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ADDRESSING IMPACTS OF MARINE DEBRIS AND ANTHROPOGENIC UNDERWATER NOISE ON MARINE AND COASTAL BIODIVERSITY

Note by the Executive Secretary

I. INTRODUCTION

1. Anthropogenic noise in the marine environment has increased markedly over the last 100 or so years as human use of the oceans has grown and diversified, causing potentially significant impacts on the fitness and survival of various types of marine species.

2. At its twelfth meeting, the Conference of the Parties noted that there had been a significant amount of research into the impact of underwater noise on aquatic life over the past few decades, but that there remained significant questions that require further study, with the largest gaps in knowledge relating to fishes, invertebrates, turtles and birds. Additional knowledge gaps relate to the characteristics of major sound sources, trends in the prevalence and magnitude, as well as the intensity and spatial distribution of underwater noise and the potential impacts of underwater noise on ecosystems and animal populations, including implications of cumulative and synergistic impacts of multiple sources of noise and other stressors (decision XII/23, para. 2). The Conference of the Parties encouraged Parties and other Governments as well as indigenous and local communities and other relevant stakeholders, to take appropriate measures, as appropriate and within their competencies, and in accordance with national and international laws**,** to avoid, minimize and mitigate the potential significant adverse impacts of anthropogenic underwater noise on marine and coastal biodiversity by providing specific guidance elements (decision XII/23, para. 3).

3. Likewise, marine debris is a key environmental issue at the global level and a major threat to marine and coastal biodiversity, having impact on a wide range of marine fauna. Many new instances of affected species are reported every year, particularly attributed to the ingestion of, and entanglement by, various forms of plastic. Marine debris is usually defined as any persistent, manufactured or processed solid material discarded, disposed of, lost or abandoned in the marine and coastal environment.

4. Pursuant to decisions XI/18 and XII/23, the Executive Secretary has carried out, or is currently undertaking, a number of activities addressing the adverse impacts of human activities, in particular anthropogenic underwater noise and marine debris, on marine and coastal biodiversity, including:

* UNEP/CBD/SBSTTA/20/1/Rev.1.

(a) Compiling and synthesizing relevant scientific and technical information concerning measures taken by Parties, other Governments and competent organizations, as appropriate and within their competencies, and in accordance with national and international laws, to avoid, minimize and mitigate the potential significant adverse impacts of anthropogenic underwater noise on marine and coastal biodiversity (see UNEP/CBD/SBSTTA/20/INF/10);

(b) Preparing an updated report entitled "Scientific synthesis of the impacts of underwater noise on marine and coastal biodiversity and habitats" (see UNEP/CBD/SBSTTA/20/INF/8);

(c) Convening an expert workshop (Baltimore, United States of America, 2-4 December 2014) to prepare practical guidance on preventing and mitigating the significant adverse impacts of marine debris (see the workshop report UNEP/CBD/SBSTTA/20/INF/7);

(d) Preparing a draft technical report, "Marine debris: understanding, preventing and mitigating significant adverse impacts on marine and coastal biodiversity" (contained in UNEP/CBD/SBSTTA/20/INF/9);

5. These activities support the achievement of Aichi Biodiversity Targets in marine and coastal areas, particularly Targets 6, 8, 10, and 12.[1]

II. ADDRESSING IMPACTS OF ANTHROPOGENIC UNDERWATER NOISE ON MARINE AND COASTAL BIODIVERSITY

6. Pursuant to paragraph 5(b) of decision XII/23, the Executive Secretary issued notification 2015-066, dated 4 June 2015, requesting scientific and technical information concerning the elements specified in paragraph 3 of decision XII/23, as well as information on related measures taken by Parties, other Governments and competent organizations. This notification was issued in conjunction with notification 2015/14,[2] issued by the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), which requested information on the implementation of CMS Resolution 10.24 on *Further Steps to Abate Underwater Noise Pollution for the Protection of Cetaceans and Other Biota*. The submissions received in response to these notifications, compiled in UNEP/CBD/SBSTTA/20/INF/10, describe various activities undertaken related to anthropogenic underwater noise, including:[3]

(a) Acoustic monitoring as well as site-specific surveys of sound-sensitive species;

(b) Production of technical guidance for different types of human activities in the marine environment;

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[1] Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

[2] http://www.cms.int/en/news/notifications;

[3] Submissions were provided by Australia, Canada, Denmark, Ecuador, the European Union, France, Germany, Ireland, Latvia, Madagascar, Mexico, New Zealand, Norway, WWF, Ocean Care, the OSPAR Commission, the Secretariat of the Pacific Regional Environment Programme, the United Nations Environment Programme and Wild Migration.

Submissions transmitted by the Secretariat of the Convention on Migratory Species were provided by Argentina, Australia, Bolivia, Cabo Verde, Denmark, Estonia, the European Union, Finland, France, Germany, Ireland, Liechtenstein, Madagascar, New Zealand, Norway, the United Kingdom of Great Britain and Northern Ireland and Uruguay.

(c) Permitting requirements for certain activities that include assessment of potential impacts of underwater noise and enforcing the use of noise-mitigation tools and practices;

(d) Requirements by licensing authorities to ensure that activities outside marine protected areas are unlikely to adversely affect the integrity of the site concerned;

(e) Regulations related to reduction in airborne noise produced by vessels;

(f) Incorporating noise vulnerability into ecological status indicators for the marine environment.

7. Pursuant to decisions XI/18 and XII/23, an updated report entitled "Scientific synthesis of the impacts of underwater noise on marine and coastal biodiversity and habitats" was prepared (see UNEP/CBD/SBSTTA/20/INF/8), drawing on a background document prepared for the Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity (London, 25-27 February 2014).[4] Following the workshop, the document was further revised and updated, incorporating comments and suggestions received from workshop participants, through a consultancy commissioned by the Secretariat with the financial support of the European Commission. The updated document was also made available for peer review by Parties, other Governments and relevant organizations.[5] After further revision, incorporating peer review comments, the document has been issued as UNEP/CBD/SBSTTA/20/INF/8. This document provides a scientific synthesis of knowledge regarding the impacts of anthropogenic underwater noise on marine and coastal biodiversity, with a focus on:

(a) Characteristics and trends of underwater sound;

(b) Sources and types of anthropogenic underwater noise;

(c) Scientific information on known and potential impacts of anthropogenic underwater noise;

(d) Future research needs.

8. Pursuant to decisions XI/18 and XII/23, the Secretariat will continue to compile and synthesize scientific and technical information on measures and experience with the application of these measures to minimize and mitigate the impacts of anthropogenic underwater noise on marine and coastal biodiversity and will issue it as information for future meetings of the Subsidiary Body, with a view to disseminating the results of the synthesis, including examples of successful experiences, through the clearing-house mechanism or other means.

III. ADDRESSING IMPACTS OF MARINE DEBRIS ON MARINE AND COASTAL BIODIVERSITY

9. Pursuant to decision XI/18, the Executive Secretary convened, with financial support from the European Commission, the Expert Workshop to Prepare Practical Guidance on Preventing and Mitigating the Significant Adverse Impacts of Marine Debris on Marine and Coastal Biodiversity and Habitats, in Baltimore, United States of America, from 2 to 4 December 2014. For the workshop report, see UNEP/CBD/SBSTTA/20/INF/7.

10. Participants at the above-mentioned workshop discussed the state of knowledge of the impacts of marine debris on marine and coastal biodiversity and habitats, including the following:

- Major types and sources of marine debris, including land-based and sea-based sources;
- Impacts of marine debris on marine and coastal biodiversity and habitats;

[4] UNEP/CBD/SBSTTA/16/INF/12.

[5] At the time of writing, the list of submitters was not available.

- Monitoring, modelling and mapping to address the impacts of marine debris on marine and coastal biodiversity and habitats;
- Major knowledge gaps regarding sources and impacts of marine debris;
- Experiences and approaches with regard to land-based sources, including measures related to waste prevention, including potential redesign of products, reduction, reuse and recycling as well as other waste management measures;
- Experiences and approaches with regard to sea-based sources, including measures related to fisheries and maritime transport;
- Main overarching approaches of regulatory and voluntary measures, infrastructure, education and awareness;
- Private sector engagement and producer responsibility;
- Improving awareness, collaboration and stewardship among international, regional, national and local stakeholders, and across sectors;
- Addressing capacity gaps and resource needs to implement measures for prevention and mitigation;
- Enhancing synergies and promoting collaboration on the prevention and mitigation of the impacts of marine debris on marine and coastal biodiversity and habitats between biodiversity-related conventions and other relevant international and regional agreements and organizations.

11. Pursuant to decision XI/18, a background document addressing the development of practical guidance on preventing and mitigating the significant adverse impacts of marine debris on marine and coastal biodiversity and habitats, including an update of the existing CBD synthesis document on the impacts of marine debris on marine and coastal biodiversity,[6] was prepared to support the above-mentioned workshop discussions. This document incorporated information submitted by Parties, relevant organizations (including the Convention on Migratory Species), and indigenous and local communities in response to notification 2014-042, dated 20 March 2014.[7]

12. Following the workshop, the document was further revised and updated, incorporating comments and suggestions received from workshop participants, through a consultancy commissioned by the Secretariat, with the financial support of the European Commission. This revised background document was made available for peer review by Parties, other Governments and relevant organizations.[8] After further revision, incorporating peer review comments, this document has been issued as UNEP/CBD/SBSTTA/20INF/9.

13. Drawing on the results of the above-mentioned workshop (see UNEP/CBD/SBSTTA/20/INF/7) and the above-mentioned background document (UNEP/CBD/SBSTTA/20/INF/9), draft practical guidance on mitigating and preventing the impacts of marine debris on marine and coastal biodiversity and habitats has been prepared and is contained in the annex to the present note for consideration by the Subsidiary Body.

IV. SUGGESTED RECOMMENDATION

14. The Subsidiary Body on Scientific, Technical and Technological Advice may wish to recommend that the Conference of the Parties at its thirteenth meeting adopt a decision along the following lines:

[6] CBD Technical Series No. 67—*Impacts of Marine Debris on Biodiversity: Current Status and Potential Solutions*.

[7] Submissions were provided by: Austria; Colombia; Denmark; European Commission; Germany; Italy; New Zealand; Nigeria; United States of America; Poland; Mediterranean Action Plan; North-west Pacific Action Plan; and OSPAR Commission.

[8] At the time of writing, the list of submitters was not available.

Impacts of anthropogenic underwater noise on marine and coastal biodiversity

The Conference of the Parties

1. *Welcomes* the updated report entitled "Scientific synthesis of the impacts of underwater noise on marine and coastal biodiversity and habitats" as contained in document UNEP/CBD/SBSTTA/20/INF/8, and *encourages* Parties, other Governments and relevant organizations to make use of the information therein;

2. *Recalling* paragraph 3 of decision XII/23, *invites* Parties, other Governments and competent organizations, including the International Maritime Organization, the Convention on the Conservation of Migratory Species of Wild Animals,[9] the International Whaling Commission, other relevant stakeholders, and indigenous peoples and local communities, to share their experiences on the application of measures to minimize and mitigate the significant adverse impacts of anthropogenic underwater noise on marine and coastal biodiversity, including the measures specified in paragraph 3 of the same decision, and *requests* the Executive Secretary to continue his work on the compilation, synthesis and dissemination of these experiences, and to develop, in collaboration with Parties, other Governments and relevant organizations, practical guidance and toolkits on measures to minimize and mitigate the significant adverse impacts of anthropogenic underwater noise on marine and coastal biodiversity;

Addressing impacts of marine debris on marine and coastal biodiversity

3. *Welcomes* the report of the Expert Workshop to Prepare Practical Guidance on Preventing and Mitigating the Significant Adverse Impacts of Marine Debris on Marine and Coastal Biodiversity and Habitats;[10]

4. *Endorses* the practical guidance on preventing and mitigating the impacts of marine debris on marine and coastal biodiversity and habitats, as contained in the annex to this decision;

5. *Urges* Parties, other Governments, relevant organizations, industries, other relevant stakeholders, and indigenous peoples and local communities, to take appropriate measures, in accordance with national and international law and with their competencies, to prevent and mitigate the potential adverse impacts of marine debris on marine and coastal biodiversity and habitats, taking into account the practical guidance contained in the annex to the present draft decision;

6. *Invites* competent intergovernmental organizations, including the International Maritime Organization and the Food and Agriculture Organization of the United Nations, within their mandates, to take appropriate measures, and to assist Parties and other Governments in taking appropriate measures to prevent and mitigate the potential adverse impacts of marine debris on marine and coastal biodiversity and habitats, taking into account the practical guidance contained in the annex to the present draft decision;

7. *Requests* the Executive Secretary:

(a) To facilitate collaboration among Parties, other Governments and relevant organizations, on the application of the practical guidance contained in the annex to the present draft decision, by facilitating the sharing of experiences, information, toolkits and best practices;

(b) To facilitate the provision of capacity-building opportunities to developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, for the implementation of various measures identified in the practical guidance contained in the annex to the present draft decision.

[9] United Nations, *Treaty Series*, vol. 1651, No. 28395.

[10] UNEP/CBD/SBSTTA/20/INF/7.

Annex

PRACTICAL GUIDANCE ON PREVENTING AND MITIGATING THE IMPACTS OF MARINE DEBRIS ON MARINE AND COASTAL BIODIVERSITY AND HABITATS

Marine debris and its impacts on marine and coastal biodiversity and habitats

1. Marine debris is usually defined as any persistent, manufactured or processed solid material discarded, disposed of, lost or abandoned in the marine and coastal environment. This includes materials transported into the marine environment from land by rivers, drainage or sewage systems or winds. Marine debris originates from a range of sea- and land-based sources.

2. Marine debris incurs socioeconomic costs, threatens human health and safety, and impacts on marine organisms. It is broadly documented that entanglement in, or ingestion of, marine debris can have negative consequences on the physical condition of marine animals and may lead to their death. Ingestion of plastics is also of concern as it may provide a pathway for the transport of harmful chemicals into the food web. Additionally, marine debris is known to damage, alter or degrade habitats (for example, by smothering) and to be a possible vector for the transfer of alien species.

3. Negative effects include alteration of the biological and ecological performance of individuals, external injuries or death. Determining the effect of ingesting marine debris on an individual organism can be difficult, and the consequences of ingestion are still not fully understood. Species that show a high incidence of debris ingestion or entanglement may be susceptible to population-level effects. This could have negative consequences for small populations, particularly those that are endangered and/or exposed to multiple stressors. Identifying the impacts of marine debris at the ecosystem level should include the evaluation of the loss of ecosystem services that can be attributed to this stressor.

4. Microplastics[11] are likely to increase in abundance, and are a persistent pollutant that is present in all marine habitats. The trophic transfer of microplastics through benthic and pelagic food webs may facilitate the transfer and accumulation of both plastics and toxic chemicals. There is some evidence of transfer of chemical additives from ingested plastics into tissue. There is also concern that the ingestion of microplastics, as well as macro- and mesoplastics, can cause physical effects, such as internal abrasion, blockage and injury, and may also provide a pathway for the uptake of harmful chemicals (for example, additives contained in plastic products) by marine organisms.

5. Marine debris can also serve as a vector for the transport of invasive alien species and may facilitate the dispersal of pathogens. Debris in the sea can be rapidly colonized by microbes to form a biofilm on the surface, effectively becoming an artificial microbial substrate. Debris can also be transported via animals through ingestion and subsequent egestion.

6. The considerable gaps in knowledge of the sources, distribution and quantity of marine debris items, and their impacts on marine and coastal biodiversity and habitats, is limiting the ability to address the problem effectively. There is a lack of information on the amount of debris entering the marine environment and degradation or fragmentation rates for debris under a range of conditions. There is limited information available for the physical and chemical consequences of debris on marine species through ingestion/uptake.

[11] Microplastic is defined as pieces or fragments of plastic smaller than 5 mm (JRC Scientific and Technical Reports. 2010. Marine Strategy Framework Directive Task Group 10 Report Marine Litter. EUR 24340 EN – 2010). The breakdown of these items results in numerous tiny plastic fragments, which are called secondary microplastics. Other microplastics that can be found in the marine environment are categorized as primary microplastics due to the fact that they are produced either for direct use, such as for industrial abrasives, or cosmetics or for indirect use, such as pre-production pellets or nurdles (OSPAR Commission, Regional Action Plan for Prevention and Management of Marine Litter in the North-East Atlantic, OSPAR Agreement 2014-1).

Approaches for preventing and mitigating the impacts of marine debris on marine and coastal biodiversity and habitats

7. The following general approaches are suggested for preventing and mitigating the impacts of marine debris on marine and coastal biodiversity and habitats:

(a) In the long term, there should be a focus on preventing the discard, disposal, loss or abandonment of any persistent, manufactured or processed solid material in the marine and coastal environment;

(b) Measures to prevent and mitigate the significant adverse impacts of marine debris, should, as appropriate, use existing platforms and tools for cooperation, which will enhance synergies and capitalize on the progress made in these forums (such as the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities,[12] the Global Partnership on Marine Litter (GPML) and the Regional Seas Conventions and Action Plans);

(c) A broad range of available instruments and policy responses, including economic incentives, market-based instruments and public private partnerships, can be used to support action aimed at preventing and mitigating the impacts of marine debris.

Priority actions for mitigating and preventing the impacts of marine debris on marine and coastal biodiversity and habitats

8. For land-based sources of marine debris, the following actions are suggested:

(a) Identify baseline data on the main land-based sources, quantities and impacts of marine debris;

(b) Promote structural economic changes that would reduce the production and consumption of plastics, increase production of environmentally friendlier materials, and support the development of alternative materials, increase recycling and reuse, and support an enabling environment for these changes through capacity-building, regulations and standards, and cooperation between industry, governments and consumers;

(c) Support research aimed at developing technology to better understand the environmental impacts of plastics on the marine environment, to design new or improved green chemistry alternatives and to assess cost-effective production on a commercial scale;

(d) Promote best practices along the whole plastics manufacturing and value chain from production to transport, such as aiming for zero loss;

(e) Assess whether different sources of microplastics and different products and processes that include both primary and secondary micro plastics[13] are covered by legislation, and strengthen, as necessary, the existing legal framework so that the necessary measures are applied;

(f) Improve the waste management systems of countries through the sharing of best practices as well as identifying and addressing loopholes that contribute to the generation of marine debris.

9. For sea-based sources of pollution, the following actions are suggested:

(a) Develop approaches to maximize the amount of waste delivered to port reception facilities and to ensure that they are disposed of properly, in collaboration with the International Maritime Organization;

(b) Identify the options to address key waste items from the fishing industry and aquaculture that could contribute to marine debris, and implement activities, including pilot projects, as appropriate

[12] A/51/116, annex II.

[13] Ibid.

(including deposit schemes, voluntary agreements and end-of-life recovery), in collaboration with the Food and Agriculture Organization of the United Nations (FAO);

(c) Promote and disseminate best practices in relation to all relevant aspects of waste management within the fishing sector (including, for example, waste management on board, waste management at harbours, operational losses/net cuttings, deposit schemes and extended producer responsibility) in collaboration with FAO;

(d) Apply guidelines on best practices (for example, 1991 FAO Voluntary Guidelines for the marking of fishing gear; 1995 Code of Conduct for Responsible Fisheries, 2011 FAO International Guidelines for bycatch management and reduction of discards) to reduce the input of abandoned, lost or discarded fishing gear from commercial and recreational fishing, as appropriate;

(e) Foster partnerships with international and regional organizations, port authorities and non-governmental organizations, to encourage the implementation of passive "Fishing for litter" schemes, to collect litter caught in fishing nets during normal fishing activities;

10. With regard to information exchange, knowledge-sharing, awareness-building, capacity-building, and socioeconomic incentives, the following actions are suggested:

(a) Promote and undertake education activities on marine debris in partnership with civil society groups, including activities related to prevention and promotion of sustainable consumption and production;

(b) Promote outreach and education activities leading to individual behaviour change that can reduce the generated amount of debris entering the environment;

(c) Establish a collaborative platform for sharing experiences and exchange of information on good clean-up practice in beaches and coastal environments, pelagic and surface sea areas, ports, marinas and inland waterways, in cooperation with relevant local stakeholders; develop best practices on environmental friendly clean-up technologies and methods; and promote the "adopt a beach" system;

(d) Identify and promote curricula for marine-related education, including both professional seafarers and the recreational sector (for example, diving and sailing schools), in order to increase awareness, understanding and respect for the marine environment and secure commitment to responsible behaviour at personal, local, national and global level;

(e) Develop and implement socioeconomic incentives to encourage coastal communities, including indigenous people and local communities, to prevent the introduction of waste into the environment, such as levies for the sale of plastic bags;

(f) Collaborate, based on existing eco-labels, with international environmental certification schemes on information exchange and inclusion of the management and prevention of marine debris in their criteria.

11. For integrated management and coordination, the following actions are suggested:

(a) Support the development and implementation of national or regional action plans to prevent or mitigate the impacts of marine debris on coastal and marine biodiversity and habitats, also by drawing upon existing guidance in certain regions (for example, the Caribbean, North-East Atlantic and Baltic Sea regions);

(b) Mainstream marine debris consideration into existing and newly developed regulatory frameworks and develop necessary legislative and institutional framework that will put sustainable waste management into practices, including through the promotion of extended producer responsibility and waste management infrastructure;

(c) Set in place quantifiable and operational targets for preventing and mitigating the impacts of marine debris on marine and coastal biodiversity and habitats;

(d) Define the role of marine debris prevention strategies within the context of cross-sectoral and area-based management tools based on the ecosystem approach.

12. For addressing knowledge gaps and research needs, the following actions are suggested:

(a) Support and promote harmonized approaches to monitoring, analysis and reporting based on standardized methodologies;

(b) Ensure access to, sharing and utilization of technology to support marine debris monitoring, particularly in developing countries;

(c) Develop and promote means to identify sources, pathways and distribution of marine debris to understand individual and population-level effects of marine debris on marine species;

(d) Investigate and promote the best available techniques as well as research and develop additional techniques in wastewater treatment plants to prevent micro particles entering the marine environment;

(e) Promote research on the potential trophic transfer of marine micro-debris in food webs to determine whether there is a bioaccumulation effect for plastics and harmful chemicals;

(f) Develop and strengthen the use of citizen science schemes that address the monitoring and enforcement of environmental standards on marine debris;

(g) Undertake socioeconomic research to better understand the social factors which may contribute to the production of marine debris, the impacts of marine debris on various coastal and maritime sectors and communities, and consumer preferences, perceptions and attitudes that can help to inform targeted outreach programmes designed according to local/cultural context;

(h) Develop a risk assessment of impact of debris on marine and coastal species, ecologically or biologically significant marine areas, and vulnerable marine ecosystems, and identify potential hotspots of gear loss and their associated biodiversity impacts;

(i) Develop monitoring strategies, taking account the following needs:

(i) To evaluate possible population-level impacts that consider in a coordinated way the migration routes and the distribution of species and populations;

(ii) To include species life stages and the specific vulnerability to marine debris (for example, monitoring of juveniles to quantify the burden on adults);

(iii) To address sublethal effects while taking into account that a broad range of interacting natural and human factors determines the survival and reproductive success of individual animals;

(iv) To take into account that in the case of highly endangered species, direct harm caused by marine debris on one individual can easily have an effect on the entire population;

(j) Apply modelling as a useful tool for marine debris management and mitigation. It can be used with spatial mapping to estimate debris distribution, encounter rates between debris and species, and support the production of global risk assessments, especially for threatened species.

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