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GESAMP

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

REPORT OF THE 48TH SESSION OF GESAMP

6 to 10 September 2021

Hosted by the IAEA (remotely)



REPORTS AND STUDIES



GESAMP REPORTS AND STUDIES 110

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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 48th session from 6 to 10 September 2021, by virtual means. 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 47 via a combination of correspondence and virtual plenary sessions due to the COVID-19 restrictions. Data on 13 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 47 to evaluate four Ballast Water Management Systems (BWMS). GESAMP noted that the number of BWMS presented to the Working Group had increased, and that it could be expected that more BWMS will have to be evaluated for freshwater, since several existing BWMS have received only Final Approval for marine and brackish water.

0.4 Atmospheric input of chemicals to the ocean (WG 38): The Working Group had held a virtual workshop on the atmospheric transport of microplastics to and from the ocean which took place in cooperation with Working Group 40 in November 2020. Furthermore, a workshop on ocean management and policy implications of air/sea exchange of chemicals was being developed to examine the potential role of atmospheric deposition in driving ocean productivity in the Mozambique Channel and the Southwest Indian Ocean. The Working Group had also finalized the manuscript for its next report, titled 'The changing acidity of the global atmosphere and ocean and its impact on air/sea chemical exchange'

0.5 Sources, fate and effects of plastics and microplastics in the marine environment (WG 40): GESAMP approved the workplan and TOR for the fourth phase of the Working Group, which aims to develop a risk assessment framework to promote a risk-based approach to assessing the social, economic and ecological impacts of all types and sizes of marine plastic litter and guide the design of cost-effective response options.

0.6 Ocean interventions for climate change mitigation (WG 41): GESAMP noted the progress with the second phase of the Working Group, including its support to the Scientific Groups under the London Convention/Protocol and the LC/LP Contracting Parties. GESAMP re-iterated the common interests between the WG and the UNFCCC processes, and

requested the Lead Agencies to follow up with the UNFCCC secretariat intersessionally

0.7 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining (WG 42): GESAMP noted that following internal and external peer-review, the final report of the Working Group was currently being reviewed by the Lead Agencies (IMO, UNEP and ISA). GESAMP welcomed the renewed engagement by ISA, and in light of this the Group noted the importance of the current final review and the need to update the report before publication. In addition, the UNEP Extractions Group had provided additional comments, which would be considered prior to publication.

0.8 Sea-based sources of marine litter (WG 43): GESAMP noted that since GESAMP 47, the Working Group had met twice by teleconference and had finalized the technical report, which had now undergone internal and external peer-review and was in the final stages of publication. A webinar was scheduled on 23 September 2021 to present the report's main conclusions. GESAMP also noted the interest from the co-sponsors (FAO, IMO, UNEP) to continue the work of WG 43 through a second phase and that the Chair would engage with the co-sponsors to review the TOR and work plan.

0.9 Biofouling management (WG 44): GESAMP noted that the WG had held its first meeting (by virtual means) in October 2020 and that it was working towards completion of its first report in September 2021. To facilitate work during the pandemic, several drafting groups had been established. GESAMP also noted that the Chair of the WG had resigned, and that the Lead Organization of the WG (IOC-UNESCO) would identify a new WG Chair, in consultation with the Chair and Vice-Chairs of GESAMP.

0.10 Climate change and greenhouse gas related impacts on contaminants in the ocean (WG 45): GESAMP noted that the WG had held two meetings since its establishment earlier in 2021. To facilitate its work, the WG had formed and defined four thematic sub-groups to work towards the compilation and synthesis of information and the identification of knowledge gaps.

0.11 Contribution to other UN processes: GESAMP noted the postponement of many ocean related UN processes due to the pandemic but reiterated its readiness to support the Sponsoring Organizations as and when required. GESAMP also highlighted the need to strengthen the ocean-related issues in the climate change dialogues, and once again noted the importance of its working groups in this context, WG 38, WG 41 and WG 45.

0.12 The United Nations Decade of Ocean Science for Sustainable Development: GESAMP noted that the work of GESAMP will be of great relevance to the Decade for many years to come, and agreed to strengthen its efforts with respect to the Decade by establishing a permanent Task Team, once the Terms of Reference would be developed and approved intersessionally.

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

0.14 Identification of new and emerging issues: GESAMP discussed a number of new and emerging issues, including 1) the use of CO₂ scrubbers in

reducing carbon output related to shipping of cargo, 2) energy transition, decarbonisation, related to the H₂ economy and the transport of NH₃, and 3) artificial light and noise, and agreed to continue consideration intersessionally, as relevant. GESAMP also welcomed the suggestion by the ISA to convene a webinar on artificial light and noise in relation to deep sea mining, and agreed to continue the consideration of establishing a mechanism to provide the Sponsoring Organizations with support in relation to emergency response.

0.15 GESAMP side-event: During the annual session, GESAMP organized a side-event, together with the IAEA as the host of the session, on "Marine contamination incidents: scientific support to emergency response", which was held as an open (virtual) seminar.

1 INTRODUCTION

1.1 The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) held its 48th session from 6 to 10 September 2021, hosted by the IAEA by virtual means. The session was chaired by Mr. David Vousden, with Mr. Manmohan Sarin and Ms. Tracy Shimmield as Vice-Chairs. The session was preceded by the GESAMP Executive Committee (ExCom) meeting on 3 September 2021, and an informal meeting of the GESAMP Members, held prior to the opening of the annual session on 6 September.

1.2 Ms. Florence Descroix-Comanducci Director of the IAEA Environmental Laboratory, Monaco, welcomed participants, stating that it was a pleasure for IAEA to organize this event as the agency was celebrating 60 years of existence. She also noted that the IAEA had been a proud sponsor of GESAMP since 1969 and was currently supporting Working Group 45. She highlighted GESAMP's key role, especially in relation to the UN Decade of Ocean Science for Sustainable Development and emphasized the increasing need for scientific expert guidance for policy makers.

1.3 Mr. Hiroyuki Yamada, Administrative Secretary for GESAMP and Director, Marine Environment Division, IMO, also welcomed GESAMP Members to the annual session. He noted GESAMP's hard work over the last year, despite the challenges of remote

working and expressed appreciation for everyone's dedication to GESAMP. He further outlined the linkages between GESAMP's work and the many ongoing ocean related intergovernmental processes, such as the forthcoming UNFCCC COP 26 and UNEA 5.2, as well as the importance of GESAMP's efforts to support not only the UN system but also the Member States in achieving the Sustainable Development Goals.

Adoption of the agenda

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

GESAMP side-event

1.5 During the annual session GESAMP organized a side-event, together with the IAEA as the host of the session, on "Marine contamination incidents: scientific support to emergency response", which was held as an open (virtual) seminar. The programme is shown in annex VII.

2 REPORT OF THE CHAIR OF GESAMP

2.1 The Chair of GESAMP introduced document 48/2, providing an update on the intersessional work of GESAMP. 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 informed that GESAMP had held two intersessional meetings, in December 2020 and in June 2021. Both meetings served as opportunities to advance GESAMP's work in the intersessional period, but the second meeting was convened specifically for the purpose of discussing GESAMP's role in and contribution to the UN Decade of Ocean Science for Sustainable Development and was joined by the Decade Secretariat as well as Technical Secretaries from the Sponsoring Organizations (see section 5, below).

2.3 In the intersessional period, GESAMP had also established a Nomination Committee, tasked to lead the identification of gaps in GESAMP's current expertise, and to identify new potential Members, that could be proposed to the ExCom. Three new Members had been presented to, and subsequently appointed by, the ExCom, namely Valerie Allain (fisheries expert, New Caledonia), Elisabeth Holland (climate change expert, Fiji), and Rosemary Rayfuse (marine law expert, Australia). Through the Nominations Committee, GESAMP had also identified a socio-

economy expert, which was currently under review by the ExCom.

2.4 The Chair also highlighted outreach activities during the year by the Chair, Vice-Chairs and Members, including the participation in the third workshop held by the World Maritime University on 'Empowering Women for the United Nations Decade of Ocean Science for Sustainable Development', a webinar organized by IMO in recognition of World Ocean Day, titled "The Ocean: Life and livelihoods – The role of IMO in Ocean Governance", as well as the Expert Panel on Chemical Pollution in the Ocean, a workshop in July 2021 hosted by the Back to Blue initiative on behalf of the Economist Group.

2.5 The Chair finally noted that one Member, Ms. Katja Broeg, Chair of WG 44 on Biofouling Management, had recently resigned as both WG Chair and as a Member of GESAMP for personal reasons. GESAMP expressed appreciation for her hard work during her membership, wished her good luck for the future and assured her that she would be genuinely missed.

Action by GESAMP

2.6 In the discussion that followed, GESAMP:

- .1 noted the value of the intersessional meetings both for updates on the status of activities and for progressing with issues such as the Decade of Ocean Science, and agreed to continue this practice;
- .2 sincerely thanked Ms. Katja Broeg (Germany, Chair of WG 44) for her services to the Group, and welcomed the three new Members (Valerie Allain, Elisabeth Holland, and Rosemary Rayfuse);

- .3 agreed to develop a proposal, including terms of reference, for an internal programmatic/strategic review of the role of GESAMP; and
- .4 agreed to consider how to strengthen its overall 'Outreach' efforts, particularly in the context of identifying possible management actions and policy implications that the Sponsoring Organizations might wish to consider with a view to advising their Member States. Further in this context, GESAMP will endeavour to include such summary statements on the scientific implications for management and policy in its reports, as well as in separate briefing documents to the Sponsoring Organizations, where this is appropriate.

3 REPORT OF THE ADMINISTRATIVE SECRETARY OF GESAMP

3.1 The Administrative Secretary of GESAMP introduced document 48/3. GESAMP noted that the ExCom had met on 24 February, to discuss working groups, preparations for GESAMP 48 and other issues, and to confirm the appointment of three new GESAMP Members that had been nominated by GESAMP.

3.2 ExCom had also met on Friday 3 September 2021 and had noted with appreciation the review by GESAMP of the current composition of the membership, the gaps in expertise and the proposal on how these gaps can be filled.

3.3 GESAMP noted the report of the activities and achievements of the Sponsoring Organizations since GESAMP 47, since there had been no such report at last year's session. The highlights of these achievements are reported in detail in annex IV to this report.

3.4 Finally, GESAMP recognized the contributions of Ms. Sylvia Sander as the IAEA Technical Secretary to GESAMP and welcomed Ms. Iolanda Osvath as the new 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 48/4, providing a report of the Working Group.

4.1.2 Since GESAMP 47, the WG had met once (EHS 58) via a combination of correspondence and virtual plenary sessions due to the COVID-19 restrictions. The full report had been published as EHS 58/9 and circulated as IMO circular PPR.1/Circ.11. The main work carried out at the last session concerned the evaluation of substances. Data on 13 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.

4.1.3 GESAMP also noted that the Working Group had considered a request from IMO to provide advice for a recommended way forward when assessing mixtures that fall in the persistent floaters (Fp) category. Other issues of concern had been estimations of acute dermal toxicity, as well as

assessments of formulated mixtures. Furthermore, the WG had noted with appreciation written observations by the European Chemical Industry Council (CEFIC) with respect to the methodology used by WG 1 (as set out in Reports and Studies No. 102) and the 7th edition of the Globally Harmonized System Classification and Labelling of Chemicals (GHS), in particular with respect to the evaluation of mixtures. The WG will consider these concerns when updating its methodology in the future.

Action by GESAMP

4.1.4 Following discussion, 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 (Working Group 34)

4.2.1 The Chair of Working Group 34 (WG 34), Mr. Jan Linders, introduced document 48/4/6, 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 47 and noted that four Ballast Water Management Systems (BWMS) had been evaluated. Of these four BWMS, two received a recommendation for Final Approval, one was not recommended for Final Approval, and one received a recommendation for Basic Approval. The next session of MEPC is scheduled for November 2021 (MEPC 77).

4.2.3 GESAMP noted that the number of BWMS presented to the Working Group had increased compared to recent reporting periods, and that it could be expected that more BWMS will have to be evaluated for freshwater, since there are still several BWMS that have received only Final Approval for marine and brackish water. The next meeting of WG 34 (BWWG 42) is tentatively scheduled for 17 to 28 January 2022, by virtual means.

4.2.4 Furthermore, GESAMP noted the Working Group's proposal to hold a stocktaking workshop (STW), in connection to one of its future regular meetings, which could eventually lead to a revision of the WG's methodology. The WG was therefore seeking approval from GESAMP as well as MEPC 77 to convene a STW.

Action by GESAMP

4.2.5 In the discussion that followed, GESAMP expressed its support for the holding of an STW, and extended great appreciation to the Chair and WG members for their hard work, and for the progress made in the intersessional period,

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 48/4/1, providing a report of the Working Group. He informed GESAMP of a virtual workshop on the atmospheric transport of microplastics to and from the ocean which took place in cooperation with WG 40 in November 2020. GESAMP was also informed of the development of a workshop on ocean management and policy implications of air/sea exchange of chemicals, which was being developed to examine the potential role of atmospheric deposition in driving ocean productivity in the Mozambique Channel and the Southwest Indian Ocean. The nature of this workshop is such that it could not effectively be held in a virtual scenario as there was a need for interaction between younger student scientists and more experienced members of the scientific establishment. As a consequence, the workshop had been postponed and was scheduled for October 2022 in Gqeberha (formerly Port Elizabeth), South Africa.

4.3.2 GESAMP also noted that the WG had continued its tradition of producing papers in peer-reviewed scientific journals and had also recently finalized a new report on 'The changing acidity of the global atmosphere and ocean and its impact on air/sea chemical exchange', for publication in the GESAMP Reports and Studies Series. In addition, the WG is planning to convene an air/sea chemical exchange session at the American Geophysical Union meeting in 2021 and the European Geosciences meeting in 2022.

Action by GESAMP

4.3.3 GESAMP expressed appreciation towards the progress made by the Working Group in the intersessional period, in particular with the completion of the new report, and thanked the Co-Chairs and the WG members. GESAMP also highlighted the connections with WG 45 and encouraged close dialogue between the two working groups. It was noted that one of the GESAMP Members, Mr. Manmohan Sarin, Vice-Chair of GESAMP, was a member of both Working Groups, and could act as a facilitator in this regard.

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 48/4/7, providing a report of the Working Group since the last annual session.

4.4.2 The Chair of WG 40 recalled that the aim of the fourth phase of the working group is to develop a risk assessment framework, which will promote a risk-based approach to assessing the social, economic and ecological impacts of all types and sizes of marine plastic litter and guide the design of cost-effective response options. The Chair also presented the new membership of the WG, as well as the new Co-Chair, and provided an overview of the planned activities.

4.4.3 GESAMP also noted that the Chair of the WG represents GESAMP on the Steering Committee of the Global Partnership on Marine Litter (GPML), and that within this context he was leading the development of an Action Track on the Science-Policy interface, with a particular focus on 1) harmonised monitoring and assessment and data sharing, 2) development of risk frameworks to support impact mitigation strategies and 3) the promotion of effective communication and understanding of risks.

4.4.4 GESAMP recalled that, following the consideration of the TOR for the fourth phase of WG 40 at last year's annual session, GESAMP had invited the WG Chair and the co-sponsors to continue the development of the TORs and workplan, for consideration intersessionally. It was noted that in the intersessional period, discussions had continued among the Chair, the lead organizations for the WG (IOC-UNESCO and UNEP) and potential new sponsors for the next phase.

Action by GESAMP

4.4.5 Following discussion, GESAMP approved the workplan, together with the ToR for the Working Group, as set out at annex V. GESAMP also thanked the WG Chair and the incoming Co-Chair and WG members for the preparatory work of the next phase.

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 48/4/2/Rev.1, providing a report of the Working Group. He informed that, since the last GESAMP annual session in September 2020 when the Working Group's new ToR were approved, the first action taken by the Co-Chairs was to reconstitute the membership of WG 41 to include marine social scientists so as to be able to deliver the new ToR and to improve its diversity. Consequently, the current membership included nine men and six women, with ten members from Western/Europe/North America and six from other countries.

4.5.2 The focus of the WG since the first meeting of the second phase had been to address the new TORs, including the proposed Integrated Assessment Framework. The Chair also informed GESAMP of the presentation of the WG 41 to the 12th UNFCCC SBTA Research Dialogue and the Working Group's potential collaboration with Surface Ocean Lower Atmosphere study (SOLAS) and Carbon Dioxide Removal Inter-Comparison Project (CDRMIP). The work of the Group had also attracted positive interest by the UN Special Envoy for the Ocean.

4.5.3 Furthermore, the WG had provided information to the meeting of the Scientific Groups under the London Convention/Protocol 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 (addressing part of TOR 11.3). The LC/LP welcomed the submission and they noted that the six marine geoengineering techniques identified by the WG as highest priorities merited urgent consideration by the Scientific Groups. Subsequently, the Scientific Groups agreed to establish an intersessional correspondence group, under the lead of Italy, to further address the issue and to engage with the Co-Chairs of GESAMP WG 41 to ensure alignment between the work of WG 41 and the LC/LP.

4.5.4 GESAMP also noted initial discussions between the WG Co-Chairs and ClimateWorks, a philanthropic foundation to tackle climate change on a global scale (<https://www.climateworks.org>), for possible funding opportunities.

Action by GESAMP

4.5.5 Following discussion, GESAMP:

- .1 noted the discussions with ClimateWorks and agreed to continue the discussion on this matter intersessionally;
- .2 re-iterated the common interests between the WG and the UNFCCC processes, and requested the Lead Agencies to follow up with the UNFCCC secretariat intersessionally; and
- .3 noted that the socio-economic expert identified by the Nominations Committee

as a potential new GESAMP Member, could also contribute to the work of WG 41.

4.5.6 GESAMP also emphasized that, with three working groups currently active on climate change issues, GESAMP is ideally placed to increase its support to the Sponsoring Organizations on these matters and strengthen its dialogue with UNFCCC. In addition, it was noted that communication and outreach regarding the work of GESAMP will be of utmost importance on this topic.

4.5.7 Finally, 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 48/4/3, providing an update on the activities of the Working Group.

4.6.2 GESAMP noted the progress made with regards to the publication of the report, which was in the final stages of publication. Following internal and external peer-review, the report was currently being reviewed by the Lead Agencies (IMO, UNEP and ISA).

4.6.3 The WG Chair and GESAMP also welcomed the renewed engagement by the ISA to the work of WG 42 (and in GESAMP in general), and in light of this the Group noted the importance of the current final review and the requirement to update the report before publication. In addition, the UNEP Extractions Group had provided additional comments, which would be considered prior to publication.

4.6.4 GESAMP noted that some other groups, active on this matter, were considering the development of guidelines and noted that, while guideline development could possibly be an outcome from the work of the WG, such initiatives should most likely come from any Lead Agency with a mandate on this subject matter. It was also agreed that, for this report and several other WG reports in development, a Science Summary for Policy Makers (SSPM) could be useful.

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 also invited the Chair to initiate discussions with the co-sponsors on the possible terms of reference for continued work of the WG once the report was finalized.

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

4.7.1 Ms. Kirsten Gilardi, Chair of Working Group 43 (WG 43), introduced document 48/4/5, providing a report of the Working Group activities since the last session.

4.7.2 Since GESAMP 47, the Working Group had met twice by teleconference and had finalized the technical report, which had now undergone internal and external peer-review and was in the final stages of publication in the GESAMP Reports and Studies Series.

4.7.3 GESAMP noted that, to promote the report to the wider audience, a webinar was scheduled on 23 September 2021 to present the report's main conclusions. GESAMP, the Sponsoring Organizations, as well as Member State delegations, partnering organizations and observers would be invited to the webinar.

4.7.4 GESAMP further noted the interest from the co-sponsors (FAO, IMO, UNEP) to continue the work of WG 43 through a second phase and that the Chair would engage with the co-sponsors to review the ToR and work plan, once the report had been published, as a matter of priority.

4.7.5 GESAMP also noted the opportunity for the WG to participate in or contribute to the work of the 80:20 Conundrum Correspondence Group.

Action by GESAMP

4.7.6 GESAMP thanked the Chair of the WG and its members for their dedication and hard work. GESAMP further agreed that any changes to the ToR and work plan could be discussed and approved intersessionally if so required.

4.8 Biofouling management (WG 44)

4.8.1 Ms. Katja Broeg, Chair of Working Group 44 (WG 44), introduced document 48/4/4, providing a report of the Working Group activities since the last session. She 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 It was noted that the WG had held its first meeting (by virtual means) in October 2020 and that it was working towards completion of its first report in September 2021. To facilitate work during the pandemic, several drafting groups had been established. GESAMP also noted the draft outline of the report.

4.8.3 GESAMP also highlighted the link to the review of the IMO Biofouling Guidelines, and the contribution from the WG to this process, as well as the link to WG 40 and WG 43, and encouraged further dialogue between the Chairs of the three working groups.

4.8.4 GESAMP noted that since Ms. Broeg had informed the Group of her resignation from the WG and GESAMP, in accordance with the Rules of Procedure, the Lead Organization of the WG (IOC-UNESCO) would identify a new WG Chair, in consultation with the Chair and Vice-Chairs of GESAMP.

Action by GESAMP

4.8.5 GESAMP expressed its appreciation to Ms. Broeg for her time as Chair of the WG and as a GESAMP Member, as well as to the other members of the WG.

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

4.9.1 Ms. Vanessa Hatje, Co-Chair of Working Group 45 (WG 45), introduced document 48/4/8, providing a report of the Working Group. She informed GESAMP of the overall objective of the Working Group, namely, to understand the impacts of climate change (ocean physics and chemistry) on the speciation, toxicity, bioaccumulation, mobilization, and transport of pollutants in the ocean and coastal ecosystems and to identify knowledge gaps to roadmap future research and new challenges.

4.9.2 Ms. Hatje further emphasized the relevance with respect to human health, ecological risk assessments, and modelling of predictive scenarios under current climate changes. GESAMP was further informed of the Group's two meetings since its establishment, and its accomplishments to date. To facilitate its work, the WG had formed and defined four thematic sub-groups to work towards the compilation and synthesis of information and the identification of knowledge gaps.

4.9.3 GESAMP highlighted the connection to initiatives under SCOR and noted the impressive amount of work that the WG was embarking on. The Group also noted that Ms. Sylvia Sander, previous IAEA Technical Secretary, had now joined the WG as a member.

Action by GESAMP

4.9.4 GESAMP noted with great appreciation the progress made by the Working Group since its formal establishment of the WG earlier in 2021.

5 CONTRIBUTION TO OTHER UN PROCESSES

5.1 The UN Regular Process, the UN Ocean Conference and BBNJ

5.1.1 The DOALOS Technical Secretary for GESAMP provided an overview of current developments relating to the UN Regular Process for Global Reporting and Assessment of the State of the Marine Environmental, including Socio-economic Aspects (Regular Process),

including preparations for the third cycle of the Regular Process, which are ongoing mostly by correspondence. More information on the regular process can be found at <https://www.un.org/regularprocess/>.

5.1.2 As part of its programme of work for the third cycle of the Regular Process, (2021-2025), the Regular Process aims to strengthen its support for and interaction with other ocean related intergovernmental processes, including through the development of a series of brief documents outlining specific policy-relevant information from the Second World Ocean Assessment. In this regard, GESAMP was informed of the preparation of briefing documents on; 1) the relevance of WOA II to the UN Decade of Ocean Science for Sustainable Development and the UN Decade of Ecosystem Restoration; 2) climate change in the ocean; 3) WOA II and the Sustainable Development Goals; and 4) marine biodiversity. Regional workshops will also be organized, including two rounds of five regional workshops in support of the implementation of the third cycle of the Regular Process and five three-day regional workshops on capacity-building for strengthening the ocean science-policy interface.

5.1.3 The DOALOS Technical Secretary also informed the meeting of recent progress with the rescheduling of the postponed 2020 UN Ocean Conference to support the implementation of SDG 14. The decision on the new dates for the Conference, from 27 June to 1 July 2022, was adopted by the General Assembly during the meeting of GESAMP 48 on Thursday, 9 September 2021. The Conference will be co-hosted by Kenya and Portugal and will be held in Lisbon, Portugal. Information on the Conference can be found at: <https://www.un.org/en/conferences/ocean2022>.

5.1.4 GESAMP was also informed that the fourth session of the Intergovernmental Conference on an International Legally Binding Instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ), which had also been postponed, was now expected to be convened in early March 2022. More information on the BBNJ Conference can be found at: <https://www.un.org/bbnj/>.

5.1.5 The DOALOS Technical Secretary also expressed appreciation to GESAMP for providing comments on the topic of focus for the 2021 meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (ICP), namely sea level rise and its impacts. The letter from GESAMP had been forwarded to the co-chairs of the ICP. More information about the ICP can be found at: https://www.un.org/Depts/los/consultative_process/consultative_process.htm

Action by GESAMP

5.1.6 GESAMP thanked DOALOS for the extensive information provided and reiterated its readiness to support the Sponsoring Organizations within the abovementioned processes, as and when required.

5.1.7 GESAMP also highlighted the need to strengthen the ocean-related issues in the climate change dialogues, and once again noted the

importance of its working groups in this context, WG 38, WG 41 and WG 45.

5.2 The United Nations Decade of Ocean Science for Sustainable Development

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

5.2.2 The coordinator for the GESAMP Correspondence Group to support the Decade, Mr. Mike Huber, presented the activities of the Correspondence Group since GESAMP 47, including the dedicated Members' intersessional meeting, held in June 2021.

5.2.3 In the discussion that followed GESAMP agreed that, since the work of GESAMP will be of great relevance to the Decade for many years to come, it would be beneficial to strengthen its efforts by evolving the current Correspondence Group to a Task Team, as had been done on previous issues, e.g. the Task Team on Open Ocean Pollution to support the preparation for the UN Regular Process and the Task Team on Exhaust Gas Cleaning Systems to support IMO's MEPC.

5.2.4 The ISA Technical Secretary informed GESAMP of ISA's contribution to the Decade, as outlined in its action plan in support of the Decade. The plan is available at: https://isa.org.jm/files/files/documents/ISBA_26_A_17-2017623E.pdf

Action by GESAMP

5.2.5 Following discussion, GESAMP agreed to strengthen its efforts with respect to the Decade by establishing a permanent Task Team, once the Terms of Reference would be developed and approved intersessionally.

5.3 Other UN processes

UNFCCC and COP 26

5.3.1 GESAMP discussed the preparations for the UNFCCC and COP 26 in late 2021 and its possible contributions in this regard. It was noted that in the sixth assessment report of the IPCC, the work of GESAMP's WG 41 was acknowledged.

5.3.2 GESAMP was also informed that at least three more reports were expected in the near future, and GESAMP Members were encouraged to sign up as reviewers in their individual capacities, as appropriate.

5.3.3 It was further suggested to ExCom that, given the importance of climate change for the foreseeable future, it may be useful to establish a mechanism to keep a watching brief specifically on these issues, for example through a Task Team.

5.3.4 The UNEP Technical Secretary informed GESAMP of the preparations for the second meeting of the fifth session of the United Nations Environment Assembly (UNEA), which was scheduled for February 2022.

5.3.5 In the ensuing discussion, GESAMP stressed the relevance of its work to the discussions at UNEA, not least the expected negotiations on a global treaty on plastic pollution and re-iterated its readiness to contribute to UNEA as required.

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 current annual session. In the period leading up to the annual session, several new and emerging issues had been discussed between the Members. During the informal meeting of GESAMP Members, held on Monday, 6 September 2021, the following topics had been selected for presentation to the annual session,

6.2 Ms. Tracy Shimmield, Vice-Chair of GESAMP, presented the outcome of the Member's discussion. Three items were identified and brought to the attention of the meeting.

The use of CO₂ scrubbers in reducing carbon output related to shipping of cargo

6.3 GESAMP noted that as the economy grows and thereby maritime transport, it would be useful to keep an eye on developments in relation to CO₂ scrubbers due to potential discharges of substances into the marine environment.

Energy transition, decarbonisation, related to the H₂ economy and the transport of NH₃

6.4 As the so-called hydrogen economy grows, the transport of NH₃ in bulk, and any associated spillages, could be a concern, as these would also have an atmospheric impact, and lead to acidification. GESAMP agreed to follow up on IMO regulations with respect to the transport of ammonia.

Artificial light and noise

6.5 GESAMP recalled that these issues had been discussed at previous sessions and noted that there is a growing knowledge regarding noise from seismic surveys, shipping, offshore wind and gas. With respect to artificial light, the knowledge base was still limited. The Members therefore discussed whether GESAMP could play a role in bringing this information together. It was recalled that artificial light had been identified as an emerging issue at GESAMP 47, whereas noise had been the topic of the side-event at GESAMP 41. It had also been addressed by the GESAMP Task Team on Open Ocean Pollution.

6.6 The UNDP Technical Secretary informed the meeting of the plans for a UNDP-IMO project on noise in relation to shipping, which had recently been submitted to the GEF for consideration. The project, 'GloNoise' would build capacity in relation to the implementation of the 2014 IMO *Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life*.

The IMO Technical Secretary also informed GESAMP of the current state of the issue within the MEPC.

6.7 The DOALOS Technical Secretary reminded the meeting that anthropogenic noise had been the topic of focus for the ICP in 2017 (ICP-17).

6.8 The ISA Technical Secretary informed the meeting of the work carried out under CBD, which included a synthesis report on the current state of knowledge regarding anthropogenic noise in the marine environment. She also noted that there was potential interest from ISA to proceed with further work on artificial light and noise with respect to deep sea mining, and suggested that a suitable starting point could be a webinar for ISA delegates, to be organized by GESAMP and ISA.

Follow-up from the side-event on 'Marine contamination incidents: scientific support to emergency response'

6.9 The Chair of GESAMP noted that the side-event on 'Marine contamination incidents: scientific support to emergency response' organized by the IAEA on 9 September (see annex VII for a summary), had indicated that there may be a role for GESAMP to provide additional support to the Sponsoring Organizations with respect to emergency response.

6.10 GESAMP noted that such a role would be advisory, not operational, and that it may not be necessary to establish a Task Team, but merely a focal point.

Action by GESAMP

6.11 Following discussion, GESAMP:

- .1 agreed to continue the scoping out of the issues, identified above by the Members, intersessionally under the lead of the Ms. Shimmield as the Vice-Chair;
- .2 welcomed the suggestion by the ISA to convene a webinar on artificial light and noise in relation to deep sea mining, and requested the ISA Technical Secretary to work with the Chair and the GESAMP Office to make any necessary preparations; and
- .3 agreed to continue the consideration of establishing a mechanism to provide the Sponsoring Organizations with support in relation to emergency response, under the lead of the Chair of GESAMP.

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, provided an update on the work of the Correspondence Group. It was noted that the final report was near completion, subject to the addition of some recent information.

Actions by GESAMP

7.1.2 Following discussion, GESAMP agreed to complete the report, under the lead of Mr. Vivian, and requested UNEP to consider the recommendations, and any future actions requested from GESAMP.

7.2 Update the Information on Sources of the Main Pollutants Impacting the Global Marine Environment (The 80:20 Conundrum)

7.2.1 The coordinators of the Correspondence Group, Mr. David Vousden and the UNDP Technical Secretary provided an update on progress intersessionally. GESAMP noted that at the last session, it had been agreed to await the final report of WG 43 before deciding on the next steps, and as this was now near publication, it would be timely to agree on how to proceed.

7.2.2 GESAMP recalled its previous discussions on this topic, and noted that despite the gaps in knowledge, there are cases that could be used to illustrate the problem with the 80:20 conundrum. GESAMP also noted that despite the erroneous nature of the concept, it was also an example of an effective communication with high impact, which had indeed influenced the narrative for decades.

7.2.3 It was agreed that any document prepared on this matter by GESAMP, would need to focus on the public and policy makers, with illustrative examples from e.g. an LME, and a possible statement. In a longer-term perspective, it would be possible to provide a longer discussion document, pollutant by pollutant.

Actions by GESAMP

7.2.4 Following extensive discussion, GESAMP agreed to continue the discussion intersessionally, under the lead of Mr. Vousden and the UNDP Technical

Secretary, with the aim of preparing a briefing document for possible submission to a high-profile journal.

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, provided an update on recent progress made by the Correspondence Group. GESAMP noted that the planned Open Science Meeting on the topic was further postponed, waiting for a physical meeting once the pandemic situation allowed. It was therefore noted that the report on the issue was still relevant, and GESAMP could provide further support to this issue, potentially as a project under the Decade of Ocean Science.

7.3.2 In addition to IOC-UNESCO and UNDP, the IAEA and UNEP Technical Secretaries expressed their interest in the issue.

Actions by GESAMP

7.3.3 GESAMP agreed that discussions on the next steps would continue intersessionally under the lead of Mr. Kershaw, IOC-UNESCO and UNEP.

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

7.4.1 GESAMP noted that the final report had been peer-reviewed and was expected to be published before the end of the year following final editing and typesetting.

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

7.5.1 The coordinators of this Correspondence Group, Mr. Vivian and Mr. Vousden informed GESAMP that the report had been in effect finalized and GESAMP was invited to decide on the next steps. In the discussion that followed, it was agreed that the coordinators would do a final review of the text, and it would then be forwarded to the Sponsoring Organizations for consideration.

8 DATE AND PLACE OF GESAMP 49

8.1 GESAMP accepted with appreciation the offer by IMO to host the forty-ninth session of GESAMP at the IMO Headquarters London, United Kingdom, in 2022 and agreed that the exact dates would be

confirmed by the Executive Committee as soon as possible. ISA also indicated its intention to host the 50th session in 2023, at its Headquarters in Kingston, Jamaica.

9 FUTURE WORK PROGRAMME

9.1 GESAMP discussed the work programme for the intersessional period including imminent tasks for each working group. The currently active GESAMP

working groups, correspondence groups and task teams are listed, with their current terms of reference set out at annex V

10 ANY OTHER BUSINESS

10.1 GESAMP discussed the possibility to reach out to industry bodies within sectors of relevance and

requested the GESAMP Office to act as the facilitator in this regard.

11 ELECTION OF CHAIRPERSONS

11.1 GESAMP unanimously re-elected David Vousden (South Africa) as Chair and Tracy Shimmield (United Kingdom) as Vice-Chair and elected Wendy

Watson-Wright (Canada) as second Vice-Chair for the intersessional period and the forty-ninth session of GESAMP.

12 CONSIDERATION AND ADOPTION OF THE REPORT OF GESAMP 48

12.1 The report of the forty-eighth session of GESAMP was considered and approved.

13 CLOSURE OF THE SESSION

13.1 The Chair of GESAMP, Mr. David Vousden, closed the forty-eighth session of GESAMP on Friday, 10 September 2021 at 16:30 hrs (CEST).

ANNEX I - PROVISIONAL AGENDA

AGENDA

48th session of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP)

Hosted by the International Atomic Energy Agency (IAEA)

by remote participation

from 6 to 10 September 2021

- 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 leading)
 - .6 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining (WG 42: IMO and UNEP co-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 Date and place of GESAMP 49
- 9 Future work programme
- 10 Any other business
- 11 Elections
- 12 Consideration and adoption of the report of GESAMP 48

ANNEX II - LIST OF DOCUMENTS

Agenda item 1

- | | |
|----------|---------------------------------------|
| 48/1.Add | Provisional agenda |
| 48/1/1 | Annotations to the provisional agenda |
| 48/INF.1 | Provisional list of participants |
| 48/INF.2 | Provisional list of documents |

Agenda item 2

- | | |
|------|-------------------------------|
| 48/2 | Report of the Chair of GESAMP |
|------|-------------------------------|

Agenda item 3

48/3 Report of the Administrative Secretary of GESAMP

Agenda item 4

- 48/4 Evaluation of the hazards of harmful substances carried by ships – Report of the Chair of WG 1
- 48/4/1 Atmospheric input of chemicals to the oceans – Report of the Co-Chairs of WG 38
- 48/4/2.Rev Ocean interventions for climate change mitigation – Report of the Co-Chairs of WG 41
- 48/4/3 Impacts of wastes and other matter in the marine environment from mining operations, including marine mineral mining – Report of the Chair of WG 42
- 48/4/4 Biofouling management and non-indigenous species – Report of the Chair of WG 44
- 48/4/5 Sea-based sources of marine litter – Report of the Chair of WG 43
- 48/4/6 Review of applications for 'active substances' to be used in ballast water management systems – Report of the Chair of WG 34
- 48/4/7 Sources, fate and effects of plastics and microplastics in the marine environment – Report of the Chair of WG 40
- 48/4/8 Climate change and greenhouse gas related impacts on contaminants in the ocean – Report of the Chair of WG 45

ANNEX III - LIST OF PARTICIPANTS

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ANNEX IV – LIST OF ACHIEVEMENTS OF THE SPONSORING ORGANIZATIONS

1 This document provides a summary of the Organizations' achievements since GESAMP 47 (held from 7 to 11 September 2020) from IMO, UNDP, WMO, IAEA and UNEP.

INTERNATIONAL MARITIME ORGANIZATION (IMO)

Implementation of the Ballast Water Management Convention

2 The Ballast Water Management (BWM) Convention was adopted in February 2004 and aims to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments. The BWM Convention entered into force on 8 September 2017. The number of Contracting Governments is currently 91.19% and with 86 contracting Parties (status as of 12 August 2021).

Matters directly related to the GESAMP-BWWG

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

4 At its postponed 75th session, which also considered the applications that would have been considered by the 76th session, the Marine Environment Protection Committee (MEPC) granted two Final Approvals to BWMS that make use of Active Substances and extended the original Final Approval for five BWMS for use in fresh water, based on the recommendations of the 39th and 40th meetings of the GESAMP Ballast Water Working Group (WG 34).

5 MEPC 75 also considered the case of a BWMS for which the recommendation of GESAMP-BWWG was that Final Approval should not be granted but the relevant Administration submitted a commenting document requesting the Committee to agree that Final Approval be granted. Following consideration, MEPC 75 requested GESAMP-BWWG to further consider the application, taking into account the comments provided by the Administration. This re-evaluation was carried out by the 41st meeting of GESAMP-BWWG, the outcome of which will be considered by MEPC 77 (and with regard to this BWMS it was again not to recommend granting Final Approval). In light of procedural and other concerns relating to this occurrence, the Secretariat asked MEPC 77 to consider developing procedures for conducting future re-evaluations.

6 In addition, MEPC 75 noted the view of GESAMP-BWWG that a unified approach was needed to determine when a change to a BWMS after Final Approval or type approval should be considered as a significant change and requested GESAMP-BWWG to prepare draft guidelines for re-evaluations in cases where modifications had been made, for consideration by the Committee at a future session.

Other matters

7 A summary of the most important outcomes from MEPC 75, MEPC 76, the 7th and 8th sessions of the Sub-Committee on Pollution Prevention and Response (PPR 7 and PPR 8), the 7th session of the Sub-Committee on Implementation of IMO Instruments (III 7), and the 45th session of the Facilitation Committee (FAL 45) is provided in this section. Due to the virtual nature of these sessions (except PPR 7), several matters were deferred to future sessions, leading to fewer outcomes than usual.

Experience-building phase

8 In accordance with the plan of the experience-building phase (EBP), MEPC 75 would have considered the first aggregate data report and would have taken stock of the EBP's timeline. However, due to the very limited data submitted to date, as well as the virtual nature of the session, this was not possible. Subsequently, the Secretariat entered into an agreement with the World Maritime University (WMU) to facilitate data gathering and analysis, and MEPC 76 encouraged Administrations wishing to submit data to the EBP, as well as other stakeholders with potential complementary data, to liaise with WMU. This activity is currently ongoing, with an update expected to be provided to MEPC 77 and the final analysis report expected to be submitted to MEPC 78.

Amendments to the form of the International Ballast Water Management Certificate

9 Following the consideration and approval by MEPC 74 of amendments to the form of the International Ballast Water Management Certificate to include additional ballast water management methods, MEPC 75 adopted amendments to Appendix I of the BWM Convention (Form of International Ballast Water Management Certificate).

10 In addition, document MEPC 75/3/5 (China), relating to clarifications and a possible unified interpretation of the amended form of the Certificate, was deferred by MEPC 75, through MEPC 76, to PPR 9.

Commissioning testing of ballast water management systems

11 MEPC 75 adopted amendments to regulation E-1 of the BWM Convention to make commissioning testing mandatory. While the amendments are expected to enter into force on 1 June 2022, MEPC 74 had agreed that commissioning testing should begin as soon as possible in accordance with the *Guidance for the commissioning testing of ballast water management systems*.

12 In this connection, in light of the amendments to regulation E-1, MEPC 75 also approved BWM.2/Circ.70/Rev.1 on *2020 Guidance for the commissioning testing of ballast water management systems*. This revised guidance was considered necessary due to the now mandatory nature of commissioning testing, and it was prepared by PPR 7.

13 Furthermore, recalling that commissioning testing would not confirm compliance with regulation D-2, MEPC 75 instructed the III Sub-Committee, in the context of the next revision of the Survey Guidelines under the Harmonized System of Survey and Certification (HSSC), to amend the paragraphs of HSSC relating to the commissioning testing of BWMS to ensure that there were no references to compliance with regulation D-2. III 7 reviewed the Survey Guidelines and accordingly amended the relevant section of the HSSC Guidelines. This will form part of the 2021 HSSC Guidelines, which are expected to be adopted by the IMO Assembly at its upcoming 32nd session.

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

14 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 standard for verification of ballast water compliance monitoring systems, there was extensive consideration of the matter at PPR 7 and PPR 8. PPR 7 considered documents PPR 7/21 (IOC-UNESCO, ICES and ISO), PPR 7/21/2 (China), PPR 7/21/7 (IMarEST), PPR 7/21/8 and PPR 7/21/9 (Denmark) and invited further proposals. Subsequently, PPR 8 considered documents PPR 8/11 (Canada et al.), PPR 8/11/1 (France) and PPR 8/11/2 (France and IACS). However, no working groups were established at this (virtual) session and PPR 8 noted that the scope and extent of comments and proposals contained in the documents would not allow the finalization of, and agreement on, the proposed protocol for the verification of ballast water compliance monitoring devices at this session, and the best way forward would be to establish a correspondence group to progress this matter. This is therefore currently 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 will report to PPR 9.

Application of the BWM Convention to specific ship types

15 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, MEPC 75 and MEPC 76 also deferred the consideration of these proposals, along with subsequent documents MEPC 75/4/7 (Australia et al.) and MEPC 75/4/8 (Russian Federation), to MEPC 77.

Ballast water sampling and analysis

16 MEPC 75 approved BWM.2/Circ.42/Rev.2 on 2020 *Guidance on ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2)*, which was also prepared by PPR 7. Following this, the work on this long-standing output has now been completed.

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 and dissemination as BWM.2/Circ.61/Rev.1. However, due to the virtual nature of PPR 8, this matter was deferred and is now expected to be completed at PPR 9.

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), 76/4/6 (Norway), MEPC 76/4/7 (INTERTANKO) and MEPC 76/4/8 (Marshall Islands)). Due to time constraints in light of the virtual nature of the session, MEPC 76 deferred the consideration of these documents to MEPC 77.

Review of the ballast water record book

19 MEPC 76 also received document MEPC 76/4/2 (Liberia et al.) proposing a review of the implementation of the ballast water record book; however, due to time constraints in light of the virtual nature of the session, MEPC 76 deferred the consideration of this document to MEPC 77 as well.

Ballast water arrival reporting

20 Following consideration of a proposal by the Republic of Korea, FAL 45 included an additional data set related to ballast water arrival reporting in the IMO Compendium on Facilitation and Electronic Business.

Inclusion of PSC guidelines in the IMO PSC Procedure

21 Since 2014 there are stand-alone Guidelines for port State control (PSC) under the BWM Convention (resolution MEPC.252(67)). 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, III 7 considered the inclusion of the BWM PSC Guidelines as a new appendix in the PSC Procedures. Recognizing that some updates are required in the BWM PSC Guidelines due to obsolete references, III 7 recommended to the MEPC to revise the Guidelines first before they can be included in the PSC Procedures; this is expected to be agreed by MEPC 78 for further action by III 8.

Future work

22 MEPC 77 (scheduled from 22 to 26 November 2021) 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 41st meeting of the GESAMP Ballast Water Working Group;
- .2 development of procedures for conducting future re-evaluations of BWMS;
- .3 an update on the experience-building phase;
- .4 proposals on the application of the BWM Convention to ships operating at ports with challenging water quality;
- .5 proposals on the application of the BWM Convention to specific ship types; and
- .6 proposals on review of the ballast water record book.

23 PPR 9 (tentatively scheduled from 4 to 8 April 2022) is expected, inter alia, to consider the following matters related to the BWM Convention:

- .1 development of a protocol for verification of ballast water compliance monitoring devices;
- .2 new method(s) for enumerating viable organisms to be added in the *Guidance on methodologies that may be used for enumerating viable organisms for type approval of ballast water management systems* (BWM.2/Circ.61); and
- .3 proposals for a unified interpretation of the form of the International Ballast Water Management Certificate.

Amendment of the Anti-fouling Systems Convention

24 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 91.19% and with 86 contracting Parties (status as of 12 August 2021). The Convention had not been amended since its entry into force.

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

26 PPR 5 and MEPC 73 considered the initial proposal, following which PPR 6 considered the comprehensive proposal and agreed to draft amendments to Annex 1 (Controls on anti-fouling systems) and Appendix 1 to Annex 4 (Model Form of International Anti-fouling System Certificate) of the AFS Convention, for approval by MEPC 74. However, MEPC 74 considered also a proposal by Japan (MEPC 74/10/9) to modify the draft amendments to the AFS Convention; specifically, to delete the requirement for removal or sealing of existing AFS containing cybutryne. MEPC 74 was unable to reach consensus on this matter and referred the draft amendments to Annex 1 of the AFS Convention to PPR 7 for further consideration and finalization.

27 Following extensive discussions and compromise, PPR 7 agreed to updated 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 are expected to enter into force on 1 January 2023.

28 In addition, MEPC 75: encouraged Member States to conduct baseline studies prior to the entry into force of controls on cybutryne, in order to allow the subsequent determination of the effectiveness of the controls; 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 requested 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. The latter two items are pending.

29 Consequentially, there is a need for the revision of relevant guidelines, namely on the survey and certification, inspection, and sampling of AFS. Due to the time constraints owing to the virtual nature of PPR 8 it was not possible to initiate this work at that session as had been planned, it is therefore now expected that this may be done at PPR 9. Once the aforementioned guidelines are revised and approved by the MEPC, the inclusion of the revised inspection guidelines as a new appendix in the PSC Procedures will be considered, similarly to what was outlined in the previous section regarding the BWM PSC Guidelines; this will also be undertaken by the III Sub-Committee.

Review of the 2011 Biofouling Guidelines

30 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.

31 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 and initially expected to be carried out over two PPR sessions commencing at PPR 7.

32 Following extensive discussions, PPR 7 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. In this regard, PPR 7 also established the Correspondence Group on Review of the Biofouling Guidelines, under the coordination of Norway, to: assess the effectiveness of the Guidelines, including assessment of the uptake and implementation of the Guidelines; review the Guidelines considering best practices, available technologies and techniques to practically control biofouling, and available research and development; and develop recommendations on how to address issues relating to the key elements of the Guidelines for revision.

33 The Correspondence Group developed a number of recommendations, as well as a proposed skeleton for revised Biofouling Guidelines. Following extensive discussion and considering the scope of the work, PPR 8 re-established the Correspondence Group on Review of the Biofouling Guidelines, instructing it to revise the Biofouling Guidelines using the aforementioned draft skeleton as the basis, and invited MEPC 76 to extend the target completion year of this output to 2023, which MEPC 76 approved. This work is therefore currently ongoing in the Correspondence Group, which will report to PPR 9; once the PPR Sub-Committee concludes this work and agrees to a revised draft of the Biofouling Guidelines (either at PPR 9 or, if required, at PPR 10), this will be forwarded to the MEPC for adoption as a new MEPC resolution.

34 The IMO Secretariat is also 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 for a period of five years. This project aims to build capacity in developing countries to implement the Biofouling Guidelines, and the experience gathered through the project's activities may also inform the review of the Guidelines. In addition, through this project IMO engages directly in the work of the recently established WG 44 on Biofouling Management.

MARPOL Annex VI (Prevention of air pollution from ships)

Consistent implementation of 0.50% sulphur limit under MARPOL Annex VI

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

36 MEPC 73 adopted amendments to MARPOL Annex VI for a prohibition on the carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship that are expected to enter into

force on 1 March 2020. MEPC 73 also adopted *Guidance on the development of a ship implementation plan for consistent implementation of the 0.50% sulphur limit under MARPOL Annex VI*.

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

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

38 MEPC 75 adopted amendments further supporting the enforcement of the 0.50% sulphur limit, specifying procedures for onboard and in-use fuel sampling of bunker fuels as well as the fuel verification procedure in MARPOL Annex VI

Fuel oil quality

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

- .1 *Guidance on best practice for fuel oil purchasers/users for assuring the quality of fuel oil used on board ships, approved by MEPC 72;*
- .2 *Guidance on best practice for fuel oil suppliers for assuring the quality of fuel oil delivered to ships, approved by MEPC 73;*
- .3 *Guidance for best practice for Member State/coastal States, approved by MEPC 74; and*
- .4 *amendments to the Guidance for best practice for member state/coastal state including the indicative example of license for bunkering approved by MEPC 76.*

EEDI reviews

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

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

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

43 MEPC 70 further agreed that it would be necessary to start a thorough review of EEDI phase 3 requirements (1 January 2025 and onwards), including discussion on its earlier implementation and the possibility of establishing a phase 4. In this respect, the correspondence group on review of the EEDI beyond phase 2, established at MEPC 71, provided an interim report to MEPC 73 and a final report to MEPC 74 (May 2019). Currently, phase 3 requirements provide that new ships be built to be 30% more energy efficient compared to the baseline.

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

45 MEPC 74 in May 2019:

- .1 adopted draft amendments to MARPOL Annex VI related to Electronic Record Books and EEDI regulations for ice-strengthened ships that are expected to enter into force on 1 October 2020;
- .2 approved draft amendments to MARPOL Annex VI so that the entry into effect date for EEDI phase 3 should be amended to 1 January 2022 for gas carriers of 15,000 DWT and above, containerships, general cargo ships, LNG carriers and cruise passenger ships having non-conventional propulsion;
- .3 approved draft amendments to table 2 of regulation 21 of MARPOL Annex VI to amend the calculation parameters for the reference line for very large bulk carriers,

.4 agreed that the entry into effect date for EEDI phase 3 of 1 January 2025 should be retained for refrigerated cargo ships and combination carriers;

.5 approved draft amendments to MARPOL Annex VI so that the reduction rates for containerships for EEDI phase 3 should be based on different size categories; and

.6 finalized draft amendments to MARPOL Annex VI to require mandatory reporting of verified attained EEDI values.

46 MEPC 75 further adopted amendments to MARPOL Annex VI to significantly strengthen the Energy Efficiency Design Index (EEDI) "phase 3" requirements for several ship types, with expected entry into force date of 1 April 2022. The amendments bring forward the entry into effect date of energy efficiency design

requirements for new built ships to 2022, from 2025, for several ship types, including gas carriers, general cargo ships and LNG carriers. For example with these new regulations in force from 1 April 2022, containerships of 200,000 deadweight tonnage will have to be 50% more energy efficient relative to the EEDI reference line.

47 MEPC 76 adopted amendments to the *2018 Guidelines on the method of calculation of the attained energy efficiency design index (EEDI) for new ships*.

Further technical and operational measures to enhance energy efficiency

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

49 MEPC 71 agreed on guidelines for verifying, managing and reporting data. Both MEPC 72 and MEPC 73 received from the Secretariat updates on the status of the development of the IMO Ship Fuel Oil Consumption Database, which was launched in March 2018.

50 In March 2021, IMO published the aggregated results of the 2019 fuel consumption data of over 27,000 ships that are subject to IMO's mandatory data collection system. Data for reporting year 2019 were submitted by 107 Administrations reporting just over 213 million tonnes of fuel in 2019 in total on a quantity basis. The majority of fuel oil was consumed by three ship types: bulk carriers, tankers, containerships. The fuel consumption data will reinforce IMO's decision making on future energy efficiency measures.

Reduction of GHG emissions from ships

51 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.

52 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).

53 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.

54 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".

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

56 MEPC 74 in May 2019:

- .1 adopted resolution MEPC.323(74) on *Invitation to Member States to encourage voluntary cooperation between the port and shipping sectors to contribute to reducing GHG emissions from ships*;
- .2 approved the terms of reference of the Fourth IMO GHG Study for consideration of the final report of the Study with a view to approval by MEPC 76 (Autumn 2020). A Steering Committee of Member States was established to review and monitor progress and confirm that the Study meets its terms of reference;
- .4 approved a *Procedure for assessing impacts on States of candidate measures*;

- .5 approved the terms of reference for ISWG-GHG 6 and ISWG-GHG 7; and
- .6 discussed various candidate short-term measures and mid-/long-term measures, including strengthening the energy efficiency requirements for existing ships based on the SEEMP, speed and other technical, operational measures and the effective uptake of alternative low-carbon and zero-carbon fuels. In view of the vast number of proposals, the working group focused on how to consider, organize and streamline proposals on candidate short-term and mid-/long term measures.

57 Postponed due to the COVID-19 pandemic, MEPC 75, originally scheduled from 30 March to 3 April 2020 was held remotely from Monday, 16 November to Friday, 20 November 2020.

58 Following preparatory work at ISWG-GHG 7 and several remote informal discussion sessions, MEPC 75 approved draft amendments to MARPOL Annex VI laying down new mandatory measures to cut the carbon intensity of ships by at least 40% by 2030, compared to 2008, building on current mandatory energy efficiency requirements to further reduce greenhouse gas emissions from shipping.

59 In parallel, MEPC 75 requested the Secretariat to initiate a comprehensive impact assessment of the short-term measure to inform decision-making at MEPC 76. The comprehensive impact assessment was conducted in a short period of time despite the COVID-19 pandemic and involved a number of internationally recognized experts such as UNCTAD and DNV-GL to assess the possible impacts of the measure on States.

60 MEPC 75 approved the *Fourth IMO GHG Study 2020*¹. The study contains an overview of GHG emissions from shipping 2012-2018, developments in carbon intensity and emission projections towards 2050. Key takeaways are as follows:

- .1 GHG emissions of total shipping have increased from 977 million tonnes in 2012 to 1,076 million tonnes in 2018 (9.6% increase) mostly due to a continuous increase of global maritime trade;
- .2 the share of shipping emissions in global anthropogenic GHG emissions has increased from 2.76% in 2012 to 2.89% in 2018;
- .3 for the first time, the *Fourth IMO GHG Study 2020* includes estimates of carbon intensity, and outlines that overall carbon intensity, as an average across international shipping, was approximately 20 to 30% better in 2018 than in 2008;
- .4 based on various long-term economic and energy scenarios (not taking into account long-term effects of the COVID-19

¹ The Study can be downloaded here: <https://www.wcdn.imo.org/localresources/en/OurWork/Environment>

</Documents/Fourth%20IMO%20GHG%20Study%202020%20-%20Full%20report%20and%20annexes.pdf>

pandemic), and without any additional measures, the Study describes that shipping emissions are projected to increase from about 90% of 2008 emissions in 2018 to 90-130% of 2008 emissions by 2050; and

- .5 under all projected scenarios, in 2050, a large share of the total amount of CO₂ reduction will have to come from the use of low-carbon alternative fuels.

61 MEPC 75 also adopted a resolution urging Member States to develop and update voluntary National Action Plans (NAP) with a view to contributing to reducing GHG emissions from maritime transport by supporting actions at national level, such as cooperation between the ports and shipping industry as well as along the maritime value chain.²

62 MEPC 75 initiated discussion on an industry-led proposal for the establishment of a non-governmental International Maritime Research and Development Board (IMRB), funded by a mandatory 2 USD contribution per tonne of fuel used by ships. The discussion, which continued at MEPC 76, will resume at the Committee's next session.

63 The eighth session of the Intersessional Working Group on Reduction of GHG Emissions from Ships, established by the MEPC, met remotely from 24-28 May 2021 and was attended by nearly 400 representatives from over 60 Member States and associate members as well as from the UNFCCC, UNCTAD, the European Commission, and around 30 non-governmental organizations.

64 The working group agreed on a comprehensive set of technical guidelines accompanying the new mandatory measures providing support to Administrations and industry in implementing the new technical requirements on the energy efficiency existing ship index (EEXI) and operational carbon intensity indicator (CII) as well as rating mechanism.

65 MEPC 76 in June 2021 adopted the amendments which are expected to enter into force in November 2021, along with the technical guidelines. The short-term measure includes a technical approach (the "Energy Efficiency Existing Ship Index" – EEXI) and an operational approach (the "Carbon Intensity Indicator" – CII rating system) which, combined, will put international shipping on track to reach the 2030 target of the Initial IMO GHG Strategy. Following consideration of the comprehensive impact assessment, the Committee also agreed to keep under review the impacts on States of the aforesaid amendments to MARPOL Annex VI, paying particular attention to the needs of developing countries, especially LDCs and SIDS, so that any necessary adjustments can be made, and to initiate a lessons-learned exercise of the comprehensive impact assessment.

66 MEPC 76 had an initial consideration of proposals for mid- and long-term measures including a proposal for a universal carbon levy. In order to conduct discussions on these complex matters in a structured

manner, the Committee approved a work plan which will entail a number of assessments, prioritization and decision steps, with a view to enable international shipping to further reduce its GHG emissions.

67 MEPC 76 established two meetings of the intersessional working group before MEPC 77. ISWG-GHG 9 will meet in September 2021 to further develop guidelines on lifecycle GHG/carbon intensity for all types of fuels and ISWG-GHG 10 will meet in October to finalize guidelines on the short-term measure and further consider proposals for mid-and long-term measures as part of the work plan.

68 MEPC 76 also approved a Work Plan to progress the work on the Shaft/Engine Power Limitation concept and adopted amendments to the Guidelines for determining minimum propulsion power to maintain the manoeuvrability of ships in adverse conditions.

Protecting the Arctic from heavy fuel oil

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

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

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

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

- .1 agreed that the methodology should be a guidance document, instead of a prescriptive one, as not all of the items and particular details mentioned in the

² Relevant national action plans and strategies can be found here: <https://www.imo.org/en/OurWork>

methodology would be applicable to every Member State and organization that might conduct an impact assessment; and

- .2 invited submissions to PPR 7 on impact assessments guided by, but not limited to, the methodology

73 PPR 7 considered impact assessments submitted by Canada, Denmark, the Russian Federation and the United States, as well as other related information submitted by Member States and international organizations and developed draft amendments to MARPOL Annex I incorporating a prohibition on the use and carriage for use as fuel of heavy fuel oil by ships in Arctic waters as new regulation 43A. The amendments were subsequently adopted by MEPC 77.

74 Subject to the amendments entering into force on 1 November 2022, the prohibition will take effect on 1 July 2024 and will cover the use and carriage for use as fuel of oils having a density at 15°C higher than 900 kg/m³ or a kinematic viscosity at 50°C higher than 180 mm²/s. Ships engaged in securing the safety of ships, or in search and rescue operations, and ships dedicated to oil spill preparedness and response would be exempted. Ships that meet certain construction standards with regard to oil fuel tank protection would need to comply on and after 1 July 2029. A Party to MARPOL with a coastline bordering Arctic waters may temporarily waive the requirements for ships flying its flag while operating in waters subject to that Party's sovereignty or jurisdiction, up to 1 July 2029.

75 The use and carriage of heavy fuel oil is banned in Antarctic waters under MARPOL Annex I, and the Polar Code recommends that Member States follow the same practice in the Arctic.

Marine litter and microplastics

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

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

78 Concerning information gathering, the Committee:

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

79 MEPC 74 noted the information provided in document MEPC 74/8/1 (Secretariat) on the outcomes of the London Convention/Protocol governing bodies meeting (LC 40/LP 13) in relation to marine litter, and the inputs by the LC/LP governing bodies to the Action Plan. In this regard, the Committee agreed that the Action Plan should be updated accordingly at its next revision, but not at this session, and requested the Secretariat to keep the LC/LP governing bodies updated on MEPC developments in relation to marine plastic litter and vice-versa.

80 The Committee also noted the following developments:

- .1 the adoption of resolution UNEP/EA.4/L.7 on marine plastic litter and microplastics, in which the adoption of the IMO Action Plan and the work of MEPC and LC/LP had been noted;
- .2 the publication of two reports under the framework of the Global Partnership on Marine Litter, one on the issue of disposal of fibreglass vessels, and one on the review of hull scrapings and marine coatings as a source of microplastics;
- .3 the recent publication of the GESAMP Reports and Studies 99 on "Guidelines for the monitoring and assessment of plastic litter in the ocean";
- .4 the cooperation by the Secretariat with FAO on these matters, including agreeing to contribute to four regional FAO workshops on best practices to prevent and reduce Abandoned, Lost or otherwise Discarded Fishing Gear, which would be held throughout 2019; and

- .5 the establishment of a new GESAMP Working Group on Sea-based sources of marine litter (Working Group 43), co-sponsored by FAO and IMO, which would, inter alia, review and analyse the existing body of knowledge on marine plastic litter from all sea-based sources and provide an assessment of data gaps.

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

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

82 In this regard, the Committee agreed that:

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

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

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

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

86 The Committee agreed that, as soon as sufficient funding had been provided by Member States and other

stakeholders, it would consider requesting the Secretariat to issue an invitation to tender for terms of reference 1 and 2 of the IMO Study on marine plastic litter from ships, noting that the work of the selected contractor/s should not duplicate the work of GESAMP.

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

88 MEPC 75 and MEPC 76, which were both held remotely from 16 to 20 November 2020 and from 10 to 17 June 2021 respectively, postponed consideration of the agenda item "Follow-up work emanating from the Action Plan to Address Marine Plastic Litter from Ships". However, MEPC 76 approved two circulars that were prepared by PPR 7, namely MEPC.1/Circ.893 on *Provision of adequate facilities at ports and terminals for the reception of plastic waste from ships* and MEPC.1/Circ.894 on *Sharing of results from research on marine litter and encouraging studies to better understand microplastics from ships*.

89 It is expected that MEPC 77, due to be held remotely from 22 to 26 November 2021, will consider matters related to marine plastic litter, including taking note of the final report of GESAMP Working Group 43.

Ship recycling

90 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, seventeen States, i.e. Belgium, Republic of the Congo, Croatia, Denmark, Estonia, France, Germany, Ghana, India, Japan, Malta, the Netherlands, Norway, Panama, Serbia, Spain and Turkey 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 13,946,356 gross tonnage.

Issues related to MARPOL Annex II and IBC Code

91 Following the entry into force on 1 January 2021 of the revised chapters 17, 18, 19 and 21 of the IBC Code, the evaluation of the safety and pollution hazard of chemicals carried in bulk by ships is being carried out by the PPR Sub-Committee and the Technical Group on the Evaluation of Safety and Pollution Hazards of Chemicals in accordance with the updated in the IBC Code.

London Convention and Protocol (LC/LP)

92 Since its 45th session, the following developments may be of interest to GESAMP. The Scientific Groups of the LC/LP met for their joint annual session in 2020 (LC/SG 43) a from 6 July to 18 September, and in 2021 (LC/SG 44) from 12 to 16 April. Both sessions were held by a combination of correspondence and virtual meeting. Due to the nature

of the meetings (online) some matters were deferred to future meetings, but the paragraphs below summarize the progress made.

Disposal site selection

93 At the 2021 session, the Groups finalized the guidance entitled 'Guidelines for selecting sites for sea disposal and for developing site management and monitoring plans', which has been forwarded to the governing bodies' session in October 2022, for final approval.

Assessment of marine cumulative effects

94 In 2019, the Scientific Groups considered the possible development of further guidance on assessment of marine cumulative effects. However, it was agreed that no new formal guidance was needed, and Groups agreed that the Correspondence Group would prepare a manuscript entitled "Cumulative effect assessment in the marine environment: A focus on the London Protocol/ London Convention", for submission to a relevant peer-reviewed journal for publication. At the 2021 joint session the Chair of the Correspondence Group was instructed to finalize the manuscript for submission to an appropriate peer-reviewed journal.

Disposal of fibreglass vessels

95 Following extensive discussion over the last few years, and the consideration of a report from a consultant, the Groups requested the Secretariat (IMO) to proceed with the development of a first draft of guidance on the alternatives for end-of-life management of fibre-reinforced plastic (FRP) vessels, in collaboration with UNEP. The guidance, which will be recommendatory, will be presented to the next joint session of the Scientific Groups in 2022, for their consideration and finalization.

Marine litter and microplastics

96 The Scientific Groups considered a report, commissioned by the Secretariat, on the control and prevention of marine litter and microplastics in waste streams permissible for dumping at sea under the LC/LP. The Groups noted that the report consolidated the actions taken to date by the LC/LP community and identified actions that could be taken by the Contracting Parties, individually and collectively, to manage and reduce plastics and microplastics in LC/LP waste streams. Following discussion, the Groups agreed to re-establish the Correspondence Group on marine litter and microplastics, under the lead of Germany and Nigeria.

97 The Correspondence Group has been tasked with identifying possible actions to be taken by the LC/LP Contracting Parties with respect to the issue, in particular with a view to facilitating the identification and quantification of marine litter and microplastics in the LC/LP waste streams. The Groups will also undertake a review of the LC/LP Waste Assessment Guidance to identify opportunities for further reduction of marine litter and microplastics in the LC/LP waste streams, and to facilitate dialogue/engage with other relevant bodies to promote synergies and avoid duplication of work, including with the IMO Correspondence Group on Marine Plastic Litter from Ships under PPR, and the

GESAMP Working Group 43 on Sea-based sources of marine litter.

Marine geoengineering

98 The Scientific Groups were informed about progress made by the GESAMP Working Group 41 on Ocean Interventions for Climate Change Mitigation and noted the terms of reference for the second phase of GESAMP WG 41, and encouraged the Working Group to continue its work on the terms of reference.

99 Stressing the importance of this subject, and the need to work even closer with the GESAMP WG 41, the Scientific Groups established an intersessional correspondence group, under the lead of Italy, to provide recommendations on the possible inclusion of marine geoengineering activities in the new Annex 4 of the London Protocol (2013 amendment), based on GESAMP WG 41's first phase report, and to engage with the Co-Chairs of GESAMP WG 41 to ensure alignment between the work of WG 41 and LC/LP.

Science Day 2020/2021

100 As part of the joint sessions, the LC/LP Scientific Groups normally hold a Science Day. This was not possible in 2020, but a virtual Science Day was held in 2021, on the topic of "Experience with comparative risk assessment for decommissioning of platforms and the disposal of vessels", by Zoom. The Science Day programme included high level presentations from a range of speakers from academia, scientific and government agencies, sharing experiences, research activities, and risk assessments being undertaken in relation to decommissioning of platforms and the disposal of vessels. A recording of the virtual event and the presentations are available on the LC/LP website at: <https://www.imo.org/en/OurWork/Environment/Pages/ScienceDay-default.aspx>

Deposition of materials jettisoned during the launch of space vehicles

101 In 2018, the Scientific Groups established a Correspondence Group on the Deposition of materials jettisoned during the launch of space vehicles, under the lead of United Kingdom. However, the Groups noted the limited information available for the Correspondence Group to form an opinion on the topic and agreed to hold the Correspondence Group in abeyance, until such time as more information was available.

Next joint session of the Scientific Groups

102 The next meeting of the governing bodies of the LC/LP will be held from 25 to 29 October 2022 (remote session). The next joint session of the LC/LP Scientific Groups is tentatively scheduled for March 2022, at IMO Headquarters (unless the pandemic situation makes it necessary to once again convene the meeting by virtual means).

United Nations Development Programme (UNDP)

103 UNDP's Ocean Governance programme in 2020-2021 included about 25 active/approved projects totalling nearly \$200 m. in grant resources. Projects supported integrated, cross-sectoral, ecosystem-based management in several [Large Marine Ecosystems](#)

including the [Yellow Sea LME](#), [Benguela Current LME](#), [Agulhas/Somali Current LMEs](#), [Caribbean Sea & North Brazil Shelf LMEs](#), Pacific/Central America 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).

104 In 2020-2021, UNDP secured approval for several new GEF-financed projects relating to marine environmental protection, these included:

- Strengthening the Palau National Marine Sanctuary for the Conservation and Management of Global Marine Biodiversity and Sustainable Fisheries (\$1.83 m.)
- Implementing Ecosystem Based Management approaches in the Black Sea LME (\$3.0 m.)
- Strengthening the stewardship of an economically and biologically significant high seas area – the Sargasso Sea (\$2.65 m.)
- Protecting and Restoring the Ocean's natural Capital, building Resilience and supporting region-wide Investments for sustainable Blue Socioeconomic development (PROCARIBE+) (\$15.43 m.)

105 In early 2021, UNDP's [Ocean Innovation Challenge](#) announced its first cohort of '[Ocean Innovators](#)' representing 8 innovators selected from over 600 submissions addressing the issue of marine pollution SDG 14.1. Projects being supported include introduction of Extended Producer Responsibility schemes into several countries, development of algae-based substitutes for industrial fertilizers, manufacture of polystyrene 'cooler' substitutes from waste coconut husks, and development of a global plastics policy inventory/database. The OIC's second call, on [sustainable fisheries](#), received nearly 300 submissions which are presently being reviewed and short-listed for further consideration.

106 UNDP works 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

107 UNDP joined its partner IW:LEARN as a co-author of the March 2021 publication "[Navigating the complexity of regional ocean governance through the Large Marine Ecosystems Approach](#)" in *Frontiers in Marine Science*.

108 UNDP Administrator Achim Steiner participated as a panelist in Panel 4, Sustainable Ocean Economy, of the 1 June 2021 PGA-organized [High Level Thematic Debate in Support of SDG 14 Life Below Water](#).

109 UNDP partnered with IW:LEARN, NOAA, University of Rhode Island, UNEP and other GEF agencies in the [Online Launch Event for the Definitive LME Volume](#), sharing its perspectives through a presentation entitled "UNDP Ocean Governance Programme: Delivering on SDG 14 Oceans through LME & EAFM approach".

110 UNDP Ocean Innovation Challenge organized a High Level Event, "[A Conversation with the 2020 Ocean Innovators](#)", on World Oceans Day 8 June 2021, in which the 8 innovators engaged in a dialogue moderated by HRH Crown Prince Haakon of Norway.

111 UNDP continues to rely on GESAMP as the UN system's provider of independent, objective, science-based analysis and advice on issues pertaining to the sustainable use of the marine environment. For example, the recent WG 39 publication, *Global Pollution Trends: Coastal Ecosystem Assessment for the Past Century*, provide valuable data and analysis of relevance to assessments (Transboundary Diagnostic Analyses) conducted under UNDP's GEF-financed LME programs.

WORLD METEOROLOGICAL ORGANIZATION (WMO)

112 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.

113 WMO's Research Board, and Technical Commissions (SERCOM and INFCOM), and the Capacity Development Panel (CDP) have been progressing ocean activities. The WMO and the Intergovernmental Oceanographic Commission (IOC) mechanism of partnership is through the WMO-IOC Joint Collaborative Board (JCB), which has developed a Joint WMO-IOC Collaborative Strategy.

114 Sustained oceanographic and marine meteorological observations and their free and unrestricted exchange are critical to address meteorological hazards, strengthen resilience in the face of climate change and variability, and build the scientific knowledge base for sustainable development. The WMO's Executive Council has endorsed 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.

115 WMO continues strengthening the global observing systems through implementation of the WMO Integrated Global Observing System (WIGOS) and

³ <https://public.wmo.int/en/media/press-release/wmo-executive-council-endorses-unified-data-policy>

WMO Information System (WIS) and observing networks with partners. In 2020 WMO published the updated strategy “Vision for the WMO Integrated Global Observing System in 2040”⁴.

116 The OceanOPS (WMO-IOC Joint Centre for Oceanography and Marine Meteorology in situ Observations Programmes Support) under the guidance of the Observations Coordination Group and its stakeholders released its new five-year Strategic Plan (2021-2025) in 2020 and rebranded from JCOMMOPS to OceanOPS under the Joint WMO-IOC Collaborative Board.

117 OceanOPS annually coordinates and publishes the Ocean Observing System Report Card (www.ocean-ops.org/reportcard). The Report Card 2020 (published October) was the fourth edition of this communication effort focusing on the in situ and satellite ocean observation status, the UN Decade of Ocean Science for Sustainable Development, advances in emerging networks such as the animal borne ocean sensors network, ship support to science and services, and the impact of COVID-19 pandemic on ocean observations.

118 OceanOPS strongly advocates for practical and multilateral solutions to facilitate the routine deployments of ~2500 ocean observations instrumentations per year, globally and regionally, and is offering its support to keep enhancing the marine observations in the Exclusive Economic Zone (EEZ) for Members benefits.

119 WMO continues its collaboration with the International Maritime Organization (IMO) and the International Hydrographic Organization (IHO) for coordinated and standardized Metocean (Meteorology and (physics) Oceanography) information, forecasts and warning services for safety of life and property at sea, improved marine environment and sustainable management of natural resources, with due focus on Polar Regions. The WMO-IMO WorldWide Metocean Information and Warning Service ([www.wmiws](http://www.wmiws.org)) as contribution to the IMO’s Global Maritime Distress and Safety System (GMDSS). The WMIWS ensures daily forecasts covering the 21 METAREAs across the globe. This fulfils the obligation of WMO Members who are contracting parties to the SOLAS Convention.

120 WMO has been working on recommendations from the *First WMO-IMO International Symposium on Extreme Maritime Weather - Towards Safety of Life at Sea and a Sustainable Blue Economy*. The full report of the Symposium is available on the WMO library⁵. The next Symposium will be hosted by the Republic of Indonesia.

121 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.

122 The joint WMO-IOC Marine Climate Data System (MCDS) coordinates the activities of existing ocean data systems, in order to have compiled coherent met-ocean climate datasets of known quality, extending beyond the GCOS Essential Climate Variables (ECVs). The data will be of known quality collected from multiple sources to be served on a free and unrestricted basis to the end users through a global network of data centres covering different data domains. A number of data centres, namely, the World Ocean Database⁶, the Coriolis data centre⁷, the Atlantic Oceanographic & Meteorological Lab⁸ were certified to be part of the MCDS.

123 A significant body of ocean research is spearheaded and coordinated by the Word Climate Research programme, which is co-sponsored by WMO. WCRP will establish two new Core Projects: Earth System Modelling and Observations (ESMO) and Regional Information for Society (RIfS). These two projects will 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.

124 One of the main WCRP activities is the coordination and setup of the Coupled Model Intercomparison Project (CMIP) to better understand past, present and future climate changes arising from natural, unforced variability or in response to changes in radiative forcing in a multi-model context. The implementation of the CMIP phase 6⁹ (CMIP6) has now been completed, with dedicated science-focussed activities, several of them with link to ocean research: the Ocean Model Intercomparison Project (OMIP) which aims to provide a framework for evaluating, understanding, and improving the ocean, sea-ice, tracer, and biogeochemical components of global climate and earth system models, the Carbon Dioxide Removal Model Intercomparison Project (CDRMIP) which could address ocean fertilization studies in the future, and the Sea-Ice Model Intercomparison Project (SIMIP) which looks at the large-scale evolution of sea ice as both an indicator and a driver of climate changes.

125 The WMO State of the Global Climate 2020¹⁰ was launched in April 2021 by the United Nations Secretary General and WMO Secretary General. The report concluded that 2020 was one of the three warmest years on record and that ocean heat content at various depths and the global mean sea level reached the highest values on record, among other conclusions.

126 WMO released its 16th Greenhouse Gas Bulletin¹¹ in November 2020 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 2019, with CO₂ at 410.5±0.2 ppm, CH₄ at 1877±2 ppb and N₂O at 332.0±0.1 ppb (148%,

⁴ https://library.wmo.int/doc_num.php?explnum_id=10278

⁵ https://library.wmo.int/index.php?lvl=notice_display&id=21738#_XvcfGZr7Spo

⁶ <https://www.nodc.noaa.gov/OC5/SELECT/dbsearch/dbsearch.html>

⁷ <http://www.coriolis.eu.org/Data-Products>

⁸ <https://www.aoml.noaa.gov/data/>

⁹ <https://www.wcrp-climate.org/wgcm-cmip/wgcm-cmip6>

¹⁰ https://library.wmo.int/doc_num.php?explnum_id=10618

¹¹ https://library.wmo.int/doc_num.php?explnum_id=10437

260% and 123% of pre-industrial levels respectively). The Integrated Global Greenhouse Gas Information System¹² (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.

127 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 2020 and 2021 and plans to develop 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.

128 The WMO is committed to participating in the United Nations Decade of Ocean Science for Sustainable Development (Ocean Decade). WMO provided comments to the Draft Ocean Decade Implementation Plan. WCRP is involved in a number of Ocean Decade activities including the Digital Twins of the Ocean (DITTO) and the CLIVAR Southern Ocean Regional Panel. OceanOPS and GOOS are also involved in several Decade activities, which were announced on World Ocean Day 2021.

129 World Meteorological Day in 2021 celebrated the theme “the ocean, our climate and weather”, showcasing WMO's focus in connecting these three important components of the Earth System. A special ‘Ocean’ theme WMO Bulletin¹³ was published. WMO launched an Ocean Video¹⁴ summarising the breadth of WMO Ocean activities, (in all UN languages) which has since been shown at the UN Ocean Conference High Level Debate (1 June 2021) and the UN World Oceans Day event (8 June 2021). These publications and the World Meteorological Day event were formally endorsed WMO contributions to the Decade.

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC of UNESCO)

Global Ocean Science Report (GOSR-II)

130 The second edition of the Global Ocean Science Report (GOSR) was launched on the occasion of the IOC's 60th anniversary celebration, on 14 December 2020. In addition to establishing a solid basis for measuring progress towards the attainment of SDG Target 14.a, the report provides the baseline for ocean science capacity and related investments and will serve as a monitoring tool for the UN Ocean Decade.

UN Decade of Ocean Science for Sustainable Development

131 The focus of the Commission in the past three years was on the preparation of the Implementation Plan for the United Nations Decade of Ocean Science for Sustainable Development 2021-2030. IOC spared no effort in engaging all Member States, UN partners and key civil society stakeholders in regional and global consultations, to seize this once-in-a-life-time opportunity to harness advances in ocean science, achieve a better understanding of the ocean system and deliver science-based solutions for the 2030 Agenda for Sustainable Development. Effective use of UN-Oceans consultations reinforced the collaborative approach to ensure a meaningful division of labour among the IOC's partners in the UN system. This work was completed successfully as on 31 December 2020, the 75th Session of the UN General Assembly, in its Resolution 75/239 on the “Oceans and Law of the Sea” took note with appreciation of the Implementation Plan of the Ocean Decade submitted by IOC. Having massively invested in the preparation of the Plan and having worked in all-inclusive manner and in a true spirit of partnership with a large number of stakeholders, IOC became the coordinating agency for the Ocean Decade.

132 This year in the context of global celebrations for World Oceans Day, IOC announced the first Actions officially endorsed as part of the United Nations Decade of Ocean Science for Sustainable Development, 2021-2030 (the ‘Ocean Decade’).

Ocean acidification

133 Significant progress was made in the collection of new data provided by Member States to IOC towards the SDG Indicators 14.3.1 and Target 14.a.1, for which the IOC has been assigned the custodianship role. Member States followed IOC's invitations to contribute to the Global Ocean Science Report (GOSR) 2020 online questionnaire—the basis for 14.a.1 reporting and to the newly established ocean acidification data portal for 14.3.1 reporting, developed in collaboration between the Ocean Science Section and IODE. This new portal, hosted at IODE, helps Member States, NODCs, other organizations and individual scientists to submit ocean acidification data. IOC HQ and IODE further develop a user-friendly GOSR data portal, which allows open access to all GOSR2020 data, and in particular the 14.a.1 information. In February 2020 and February 2021 IOC reported to the IAEG on both indicators. Several activities were undertaken to advance the methodology of indicators for targets 14.3 and 14.a, as well as in relation to target 14.1 on marine pollution (Nutrients).

134 IOC continued to provide the function of the technical secretariat of the Global Ocean Acidification Observing Network (GOA-ON), together with the International Atomic Energy Agency (IAEA). The IOC Secretariat co-organized the “4th GOA-ON International Workshop” in Hangzhou, China, 12–14 April 2019. The Secretariat is actively involved in the organization of the “5th International Symposium on the Ocean in a High-CO₂ World”, originally scheduled to take place in September 2020. IOC actively supports GOA-ON

¹² <https://ig3is.wmo.int/>

¹³

https://library.wmo.int/index.php?lvl=bulletin_display&id=4061#.YL4CpvkzY2x

¹⁴ <https://www.youtube.com/watch?v=1WmWnHUVWtM>

submission to the call of action for Ocean Decade programmes. The proposed programme, OARS–Ocean Acidification Research for Sustainability, was submitted in January 2021. OARS aims to foster the development of the science of ocean acidification including the impacts on marine life and sustainability of marine ecosystems in estuarine-coastal-open ocean environments.

Blue Carbon

135 In addition to continuing to co-sponsor the Blue Carbon Initiative together with Conservation International and IUCN, IOC now co-hosts together with Australia the secretariat for the coordination of the International Partnership for Blue Carbon, IOC co-organized and co-sponsored the International Blue Carbon Initiative (BCI) annual meeting in China in August 2018 and in September 2019 in Denmark. IOC further supported several side events during the UNFCCC COP24 and COP25 highlighting the potential of Blue Carbon Ecosystems as a nature-based solution to be applied in the Nationally Determined Contributions (NDCs) under the Paris Agreement to mitigate climate change; blue carbon activities as coordinated by IOC are also of direct relevance to the adaptation work stream of the UNFCCC.

Harmful Algal Blooms

136 IOC launched a Global HAB Status Report (GHSR) on 8 June 2021. This unprecedented seven-year study by 109 scientists in 35 countries, with analysis of almost 10,000 Harmful Algal Bloom (HAB) events worldwide over the past 33 years says reported HAB events have increased in some regions, decreased or held steady elsewhere, and provides the world's first baseline against which to track future changes.

137 IOC priorities and actions on Harmful Algal Blooms are set by the IOC Intergovernmental Panel on Harmful Algal Blooms (IPHAB) and the programme is implemented via number of global and regional initiatives. The research component under IPHAB, GlobalHAB, which is jointly sponsored with SCOR, has implemented a number of initiatives from its Science and Implementation Plan. 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

138 IOC leads scientific and capacity development efforts related to deoxygenation, for the benefit of its Member States, through its Working Group Global Ocean Oxygen Network (GO2NE). A new series of monthly webinars was launched in November 2020, with more than 200 participants from more than 60 countries attending each session.

139 GO2NE held a joint workshop with GlobalHAB in June 2019, which focused on the interaction of deoxygenation and harmful algae blooms. This workshop was followed by the “2019 GO2NE meeting”, which focused on the workplan for the upcoming two years, including the organization of the “first GO2NE Summer School” in September 2019 and the development of the Ocean Oxygen Data Portal. The

GO2NE Summer School, held at the Xiamen University's Xiang'an Campus (China), which hosts the State Key Laboratory of Marine Environmental Science, was attended by 37 students from 19 countries, including participants from Africa.

140 The IOC Secretariat contributed to the production and launching at the UNFCCC COP25 of a major book on ocean deoxygenation coordinated by IUCN.

World Ocean Assessment

141 To showcase this emerging cooperation, IOC and DOALOS (Secretariat of the Regular Process) organized a joint webinar on the Strengthening the Science Policy Interface for Ocean sustainability on 1 March 2021. Furthermore, the IOC Executive Secretary took part in the launch event of the WOA-2 report on 21 April 2021. Whilst the [first World Ocean Assessment](#) (WOA-I), released in 2015, had warned that many areas of the ocean had been seriously degraded, the latest assessment notes that the situation has not improved — and that many of the benefits that the ocean provides to people such as oxygen, food, jobs, medicine and climate regulation are increasingly being undermined by human activities. The report also identifies a number of key findings and message for ocean science.

Ocean Carbon Research

142 IOC has pursued a very active coordinating work aimed at federating the ocean carbon research community. The many gaps in knowledge on ocean and climate we still face, and the high degree of uncertainty related to our current knowledge, combined with the great sense of urgency to act, have prompted IOC Member States through decision [IOC/EC-LI/4.2](#) to convene the current main players in ocean carbon research and systematic observations under the umbrella of an expert Integrated Ocean Carbon Research (IOC-R) initiative. The goal of this initiative is to design an integrated research and observation agenda in the next decade in support of relevant efforts by the UNFCCC and its SBSTA (Subsidiary Body for Scientific and Technological Advice).

143 The future behaviour of the world ocean will depend on future emissions, and different scenarios can be formulated, including a reduced buffer capacity ([IOC Technical Series 158](#), 2021).

144 Integrated Ocean Carbon Research: A Summary of Ocean Carbon Knowledge and a Vision for Coordinated Ocean Carbon Research and Observations for the Next Decade, a report newly published by IOC sets out to accomplish the vital task of studying the evolution of CO₂ uptake. It points out that in absorbing carbon dioxide (CO₂), the ocean plays a crucial role in regulating the climate, a role yet to be fully understood. However, the ocean's ability to contribute to climate regulation may decline and even be reversed in the future. The ocean that is now the blue lung of our planet, could end up contributing to global warming.

OBIS

145 Between May 2020 and March 2021, 11 million presence records were added to the Ocean Biodiversity Information System (OBIS) (<https://www.obis.org>) from 768 new datasets, providing 22,810 new marine species to OBIS. In total, OBIS now has 70 million occurrences of 154,307 species from 3,869 datasets. OBIS' priorities are improving its data quality with more advanced data quality control tools and QC reports to data providers. A registry of recommended vocabulary terms used for measurements and sampling facts is under development in collaboration with the British Oceanographic Data Centre. In addition, OBIS is developing data integration workflows for DNA-sequence derived species occurrence records, in collaboration with the Biodiversity Information Standards (TDWG), the Genomic Standards Consortium (GSC) and the Global Biodiversity Information Facility (GBIF), with whom we signed a new five-year collaboration agreement.

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

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

147 IAEA hosted and organized a virtual Technical Meeting on the Use of Nuclear and Isotopic Techniques to Strengthen Member States Seafood Safety Programmes, 30 November – 1 December to document achievements under our eponymous PUI project

148 IAEA cooperated and participated in the Human Health and the Ocean International Symposium organized by the Scientific Centre of Monaco (<http://www.oceanhealthmonaco.org>) held on 2-3 December 2020 in Monaco. A presentation on “*New toolbox to study microplastics in the marine environment using nuclear and isotopic techniques.*” was delivered.

MARINE ENVIRONMENTAL STUDIES LABORATORY (MESL) ACTIVITIES

Production of Certified Reference Materials and Interlaboratory Comparison exercises

149 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 polycyclic aromatic hydrocarbons in a sediment sample (IAEA 475 and IAEA-477 respectively) has been released and is now available to the Member States. A new characterization exercise for the certification of mass fractions of polychlorinated biphenyls (PCBs), organochlorine pesticides and polybrominated diphenyl ethers (PBDEs) in a tuna fish flesh homogenate (IAEA-435A) has been organized and the final certification report is on preparation.

150 A new characterization exercise for the certification of mass fractions of trace elements and

methyl mercury in a tuna fish flesh homogenate (IAEA-407A) is on-going.

151 The IAEA participated in the proficiency tests for trace elements and organic pollutants in marine samples organised by Quasimeme, and the Laboratoire National de Metrologie et d'essais (LNE) from Paris. The IAEA is also member of the Bonn-Osinet network of oil spill experts and participates regularly in their round robin tests on oil spill identification.

152 One worldwide interlaboratory comparison on the determination of trace elements and methyl mercury ILC-IAEA-MESL-2021-01-TE-BIOTA) in a fish sample is on-going. In total 123 laboratories from 59 countries reported results back to the organizers.

Technical Cooperation and IAEA Emergency responses

153 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.

154 Sri Lanka TC project RAS0081- emergency response to mitigate the environmental pollution caused by a container cargo that fired 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 short-, medium- and longer-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 and expert advice in setting up its monitoring of post-spill contamination and assessment of impact on marine and coastal ecosystems

155 RER7015 - Enhancing Coastal Management in the Mediterranean, the Black Sea, the Caspian Sea and the Aral Sea by Using Nuclear Analytical Techniques. The project is supporting Albania, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Georgia, Greece, Kazakhstan, Malta, Montenegro, Russian Federation, Slovenia, Turkey, Turkmenistan, Ukraine, and Uzbekistan.

156 IAEA/RCA RAS7037 -Enhancing Wetland Management and Sustainable Conservation Planning

(RCA). The program brings together representatives 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

157 Other national IAEA Technical Cooperation (TC) projects, where MESL is assisting in the development and implementation includes the TC project (BZE7002) to build capacity to monitor pesticides in the environment of Belize; d) a TC project (BRA7012) to provide training and capacity for compound specific stable isotopes to identify triggers of harmful algal blooms in the coastal environment of Brazil; f) TC project (DJJ7001) 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 (FIJ7001) for Establishing an Environmental Monitoring Laboratory for the Protection of the Marine Coastal Resources in the Context of Mining in Fiji; Regional TC Project (RER7009) for Enhancing Coastal Management in the Adriatic and the Black Sea by Using Nuclear Analytical Techniques; and Regional TC project (RLA7019) For Developing Indicators to Determine the Effect of Pesticides, Heavy Metals and Emerging Contaminants on Continental Aquatic Ecosystems Important to Agriculture and Agroindustry in Asian Pacific.

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

158 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 NAEL in the development in their quality assurance programs for the determination of trace elements and organic contaminants in the marine environment.

159 The IAEA participated in the virtual UNEP MAP Integrated Meeting of the Ecosystem Approach Correspondence Groups on Monitoring (CORMON) Biodiversity and Fisheries, Pollution and Marine Litter, and Coast and Hydrography. During this CORMON meeting with 65 participants 14 documents covering 10 guidelines that were prepared as part of NAEL collaboration with UNEP MAP. These guidelines cover the Ecological Objective 5 related to eutrophication, and Ecological Objective 9 related to pollution and describe techniques for the sampling and sample preservation, as well as sample preparation and analysis of Nutrients, trace elements/heavy metals and organic contaminants.

160 The IAEA organised two Proficiency Tests to assist Member States strengthen data quality assurance in laboratories participating in marine pollution monitoring programmes. In total 30 laboratories from 17 Member States participated in these exercises:

- .1 Analytical Performance Study for MEDPOL: Determination of trace elements in marine biota sample: 15 laboratories from 14 Mediterranean Member States (Albania, Bosnia & Herzegovina, Croatia, Cyprus, France, Greece, Israel, Italy, Lebanon, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia, Turkey); and
- .2 Analytical Performance Study for MEDPOL: Determination of organochlorine pesticides, PCBs and PAHs in sediment sample: 15 laboratories from 13 Mediterranean Member States (Albania, Croatia, Cyprus, Egypt, Greece, Israel, Italy, Montenegro, Morocco, Slovenia, Spain, Tunisia, Turkey).

161 One US fellow was trained in the laboratories of MESL on the analysis of perfluorinated alkyl substances (PFAS)

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

163 One TC fellow from Argentina was trained in inorganic laboratories of MESL on the production of CRMs for trace elements and long-lived radionuclides.

164 One analytical procedure dealing with the determination of ultra-low level methylmercury in seawater has been recently validated and published in peer review journal.

165 A collaboration between IAEA/NAEL and UNEP/MAP under 2020/2021 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 18 and 20) are being finalized.

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

166 The IAEA continued the development and validation of analytical methods for monitoring the marine environment, which were published in peer reviewed journals and presented in International Conferences: i) analytical procedures for simultaneous determination of emerging and historical halogenated flame retardants in biota with a single preparation treatment i) method for uranium isotope ratios in sediment and in seawater samples ii) reference methods for toxic elements in biota and sediment samples, based on direct and species-specific isotope dilution inductively coupled plasma mass spectrometry.

167 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) the bioavailability of copper to marine organisms iv) the study of plastic debris as a sources of flame retardants in the marine environment and their potential bioaccumulation and effects on corals. iii) the use of sponges as passive samplers for biomonitoring and remediation

168 NAEL staff, being member of the OSINET, the Bonn Agreement oil spill identification network of experts specialized in oil spill identification techniques, reviewed the draft European Standards on 1) Oil spill identification Petroleum and petroleum related products. Part 1: Sampling (CEN/TR15522-1:2006) 2) Oil spill identification-Waterborne petroleum and petroleum products-part 2: Analytical methodology and interpretation of results based on GC-FID and GC-MS low resolution analyses (CEN/TR 15522-2:2012).

169 The IAEA contributed in the base line monitoring studies of Western and African coast for trace elements and new emergency pollutants as well as in the pollution history investigations in the same region.

171 The use of sponges for biomonitoring of mercury and methylmercury was investigated.

172 One monitoring project for trace elements and new emergency pollutants for Caribbean region was finalised and obtained results published in a peer review journal.

RADIOECOLOGY LABORATORY (REL) ACTIVITIES

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

173 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.

174 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.

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

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

177 The Philippine Nuclear Research Institute (PNRI) is becoming 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.

178 With the support of a 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.

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

180 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.

181 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.

182 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.

183 The IAEA in Monaco has begun a new research and development project that will facilitate 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.

Technical Cooperation

184 The IAEA Environment Laboratories Radioecology Laboratory in Monaco assist Agency Member States in the implementation of national, regional and interregional 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)

185 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.

186 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.

187 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.

188 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.

189 A key effort of the OA-ICC is to ensure the sustained archival and quality control of data on the biological response to ocean acidification, and to promote easy access to the data for all users. To this end, a portal to improve the search experience of data sets included in the OA-ICC Data Compilation,

maintained in cooperation with Xiamen University and hosted at the Germany based data centre Pangaea.

190 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.

191 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, policymakers and the aquaculture industry to develop a Latin American action plan to better understand and address ocean acidification.

192 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.

193 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.

194 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.

195 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"

196 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 3-year project 'Marine Monitoring: Confidence Building and Data Quality Assurance' (2014–2016) was initiated as a follow-up activity to recommendations made on marine radioactivity monitoring in a report issued by the IAEA in 2013 which reviewed Japan's efforts to plan and implement the decommissioning of the Fukushima Daiichi Nuclear Power Station. Six sampling missions and interlaboratory comparisons (ILCs) and three proficiency tests (PTs) were organized during this project. The project was concluded with a report published in 2017 showing that Japan's sample collection procedures follow the appropriate methodological standards required to obtain representative samples.

197 The results obtained in ILCs demonstrate a high level of accuracy and competence on the part of the Japanese laboratories involved in the analyses of radionuclides in marine samples for the Sea Area Monitoring programme, corroborating the conclusions of the PTs. The project was extended for a period of 4 years. Four sampling missions and ILCs and four PTs were organized between 2017 and 2020. As before, these exercises demonstrated a high level of accuracy and competence on the part of the Japanese laboratories and the importance of regular participation in PTs and ILCs of monitoring laboratories. The project was extended for a further 2 years (2021-2023).

Technical Cooperation

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

198 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" is running in the Asia-Pacific region under the "Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific" (RCA) 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.

199 The project, extending between 2017-2020, is training scientists and laboratory staff from the region in analytical and assessment techniques for radioactivity in seawater, sediment and biota. Training includes collection and preparation of marine samples, routine and rapid analytical methods, quality management in the analytical laboratory, experimental radioecology, dose

assessment and risk analysis modelling. Given the delays in implementation related to the pandemic, the project was extended until end 2022. Meetings and training activities which were feasible in virtual mode were maintained and a virtual workshop on Tritium in the marine environment was added to the 2021 work plan.

IAEA Regional Technical Cooperation project RAF7017 (Africa)

200 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

201 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 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. Therefore, there will be a strong emphasis on public communication.

202 The IAEA Environment Laboratories conducted two expert missions to the atoll in 2016 to review existing sampling and laboratory capabilities and protocols and to help define the requirements for establishing a national radioactivity monitoring capability. Fellowship training of key Marshallese scientists and an expert mission focussing on sampling and pre-treatment techniques and basic gamma-ray spectrometry were undertaken in 2017 and early 2018. A national training course in radiation protection and environmental radioactivity has also been provided. Provision of required radiometric equipment continues. The initial project was completed in December 2017 and a follow-up project, running from 2018 to 2021 and aiming to continue to develop this capacity, is currently being implemented.

Analytical quality services

203 One new IAEA reference material is in the initial phases of production and is expected to be available in 2022-2023: Radionuclides in shrimp tissue.

204 Proficiency Testing: Nine world-wide PTs for radionuclides in seawater were organised between 2012 and 2020. The IAEA is organising in 2021 a tenth PT exercise with seawater samples spiked with H-3, Sr-90, Cs-134, Cs-137 and an undisclosed gamma emitter at environmental levels to increase the analytical challenge to the participants. Approximately 100 participants will take part in the 2021 proficiency test.

MARIS database

205 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. 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 July 2021 MARIS containing over 660,000 individual measurement results of radionuclides in seawater, suspended matter, bottom sediment and biota.

Coordinated Research

IAEA CRP K41015

206 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

207 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. 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 environment. Specific research objectives are to establish a scientific platform to improve the radiometric dating methods for defining time-trends of pollution, to verify the improved and harmonized common approach on a broad range of case studies in selected coastal areas with high sedimentation rates and to appraise pollution sources using stable- and 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

208 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 radiotracer techniques to oceanographic research. The CRP started in 2017 and is due for completion in 2022. A comprehensive data compilation of global marine radioactivity measurements covering approximately the last decade 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

209 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)

210 UNEP plays a central role in assisting the international community in making decisions to address

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

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

212 UNEP established the Regional Seas Programme which consists of 18¹⁵ Regional Seas Conventions and Action Plans across the world. UNEP hosts seven¹⁶ of the Regional Seas Programme secretariats, thereby creating a direct means through which the agency promotes and enhances regional integration and cooperation in many areas, ranging from science-to-policy translation, to facilitating coordination in the governance of shared coastal and marine ecosystems in the multilateral partnership arena. UNEP also hosts the autonomous secretariats for multilateral environmental agreements that are relevant to marine environment protection, such as the joint Secretariat of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the Stockholm Convention on Persistent Organic Pollutants Conventions and the Secretariat for the Convention on Biological Diversity.

UNEP's new Medium-Term Strategy (MTS)

213 The fifth session of the United Nations Environmental Assembly (UNEA-5.1) has been held virtually 22-23 February 2021. The overall theme of UNEA-5 was "Strengthening Actions for Nature to Achieve the Sustainable Development Goals". The theme called for strengthened action to protect and restore nature and the nature-based solutions to achieve the Sustainable Development Goals (SDG) in its three complementary dimensions (social, economic and environmental). During the meeting held virtually due to the on-going pandemic, the proposed Medium Term Strategy for UNEP (2022-2025) has been approved. The

strategy rest on the recognition of the existence of three planetary crises – climate change, biodiversity loss and pollution – which put us at risk of irreversibly changing our relationship with the natural world.

214 Tackling these challenges to achieve climate stability, living in harmony with nature and moving towards a pollution-free planet will require a recalibration of our economies and societies towards more sustainable and equitable models. The medium-term strategy outlines a set of transformative shifts that target the drivers of climate change, biodiversity loss and pollution, and looks at their impact. It maps out the actions needed to reshape our consumption and production patterns towards sustainability, framing the contribution of UNEP in the context of the 2030 Agenda for Sustainable Development and the decade of action to deliver the Sustainable Development Goals and beyond. It does so while respecting synergies with the multilateral environmental agreements and in line with their relevant objectives, goals and principles, without prejudice to the outcome of future negotiations. The medium-term strategy will also guide the support provided by UNEP in a manner consistent with other internationally agreed frameworks. It will leverage the United Nations development system reform to engage the wider United Nations system in stronger, more coordinated and mutually supportive environmental action.

UNEP @ 50 –Fiftieth Anniversary of the Establishment of UNEP

215 The commemoration of the creation of UNEP ([UNEP@50](#)), as mandated in paragraph 8 of UNEA Decision 4/2 and paragraph 10 of Decision 5/3, has been launched at the online session of UNEA-5 in February 2021 (UNEA-5.1) and will culminate at a special session of the United Nations Environment Assembly to commemorate the fiftieth anniversary of the establishment of the United Nations Environment Programme, to be held in Nairobi, on 3 and 4 March 2022, in conjunction with the resumed session of UNEA-5 (UNEA-5.2). The overall theme of UNEA-5 is "Strengthening Actions for Nature to Achieve the Sustainable Development Goals".

216 UNEP at 50" is a time to reflect on the past and envision the future." 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 is ahead in decades to come. The celebration will be complemented by various initiatives organized in conjunction with other relevant meetings and events in 2021 and 2022, concluding at the World Environment Day on 5 June 2022 (the date of the 50th anniversary).

¹⁵ They are, namely, Antarctic, Arctic, Baltic, Black Sea, Caspian, Eastern Africa, East Asian Seas, Mediterranean, North-East Pacific, Northwest Pacific, Pacific, Red Sea and Gulf of Aden, ROPME Sea Area, South Asian Seas, South-East Pacific, Pacific, Western Africa and Wider Caribbean.

¹⁶ Abidjan Convention, Barcelona Convention, Cartagena Convention, East Asian Seas Action Plan, Nairobi Convention, Northwest Pacific Action Plan, and Tehran Convention.

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

217 UNEP is committed to convene the emergence of an innovative Global Environment Monitoring System for the Ocean and Coasts (GEMS/Ocean). 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. To this end, GEMS/Ocean will use 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 general 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 will be of the utmost importance to avoid any duplication of existing initiatives and monitoring efforts. Rather, the focus would be on bringing together information that focuses on main trends in climate change, biodiversity and pollution. The Sustainability Research and Innovation Congress (SRI2021) session of GEMS/Ocean held on the 14th of June 2021, gave an opportunity to explore the co-design and formation of operational partnerships towards an integrated monitoring of the ocean to support healthy marine ecosystems, address gaps in current ocean monitoring systems and inform societal transformation. The partnership process towards a collective GEMS/Ocean was initiated and the following core partners have been involved: UNESCO-IOC, GOOS, Mercator Ocean, GRID-Arendal, GRID-Geneva, G7 FSOI, UNEP-WCMC, and Future Earth. The involvement of GESAMP in this on-going process would be mutually beneficial.

GESAMP activities in UN Environment Programme.

218 The Science Division and IOC-UNESCO jointly with GESAMP and UNEP's Global Partnership on Nutrients Management (GPNM) in collaboration with UNEP's Cartagena Convention and the Abidjan Convention have organized five webinars on the Sargassum from May 2020. The objective of the Sargassum webinar series was to provide an update of Sargassum situation and build synergies amongst various stakeholders in addressing the Sargassum challenge through integrated approaches in line with the 2030 Agenda, the Paris Agreement, biodiversity and ecosystems, as well as chemicals related Multilateral Environmental Agreements. The concluding webinar has been held on 10 June 2021 focusing on the opportunities for collaboration - Sargassum science, assessment, and monitoring; Sargassum policy mainstreaming at the regional and global levels; as well as Launch of Sargassum White Paper for the Caribbean. [The 24th edition of UNEP's Foresight Brief](#) focused on floating sargassum seaweed and aims to support the sargassum paradigm shift from a 'brown tide' hazard to a 'golden jewel' opportunity.

219 The GESAMP EXECUTIVE COMMITTEE intersessional meeting has been held by teleconference on 24 February 2021 with participation by UNEP. The meeting reviewed progress of work by Working Groups and Correspondence Groups, Follow-up actions from GESAMP 47 and the upcoming preparations for GESAMP 48 to be hosted by the IAEA 6 to 10 September, Monaco (virtual).

220 The WG 43 on SEA-BASED SOURCES OF MARINE LITTER has submitted its study findings for publication. UNEP, IMO and FAO have been the co-sponsors of this study, the report has provided input to the updated assessment report presented to UNEA-5.

221 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 kick-off meeting for Working Group (WG45) and the first meeting of the working group has been held virtually on 27 April and 20-21 July 2021, respectively.

United Nations decade of ocean science for sustainable development

222 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) has also been launched last June 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.

Regional Seas Programme¹⁷

223 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

¹⁷ <http://www.unep.org/regionalseas/>

framework in the form of a regional Convention and associated Protocols on specific problems.

224 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.

225 UN Environment administers regional UN Environment programmes 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.

Activities in the regions:

Mediterranean Action Plan (MAP) Barcelona Convention Secretariat

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

227 **Hazards of harmful substances carried by ships.** In the framework of the Prevention and Emergency Protocol to the Barcelona Convention, UNEP/MAP is actively supporting the Contracting Parties to develop and implement Contingency Plans including at sub-regional level (i.e. Adriatic/Ionian Sub regional Oil Spill Contingency Plan (ASOSCoP), Sub-Regional Contingency Plan between Algeria, Morocco and Tunisia, Sub-regional Marine Oil Pollution Contingency Plan between Cyprus, Greece and Israel (ratified by Cyprus on May 2021), Sub-regional Marine Oil Pollution Contingency Plan between Greece, Cyprus and Egypt etc. At national level, National Action Plans (NAP) for the implementation of the Regional Strategy for Prevention of and Response to Marine Pollution from Ships (2016-2021) were prepared by Albania, Egypt, Montenegro, Morocco, Tunisia and Turkey, with MAP support. In 2021, activities were relaunched for the development of the National Contingency Plan (NCP) of Bosnia and Herzegovina. In the biennium 2020-2021 a new Mediterranean Strategy for Prevention of, and Response to Marine Pollution from Ships (2022-2031) and its Action Plan, replacing the current Strategy (2016-

2021), has been prepared and will be submitted for the consideration and approval by the 22nd Meeting of the Contracting Parties to the Barcelona Convention and its Protocols (COP 22) (Antalya, Turkey, December 2021).

228 **Active substances in ballast water management systems.** The update of the Mediterranean Strategy on Ships' Ballast Water Management (2022-2027), including its Action Plan and Timetable, has been undertaken in 2020-2021, and will be submitted for the consideration and approval by the COP 22.

229 **Atmospheric input of chemicals to the ocean.** At COP 21 (December 2019), a roadmap was adopted for a proposal for the possible designation of the Mediterranean Sea, as a whole, as an emission control area for sulphur oxides pursuant to MARPOL Annex VI, within the Framework of the Barcelona Convention. An information document related to the adoption of this Decision was submitted to the IMO Secretariat ahead of the 76th session of the IMO's Marine Environment Protection Committee (MEPC, 10-17 June 2021). In implementing this COP decision, further studies were carried out to address the criteria and procedures more fully for the designation of emission control areas laid down in Appendix III to MARPOL Annex VI. In addition, a number of National Workshops on Ratification and Effective Implementation of MARPOL Annex VI, for Albania (Durrës, 25-26 November 2019), Bosnia and Herzegovina (Sarajevo, 28-29 November 2019), Libya (Tunis, Tunisia, 5-6 December 2019), Egypt (25 November 2020), Algeria (26 November 2020), and Lebanon (10 December 2020), were organised to support the implementation and ratification processes in line with the Roadmap. A similar event is envisaged to be organised for Israel in the second semester of 2021. A draft decision on the Designation of the Mediterranean Sea as an Emission Control Area for Sulphur Oxides, pursuant to MARPOL Annex VI, will be submitted for consideration and approval by COP 22.

230 **Plastics / microplastics (sources, fate, effects) including Sea-based sources of marine litter.** UNEP/MAP's efforts have continued and further increased towards prevention and reduction of marine litter from land and sea-based sources, in accordance with the provisions of the Regional Plan on Marine Litter Management in the Mediterranean, adopted in 2013, being the first ever regional legally-binding instrument to combat marine litter including concrete measures and timetables, including through expansion in 2020-2021 biennium of pilots on Fishing for Litter and Adopt a Beach and other marine litter removal/reduction and prevention pilot projects on Sustainable Consumption and Production (SCP), particularly focusing on plastics and microplastics.

231 An Evaluation Report of the implementation of targeted measures of the Regional Plan on Marine Litter Management in the Mediterranean, is currently underway. Proposed amendments to the Regional Plan on Marine Litter Management prepared in 2020-2021 will be submitted for the consideration and approval by the COP 22.

232 The Coordinating Unit and REMPEC, in consultation with IMO, continued exploring synergies between the Regional Plan on Marine Litter Management in the Mediterranean and the IMO Action Plan to address marine plastic litter from ships.

233 In view of supporting the Parties in the implementation of the Regional Plan on Marine Litter Management a set of marine litter guidelines have been developed and endorsed by COP 21 (December 2019) namely on: (a) Implementation of the “Adopt-a-Beach” measures in the Mediterranean; (b) Phase out Single-Use Plastic Bags in the Mediterranean; (c) Operational Guidelines on the Provisions of Reception Facilities in Ports and the Delivery of Ship-Generated Wastes in the Mediterranean; (d) Guidance Document to Determine the Application of Charges at Reasonable Costs for the Use of Port Reception Facilities or, when Applicable, Application of No-Special-Fee System in the Mediterranean. In 2020-2021 biennium draft Guidelines to tackle single use plastic items have been also prepared. With support through the Bilateral Cooperation Agreement between UNEP/MAP and the Italian Ministry of Ecological Transition a report on marine litter hotspot identification has been prepared.

234 The work of the Secretariat continued in 2020-2021 on the refinement of baseline and thresholds values for marine litter-related Indicators of the Integrated Monitoring and Assessment Programme (IMAP). Updated baseline values and proposed threshold values for beach marine litter were finalized in 2021. A Regional Operational Strategy for Monitoring Candidate Indicator 24 related to marine litter ingestion and entanglement was developed and endorsed in March 2021, whose aim is to provide practical guidelines to the Contracting Parties to design and develop monitoring programmes to collect standardized data on marine litter ingested by sea turtles, and to assess how Good Environmental Status relating to this indicator can be achieved. Finally, monitoring guidelines for floating microplastics have been prepared.

235 Global pollution trends establishment. UNEP/MAP continues working on pollution monitoring and assessment and the establishment of trends in the Mediterranean. Following the adoption of the IMAP in 2016, providing for a coherent programme based on region-wide commonly agreed indicators, Contracting Parties developed, updated and, with the support of the Secretariat, are implementing their national IMAPs, which are expected to generate real time data to assess the status of the marine and coastal environment. To this respect, after the publication in 2017 of the first Mediterranean Quality Status Report (QSR), a Roadmap was approved by COP 20 (December 2017) for the preparation and delivery of the second QSR in 2023 (2023 MED QSR). Accordingly, work started at the level of the Correspondence Group on Pollution and Marine Litter Monitoring (CORMON Pollution and Marine Litter) to develop and further refine the methodologies proposed for GES-integrated assessment based on DPSIR approach, the scales of assessment in Mediterranean by applying nested approach, the IMAP Common Indicators Data Standards and Data Dictionaries, and to implement new Quality Assurance Scheme and the proposed monitoring protocols. In parallel, in 2019, UNEP/MAP published the State of Environment and Development Report (SoED), which addresses the environmental status and main sustainability issues related to the environment and development in the Mediterranean region, including the state, evolution and trends of the environment and development, driving forces and root causes, as well as existing and required policy and societal responses

(<https://planbleu.org/en/soed-2020-state-of-environment-and-development-in-mediterranean/>).

236 In order to support The reporting of pollutant loads discharged directly or indirectly to the Mediterranean, three guiding documents were developed namely on “Estimation techniques and applied methodologies for non-point sources release from agriculture”, “Estimation techniques and applied methodologies for point source releases from aquaculture”, and “Guideline on estimation techniques and applied methodologies for non-point sources release from catchment runoffs”.

237 In line with the main elements of six Regional Plans to reduce/prevent marine pollution from land-based sources, the Regional Plans on Urban Wastewater Treatment and on Sewage Sludge Management were prepared in 2020-2021 and will be submitted for consideration and approval by COP 22.

238 In parallel, in line with the mandate given to the Secretariat by COP 21 (Naples, Italy, December 2019), proposed amendments to the Annexes of three pollution related Protocols to the Barcelona Convention, i.e. LBS Protocol, Dumping Protocol, and Offshore Protocol, have been prepared in 2020-2021 and will be submitted for consideration and approval by COP 22.

239 A Mid-term Evaluation Report of the National Action Plans under the LBS Protocol, which were endorsed in 2016 was prepared and agreed during the Meeting on National Baseline Budget Methodologies, Assessments of new Regional Plans and Evaluation of National Action Plans under the LBS Protocol (22-23 April 2021), while a final evaluation of the implementation of targeted measures by the Contracting Parties (by 2021) is currently underway.

240 Impacts from offshore exploration and exploitation activities. COP 21 (Naples, Italy, December 2019) adopted two Mediterranean Offshore Guidelines and Standards, addressing key aspects of offshore activities: (i) the Common Standards and Guidance on the Disposal of Oil and Oily Mixtures and the Use and Disposal of Drilling Fluids and Cuttings; and (ii) the Common Standards and Guidelines for Special Restrictions or Conditions for Specially Protected Areas (SPA) within the Framework of the Mediterranean Offshore Action Plan. Guidelines for the Conduct of Environmental Impact Assessment (EIA) under the Offshore Protocol, have also been prepared and will be submitted for consideration and approval by COP 22. In addition, a “Comprehensive Plan of Actions, including resource mobilization strategy” for the effective implementation of the Mediterranean Offshore Action Plan has been prepared in 2020-2021.

241 Biodiversity conservation. In line with the mandate given by COP 21 (Naples, Italy, December 2019) the Post-2020 Strategic Action Programme for the Conservation of Biodiversity and Sustainable Management of Natural Resources in the Mediterranean Region” (Post-2020 SAP BIO), was prepared in alignment with the ongoing preparation of the CBD Post-2020 Global Biodiversity Framework and the Sustainable Development Goals. In parallel, a Post-2020 Regional Strategy for marine and coastal protected areas (MCPAs) and other effective area-based conservation measures (OECMs) in the Mediterranean has been also

prepared. Both strategic documents will be submitted for consideration and adoption by COP 22.

242 New emerging issues. MAP work in 2021 focused on promoting the integration of Nature Based Solutions in Climate Change Adaptation Strategies, through a dedicated workshop planned during the next IUCN World Conservation Congress. A catalogue of 50 climate change adaptation options and 6 examples of good practices has been developed and a report on socio-economic indicators associated with climate change vulnerabilities in MPAs was published (October 2020). UNEP/MAP and the Union for the Mediterranean, together with other partners, supported MedECC's First Mediterranean Assessment Report (MAR1) and Summary for Policymakers on Environment and Climate Change in the Mediterranean, published in 2020, an important regional initiative which contributes to the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC), with a chapter dedicated for the first time to the Mediterranean.

243 Global presence. In 2020-2021, notwithstanding the limitations imposed by the COVID-19 pandemic in terms of travel restrictions and cancellation of meetings and events, UNEP/MAP had an active presence in key regional and global events and fora, including the first session of the UNEA-5 (February 2021), the Regional Workshop for the Mediterranean organized in the context of the United Nations Decade on Ocean Science for Sustainable Development (January 2020, Venice Italy), the 8th Meeting of the Working Group of the Parties to the Protocol on PRTRs (16-18 December 2020, Geneva), the 13th Meeting of the International PRTR Coordinating Group (ICG-13), on 27 January 2021, and others. Moreover, the UNEP/MAP Secretariat is preparing its participation in the UN Ocean Conference (Lisbon, Portugal, 2-6 June 2020, postponed), and in other major meetings in the second half of 2021, including the IUCN World Conservation Congress, the CBD COP 15, and the UNFCCC COP 26.

244 Cooperation/partnerships: UNEP/MAP has continued and further strengthened cooperation with key regional and global organizations and actors. Among others, the Secretariat liaised with the Parliamentary of the Mediterranean (PAM) and the Circle of Mediterranean Parliamentarians for Sustainable Development (COMPSUD) towards the preparation of Memoranda of Understanding (MoU). Work is also ongoing to update the MoU with FAO/GFCM to better reflect ongoing activities including about marine litter and ballast water management. Building on the successful implementation of the Joint Work Plan 2016-2021 between UNEP/MAP and the European Environment Agency (EEA) negotiations are ongoing for the preparation of a new Joint Work Plan 2022-2030, building on common strategic priorities. Cooperation with other regional and global organizations including OSPAR, HELCOM, the Black Sea Commission, the ACCOBAMS, the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO), the Union for the Mediterranean (UfM), the Basel Convention Plastic Waste Partnership (PWP) etc. has also continued in the 2020-2021 biennium. Scientific projects, partners and institutions are being engaged in the development of a Partnership Plan and Timeline for regional data-sharing for the purposes of preparation of the 2023 MED QSR, with the first meeting planned in the second half of 2021.

245 The Secretariat also continues the close collaboration with the European Union's Marine Strategy Framework Directive (MSFD) Working Groups (WG) - in particular, WG on Data, Information and Knowledge Exchange and WG on Good Environmental Status - to ensure synergies and complementarities between the MSFD and Integrated Monitoring and Assessment Programme (IMAP) implementation.

246 The Secretariat is actively participating in several ocean related processes in the regional and global levels, including the preparation of the Regional Seas Strategic Directions 2022-2025; the process for the development of an African Ocean Governance Strategy (the 3rd consultative meeting was organized virtually on 15-16 June 2021); the International Ocean Governance process led by the European Union (EU); as well as the Basel Convention Plastic Waste Partnership (PWP) and its working groups.

Nairobi Convention ([East Africa](#))

247 Working with the 10 Contracting Parties and other partners, the Nairobi Convention is currently implementing five projects and programmes as follows: [WIOSAP Project](#), whose goal is to reduce impacts from land-based sources of pollution on the WIO and sustainably manage coastal and river ecosystems, [SAPPHIRE Project](#), whose goal is to achieve effective, long-term ecosystem management in the WIO Large Marine Ecosystems, the Partnership Project on African, Caribbean, and Pacific Countries Capacity Building of Multilateral Environmental Agreements ([ACP-MEAs 3](#)), Partnership Project for Marine and Coastal Governance and Fisheries Management for Sustainable Blue Growth in the WIO ([NC-SWIOFC](#)) and, Integrated Management of the Marine and Coastal Resources of the Northern Mozambique Channel Project ([NoCaMo](#)).

248 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. Report of the negotiations of the Protocol will be submitted to the Conference of Plenipotentiaries in November 2021.

249 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.

250 Building on the regional cooperation in response to marine pollution incidents, the Nairobi convention in collaboration with the International Maritime Organization (IMO) held a regional workshop on 'cooperation in preparedness and response to marine pollution incidents' from 3 - 5 March 2020 in Zanzibar, Tanzania. The workshop brought together governments and focal points responsible for oil spill preparedness

and response issues to promote the implementation of the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) and OPRC Hazardous and Noxious Substances (HNS) Protocol.

251 Following the global outbreak of Covid-19 in March 2020, the focal points of the Nairobi Convention deliberated in April 2020 and again in July 2020 on the status of Covid-19 pandemic in their countries and impact on implementation of project activities and the Work Programme of the Nairobi Convention. Countries reported to be at varying levels of restrictions and lockdowns put in place to contain the spread of COVID-19. Implementation of activities on the ground, and those requiring face-to-face interactions were delayed significantly while others progressed, albeit slowly. Desktop work and virtual engagements with different stakeholders however continued to ensure that activities that were not field-based and would not require face-to-face interactions proceeded. Covid-19 waves continued to be reported in several countries of the WIO in 2020 and in the first half of 2021.

252 The Nairobi Convention and partners organized a virtual Western Indian Ocean Regional [Science to Policy meeting](#) on 23 - 25 March 2021. The forum enabled identification of key current and emerging policy, technical, financial and scientific issues relating to the Western Indian Ocean region. The potential recommendations of the forum provided inputs for revision of the Protocol concerning protected areas and wild fauna and flora in the Eastern African region, and critical inputs for policy and decision making. The meeting saw participation of a large pool of partners and stakeholders from all Contracting Parties. The 2021 workshop was themed '*Transition to a Sustainable Western Indian Ocean Blue Economy: Addressing the challenges and seizing the opportunities*, and saw 33 papers presented in the course of the 3-day workshop focusing on (i) Ocean Finance: financing the transition to a sustainable Ocean Economy, (ii) Climate change adaptation and mitigation, (iii) The role of the private sector in the management of plastics as an environmental challenge, (iv) Establishing and managing area-based conservation measures, and (v) Regional Ocean governance: Emerging issues/frameworks. The workshop had several technical and policy recommendations.

253 Project Steering Committee (PSC) Meetings: The Nairobi Convention held PSC meeting for the [WIOSAP](#) project on 24 November 2020, the [SAPPHIRE](#) project on 26 November 2020 and 16 March 2021, and the [NC-SWIOFC Partnership Project](#) (A Partnership for Marine and Coastal Governance and Fisheries Management for Sustainable Blue Growth) on 10 June 2021. The meetings approved progress reports, proposals and concepts for demonstration projects, guidelines and toolkits, and annual workplans and budgets. The impact of COVID-19 on the implementation of planned activities at the national and regional levels was discussed and possible acceleration mechanisms and joint solutions proposed.

254 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 28 May 2021, a meeting was organised with strategic partners such as PMAESA, MTCC, WIOMSA, WWF and IOM to discuss the strategy of supporting sustainable port development in the Western Indian Ocean region. 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.

255 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 assessment is expected to quantify the value of the resources within the TBCA, provide their future sustainable management scenarios and inform investment opportunities to optimize the benefits. The assessment follows a stakeholder consultations webinar that was held on 21 October 2020 to discuss the then proposed economic valuation of the TBCA assessment which ensured that the stakeholders involved in the TBCA have a common understanding of the need, basis and value of the proposed economic valuation of the TBCA and documentation of current initiatives in the area.

256 In August 2020, the Nairobi Convention began supporting the demonstration of Marine Spatial Planning within a Blue Economy framework in Kenya for further replication and transfer of lessons. The demonstration project seeks to prioritize key maritime sectors that can help the Government at both the national and county levels to provide policy and regulatory direction towards the realization of the blue economy promise. The project which is expected to end in September 2021 seeks to (i) support the advancement of knowledge on the ocean economy/maritime sectors and resources in Kenya, particularly the definition, classification and status, capacities, potential and values, and governance frameworks in the ocean/maritime sectors, (ii) support the Government of Kenya to prioritize high-potential sectors and strengthen its policy orientation towards the blue economy for wealth and employment creation, food security and reduction of poverty; (iii) provide input into the development of the National Blue Economy Strategy; and (iv) contribute to Marine Spatial Planning (MSP) and Ecosystem Based Management (EBM) approaches in the maritime sectors.

257 **Cooperation/Partnerships:** In April 2020, the Nairobi convention advanced a partnership with the Western Indian Ocean Governance Initiative (WIOGI). The 3-year project of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the Federal Ministry of Economic Cooperation and Development (BMZ) seeks to strengthen the cooperation among relevant actors at regional, national and local levels on the protection and sustainable use of marine and coastal biodiversity in the WIO region. The mutually beneficial focus areas of work for the Nairobi Convention and WIOGI partnership include strengthening policy dialogue, strengthening the involvement of the private sector in regional ocean governance and to support a national multi stakeholder partnership in Mozambique. 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 and marine ecosystem data to support ecosystem based Marine Spatial Planning (MSP) in the region. The [WIO Symphony \(WIO Sym\)](#) is a co-developed decision support tool for ecosystem-based MSP aimed at the regional and national scales. 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. 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. The Convention has continued to advanced outreach to the Regional Economic Communities (RECs) including IGAD, COMESA, EAC, SADC and AU and partners to strengthen cooperation on ocean governance and blue economy issues. Memorandum of Understanding (MoU) were concluded with PMAESA (2020), Macquarie University (2020) and UNEP and SADC (2021).

258 The Nairobi Convention's [Western Indian Ocean Regional Outlook on Marine Protected Areas](#) was launched on 16 July 2021 in a meeting that was attended by an array of stakeholders from the WIO region and beyond. The outlook documents the progress made by countries in the region towards the achievement of Sustainable Development Goal 14.5 target (to conserve at least 10 per cent of coastal and marine areas) and provides lessons and opportunities to increase momentum for achieving post-2020 Global Biodiversity Framework targets. The MPA Outlook recommends the need for (i) dedicated budgets for MPA management; (ii) adopting proactive law enforcement and compliance strategies to ensure MPA regulations and guidelines are being respected which could be informed by the best practices in fishery reserves like Mauritius, which have helped to restore fish stocks and protect biodiversity; (iii) incorporating research and monitoring programmes on biodiversity and ecosystems into decision-making in MPAs; and (iv) strengthening community engagement in marine protection by implementing lessons learned by the MIHARI Network, which brings together more than 200 Locally Managed Marine Areas in Madagascar.

259 Nairobi Convention launched tools and guidelines to support the implementation of national demonstration projects including: [Mangrove restoration guidelines](#) (launched on 24 July 2020), and [seagrass restoration guidelines](#), (on 5 October 2020) The Guidelines capture respective WIO specific case studies on how the various interventions have worked and lessons learnt. The climate change vulnerability assessment toolkit is currently being pilot tested in selected Western Indian Ocean (WIO) countries and will document the risks and vulnerabilities (natural and human) and drivers affecting coastal fishery communities.

260 Stakeholders during the Science-Policy meeting held on 23-25 March 2021 had the opportunity to glean through strategies and framework that were being

finalised by the Nairobi Convention. Among these included the Regional Marine Spatial Planning Strategy, Integrated ecosystem monitoring framework for the Western Indian Ocean region, [Framework for Private Sector Engagement](#) and a Water Quality Monitoring Framework. The frameworks will be presented to contacting parties for endorsement at COP10.

261 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.

262 The Nairobi Convention's SAPPHERE project provided support for the establishment of a WIO Regional Women's Leaders Network that was launched in April 2021. The launch of the network coupled with previous Advanced Leadership Workshops is part of the project's efforts to support leadership capacity building in ocean governance and sustainable resources management at national and regional level. Phase 3 of the Advanced Leadership Workshop for Senior Leaders, Officials and Policy Makers (Women) in Marine Policy and Ocean Governance will be held in quarter four of 2021.

263 During the World Environment Day on 5 June 2021 and the World Oceans Day on 8 June 2021, the Nairobi Convention celebrated by releasing [exciting stories](#) on how countries and stakeholders are working to protect, conserve, and manage the Western Indian Ocean region. Various efforts across the region were highlighted from rehabilitating seagrass beds in Mozambique, restoring mangroves in Tanzania, seabird habitat restoration in Mauritius, updating the Convention's Flora and Fauna Protocol, halting illegal fishing in the Comoros, marine protected areas management in Kenya, among others.

[South Asian Seas \(SAS\) Programme](#)

264 SACEP is the Secretariat for the South Asian Seas Programme (SASP), which is one of the eighteen Regional Seas Programme of the United Nations Environment Programme (UNEP), signed and formally adopted by the five South Asian maritime countries namely Bangladesh, India, Maldives, Pakistan and Sri Lanka in 1995 to protect and manage the marine environment and related coastal ecosystems of the region in an environmentally sound and sustainable manner.

Ongoing Activities:

265 **South Asia Framework Policy on Nitrogen Management:** The South Asia Co-operative Environment Programme (SACEP) has established "the South Asian Nitrogen Hub", in collaboration with the Centre for Ecology & Hydrology and many other

organizations across the UK and South Asia. The Hub is funded by UK Research and Innovation (UKRI) under its Global Challenges Research Fund (GCRF). This will contribute to protection from marine pollution, air pollution and climate change from land-based sources in South Asia, with a view to establish policy recommendations for the nitrogen management in the South Asian Region. Over the next five years, South Asian Nitrogen Hub (SANH) will study the impacts of the different forms of pollution to form a coherent picture of the nitrogen cycle. It will look at nitrogen in agriculture in eight countries – India, Pakistan, Bangladesh, Nepal, Afghanistan, Sri Lanka, Bhutan and Maldives. The Hub's recommendations will support cleaner and more profitable farming, as well as industrial recycling of nitrogen, fostering development of a cleaner circular economy for nitrogen.

266 In pursuit of implementation number of workshops and activities were carried out. This includes a work programme meeting on Role of eutrophication in exacerbating coral bleaching and coastal impact (GCRF SANH W.P 3.2) from 2 - 5 September 2019 in Maldives, Workshop on Regional Nitrogen Modelling (GCRF SANH) from 11 - 13 September 2019 in Chennai, India and workshop on preparing the database to develop the inventory for different forms of reactive nitrogen was hosted by the Bangabandhu Sheikh Mujibur Rahman Agricultural University. Finally, SACEP and SANH jointly organized the 1st Sub-Regional Workshop on South Asia Framework Policy on Nitrogen Management was held virtually on 21st July 2020 where all the SACEP member shared their national information through their participation and questionnaire shared with countries in advance. SACEP and SANH reviewed information of seven countries independently and shared review report with the respective SACEP country governments for obtaining the remaining information in October 2020. A draft report was prepared on the Policy landscape on Nitrogen Management in South Asia based on the input from member countries.

267 Conserving the coastal and marine ecosystem by implementing the regional marine and coastal biodiversity strategy: Regional Marine and Coastal Biodiversity Strategy for SAS region was adopted in 6th IMM-SAS in November 2019 in Dhaka, Bangladesh. This strategy provides a framework for coordination and coherence between countries' efforts towards the implementation of NBSAPs, leading to enhanced national and regional interventions for the achievement of the strategic plan. One of the key objectives of the Strategy is to support countries of the region in the process of developing the post 2020 global biodiversity framework to be adopted at CBD COP15. The strategy also contributes strengthening regional coherence in planning for, implementing and tracking progress towards the 2030 Agenda for SDGs, particularly SDG14. UNEP and the European Commission (EC) organized the virtual workshop on the Regional Seas Programme and the Post 2020 Global Biodiversity Framework on 27-28 October 2020. The workshop focused regional seas indicators used for the post 2020 Global Biodiversity Framework and policy uptake of the post 2020 Global Biodiversity Framework by regional seas programmes.

268 Addressing issue of Invasive Alien Species coming through Biofouling and Ballast Water: South

Asia Co-operative Environment Programme (SACEP) has joined the GloFouling Project of the International Maritime Organization (IMO) as a Regional Coordinating Organization (RCO). SACEP participated the technical workshop on IMO-GloFouling Research and Development Forum with an aim to bring some clarification on optimum techniques for biofouling management and point us in the direction of promising future research in the SAS region and development to minimize or eliminate the spread of invasive by maritime industries SACEP also participated and presented updates at the Awareness raising workshop and the first meeting of the National Task Force of Sri Lanka in February 2020, May 2020 and November 2020. As RCO, SACEP is facilitating National Assessment of Sri Lanka, conducted regional awareness workshop on 16 June 2021 and plans convening regional task force in late 2021 to strategize regional action to address the issue related to both Biofouling management guidelines and Ballast Water Management convention.

269 Development of Sea Water Quality Criteria in South Asian Seas Region: The objective of this activity is for reduction of and control of various types of pollution by developing threshold values for various parameters of marine and coastal waters to maintain healthy and resilient ecosystem for the common benefit of the SAS region. The SAS member countries will develop threshold values of the significant polluting parameters that are degrading their marine and coastal waters and validate those values with relevant stakeholders. Under this activity SACEP SAS has received nomination of National Focal person to coordinate project activity and contracts have been issued National Consultants to prepare the report from the Governments of India, Bangladesh and Pakistan on 3 September 2020, 25th September 2020 and 25 February 2021 respectively.

270 Regional Marine Litter actional Plan: The Regional Marine litter action plan for South Asia was adopted in the 6th IMM of the SASP on 6th November 2019 at Dhaka, Bangladesh. Some best management practices (BMP) guidelines have also been developed during the year 2019, supported by UN Environment, that could be used for combating the marine litter through reduction and reuse, recycling, composting and fermentation, better management of landfills and land application. The developed BMP also facilitate and support the development of National Action Plan/Policy by member countries. The necessary reports have been shared amongst the SAS member states to receive their final consents. Recognizing the importance of Regional Marine Litter Action Plan in the region, SACEP-SAS became the regional node under UNEP-GPML to host for South Asia Seas Region in June 2020 and submitted request to the UNEP-GPML for allocating grants to develop the National Marine Litter Action Plan for the Governments of Bangladesh and India. SACEP SAS has also developed a declaration with the assistance of the member states on managing the Plastics before entering to Marine Environment and encouraging circular economy in the SAS region. Presently SACEP is the implementing partner of the "Plastic Free Rivers and Seas for South Asia", with the objective to catalyze actions that reduce flow plastic pollution in South Asian Seas. This project would support regional coordination, cooperation, institutions and policy development that deliver both short and long-term solutions to plastic pollution in the region.

271 In a partnership between The World Bank, Parley for the Oceans Foundation, and the South Asia Co-operative Environment Programme (SACEP), the Plastic Free Rivers and Seas for South Asia project will strengthen innovation and coordination of circular economy solutions to plastic pollution flowing into South Asian seas and Indian ocean. The overall project is financed through an International Development Association (IDA) regional grant and parallel financing and investment from Parley. The financing agreement between SACEP and The World Bank has been signed in a virtual ceremony held on 8th June 2020, on the World Ocean Day. The World Bank officially declared Project Effectiveness on 12th August 2020 with the acceptance of the evidence submitted in fulfilment of the condition's precedent to the effectiveness of the Financing Agreement.

272 SACEP-SAS and IOCINDIO collaboration initiatives: The Intergovernmental Oceanographic Commission (IOC) of UNESCO is the UN body responsible for supporting global ocean science and services. The IOC enables its 150 Member States to work together to protect the health of our shared ocean via coordinating programmes in areas such as ocean observation, tsunami warnings and marine spatial planning. IOC Regional Committee for the Central Indian Ocean (IOCINDIO) organized Workshops on Coastal Vulnerability and Regional Planning of the UN Decade of Ocean Science for Sustainable Development (2021-2030) for Northern and Central Indian Ocean Countries as well as ROPME Seas Area which was held on 6-10 January 2020. SACEP-SAS presented the regional action plans and shown interest to work collaboratively with IOCINDIO to avoid duplication and pool expertise, knowledge and best practices available in the region. SACEP-SASP shared valuable inputs to UN Decade report that bring more visibility for mitigating the environmental management of the region and following up the opportunity by attending meetings regularly from February 2020 onwards.

Coordinating Body on the Seas of East Asia (COBSEA)

273 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.

274 COBSEA supports participating countries to address priority issues in line with the COBSEA Strategic Directions 2018-2022 adopted in 2018 focusing on regional governance; addressing land-based marine pollution with a focus on nutrients, sediment, wastewater and marine litter; and marine and coastal planning and management, with a focus on ecosystem-based management approaches, including Marine Protected Areas (MPAs) and Marine Spatial Planning (MSP), towards achievement of relevant SDGs and Aichi Targets. A regional outlook document on COBSEA's contribution to the follow up and review of the 2030 Agenda for Sustainable Development has been

prepared, identifying how COBSEA will support participating countries with the implementation and monitoring of ocean-related Sustainable Development Goals and associated targets. A Voluntary Commitment made at the first UN Ocean Conference in 2017 (#OceanAction15986) has been completed and COBSEA plans to launch two new Voluntary Commitments at the second UN Ocean Conference (postponed to 2022).

275 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, to strengthen marine litter monitoring and assessment, and create an enabling environment for implementation. IGM 25 will take place in two parts with a virtual Meeting on 8-9 September 2021 and an in person Meeting as soon as possible in Viet Nam in 2022. In response to IGM 24 resolution and based on meetings of the WGML in June 2020 and 2021, IGM 25 will consider inter alia establishment of the East Asian Seas Regional Node of the Global Partnership of Marine Litter (GPML) to support knowledge management and information exchange on marine litter; establishment of the Regional Capacity Centre for Clean Seas (RC3S) in Indonesia as a COBSEA Regional Activity Centre; and a process for developing new Strategic Directions to guide COBSEA's efforts from 2023.

276 IGM 25 will further consider adoption of COBSEA Regional Guidance for Harmonized Marine Litter Monitoring Programmes 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).

277 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.

278 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, 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. SEA of Solutions 2021 will take place as a hybrid event co-hosted by the Government of Malaysia in November 2021.

279 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 development of further actions in line with COBSEA Strategic Directions 2018-2022.

280 COBSEA is cooperating 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. A review of national and regional legal and policy frameworks relevant to marine and coastal spatial planning in the region was conducted, identifying key recommendations for wider use of MCSP in marine and coastal ecosystem-based management. In November 2020, a regional virtual training workshop on MCSP was organized with twenty participants from national and local authorities of COBSEA countries to build capacity on ecosystem-based planning processes, and protection of blue economy assets for climate resilience. A community of practice was established across COBSEA countries to support the development of action plans. Upcoming activities include a training on Sustainable Ocean Economies for COBSEA countries. Efforts towards establishing a COBSEA network of Marine Protected Areas have been initiated.

281 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 project will run until 2023 and an inception workshop took place on 1 July 2021.

282 COBSEA will contribute towards the implementation of the UN Decade of Ocean Science (2021-2030) through ongoing and emerging efforts, in relation to Strategic Objective 2 on evidence base and capacities for ecosystem-based management as well as Cross cutting Objective 4 on networks, data systems, other infrastructure and partnerships, and Cross cutting Objective 6 on knowledge-to-policy cooperation, coordination and communication. The COBSEA Secretariat participated in initial planning for the UN Decade of Ocean Science during the Twelfth

Intergovernmental Session of the IOC Sub-Commission for the Western Pacific (IOC-WESTPAC) in Manila, the Philippines, in April 2019, and in the Regional Planning Workshop towards the UN Decade in July and August 2019 in Tokyo, Japan, and will continue engaging in the planning process at the regional and global level.

The Cartagena Convention-Caribbean Environment Programme

283 **Governance:** Memoranda of Understanding (MOU) were signed between the Cartagena Convention Secretariat and the Gulf and Caribbean Fisheries Institute (GCFI), Water Centre for the Humid Tropics of Latin America and the Caribbean (CATHALAC), Institute of Marine and Coastal Research (INVEMAR), and the Caribbean Natural Resources Institute (CANARI) to enhance cooperation on the management of coastal and marine resources. As a follow up to the voluntary commitment registered by the OSPAR Commission (OSPAR) and the Cartagena Convention Secretariat, an MOU was developed and signed to further inter-regional cooperation on marine protected areas (MPAs), marine litter and ecosystem-based management.

284 The Cartagena Convention Secretariat continued to actively participate in the development of a Coordination Mechanism (CM) for integrated ocean governance framework in the Wider Caribbean Region.

285 In 2019, the Government of Barbados became the 15th country to ratify the Protocol Concerning Pollution from Land-Based Sources and Activities (LBS) and in 2020, the Government of Nicaragua ratified the Specially Protected Areas and Wildlife Protocol (SPAW).

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

287 **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 WCR. This report with data on water quality and an agreed list of indicators will enable improved reporting on Multilateral Environmental Agreements and progress towards the Sustainable Development Goals. Analysis on pollution parameters relating to ocean acidification, eutrophication (the excess of nutrients in water), hypoxia (the lack of oxygen dissolved in the water), sedimentation, and bacterial contamination were provided in the report. Recent findings concerning plastics and mercury pollution were presented and state of the art science and modelling was used to complete the evaluation and draw predictions. Some of the findings revealed that faecal contamination of coastal waters (*Enterococcus* and *E. coli*) are widespread in all locations in every country assessed. Summaries of the SOCAR report for 3 stakeholder groups – Policy Makers, Civil Society and the Private Sector and an integrated brief on SOCAR and the State of Marine Habitats (SOMH) were published and will support improved knowledge management and awareness raising. The final report was launched at the Meeting of Ministers of Environment in Latin America and the Caribbean in February 2021.

288 A joint feasibility assessment, investment plan and business cases outlining high-priority actions to reduce LBS pollution, with special attention to pollution sources known to cause substantial impacts on the provision of ecosystem goods and services that are of critical importance for human well-being and sustained socio-economic development as well as targeted habitat restoration interventions was developed with support of the UNDP GEF CLME+ project.

289 The development and adoption of the first Regional Nutrients Pollution Reduction Strategy for the Wider Caribbean Region will enable an integrated approach to addressing pollution from major sources of sewage and agrochemical run-off.

290 **Water and Wastewater Management:** Since the official launch of the GEF-funded Caribbean Regional Fund for Wastewater Management (CReW+) Project entitled 'Upscaling and enhancing the experience of the Caribbean Regional Fund for Wastewater Management to the wider Caribbean promoting through an integrated approach of innovative technical solutions and financing mechanisms' in August 2020, significant progress has been made towards achieving the project's multiple objectives.

291 Technical reports on the integration of Water Resource Management into the Cartagena Convention framework and on nutrients management guidelines/standards for wastewater discharges into the Wider Caribbean Region will guide the further development of the Land Based Sources of Marine Pollution (LBS) Protocol.

292 A new training platform – the CReW+ Academy was established to support ongoing capacity building in the Wider Caribbean Region on wastewater management. The first block of webinars was hosted from February to April 2021 and covered several topics including on wastewater infrastructure, sustainable financing mechanisms and effective wastewater were covered.

293 The Secretariat developed the Hello Rain online training tool on rainwater harvesting in Jamaica and will complete the development of a model for participatory management and operation of community-based water systems for replication and upscaling in the Wider Caribbean Region in 2021.

294 **Solid Waste and Marine Litter Management:** The Cartagena Convention Secretariat in collaboration with the Gulf and Caribbean Fisheries Institute continued work on Marine Litter as part of the Caribbean Regional Marine Litter Node with multiple projects and activities that were guided by technical information from GESAMP publications on marine litter. These included a Regional Marine Litter Strategy for the Caribbean and a Compendium of Case Studies on Solid Waste/Plastics Management from the Tourism sector. The Trash Free Waters International partnership implemented solid waste reduction projects in Jamaica and Panama which increased public education and awareness about the impacts of solid waste pollution and further understanding about environmental protection. The projects facilitated stakeholder participation, community involvement and livelihood training through capacity-building workshops on upcycling. New fact sheets and

infographics on Solid Waste, Microplastics, and Plastics were developed with support of the EU ACP MEA Programme and a Community Based Marine Litter/Plastics Grant Programme will be launched in September 2021.

295 Activities for reducing Fishing Gear Loss into the Marine Environment in the Caribbean were completed in Jamaica, Grenada and Belize with plans to expand to Mexico and other Caribbean islands. Communication and Outreach activities included a Plastic Free July and Christmas Social Media Campaigns and development of an interactive map on the status of plastic bans in the Caribbean region.

296 The Secretariat supported the development of the Central American Regional Marine Litter Action Plan, finalization of the Caribbean Regional Action Plan on Solid Waste, and development of joint project proposals on solid waste, marine litter and plastics.

297 As a follow up to the UNEP Global #CleanSeas campaign launched in Bali on 23 February 2017, the Cartagena Convention Secretariat supported the launch of a Regional Caribbean Clean Seas Campaign in 2019. The campaign built on the annual International Coastal Clean-up (ICC) activities with support from the Caribbean Youth Environment Network (CYEN). Through the campaign, capacity-building support was provided to various stakeholders on outreach, advocacy, resource mobilization and the development of new project proposals for reducing marine litter and plastics.

298 The Caribbean #CleanSeas Campaign was initially launched in October 2019 in Barbados, Trinidad and Tobago, and St Kitts and Nevis and later in Grenada and St Vincent and the Grenadines in November 2019.

299 The clean-up activities conducted as part of the campaign were used to field test a harmonized marine litter monitoring methodology which was developed through the Node at the end of 2018. The Caribbean Breaking Up with Plastics video developed by the GEF-IWEco Project was launched as part of the campaign. The video received an award for Best Short Video at the GCFI CINEFISH Festival in 2019 (73rd GCFI Conference), a Silver Telly Award in the category "Green/Eco-Friendly for Online" and a Communicator's Award of Distinction in the category "Individual-Social Responsibility for Online Video", both in 2020.

300 **Marine Biodiversity:** With support of 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 Specially Protected Areas and Wildlife Protocol.

301 Under the project Biodiversity for Sustainable Development in the Caribbean (funded by the Government of Italy), which is now linked to the CLME+ Hub, the Secretariat was able to complete re-structuring of the CaMPAM database and expand its interactivity with users. The database now contains information for over 1,069 Caribbean MPAs with 48 fields, and displays an online interactive map generated with QGIS Cloud platform which facilitates specific searches for any of the fields and allows the download of information in multiple formats (e.g. SHP package, KML, XLS or as a Web Mapping Service (WMS)). Users also have the option to

share photos, videos, and audio through interactive buttons, and generate statistics and reports.

302 Marine Protected Areas: In collaboration with CERMES (with support from IUCN-Biopama Programme, GCFI and CaMPAM), the XII edition of the Training the Trainers (ToT) regional MPA course in Barbados was used as a vehicle for stakeholder collaboration, training and capacity building by interconnecting linkages with countries within the CLME able to facilitate targeted stakeholder trainings in data management, ecosystem services and valuation methods, and specific outputs which overlap with the CLME+ Projects.

303 Ecosystem-Based Management: The Ecosystem-Based Sub-project for the NBSLME involving integrated management of coastal and marine habitats and pollution reduction was successfully implemented by the Governments of Guyana, Trinidad and Tobago and Suriname. It resulted in Agriculture pollution reduction practices from the training of farmers in integrated pest management and use of pesticide alternatives and improved waste disposal. Degraded Mangroves were restored and policy briefs and management guidelines developed for improved management of mangroves and wetlands. Alternative livelihoods including new nature-based tourism activities were identified.

304 Stony Coral Tissue Loss Disease: The United Nations Environment Programme in collaboration with GCFI published a White Paper on Stony Coral Loss Diseases (SCTLD) in July 2021. The publication outlines the origin, impact, identification and potential causes of the disease. It provides monitoring and management approaches to SCTLD and next steps as recommended actions to respond to the issue. Case studies are also presented of monitoring and management efforts in the region. The publication will be launched during the upcoming biennium.

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

305 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 4th Intergovernmental review Meeting in Bali in October 2018. The review meeting was attended by more than 240 delegates, representing over 60 states. The meeting also saw the participation of UN partner agencies, intergovernmental organizations observers, experts, the private sector and the academia. The meeting considered the review of the work of the Programme since the last intergovernmental review held in the Philippines in 2012, the outlook on future work and strategic options for management of the Programme, mandate and alignment to the UN Environment Assembly. The meeting concluded with a “Bali Declaration” where countries affirmed the need for continued focus on the priority marine pollution categories, namely marine litter, nutrients, and wastewater. The countries underscored the value of the

work of the global partnerships associated with the three pollution categories with encouragement for strengthening. The meeting mandated the GPA Coordination Office to complete the review of the future options of the Programme for presentation at the next UN Environment Assembly (UNEA4) for consideration by countries.

306 The GPA of UN Environment has developed a new project document titled “Protecting the Marine Environment from Land-Based Pollution through Strengthened Coordination of Global Action.” The project, launched in January 2019, will be implemented on a global level and includes partners such as international organizations, the private sector, and NGOs. It aims to strengthen responses to land-based pollution, enhance 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, including the Global Wastewater Initiative (GW²I).

307 The GPA has organized side events during the 4th UN Environment Assembly, which was hosted by UN Environment from 10 to 15 March 2019 at its headquarters in Nairobi, Kenya. The events took place in the Clean Seas Tent, were all well attended and allowed the audience to interact with speakers and experts coming from different sectors directly, and across the entire globe. A cross-cutting event¹⁸, aiming to touch upon the three main source categories of pollution tackled by the GPA, was organized to discuss the nexus between nutrients, wastewater, and plastic pollution.

308 A draft resolution on the future of the GPA has been developed and submitted to the CPR members in April 2020. This resolution received comments from the CPR and there are two different positions emerging. Follow-up dialogues were held with the USA representative as well as with the EU representative. This resolution is to be tabled at UNEA 5.2 in 2022 due to the re-organization of UNEA 5 because of COVID-19. The team has also continued working on the country survey report on land-based sources of pollution and has received a draft of the report for internal comments before presenting it to the CPR.

Wastewater and the Global Wastewater Initiative (GW²I)

309 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](#).

¹⁸ <http://web.unep.org/environmentassembly/session-nasty-nexus-nutrients-wastewater-and-marine-litter>

310 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.

311 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.

312 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](#).

313 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.

314 [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).

315 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.

316 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.

317 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.

318 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, anti-microbial resistance.

319 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.

320 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.

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

321 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.

322 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*.

323 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.

324 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/>

325 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](#).

326 [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>

327 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. 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).

328 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.

329 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.

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

330 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.

331 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 2018¹⁹ a summary of the GESAMP WG 40 report *Overview of the Guidelines for the Monitoring and assessment of Plastic Litter in the Ocean*²⁰ 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 document²¹ was adopted; the fourth and last meeting of the AHEG was held virtually in November 2020, a chair's summary²² with a list of potential response options identified was adopted by participants.

332 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.

333 As called for in paragraph 3 of UNEA resolution 4/6, the beta version of Phase 1 of the Digital Platform was introduced during the UN Science -Policy Business Forum on the Environment on 19 February 2021 and demonstrated during the "Understanding the State of the Ocean" webinar on 25 February 2021. During Phase 1 resources and stakeholders' database were integrated and made available through a single portal using mapping and searching functionalities. Following the Phase 1 release, an iterative, user-centred design process to collect feedback from users to inform new versions of the Platform. A series of phased releases will

culminate in a full-fledged final version, to be launched in June 2023. Stakeholders including governments, the scientific and technical community, businesses, and NGOs will navigate the platform by searching for data and information, using mapping and layering tools, and interacting with the platform or other users. Content will include data sets and data layers such as a plastic flow model assessing how litter moves through the environment, a policy toolkit with information on national legislation from around the world, marine litter technology inventory (in response to paragraph 2d), inventory of marine litter actions repository, inventory of marine litter actions dashboard and action plans. Additional tools and pilots under development are interfaces for inventories of technical and financial resources and mechanisms, interoperability between models and matchmaking functionalities (needs with resources). Additional assessments with country partners and other user groups will help confirm priorities for a series of requests for phased releases beginning in early 2021. The coordination aspect and further development of the platform will be supported by the GPML "Action Tracks". UN Environment Programme and the Open University have created a Massive Open Online Course (MOOC) on Marine Litter²³. 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 30,000 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 2021.

334 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

¹⁹ <https://papersmart.unon.org/resolution/second-adhoc-oeeg>

²⁰ https://papersmart.unon.org/resolution/uploads/un_environment_scienc_e_-_marine_plastics_guidelines_synopsis_18-03553_002.pdf

²¹

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

²² <https://www.unep.org/environmentassembly/chairs-summary-aheg-4>

²³ <https://www.gpmarinelitter.org/what-we-do/training>

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.

Basel, Rotterdam and Stockholm Conventions

335 The Basel, Rotterdam and Stockholm (BRS) conventions²⁴ 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.

336 **Generating global data on chemicals and waste:** The BRS conventions, through the work of the scientific subsidiary bodies, the prior informed consent procedure, and the national reporting obligations, play an important role in generating global data on the production, consumption, trade, emissions, releases and environmentally sound management (ESM) of chemicals and waste and making it publicly available.

337 The Stockholm Convention's Global Monitoring Plan (GMP) generates long-term and comparable monitoring data on the concentrations of persistent organic pollutants (POPs) in humans, ambient air, and surface water for water-soluble POPs. The POPs monitoring data under GMP can be found in the regional and global monitoring reports²⁵ and the GMP data warehouse.²⁶

338 The BRS conventions support international research on the fate and adverse effects of marine plastics and microplastics, including GESAMP. The Secretariat provided inputs to the UNEP's assessment on sources, pathways and hazards of litter including plastic litter and microplastic pollution.

339 The BRS Secretariat cooperates 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.

340 New reports "Chemicals, wastes and climate change: Interlinkages and potential for coordinated action"²⁷ and "Interlinkages between the chemicals and waste multilateral environmental agreements and biodiversity: KEY INSIGHTS"²⁸ were jointly published by the secretariats of the BRS conventions and the Minamata Convention on Mercury in 2021.

341 A new publication "Drowning in Plastics – Marine Litter and Plastic Waste Vital Graphics" is being prepared with UNEP and Grid-Arendal (in press).

342 **Actions towards preventing and reducing plastic pollution:** As called for in UNEA resolution 4/6, 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. Following the adoption of the Plastic Waste Amendments by the Conference of the Parties to the Basel Convention²⁹ which became effective on 1 January 2021, 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.

343 The following technical assistance projects are being implemented by the BRS:

344 "Marine litter and microplastics: promoting the environmentally sound management of plastic waste and achieving the prevention and minimization of the generation of plastic waste" seeks to prevent and significantly reduce marine litter and microplastics by strengthening capacity in Ghana and Sri Lanka and at the regional and global levels;³⁰

345 "Further actions to address plastic waste under the Basel Convention" aims to assist partner countries to improve their management of plastic waste and ultimately contribute to Sustainable Development Goal target 14.1;³¹

346 "Plastic Waste in Remote and Mountainous Areas"³² aims to strengthen capacity and awareness in remote and mountainous areas to reduce plastic waste and to ensure its environmentally sound management. Pilot activities are being initiated in Kyrgyzstan, Nepal and Tajikistan;

347 "Strengthening knowledge and capacity to prevent and reduce releases of plastic waste in Malawi and Zimbabwe"³³ aims to protect human health and the environment from plastic waste by strengthening knowledge and capacity among decision makers.

348 Under the Small Grants Programme on Plastic Waste,³⁴ 15 pilot projects are implemented/being prepared for implementation by the Basel and Stockholm Conventions Regional Centres.³⁵ The pilot projects will benefit 32 countries in Africa, Asia-Pacific, Latin America and the Caribbean and Eastern Europe.

349 The Basel Convention Plastic Waste Partnership³⁶ established in 2019, seeks to mobilize its broad stakeholder base to tackle the issue of plastic pollution on multiple fronts: from stimulating the development of strategies to strengthen policy and regulatory frameworks within countries; to developing

²⁴ <http://basel.int/>; <http://pic.int/>; <http://pops.int/>.

²⁵ <http://pops.int/tabid/525>.

²⁶ <https://pops-gmp.org>.

²⁷ <https://brsmeas.org/climatechange-report/>.

²⁸ <https://brsmeas.org/biodiversity-report/>.

²⁹ <http://basel.int/tabid/8426>. The Conference of the Parties to the Basel Convention adopted decision BC-14/12 by which it amended Annexes II, VIII and IX to the Convention, with the objectives of enhancing the control of the transboundary movements of plastic waste and clarifying the scope of the Convention as it applies to such waste.

³⁰ <http://basel.int/tabid/8343>.

³¹ <http://basel.int/tabid/8344>.

³² <http://basel.int/tabid/8346>.

³³ <http://basel.int/tabid/8721>.

³⁴ <http://basel.int/tabid/8402>.

³⁵ <http://brsmeas.org/tabid/2636>.

³⁶ UNEP/CHW.14/INF/16/Rev.1; <http://basel.int/tabid/7520>.

solutions to improve the collection, separation and sound management of plastic waste; and stimulating innovations for increasing the durability, reusability, reparability and recyclability of plastics. The membership currently stands at 210 representatives from Parties to the Convention, its regional centres, the private sector, civil society and intergovernmental organizations. A first call for proposals to undertake capacity building pilot projects under the Partnership was issued in 2020 and 23 pilot projects were selected for implementation in 22 countries.³⁷ Further calls for proposals are expected later in 2021 or 2022.

350 Parties to the Basel Convention are required to prevent and combat illegal traffic in hazardous wastes and other wastes. The Basel Convention provides a framework for the development of guidance to assist Parties in preventing and combatting illegal traffic,³⁸ as well as for a partnership to promote compliance with the Convention's provisions through a better implementation and enforcement of national law: the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic (ENFORCE).³⁹

351 **Persistent organic pollutants:** Some of the POPs listed under the Stockholm Convention have been used as plastic additives such as flame retardants, plasticizers, oil and water repellents and in manufacture of fluoropolymers (brominated diphenyl ethers, hexabromocyclododecane, short-chain chlorinated paraffins, perfluoro octane sulfonic acid (PFOS), and perfluorooctanoic acid (PFOA)).

352 At its sixteenth meeting held in January 2021, the POPs Review Committee reviewed, among others, the a proposal for listing UV-328, an antioxidant for plastics, and agreed to prepare a draft risk profile to evaluate whether the chemical is likely, as a result of its long-range environmental transport, to lead to significant adverse human health and/or environmental effects, such that global action is warranted. The Committee is also analysing information on the potential for long-range environmental transport of chemicals of concern including through plastic debris. Other chemicals under review by the Committee include Dechlorane Plus, medium-chain chlorinated paraffins and long-chain perfluoro carboxylic acids (LC-PFCAs), their salts and related compounds, chlorpyrifos and methoxychlor.

³⁷ <http://basel.int/tabid/8494>.

³⁸ <http://basel.int/tabid/3423>.

³⁹ <http://basel.int/tabid/4526>.

ANNEX V – FUTURE WORK PROGRAMME: 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), Katye 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)

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 complete the peer-reviewed publications based on previous WG activities, with a final report on these activities completed in 2021. Also, to carry out the delivery of two workshops. One on the ocean management and policy implications of the air/sea exchange of chemicals; and one workshop jointly with WG 40 on the atmospheric transport of microplastics to and from the ocean.

WG 40: Sources, fate and effects of plastics and microplastics 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), Hrisi 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), Kelsey Richardson (Australia), Krystal Ambrose (Bahamas), Francisco Alpizar (Costa Rica), Amy Brooks (United States).

Terms of reference for fourth phase of WG 40:

(Germany), Alana Lancaster
(Barbados), Nadine Mengis
(Germany).

(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: Initially, WG 40 will operate remotely until such time that in-person meetings become justified and viable, in consideration of the current global COVID-19 pandemic. 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.

Start-up meeting: 10-12 November 2021

Interim report: fourth quarter 2022

Final report: fourth quarter 2023

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

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 timeline⁴⁰ for the second phase (subject to availability of funding):
 - .1 Co-chairs and technical secretary of the Working Group to produce a detailed scope of the work to address the Terms of Reference for the second phase and finalize potential Working Group members in xxx;
 - .2 Full Working Group meeting in xxx to address the Terms of Reference; Deliver a meeting report by xxx;
 - .4 Potential additional Working Group meetings xxx;
 - .5 Deliver draft final report addressing points 8.1 and 8.3 of the phase 2 Terms of Reference by xxx;
 - .6 Peer review of the draft final report addressing points 8.1 and 8.3 of the

⁴⁰ Timeline will be addressed at the next meeting of the working group in November 2021

- phase 2 Terms of Reference required by xxx;
- .7 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);
 - .8 Deliver final report by xxx;
 - .9 Prepare workshop report within 8 weeks after the workshop;
 - .10 Alternatively, instead of points 7, 8 and 9 above, carry out a wide peer review process
 - .11 Revise draft assessment framework based on results of the workshop or wide peer review process;
 - .12 Prepare draft final report, by xxx;
 - .13 Peer review of the draft final report covering the draft assessment framework, i.e. point 8.2 above required by xxx;
 - .14 Deliver final report by end 2022; and
 - .15 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 Mepstad (Norway), James Hein (United States), Stuart Simpson (Australia), Andrew Sweetman (United Kingdom), Gi Hoon Hong (Republic of Korea), Hannah Grant (United Kingdom)

Terms of reference for WG 42

The working group on the impacts 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 2021. 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), Li Wang (China), Sally N. Thomas (India), Kelly Richardson (Australia), Emilie Grilly (Australia), Peter Van Den Dries (Belgium), David Santillo (United Kingdom), Raffaella Piermarini (Italy), Olof Linden (Sweden), Francois Galgani (France)

Terms of reference for WG 43

The Working Group has two concurrent work-streams:

Work-stream 1, with an overarching scoping study which would, amongst other objectives, support the initial information requirements of IMO's *Action plan to address marine litter from ships* and help identify priorities within this overarching scope.

Work-stream 2, with recognition that some types of sea-based sources of marine litter, such as Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG), are further progressed in terms of available information but require more focussed scientific attention to inform interventions. The work-stream will focus on specific areas of research to fulfil this requirement. ALDFG will be the focus based on the existing knowledge that this is a major source of marine litter from ships and the fishing sector specifically. It is also already identifiable as a key area of work for both FAO and IMO whose Members have highlighted an urgent need to address this issue.

Work-stream 1 – Global overview

A global overview of sea-based sources of marine litter, including fishing gear and other shipping related litter, which should include:

- ToR 1: An identification of sources of marine litter from sea-based sources, including but not limited to:
- a. fishing operations (e.g. gear, packaging material, strapping bands);
 - b. aquaculture (e.g. cages, buoys, netting, packaging materials structures);
 - c. shipping (garbage, hull scrapings, containers, spoilt cargo, grey water, ropes and cargo nets);
 - d. dumping of waste and other matter at sea, derelict fibreglass (FRP) vessels;
 - e. other (e.g. recreational boating, recreational fishing)
- ToR 2: An estimate of the relative contribution and impacts of different sea-based sources of marine litter.
- ToR 3: An analysis of how much plastic is produced and used by the fishing and shipping industries. This would include what kind of plastic is manufactured and used by these industries, as well as an overview of the existing waste management streams for these plastics and how these vary by region.
- ToR 4: An assessment of data gaps, as identified under ToR 1 to 3 above, and prioritization for further work.

Work-stream 2 - ALDFG

Phase 1: Distribution, trends and impacts

- ToR 5: Identification of ALDFG hotspots – utilizing data collected in various platforms including the Global Ghost Gear Initiative (GGGI) data portal and building upon work done in CSIRO gear loss study (pending publication)
- ToR 6: Quantification of the impacts of ALDFG – environmental, social and economic

Phase 2. Interventions

- ToR 7: Review and compare strategies for preventing and mitigating ALDFG.

Planning and outputs: Completion of the final report and its publication by the fourth quarter of 2021. Review of the TORs and work plan intersessionally for the establishment of a second phase of the work of the group.

WG 44: Biofouling Management

Lead Organizations: IOC-UNESCO

Co-Sponsors: IMO, UNDP

Chairperson: Vacant

Members: Joop Coolen (the Netherlands), Andrew Want (United Kingdom), Pedro Almeida Vinagre (Portugal), Serena Teo (Singapore), YounaLyons (Singapore), Nina Blocher (Norway), R. R. M. K. P. Ranatunga (Sri Lanka), Agnese Marchini (Italy), Koebraa Peters (South Africa), Mario Tamburri (United States), David Smith (United Kingdom), Marnie Campbell (Australia), Pei-Yuan Qian (China), Evangelina Schwindt (Argentina), Anna Yunnie (United Kingdom), 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)

Christoph Voelker (Germany),
Maeve Lohan (United Kingdom),
Sylvia Sander (Germany)

Terms of reference for WG 45

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 first draft version of the report by September 2021.

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), Elisabeth Holland (Fiji), Manmohan Sarin (India)

Members: Sylvia Sander (Germany), Purvaja Ramachandran (India), Lorraine Currivan (Ireland), Nuria Casacuberta (Switzerland), Ricardo Barra (Chile), Dario Omanovic (Croatia), Alessandro Tagliabue (United Kingdom),

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.

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: The Correspondence Group will discuss next steps regarding work on the issue interessionally.

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: At the 46th annual session GESAMP noted that it would be advisable to await the outcome of the work of WG 43 (sea-based sources of marine litter including fishing gear and other shipping-related litter) before taking the next steps. It would then be possible to review the figures and produce a short and more accurate ‘Brief’ for use by the Sponsoring Organizations. The intention would be to prepare a press release or briefing document for the next UN Ocean Conference.

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: To complete the report and request UNEP to consider the recommendations and any future actions requested by GESAMP.

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 last quarter of 2021.

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: Decide on the further development on the completed paper during the intersessional period.

Correspondence Group to support the Decade of Ocean Science for Sustainable Development

Lead: Mike Huber (Australia)

Members: David Vousden (South Africa), Peter Kershaw, (United Kingdom) Wendy Watson-Wright (Canada), Chris Vivian (United Kingdom).

Planning and outputs: Establishment of a permanent Task Team, with Terms of Reference to be developed and approved intersessionally.

ANNEX VI - TEMPLATE FOR NEW GESAMP WORKING GROUPS

BACKGROUND AND CONTEXT

The subject:

Brief description subject of the study

The nature of the issue:

Why the subject is of concern or interest to the international community from the perspective of marine environmental protection

The justification:

Why a GESAMP study is needed (e.g. synthesis of scattered information, assessment of environmental status/impacts, development of new methodologies, establishment of standards or guidelines, identification of requirements for research, monitoring, management and/or policy development)

TERMS OF REFERENCE

The Terms of Reference should:

1. Be specific, concrete, point-by-point tasks to be carried out by the Working Group and/or specific information to be included in the report
2. Define the scope: what will and will not be included
3. Avoid being open-ended: focus on a specific product to be produced (usually a report)
4. Focus on the specific task being proposed
5. Identify the expertise required for the Working Group.

WORK PLAN

Describe the proposed work programme and methods to carry it out, such as workshops, intersessional activities, electronic communications and online platforms.

Devise a provisional timeline, including:

1. Meeting dates
2. Milestones (drafts, reviews, revisions, etc.)
3. Deliverables and delivery date (usually publication of a report)
4. Provisions for peer review
5. Provisions for publication, dissemination and outreach (public relations)

ALIGNMENT WITH SUSTAINABLE DEVELOPMENT GOALS

Proposals for the establishment of new Working Groups should indicate how the proposed Working Group will support specific SDGs and their targets.

CONFLICTS OF INTEREST

GESAMP depends on members of Working Groups to act in an independent capacity, and for the assessment and advice they provide to be reliable, authoritative and independent of any interest groups. To ensure that this process is transparent, it is necessary for each agency, in consultation with the Working Group Chair, to identify potential conflicts of interest and devise suitable steps to address them, if required.

ADMINISTRATIVE ARRANGEMENTS

The following information should be provided:

1. Sponsoring Organization(s)
2. Additional supporting organizations
3. Proposed budget and funding sources
4. Working Group Chair(s) and members if available at time of proposal
5. Proposed Technical Secretary for the Working Group.

ANNEX VII - GESAMP SIDE-EVENT PROGRAMME

Marine contamination incidents: scientific support to emergency response

Open seminar (virtual) at the 48th session of GESAMP
Thursday, 9 September 2021, 14:00 – 17:00 CEST

In July 2020, a cargo ship incident on Mauritius' coral reefs, released 1000 of its 4000 tons of heavy bunker fuel into the pristine waters of the Indian Ocean. This was the worst oil spill in the country's history, causing pollution to biodiversity-rich marine ecosystems, including the international UNESCO Ramsar sites for wetlands. In May 2021, another container ship caught fire off the coast of Sri Lanka, and sank, causing enormous environmental damage. The ship's cargo included highly corrosive nitric acid, sodium hydroxide, tonnes of oil/lubricants and billions of plastic pellets that have caused one of the worst environmental disasters in Sri Lanka's history.

Accidents at sea or at coastal industrial facilities, as well as natural disasters such as earthquakes or tsunamis, can cause or trigger the release of hazardous and toxic substances to the marine environment. It is important for countries to have in place emergency preparedness and response plans to mitigate the damage and assess the ecological consequences of this type of contamination events affecting their marine areas and potentially impacting their coastal resources. The science behind the rapid response includes fit-for-purpose fast analytical methods, established quality-assured data flows, modelling of dispersion and transfer of contaminants during the emergency, risk assessment in support of management decisions, all this being part of the preparedness countries should set in place. UN Agencies have an important role in supporting countries, with planning, capacity building and implementation of the response to emergencies.

This session is intended to provide an overview of complex and challenging marine contamination incidents and accidents, such as cargo ships, where a cocktail of spilled contaminants, eventually including incompatible chemicals, requires new technical approaches for the short-, medium and long-term monitoring of the post-spill contaminants to effectively assess the ecological risk of these marine environmental disasters. Further examples will refer to nuclear and radiological accidents affecting the marine environment. A discussion of how these complex marine pollution events can be addressed, and the role of science in this context, will follow the presentations.

Speakers:

Dr Florence Descroix-Comanducci	<i>Welcome</i>
HE Mr Peter Thomson UNSG's Special Envoy for the Ocean	<i>Opening</i>
Professor David Vousden Chair of GESAMP	<i>Welcome and introduction to GESAMP</i>
Dr Imma Tolosa IAEA Marine Environmental Studies Laboratory, IAEA Environment Laboratories, Monaco	<i>Emergency response to accidental marine pollution with oil and chemical contaminants: IAEA's scientific support</i>
Dr Paul McGinnity Radiometrics Laboratory, IAEA Environment Laboratories, Monaco	<i>The IAEA Environment Laboratories' technical support to nuclear and radiological emergencies impacting the marine environment</i>
Dr Justin Gwynn Norwegian Radiation and Nuclear Safety Authority, The Fram Centre, Tromsø, Norway	<i>The sinking of the nuclear submarine Komsomolets and its impact on the environment</i>
Ms. Patricia Charlebois Deputy-Director, Sub-division for Implementation, Marine Environment Division, IMO	<i>Emergency response to accidental marine pollution: IMO's experiences and perspectives</i>
Discussion	

Moderator: Dr Iolanda Osvath, IAEA, Technical Secretary WG 45

ANNEX VIII - 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.
- 14 Report of the twelfth session, Geneva, 22-29 October 1981. (1981). Rep. Stud. GESAMP (14): pag.var. Available also in French, Spanish and Russian
- 15 The review of the health of the oceans.(1982). Rep. Stud. GESAMP (15): 108 p.
- 16 Scientific criteria for the selection of waste disposal sites at sea. (1982). Rep. Stud. GESAMP (16): 60 p.
- 17 The evaluation of the hazards of harmful substances carried by ships. (1982). Rep. Stud. GESAMP (17): pag.var.
- 18 Report of the thirteenth session, Geneva, 28 February - 4 March 1983. (1983). Rep. Stud. GESAMP (18): 50 p. Available also in French, Spanish and Russian
- 19 An oceanographic model for the dispersion of wastes disposed of in the deep sea. (1983). Rep. Stud. GESAMP (19): 182 p.
- 20 Marine pollution implications of ocean energy development. (1984). Rep. Stud. GESAMP (20): 44 p.
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