respond to emerging issues. It will better define GESAMP's role moving forward and how that role can be better broadcasted and communicated, both within and beyond the UN agencies.
- .2 **The draft road map to be circulated within the Membership first for their agreement and then sent to ExCom for discussion and approval.**
- .3 **The ten-year road map will subsequently be launched at the appropriate annual session of GESAMP.**

Following approval of the road map, the GESAMP Office will be requested to prepare communications materials (leaflet, digital cards, etc.) for circulation and communication through the website and the Sponsoring Organizations.

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 – CURRENT WORKING GROUPS AND THEIR TERMS OF REFERENCE

WG 1: Evaluation of the hazards of harmful substances carried by ships

Lead Organization: IMO
Co-sponsors: None
Chair: Richard Luit (Netherlands)
Members: Stéphane le Floch (France), Wenxin Jiang (China), Matthias Grote (Germany), Bette Meek (Canada), Michael Morrisette (United States), Akiko Masuda (Japan)

Terms of reference for WG 1

The terms of reference of the Working Group 1, as amended at its 46th session in 2019, are:

1 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 the 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: As per terms of reference.

WG 34: Review of applications for “Active Substances” to be used in ballast water management systems

Lead Organization: IMO
Co-sponsors: None
Chair: Jan Linders (Netherlands)
Vice-Chair: Annette Dock (Sweden)

Members: Teresa Borges (Portugal), Shinichi Hanayama (Japan), Kitae Rhie (Republic of Korea), David J. D. Smith (United Kingdom), Gregory Ziegler (United States), Claude Rouleau (Canada), Assad Ahmed Al-Thukair (Saudi Arabia)

Consultant: 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 resolution MEPC 169(57)) by MEPC;

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, 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 the 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: As per terms of reference.

WG 38: Atmospheric input of chemicals to the oceans

Lead Organization: WMO

Co-sponsors: IMO, US National Science Foundation, SCOR, SOLAS, University of East Anglia

Chairs: Robert Duce (United States), Tim Jickells (United Kingdom)

Members: Sajjad Abbasi (Iran), Deonie Allen (New Zealand), Katy Altieri (South Africa), Alex Baker (United Kingdom), Cecile Guieu (France), Francis Hopkins (United Kingdom), Akinori Ito (Japan), Maria Kanakidou (Greece), Daoji Li (China), Peter Liss (United Kingdom), Natalie Mahowald (United States), Mike Roberts (South Africa), Manmohan Sarin (India), Morgane Perron (Australia/France)

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: To carry out a workshop on the ocean management and policy implications of the air/sea exchange of chemicals; continue preparation of additional manuscripts as per TOR.

WG 40: Sources, fate and effects of plastics and micro-plastics in the marine environment

Lead Organization: IOC-UNESCO and UNEP

Co-sponsors: To be confirmed

Co-Chairs: Peter Kershaw (United Kingdom), Bethanie Carney Almroth (Sweden)

Members: Daoji Li (China), Dick Vethaak (Netherlands), Francois Galgani (France), Sabine Pahl (Austria), Martin Thiel (Chile), Denise Mitrano (Switzerland), Hrissi Karapanagioti (Greece), Saly Thomas (India), Suchan Apple Chavanich (Thailand), Peter Ryan (South Africa), Allan Kelling (Brazil), Eric Gilman (United States), Chelsea Rochman (Canada), Maartje Folbert (Curaçao), Anthony Andrady (United States), Atsuhiko Isobe (Japan), Todd Gouin (United Kingdom), Andres Arias (Argentina), Eric Okuku (Kenya), Daniela Honorato-Zimmer (Chile), Krystal Ambrose (Bahamas), Francisco Alpizar (Costa Rica), Amy Brooks (United States), Stephanie Wright (United Kingdom), Patricia Villarrubia Gomez (Spain/Sweden), Won Joon Sim (Republic of Korea)

Terms of reference for fourth phase of WG 40:

(Terms of reference 1 to 5 to include social, environmental and economic aspects)

1 Review and further develop risk assessment methods for marine litter and microplastics & identify data needs – based on the outcome of the 2019 GESAMP risk workshop

2 Assess the effects of marine litter and macroplastics – e.g. human wellbeing, biodiversity & animal welfare, food security, direct & indirect cost to different sector, risk perception & communication. This will include consideration of Covid-19 related litter, especially material used for medical and hygiene purposes.

3 Assess the effects of nano- & micro-plastics – e.g. chemical contaminants, biodiversity, human health, risk perception & communication

4 Assess the effects of transfer of biota by marine litter and microplastics – e.g. human welfare, biodiversity, direct & indirect costs, pathogens, risk perception & communication

5 Carry out initial risk assessment (based on terms of reference 1 to 4)

Planning and outputs: The WG will operate using a mix of plenary/group and sub-group activities.

Arrangements will be made to allow participation remotely using workshops (with parallel sessions, recorded sessions) and on-line platforms (e.g. Basecamp) to overcome time-zone differences. A meeting of the WG will be held back to back with 7IMDC in Busan, Republic of Korea, in September 2022.

WG 41: Ocean interventions for climate change mitigation

Lead Organization: IMO, IOC-UNESCO and WMO

Co-Sponsors:

Chairpersons: Chris Vivian (United Kingdom), Philip Boyd (Australia)

Members: Andreas Oschlies (Germany), Greg Rau (United States), Miranda Boettcher (Germany), Mike Elliott (United Kingdom), Rahanna Juman (Trinidad and Tobago), Alejandro H. Buschmann (Chile), Long Cao (China), Christine Merk (Germany), Aarti Gupta (Netherlands), Masahiro Sugiyama (Japan), Olaf Corry (Denmark), Clare Heyward (Germany), Alana Lancaster (Barbados), Nadine Mengis (Germany), Guanqiong Ye (China)

Terms of reference for second phase of WG 41

1 The overall aims of GESAMP Working Group 41 for the second phase are:

- .1 to better understand the potential environmental and societal impacts of different ocean interventions for climate change on the ocean;
- .2 to develop a framework to integrate inputs from natural sciences and societal disciplines into a holistic assessment of ocean interventions for climate change mitigation or other purposes; and
- .3 to provide advice to the London Protocol Parties to assist them in identifying those ocean interventions for climate change mitigation, or other purposes, consistent with the London Protocol's definition of marine geoengineering, that it might be prudent to consider for listing in the new Annex 4 of the Protocol.

2 The second phase of the GESAMP Working Group 41 study should:

- .1 Develop a flow chart and questionnaire with associated guidance to elicit information from proposers of ocean interventions for climate change mitigation or other purposes consistent with the London Protocol's definition of marine geoengineering, to enable a preliminary assessment (including constructive feedback) of their techniques by regulators, policy makers, funders or anyone considering or permitting proposals. The flow chart and questionnaire with associated guidance will be aimed to facilitate the London Protocol 'Guidance for consideration of marine geoengineering activities' (IMO, 2015). The Working Group should also consider additional incentives that can be provided to proposers of ocean interventions for climate change mitigation to comprehensively report their approaches in the permanent public record, drawing upon the discussions of these incentives in the Working Group report. Examples

of such incentives to proposers of ocean interventions for climate change mitigation include modelling assessments (externally funded) that straddle conceptual, box models on to more complex approaches such as CDRMIP (Carbon Dioxide Removal Model Inter-comparison Project).

- .2 Develop a framework to integrate inputs from natural sciences and societal disciplines into a holistic assessment of ocean interventions for climate change mitigation or other purposes consistent with the London Protocol's definition of marine geoengineering, to be used by regulators, policy-makers, funders or anyone considering or permitting proposals, exploring the use of a systems approach framework such as that presented at the March 2019 workshop (see Elliott et al., 2015; Cormier and Elliott, 2019; Barnard and Elliott, 2015).
- .3 Provide advice to the London Protocol Parties:
 - a) identifying promising ocean interventions for climate change mitigation or other purposes i.e. those consistent with the London Protocol's definition of marine geoengineering, that might be worthwhile to consider for listing in the new annex 4 of the Protocol, including techniques having the potential to move to field testing;
 - b) developing an outline of the specific issues to be addressed in an assessment framework for each of a subset of techniques identified 11.3(a) above, using the London Protocol Assessment Framework for Scientific Research Involving Ocean Fertilization as a template;
 - c) providing an initial assessment of monitoring and verification approaches, including the difficulties and challenges, for each of the techniques, meriting detailed scrutiny, identified under 9.3(a) above; and
 - d) identifying significant gaps in knowledge and uncertainties associated with each of the small suite of techniques identified under 2.3(a) above that need to be addressed to assess their implications for the marine environment and, where appropriate, the atmosphere.
- .4 Provide brief updates, based on new scientific evidence since the WG 41 report was published in March 2019 (in particular from the IPCC 'Special Report on the Ocean and Cryosphere in a Changing Climate' published in 2019, and the forthcoming IPCC 6th Assessment Reports) on:
 - a) any new proposed ocean interventions that may have potential for climate change mitigation or other purposes consistent with the London Protocol's

- definition of marine geoengineering such as fisheries enhancement, and their scientific practicality and efficacy; and
- b) the potential environmental and societal impacts of ocean interventions for climate change mitigation or other purposes consistent with the London Protocol's definition of marine geoengineering, on the marine environment and, where appropriate, the atmosphere.
- .5 Produce reports and potentially peer-reviewed scientific papers on the points above at appropriate points in the work plan.

Planning and outputs:

1 The working methods of the Working Group will be a mix of face to face meetings, Intersessional work/correspondence and videoconferencing/telephone conferencing.

2 Provisional timeline³⁹ for the second phase (subject to availability of funding):

- .1 Deliver a meeting report by xxx;
- .2 Potential additional Working Group meetings xxx;
- .3 Deliver draft final report addressing points 8.1 and 8.3 of the phase 2 Terms of Reference by xxx;
- .4 Peer review of the draft final report addressing points 8.1 and 8.3 of the phase 2 Terms of Reference required by xxx;
- .5 Presentation of draft assessment framework integrating natural sciences and societal disciplines into a holistic assessment of ocean climate intervention techniques for climate change mitigation at a stakeholder workshop in xxx 2022 for review by experts from all relevant disciplines (subject to specific funding being available);
- .6 Deliver final report by xxx;
- .7 Prepare workshop report within 8 weeks after the workshop;
- .8 Alternatively, instead of points 7, 8 and 9 above, carry out a wide peer review process
- .9 Revise draft assessment framework based on results of the workshop or wide peer review process;
- .10 Prepare draft final report, by xxx;
- .11 Peer review of the draft final report covering the draft assessment framework, i.e. point 8.2 above required by xxx;

³⁹ Timeline will be addressed at the next meeting of the working group in November 2021

- .12 Deliver final report by end 2022; and
- .13 Provisions for publication, dissemination and outreach.

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

Lead Organization: IMO

Co-Sponsors: UNEP, ISA

Chairperson: Tracy Shimmield (United Kingdom)

Members: Bronwen Currie (Namibia), Raymond Nepstad (Norway), 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 of wastes in the marine environment from mining operations, including marine mineral mining 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 associated wastes from land-based mining (hereinafter referred to as "mine tailings") and potential environmental impacts from sea-based mining operations. This should take account of interactions of mine tailings and other matter associated with mining operations in both nearshore and deeper water ecosystems with resources in the water column (e.g. ecological, biological) excluding sand and gravel mining. 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 (see document 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 to the organisms;
- 3 Review and identify the best practices in modeling the physical and chemical behavior 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 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; and

7 Produce a report on the above work under a time frame and any other reporting requirements to be agreed between LC/LP and the GESAMP.

Planning and Outputs: Finalize and publish the report addressing first term of reference to be published by end of 2022. This will be followed by a review of the rest of the terms of reference in order to allow further work on the issue.

WG 43: Sea-based sources of marine litter including fishing gear and other shipping related litter

Lead Organizations: FAO, IMO

Co-Sponsors: UNEP

Chairperson: Kirsten Gilardi (United States)

Members: Pingou He (United States), Kylie Antonelis (United States), Lumin Wang (China), Saly N. Thomas (India), David Santillo (United Kingdom), Raffaella Piermarini (Italy), Francois Galgani (France)

Terms of reference for WG 43

Phase two of the Working Group will have two concurrent work-streams:

Work-stream 1 will support information requests of the Scientific Groups of the London Convention/Protocol (LC/LP) Parties that will help identify priorities for addressing LC/LP waste streams, including ship coatings and abandoned vessels, as sources of plastic in the ocean.

Work-stream 2 will support information requests of FAO to further understand abandoned, lost and otherwise discarded fishing gear (ALDFG) as a source of ocean plastic, with a particular focus on methodologies for remediation, monitoring and reporting.

Work-stream 1 – LC/LP waste streams

TOR1. Review methodologies and technologies to measure and reduce the presence, type, origin and quantity of plastic litter and microplastics in LC/LP waste streams.

TOR 2. Further elucidate the amount and types of microplastics in anti-fouling paint and hull coatings, and the major geographic locations where these materials are applied and removed from ships.

TOR 3. Conduct a global review on the scrapping and abandonment of fibre-reinforced plastic/polymer vessels, including their types, numbers, and spatial and temporal distribution.

Work-stream 2 – ALDFG

TOR 4. Analyse trade-offs between economic and environmental costs of ALDFG recovery and benefits derived from such recovery efforts, including drifting Fish Aggregating Devices (dFADs).

TOR 5. Identify elements that should be included in a monitoring programme for ALDFG, including an update on availability of remote, or vessel based, sensing technologies/tools for monitoring ALDFG.

TOR 6. Identify and analyse potential causal links between Illegal Unreported and Unregulated (IUU) fishing and ALDFG.

Planning and outputs: Initiate phase two, including a reconfiguration of the membership.

WG 44: Biofouling Management

Lead Organizations: IOC-UNESCO

Co-Sponsors: IMO, UNDP

Chairperson: Mario Tamburri (United States)

Members: Joop Coolen (the Netherlands), Andrew Want (United Kingdom), Pedro Almeida Vinagre (Portugal), Serena Teo (Singapore), Youna Lyons (Singapore), Nina Blocher (Norway), Kamal Ranatunga (Sri Lanka), Agnese Marchini (Italy), Koebra Peters (South Africa), David Smith (United Kingdom), Marnie Campbell (Australia), Pei-Yuan Qian (China), Evangelina Schwindt (Argentina), Hiroshi Kawai (Japan), Jung-Hoon Kang (Republic of Korea)

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 to 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: Present the final report before end 2023.

WG 45: Climate change and greenhouse gas related impacts on contaminants in the ocean

Lead Organization: IAEA

Co-Sponsors: IOC-UNESCO, UNEP, WMO, IMO

Co-Chairs: Vanessa Hatje (Brazil), Manmohan Sarin (India)

Members: Elisabeth Holland (Fiji), Sylvia Sander (Germany), P Nuria Casacuberta (Switzerland), Ricardo Barra (Chile), Dario Omanovic (Croatia), Alessandro Tagliabue (United Kingdom), Christoph Voelker (Germany), Justin Gwynn (Norway), Pamela Noyes (United States)

Terms of reference for WG 45

- 1 Critically review existing research on:
 - a. The effect of changes in ocean physics and chemistry on the speciation, cycling, fate and bioavailability of diverse contaminants including trace elements, radionuclides, organic pollutants and nutrients.
 - b. The effect of such changes on important coastal and marine resources.
- 2 Identify knowledge gaps.
- 3 Make recommendations for future research directions on the effect of changes in ocean physics and chemistry on the speciation, cycling and bioavailability of diverse contaminants including trace elements, radionuclides, organic pollutants and nutrients.

4 Develop a plan for publication and dissemination of the findings of the WG.

5 Propose additional work relevant to the topic of the WG that may be useful to the sponsoring agencies and which could be carried out by the WG beyond what is listed above.

Planning and outputs: Compilation and synthesis of information into four thematic sub-groups and the identification of knowledge gaps in the first stage of the work.

TASK TEAMS

Task Team on the United Nations Decade of Ocean Science for Sustainable Development (Ocean Decade)

Lead: Rosemary Rayfuse (Australia)

Members: David Vousden (South Africa), Peter Kershaw, (United Kingdom) Wendy Watson-Wright (Canada), Chris Vivian (United Kingdom).

Purpose: To coordinate, facilitate and promote GESAMP contributions to the Ocean Decade

Terms of Reference:

1 Provide a focal point for interactions between GESAMP and the Ocean Decade;

2 Coordinate GESAMP's role in the Ocean Decade Strategic Ambition Setting Process through identification of GESAMP Members/Experts to participate in relevant joint GESAMP-Decade working groups on Decade Challenges and their longer-term tracking, monitoring and refining, and in other Decade structures;

3 Maintain mapping/registry of GESAMP activities against Decade Challenges and

Outcomes including coordinating the identification by GESAMP WGs of knowledge gaps in their respective areas of work;

4 Support communications on the Ocean Decade within GESAMP membership and beyond;

5 Provide input to the Ocean Decade on emerging issues through GESAMP ExCom;

6 Encourage GESAMP Members/Experts to register with the Decade Expert Roster and to lead/participate in/engage with Decade Actions; and

7 Encourage GESAMP Members/Experts to engage with Decade.

Outputs: Up to date tracking of GESAMP contributions to the Decade. Joint GESAMP – Decade working groups on relevant Decade Challenges to provide white papers on strategic ambitions for consideration at Second International Ocean Decade Conference in 2024.

Task Team on Climate Change

Lead: Elisabeth Holland (Fiji)

Members: Alexander Girvan (Jamaica), Chris Vivian (United Kingdom), Robert Duce (United States), Vanessa Hatje (Brazil), Wendy Watson-Wright (Canada), Valerie Allain (Fiji).

Terms of Reference:

- 1 Draft a short scoping paper highlighting the current progress on Ocean and Climate Change issues, including issues related to ocean-based climate change mitigation activities;
- 2 Ensure watching brief on climate change issues in general and alert GESAMP as appropriate to breaking relevant information;

3 Create a link between the existing WGs working on related issues (at least WG 38, 41 and 45); and

4 Provide a short report at future annual sessions and to GESAMP Members at Intersessional meetings.

Task Team on the Strategic Review of GESAMP

Lead: David Vousden (Chair of GESAMP)

Members: Rosemary Rayfuse (Australia), Alexander Girvan (Jamaica), Robert Duce (United States), Jan Linder (Netherlands), Manmohan Sarin (India), Chrysanthe Kolia (GESAMP Office)

The Review Task Team will coordinate the strategic review of GESAMP, according to the work plan and methodology set out in annex V.

Planning and outputs:

Action	Timeline/deadline	Responsible
Approval of review work plan and establishment of the Review Task Team	September 2022 (GESAMP 49)	GESAMP
Review step 1: Initial internal evaluation	October 2022-February 2023	Review Task Team
Presentation of initial findings to GESAMP and ExCom	March 2023	Review Task Team
Review step 2: External review/evaluation	Presented to GESAMP 50 in September 2023	Review Task Team
Review step 3: Drafting of the ten-year road map	October to December 2023	Review Task Team
Approval and launch of the ten-year road map	Late 2023/first half of 2024	GESAMP/ExCom

CORRESPONDENCE GROUPS

Correspondence Group 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 (United Kingdom)

Members: Jan Linders (Netherlands) others to be confirmed

Planning and outputs: Follow developments on the issue and explore possible GESAMP co-sponsorship in the Open Science Meeting.

Correspondence Group to update the information on sources of the main pollutants impacting the global marine environment – “The 80:20 Conundrum”

Lead: David Vousden (South Africa) and Andrew Hudson (UNDP)

Planning and outputs: Provide an analysis based on the GESAMP 49 discussions.

Correspondence Group on sand and gravel mining in the marine environment – new insights on a growing environmental problem

Lead: Chris Vivian (United Kingdom)

Planning and outputs: Update the scoping paper and discuss with UNEP way forward.

Correspondence Group on relevance of inputs of disinfection byproducts (DBPs) into the marine environment

Lead: n/a

Planning and outputs: Publish report of the correspondence group in the GESAMP R&S Series by the end of 2022.

Correspondence Group on impact of armed conflicts on the marine environment and sustainable development

Lead: Chris Vivian (United Kingdom), David Vousden (South Africa)

Planning and outputs: Circulate scoping paper to the GESAMP Members for further input and revisit the topic at the next intersessional.

Correspondence Group on effects of a changing ocean on human health

Lead: Kirsten Gilardi (United States), Wendy Watson-Wright (Canada)

Planning and outputs: Develop and circulate scoping paper to the GESAMP Members for further input at the next intersessional.

ANNEX VIII – SIDE-EVENT

Environmental economics and its role in marine environmental protection

Open seminar at the 49th session of GESAMP

Thursday, 8 September 2022, 9:30 -12:30

Ocean ecosystems and the services they provide are vital for our survival and quality of life on the planet and they play a critical role in supporting the development of the global economy. In the past decade, discussions around the concept of blue economy as an economic model for sustainable development that puts the ocean-based activities at its center has increased significantly, coupled with rapid private and public capital and resource flows towards these activities. With the increased interest and economic activity in the ocean space comes associated increased risks to ocean health but also potential opportunities for enhanced environmental protection.

In addition to the advancement of the blue economy concept, environmental economics approaches such as ecosystem service valuation, natural capital accounting and more recently nature's contribution to people¹ approaches are increasingly recognized as essential tools for effective environmental management.

Understanding the evolving global policy discussions around blue economy and the application of this concept by governments and the private sector is essential to managing the current and future threats human activities pose to already pressured and delicate marine ecosystems, nutrient and chemical cycles. Further, understanding environmental economic approaches that articulate the value of critical ocean services, and the potential costs of associated changes presents an additional and powerful tool to bodies such as GESAMP and the UN agencies it supports.

This session is intended to provide an overview of key issues related to blue economy discussions from public and private sector perspectives. Additionally, this session will introduce how environmental economic approaches can be applied to marine environmental science and protection. Presentations will be used as a basis for discussion as to how GESAMP can collaborate with those working in the blue economy space and apply environmental economic approaches to its work.

Programme

Moderator: Kirsten Gilardi – GESAMP Member

Speakers:

9:30-9:45	Prof David Vousden Chair of GESAMP	<i>Welcome and brief introduction to GESAMP</i>
9:45-10:00	Dr Alexander Girvan GESAMP Member	<i>The role of environmental economics in the science/policy interface</i>
10:00-10:35	Dr Nick Hardman-Mountford Head of Oceans & Natural Resources, Commonwealth Secretariat	<i>Blue economy and the Commonwealth Blue Charter: science-policy perspectives</i>
10:35-11:10	Dr Gaetano Grilli Centre for Social and Economic Research on the Global Environment (CSERGE), University of East Anglia	<i>Accounting and valuation of marine and coastal ecosystem services with applications and policy implications for the blue economy</i>
11:10-11:45	Mr Simon Dent Head of Blue Investment Mirova Natural Capital	<i>Financing a sustainable blue economy</i>
11:45-12:30	Discussion – the economic dimension and GESAMP's role	



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

The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) is an advisory body, established in 1969, that advises the United Nations (UN) system on the scientific aspects of marine environmental protection. The Mission of GESAMP is: "To provide authoritative, independent, interdisciplinary scientific advice to organizations and member Governments to support the protection and sustainable use of the marine environment." For more information visit www.gesamp.org

¹ https://ipbes.net/media_release/Values_Assessment_Published

ANNEX IX – GESAMP REPORTS AND STUDIES

GESAMP REPORTS AND STUDIES

The following reports and studies have been published to date by GESAMP. They are available from the GESAMP website: <http://www.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 sea-bed. (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 - 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.
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