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

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SCOPING ACTIVITIES

Proposal to establish a GESAMP Biofouling Management Working Group

Submitted by IOC-UNESCO

Background and context

1 The introduction of non-indigenous species (NIS) to new environments has been identified as a major threat to the world's oceans and to the conservation of biodiversity. According to a recent IPBES Report[1], invasions of alien species is one of the five direct drivers that most impact change in nature.

2 Biodiversity and ecosystem services are impacted because translocated NIS may survive to establish a reproductive population in the host environment and become invasive. Invasions occur when introduced species out-compete native species and multiply into pest proportions. Bio-invasions in marine or aquatic environments are the source of significant environmental and socio-economic impacts that can affect fisheries, mariculture, coastal infrastructure and other development efforts, ultimately threatening livelihoods in coastal and inland communities.

3 It is widely recognised that ships' ballast water and vessel biofouling are the two main vectors for the introduction and spread of NIS in the marine environment. However, NIS transferred via ships' ballast water (and sediments) has been the focus of the last 20 years, culminating with the development and entry into force of the Ballast Water Management Convention. In the interim, it has been gradually acknowledged that biosafety risks from biofouling may have been underestimated in the past, despite the relationship between ships' biofouling and NIS introduction in marine ecosystems being known for a long time.

4 There are several definitions of biofouling in the available literature. Simply put, biofouling is the accumulation of biological organisms on submerged or wet surfaces. It is a naturally occurring phenomenon whereby microorganisms, plants, algae or tiny animals will colonise wet or submerged surfaces by creating a viable ecosystem on the colonised surfaces. Ship biofouling specifically refers to species or organisms attached to wet or underwater surfaces of a ship, i.e. the vessels' hull and submerged equipment and apparatus such as anchors and chains. All types of vessels can be affected, including fishing vessels and small recreational crafts.

5 Biofouling can occur almost anywhere, where water is present and grow on a variety of submerged, floating or wet infrastructures, instruments or equipment and apparatus. In addition to the problem of biofouling on ships, there are a number and variety of surfaces in marine waters (examples include oil and gas exploration and exploitation platforms, mining infrastructure, aquaculture nets and cages, ocean energy structures, etc.) which, when moved, are also capable

[1] IPBES. 2019. Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, J. Settele, E. S. Brondizio E.S., H. T. Ngo, M. Guèze, J. Agard, A. Arneth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razzaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis, and C. N. Zayas (eds.). IPBES secretariat, Bonn, Germany. XX pages.

of NIS translocation between ecoregions, resulting in potential invasions. In addition, fixed surfaces may provide the substrate for potential invasive species to settle and grow in proximity to ships. These surfaces thus can serve as stepping stones and a source for living organisms which may attach to a ship and be translocated and introduced in new environments. For these reasons, it is essential to tackle biofouling across the full range of biofouling sources and structures present in the marine environment.

6 From the perspective of international shipping, guidelines for biofouling management were adopted in 2011 under the aegis of the International Maritime Organization (IMO). The *2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species* (IMO Biofouling Guidelines) are intended to provide a globally consistent approach to the management of biofouling and apply to ships defined widely as "…vessel of any type whatsoever operating in the aquatic environment and includes hydrofoil boats, air cushion vehicles, submersibles, floating craft, fixed or floating platforms, floating storage units (FSUs) and floating production storage and off-loading units (FPSOs)". These Guidelines have been supplemented by the *Guidance for minimizing the transfer of invasive aquatic species as biofouling (hull fouling) for recreational craft*, adopted in 2013, which is for use by all owners and operators of recreational craft less than 24 metres in length. Recreational craft of any size may constitute an important primary and secondary pathway for the transfer of invasive aquatic species.

7 To date, the application of the IMO Biofouling Guidelines by the shipping industry and IMO Member States has been inconsistent. While some preventative solutions mainly based on anti-fouling coatings and paints are available, other aspects still present challenges, particularly irregular surfaces and cavities such as niche areas of ship hulls. Moreover, in the absence of harmonized protocols to assess the effectiveness of recent emerging in-water cleaning technologies, there is little knowledge on the efficacy of these technologies with respect to biological and chemical contamination of waters.

8 Despite the volume of research and reports related to biofouling, there is limited clarity with regard to biofouling dynamics as a vector for the transfer of NIS, and to impacts on ecosystems and human activities. The surge of new or larger marine structures linked to the blue economy could also increase the role of marine biofouling as a vector for the introduction of NIS. This is particularly the case for new or expanding industries such as mariculture, ocean renewable energies, ocean instruments, seabed mining and ocean instruments and cabling.

Recent developments

9 At the 71st session of IMO's Marine Environment Protection Committee (MEPC), from 3 to 7 July 2017, the Committee approved the introduction of a new agenda item of its Sub-committee on Pollution Prevention and Response (PPR) to review the IMO Biofouling Guidelines. This review will take place during two sessions scheduled in 2020 and 2021.

10 Some countries have recently taken steps to address the role of biofouling in the transfer of NIS and are at different stages in the development of national legislation and requirements to manage biofouling across maritime sectors.

11 The IMO Secretariat, partnering with the Global Environment Facility (GEF) and the United Nations Development Programme (UNDP), have also stepped up their efforts to meet the challenge of biofouling, based on specific requests made by several countries. The three organizations launched a new project in January 2019, the GEF-UNDP-IMO GloFouling Partnerships, to develop suitable tools and provide capacity building on biofouling management in twelve developing countries and Small Island Development States. The Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) has joined the three agencies to provide scientific guidance and coordinate efforts to address non-ship pathways.

Scope of work

12 The overall objective of the GESAMP Working Group on biofouling management and non-indigenous species is to build a broader understanding on introduction and spread of NIS via biofouling across all maritime industries. The GESAMP Working Group will provide a global overview of the impact of biofouling across all maritime industries and structures and support the initial information requirements of the GloFouling Partnerships for understanding the role of biofouling in the transfer of NIS.

13 GESAMP can provide valuable support and scientific advice for the growing programmes of work on marine biofouling and its role within different maritime industries as a vector for the transfer of NIS. This information will form the basis for policy instruments and tools which deal with marine biofouling.

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

Inter-agency cooperation

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

16 It is further expected that the output from this Working Group will contribute to the review of the IMO Biofouling Guidelines conducted within the framework of IMO's PPR Sub-committee, as well as other UN processes associated with SDG14 and Aichi Target 9.

Administrative arrangements

17 The Working Group will be set up with the following structure and initial sponsorship, with further sponsorship contributions welcome upon establishment.

Name of working group: WG on biofouling management and non-indigenous species
Lead agency: IOC-UNESCO
Sponsoring agency: IMO (GEF-UNDP-IMO GloFouling Partnerships)
Budget: USD 114,000
WG Technical Secretary: Mr. Henrik Enevoldsen (IOC-UNESCO)

Resource considerations

18 The core source of funding will be provided by the GEF-UNDP-IMO GloFouling Partnerships, while IMO and IOC-UNESCO are expected to provide in-kind expertise and support. Other sources of funding can be identified if the Working Group is established with inter-agency leadership which will help reduce the amount of contributions from each organization.

19 Tentative two-year budget:

Workshop 1:
Costs for appr.12 experts, travel/DSA: USD 44,000

Publication and outreach: USD 8,000

Workshop 2:
Costs for appr. 12 experts, travel/DSA: USD 44,000
Publication and outreach: USD 8,000

Workshop 3:
Costs for appr. 12 experts, travel/DSA: USD 44,000
Publication and outreach: USD 8,000

Total budget: USD 144,000

Tentative work plan

20 The working method of the Working Group will be a mix of meetings and intersessional work/correspondence, including videoconferencing/telephone conferencing, where appropriate. The proposed timeline is as follows:

i. Identification of two WG Co-chairs and WG members: November-December 2019
ii. First meeting of the WG: February-March 2020
iii. Deliver interim report (including provisional structure) by May 2020
iv. Second meeting of the WG: October-November 2020
v. Deliver first draft report by March 2021
vi. Third meeting of the WG: June-July 2021
vii. Deliver draft final report by end October 2021
viii. Deliver final report by end of 2021

Proposed Terms of Reference

21 The WG report will include:

.1 Comprehensive identification and description of both primary and secondary pathways for the transfer of NIS, including, but not limited to:

a. fishing (e.g. ships, gear, lines);
b. aquaculture (e.g. structures, cages, buoys, netting);
c. shipping (e.g. hulls, niche areas, propellers, ropes, anchors);
d. other shipping (e.g. recreational boating, recreational fishing, Aids to Navigation);
e. marine offshore operations (e.g. offshore platforms and structures);
f. ocean renewable energy generation (e.g. underwater turbines, shafts);
g. ocean monitoring (e.g. measuring instruments); and
h. coastal industry infrastructure (e.g. ports, marinas, cooling towers, water purifying units)

.2 Description and assessment of impacts on biodiversity (alteration of biodiversity) of the introduction and/or spread of NIS via the identified pathways.

.3 Description and assessment of impact of and costs resulting from the introduction and/or spread of NIS via the identified pathways (economic loss and/or alteration of assets; management costs including cost of preventative and reactive measures/mitigation strategies) on human health, social activities and the economy (such as fisheries, aquaculture, fish processing, tourism and related activities and businesses).

.4 Provision of an analysis of best management approaches within impacted industries, including the use of emerging technologies, techniques and methods to prevent or reduce the introduction and/or spread of NIS and water contamination resulting from cleaning activities.

.5 Provision of recommendations to reduce or prevent the introduction or spread of NIS.

.6 Identification of data gaps, in relation to ToR 1 to 4 above, and prioritization for further work:

a. Consider additional work that may be useful to be carried out by the Working Group beyond what is listed above;
b. Peer review of the draft report required; and
c. Provisions for publication, dissemination and outreach.

Proposed profile for Working Group members

22 The expertise required by the Working Group includes:

.1 Marine scientists and engineers with expertise in marine ecology and ecosystems, fisheries, marine biodiversity and invasive aquatic species;
.2 Scientists and engineers who have studied marine and/or coastal structures and their potential impacts; and
.3 Social scientists with expertise including environmental and/or natural resource economics.

Action requested of GESAMP

23 GESAMP is invited to consider the information provided and take action as appropriate.