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The Role of IMO Member States in Implementing the BBNJ Agreement Using Existing Tools and Measures

Discussion Paper

June 2025

Executive Summary

This discussion document comprises a background study aligning the BBNJ Agreement requirements with the mandate of IMO to explore the potential of existing IMO measures to demonstrate sectoral implementation of protection of biodiversity in areas beyond national jurisdiction (ABNJ), augmented by structured interviews with a range of experts.

IMO represents over 90% of world shipping tonnage through its widely accepted agreements and conventions. Many IMO measures actively contribute to conservation of biodiversity in ABNJ, primarily through the control of shipping-related environmental impacts (greenhouse gas emissions, ballast water discharge, transfer of invasive species, waste dumping at sea) and are monitored through IMO's Marine Environment Protection Committee (MEPC). Thus, as a competent international organisation, IMO is a key global sectoral body and considered to be a pre-eminent stakeholder in the implementation of some elements of the BBNJ Agreement.

Two key elements of the BBNJ Agreement are considered particularly relevant for this study: Part III — area-based management tools (ABMTs) including marine protected areas (MPAs), and Part IV — environmental impact assessment. In the context of both these elements is the potential to use existing IMO measures and update current voluntary practices to mitigate harmful impacts of international shipping on marine biodiversity, including vessel strikes, underwater radiated noise, pollution and biofouling.

Key Insights

1. It should be broadly acknowledged by the shipping sector that adoption, by consensus, of the BBNJ Agreement in 2023 was an historic achievement for multilateralism that complements existing organisations and institutions including IMO. Furthermore, IMO has a vested interest in being involved with the BBNJ Agreement, and IMO Member States should be proactive, giving due consideration to how commercial shipping perspectives can be accommodated.

2. In anticipation of ratification of the BBNJ Agreement and its entry into force (with a predicted first Conference of the Parties in the third quarter of 2026), a better understanding of the new treaty by the shipping sector would be advantageous. UN General Assembly resolution 78/272 established a BBNJ Preparatory Commission (PrepCom), and at an organisational meeting in June 2024 it was decided to hold PrepCom meetings in April and August 2025 and at least one session in 2026. In addition to an IMO presence at PrepCom, this discussion paper suggests ways to be proactive, putting in place mechanisms to enhance cooperation and collaboration using existing IMO structures and processes as implementation of the BBNJ Agreement is agreed and evolves into a community of practice.

3. Existing established measures to regulate impacts of international shipping on high seas biodiversity that merit most attention in the context of the BBNJ Agreement include the establishment of PSSAs (through their APMs) and voyage planning practices. There is potential to use existing measures and update current voluntary practices to mitigate or reduce harmful impacts on marine biodiversity, including vessel strikes, underwater radiated noise and biofouling. Efforts should be made to build on this work and develop synergies (including links to KMGBF targets) to optimise environmental soundness and efficiency of maritime activities and to enhance marine environmental protection. The IMO approach, incorporating an experience-building phase to help socialise new regulations supported by new technology, is a useful learning by doing practice.

4. Pioneering tools for remote monitoring that are supported by the shipping industry can contribute towards establishing an ecologically representative and well-connected high seas MPA network. For example, evidence of shipping patterns and interaction with cetaceans can be visualised in collaboration with known data sources.

5. Consideration is being given to the constitution and operation of the BBNJ Scientific and Technical Body (e.g., Hassanali et al., 2025). It will be important to include shipping expertise as part of the pool of experts.

6. It would be advantageous for States to understand the position of shipping stakeholders vis-à-vis the BBNJ Agreement by recognising the merits of a comprehensive ecosystem-based approach. This could be achieved by building on the WMU future of shipping roundtable and the Sargasso Sea Commission shipping stakeholder engagement exercise to apply and promulgate conclusions to the high seas more generally. The Arctic Council's Arctic Shipping Best Practice Information Forum could be a useful model for the BBNJ Agreement to consider.

Policy Recommendations

Recommendation 1: Prompted by a champion/early mover Member State submission to MEPC, IMO could consider allocation of time in the appropriate subcommittee(s) for BBNJ matters with a remit to provide information papers to assist Member States with implementing the BBNJ Agreement in relation to international shipping and driving enhanced co-operation.

Recommendation 2: Establish, through the BBNJ Agreement COP (initially in discussion with the BBNJ Scientific and Technical Body), that any areas in ABNJ qualifying as a PSSA should go through an appropriate assessment with a view to being recognised as an ABMT by the BBNJ Agreement (consistent with BBNJ Agreement Art. 22.4).

Recommendation 3: As ABMTs including MPAs are approved on a case-by-case basis by the BBNJ Agreement COP (which in any event will involve consultation and scrutiny by IMO Member States, subject to the implementation/consultation protocol yet to be elaborated by the BBNJ Agreement

Scientific and Technical Body per BBNJ Agreement Art. 21), the IMO Secretariat should acknowledge each ABMT and, as appropriate, make relevant information available through pertinent bodies such as MEPC to international shipping to facilitate appropriate measures or subsequent monitoring or both. It should be noted that any such ABMT proposals should also be subject to review by other MEAs with relevant biodiversity conservation competency.

Recommendation 4: Explore how IMO can collaborate with remote sensing expertise to take measures to protect ephemeral and dynamic biodiversity hotspots as an important contribution to safeguarding BBNJ.

Recommendation 5: Consider how shipping expertise might be represented on the roster of experts to be established under the BBNJ Agreement Scientific and Technical Body.

Recommendation 6: All ABMTs established under the BBNJ Agreement should be displayed on nautical charts/ECDIS. This could be extended to include established (migratory) Important Marine Mammal Areas covering migration corridors in the high seas.

Recommendation 7: Detailed voyage planning (as undertaken under the Polar Code) should be encouraged to incorporate additional voluntary measures where operational impacts of ships can affect threatened and endangered species and unique ecosystems. This could recognise a synergy with the emerging network of “green shipping corridors” to expand their remit from climate change emissions reduction (a current priority for IMO) to include biodiversity conservation through operational practices.

Recommendation 8: Lessons learned from the delivery of international shipping competence-based training programmes should inform a capacity-building package, developed within the framework of the BBNJ Agreement, with the objective of raising ocean biodiversity literacy for mariners.

Recommendation 9: In response to a request from an IMO Member State, the IMO Secretariat should facilitate the Sargasso Sea Commission as part of its Strategic Action Plan under the GEF-UNDP-IOC Project under the FAO Common Oceans Program to promulgate a PSSA proposal. This would be a first for the high seas, drawing on the NW Mediterranean PSSA and seeking voluntary measures to safeguard the humpback whale migration corridor identified as an IMMA (with the potential to also be proposed as a CBD EBSA).

Recommendation 10: Convene a webinar to share and elaborate upon ideas in this discussion document with flag States and with IWC, IUCN and other relevant intergovernmental organisations.

Acknowledgements

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Contents

Abbreviations

ABMT	Area-based management tool
ABNJ	Areas beyond national jurisdiction
ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area
AIS	Automatic identification system
APM	Associated Protective Measure
BBNJ	Biodiversity beyond national jurisdiction
BWM	International Convention for the Control and Management of Ships' Ballast Water and Sediments
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CBD	Convention on Biological Diversity
CMS	Convention on Migratory Species of Wild Animals
COP	Conference of the Parties
EBP	Experience-building phase
EBSA	Ecologically or biologically significant marine area
ECA	Emission Control Area
ECDIS	Electronic Chart Display and Information System
EEZ	Exclusive economic zone
EIA	Environmental impact assessment
ECDIS	Electronic Chart Display and Information System
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GPS	Global Positioning System
IBA	Important Bird and Biodiversity Area
IAS	Invasive aquatic species
ICS	International Chamber of Shipping
IFB	Instruments, frameworks and bodies
IHO	International Hydrographic Organization
IMMA	Important Marine Mammal Area
IMTA	Important Marine Turtle Area
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission
ISA	International Seabed Authority
ISRA	Important Shark and Ray Area
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
KMGBF	Kunming-Montreal Global Biodiversity Framework
MARPOL	International Convention for the Prevention of Pollution from Ships
MPA	Marine protected area

MEA	Multilateral environmental agreement
MEPC	Marine Environment Protection Committee
MoU	Memorandum of Understanding
MPA	Marine protected area
OECM	Other effective conservation measure
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
PSSA	Particularly Sensitive Sea Area
RFMO	Regional fisheries management organisation
SAR	International Convention on Maritime Search and Rescue
SEDA	Socioecosystem diagnostic analysis
SOLAS	International Convention for the Safety of Life at Sea
STB	Scientific and Technical Body
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNF	United Nations Foundation
URN	Underwater radiated noise
VMS	Vessel monitoring system
WCMC	World Conservation Monitoring Centre
WMU	World Maritime University
WSC	World Shipping Council

1. Introduction

The main aim of this discussion paper is to highlight and explore existing IMO measures and practices with the potential to support the implementation of provisions of the BBNJ Agreement. The premise is that the BBNJ Agreement should draw on the experience and good practice of IMO to mutually reinforce the mandates of both. A secondary objective is to gauge interest and support for taking proactive steps to recognise and apply such measures.

This will be addressed using a two-phase methodology:

(a) A desk study aligning the BBNJ Agreement requirements with mandate of IMO to explore the potential of using existing IMO measures to demonstrate sectoral implementation of protection of biodiversity in ABNJ.
(b) Ten to 15 structured interviews to reflect on the effectiveness of using existing IMO measures.

2. Background

The United Nations Convention on the Law of the Sea (UNCLOS) establishes a comprehensive regime of law and order in the world's oceans and seas. Conceived in the 1970s and adopted in 1982, UNCLOS came into force in 1994. Reflecting to a significant extent customary international law (to which all States must adhere), it sets out rules for peaceful use of the seas, regulates the use of marine resources, and promotes conservation of living resources and preservation of the marine environment. It also provides a framework to address new concerns, although its ability to engage with and regulate climate change, new technologies and other challenges not envisaged at the time of its negotiation has been questioned.

Under UNCLOS, marine areas are divided into five zones: internal waters; territorial sea; contiguous zone; exclusive economic zone (EEZ); and high seas. Both the water column beyond the 200 nautical mile–EEZ boundary and the seabed beyond nations' continental shelf claims (the Area) comprise area beyond national jurisdiction (ABNJ). More specifically:[1]

- The high seas comprise all parts of the sea that are not included in an EEZ, territorial sea, or a State's internal or archipelagic waters. They are open to all States, and States enjoy the freedom of navigation, freedom of overflight and the freedom to lay submarine cables, among other freedoms. No part of the high seas can be subject to claims of sovereignty.

- The Area is the seabed beyond the continental shelf. It is governed by the principle of "common heritage of humankind", and activities in the Area shall be carried out for the benefit of humankind as a whole. The International Seabed Authority was established in 1994 to provide for the equitable sharing of financial and other economic benefits derived from activities in the Area.

[1] UK House of Lords (2022) UNCLOS: The law of the sea in the 21st century. UK House of Lords Paper 159. Available at https://committees.parliament.uk/publications/9005/documents/159002/default/.

Ratified by 170 parties, UNCLOS defines the rights and obligations of States Parties with respect to the marine environment. As a framework convention, it sets out broad commitments and principles for States Parties, leaving the setting of detailed rules and some other specific commitments to subsequent international treaties and institutions (competent international organisations) or national legislation (Figure 1).

After more than a decade of preparatory work, the United Nations General Assembly decided in 2015 to develop an international legally binding instrument under UNCLOS on the conservation and sustainable use of biodiversity beyond national jurisdiction.[2] This BBNJ Agreement seeks to enhance the provisions and broad obligations to protect and preserve the marine environment in Part XII of UNCLOS (Box 1). On 19 June 2023 the BBNJ Agreement was adopted. The Agreement is in line with the aims of the 2030 Agenda for Sustainable Development and the Convention on Biological Diversity's Kunming-Montreal Global Biodiversity Framework (KMGBF). It is the third UNCLOS Implementing Agreement (the first was the Agreement relating to the implementation of Part XI addressing seabed mining provisions, and the second was the 1995 United Nations Fish Stocks Agreement).

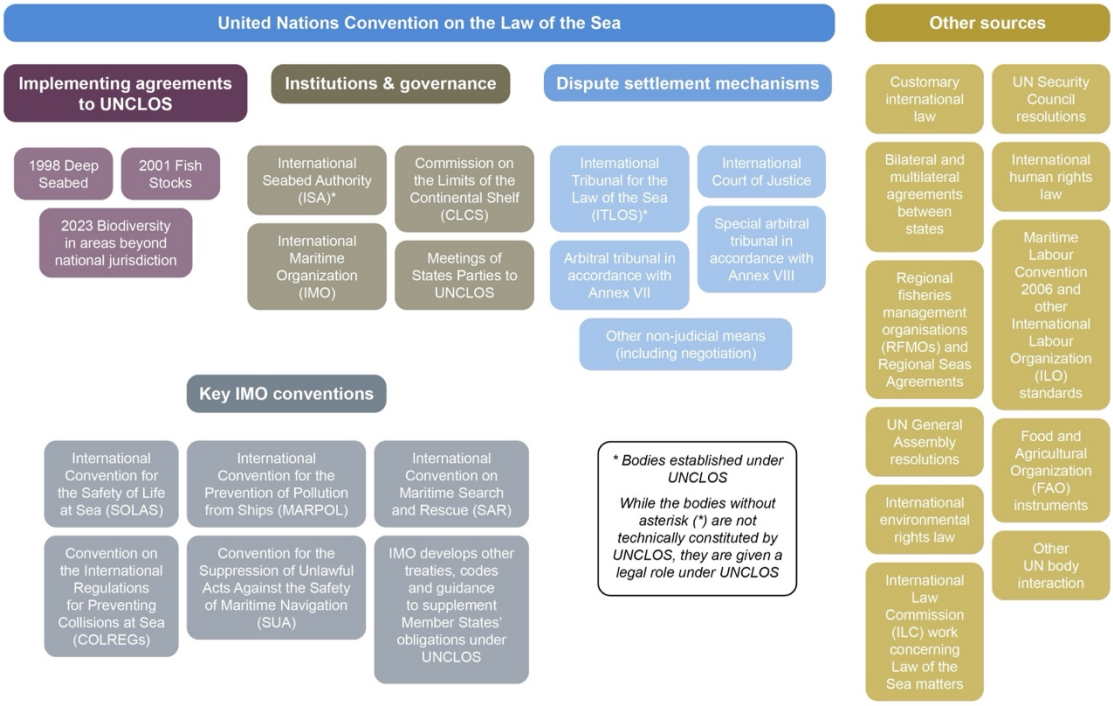


Figure 1: Schematic showing how relevant international organisations and treaties relate to UNCLOS. Adapted from House of Lords Paper 159 (2022).

[2] UNGA Resolution 69/292

BOX 1: SUMMARY OF THE BBNJ AGREEMENT

Under the overall objective of the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, for present and in the long-term, through effective implementation of the relevant provisions of the Convention and further international cooperation and coordination the BBNJ Agreement addresses four main issues:

- Marine genetic resources, including the fair and equitable sharing of benefits.
- Measures such as area-based management tools, including marine protected areas.
- Environmental impact assessments.
- Capacity building and the transfer of technology.

The Agreement also addresses a number of "cross-cutting issues", establishes a funding mechanism and sets up institutional arrangements including a Conference of Parties and various subsidiary bodies, a Clearing-House Mechanism and a secretariat.

The Agreement is open for signature by all States and regional economic integration organisations from 20 September 2023 to 20 September 2025 and will enter into force 120 days after the date of deposit of the sixtieth instrument of ratification, approval, acceptance or accession.

Text taken directly from UN website: www.un.org/bbnjagreement/en

The preambular paragraphs of the BBNJ Agreement are intended to give context and ensure that States Parties share an understanding of the situation. Among other things, they recall the UNCLOS obligation to protect and preserve the marine environment, acknowledge the need to address biodiversity loss, and recognise the need for a comprehensive global regime to ensure the conservation and sustainable use of marine biological diversity of ABNJ. Several of the preambular paragraphs relate indirectly to international shipping (and other ocean users) but none relate specifically. Part I General Provisions includes Use of terms (Article 1). For the purposes of this discussion document, it is useful to have definitions of area-based management tools, areas beyond national jurisdiction, cumulative impacts, environmental impact assessment, marine protected area and marine technology.

The International Maritime Organization is a UN specialised agency to which 176 States are a party. The IMO mission is "to promote safe, secure, environmentally sound, efficient and sustainable shipping through cooperation". IMO agreements and conventions are generally very well ratified and implemented by States, and as a result they represent over 90% of world shipping tonnage. Thus, IMO — a competent international organisation — is a key global sectoral body with its own legal instruments and frameworks (as per Articles 5 and 8 of the BBNJ Agreement) and a pre-eminent stakeholder in the implementation of some elements of the BBNJ Agreement. Acknowledging this, the IMO Secretariat participated throughout the BBNJ negotiations. A majority of the 14 general principles and approaches (Table 1) set out in Article 7 of the BBNJ Agreement also apply to most IMO instruments and treaties.

BBNJ Agreement Article 7: General principles and approaches	
(a)	The polluter-pays principle
(b)	The principle of common heritage of humankind which is set out in the Convention
(c)	The freedom of marine scientific research, together with other freedoms of the high seas

(d)	The principle of equity and the fair and equitable sharing of benefits
(e)	The precautionary principle or precautionary approach, as appropriate
(f)	An ecosystem approach
(g)	An integrated approach to ocean management
(h)	An approach that builds ecosystem resilience, including to adverse effects of climate change and ocean acidification, and also maintains and restores ecosystem integrity, including the carbon cycling services that underpin the role of ocean in climate
(i)	The use of best available science and scientific information
(j)	The use of relevant knowledge of Indigenous Peoples and local communities, where available
(k)	The respect, promotion and consideration of their respective obligations, as applicable, relating to the rights of Indigenous Peoples or of, as appropriate, local communities when taking action to address the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction
(l)	The non-transfer, directly or indirectly, of damage or hazards from one area to another and the non-transformation of one type of pollution into another in taking measures to prevent, reduce and control pollution of the marine environment
(m)	Full recognition of the special circumstances of small island developing States and of least developed countries
(n)	Acknowledgement of the special interests and needs of landlocked developing countries

Table 1: BBNJ Agreement — General principles and approaches

IMO regulations for international shipping (delineated in more than 50 globally binding treaties) are universally accepted. They are enforced through a well-established system of flag, coastal and port State control. Many IMO measures actively contribute to conservation of biodiversity in ABNJ, including the International Convention for the Prevention of Pollution from Ships (MARPOL) and the International Convention for the Control and Management of Ships' Ballast Water and Sediments, which aims to prevent the transfer of potentially invasive aquatic species, as well as the London Convention and London Protocol, which regulate dumping of waste at sea. As a result, ships are subject to stringent environmental, safety and security rules that apply throughout their voyage.

The Marine Environment Protection Committee (MEPC) is a principal IMO committee with associated working groups and a complex wide-ranging remit with links to BBNJ. For example, MEPC 83 (April 2025) considered a range of IMO instruments regulating harmful aquatic organisms in ballast water, air pollution prevention, energy efficiency of ships, reduction of greenhouse gas emissions from ships, marine plastic litter from ships, underwater radiated noise and Particularly Sensitive Sea Areas (PSSAs).

3. Operationalising Mandates to Cooperate and Collaborate

Cooperation and collaboration among UN agencies and instruments are essential, not least to foster mutual understanding of roles and responsibilities. Established multilateral environmental agreements (MEAs) include convention text and decisions relating directly to cooperation and collaboration with other relevant competent international organisations. Recently, taking note of the BBNJ Agreement, this has included specific references to ABNJ. For example, other conservation-orientated MEAs include:

- The Convention on Biological Diversity (CBD), specifically Art. 5 Cooperation and Art. 18 Technical and Scientific Cooperation and COP15 Decisions 15/8, 15/13, 15/24. COP/DEC/15/24 requests the Executive Secretary, upon the adoption of [the BBNJ Agreement] to identify

potential options for modalities for collaboration and cooperation with relevant global and regional organisations. Furthermore, the Kunming-Montreal Global Biodiversity Framework (KMGBF) Target 20 seeks to strengthen capacity-building, technology transfer, and scientific and technical cooperation for biodiversity.

- The Convention on Migratory Species of Wild Animals (CMS) specifically Art. IV, Appendix II on international cooperation, as well as specific areas for cooperation including the Samarkand Strategic Plan for migratory species Target 6.4, and COP14 Decisions 14.43 on marine noise, 14.60 on Important Marine Mammal Areas and 14.61 on Important Shark and Ray Areas.

When considering the role of States as members of IMO, Articles 5 and 8 in Part I of the BBNJ Agreement are worth highlighting:[3]

- **Article 5: Relationship between the BBNJ Agreement and the Convention and relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies** states that the BBNJ Agreement shall be interpreted and applied in a manner that does not undermine relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies and that promotes coherence and coordination with those instruments, frameworks and bodies (IFBs).

- **Article 8: International cooperation** states that parties shall cooperate in the achievement of the objectives of the BBNJ Agreement; they shall endeavour to promote the BBNJ Agreement in other relevant legal instruments, frameworks or global, regional, subregional or sectoral bodies; and they shall promote international cooperation in scientific research and the development and transfer of marine technology.

IMO Member States that are party to BBNJ will therefore have an obligation to promote the BBNJ Agreement at the International Maritime Organization. Both these articles underscore the independence of IFBs such as IMO while encouraging cooperation and collaboration (Wang and Zhang, 2024). However, some commentators (e.g., Friedman, 2024; De Lucia, 2024) point out that some questions have yet to be addressed on the relationship between the BBNJ Agreement with other relevant IFBs, including institutional overlap and the issue of recognition of area-based measures adopted under other IFBs. In time this will become clear.

The IMO Strategic Plan for the six-year period 2024 to 2029 (A33/Res. 1173) sets out strategic directions for the organisation, with associated performance indicators and biennium outputs. Several of the strategic directions have a resonance with the BBNJ Agreement; Strategic Direction 4 specifically is to continue to engage in ocean governance and includes reference to collaboration and cooperation (Box 2).

Bilateral relationships between intergovernmental organisations are also often codified as formal agreements of cooperation. For example, the agreement between IMO and the OSPAR (Convention for the Protection of the Marine Environment of the North-East Atlantic) Commission (OSPAR Agreement 99/8/2), seeks to ensure maximum coordination and consultation on matters of common interest without being binding on Member States. Bilateral arrangements such as this can help with communication and information exchange, strengthening cooperation. Consultation processes are also emphasised in other operative sections of the BBNJ Agreement, such as Part IV Environmental Impacts Assessment, Art. 32.

[3] Selected elements of the articles are emphasised here, not quoted verbatim.

As of end of June 2025, the BBNJ Agreement has 50 ratifications, including IMO flag States with high percentages of world tonnage such as Panama and Marshall Islands, with an anticipated entry into force in 2026 and a first Conference of the Parties anticipated in late 2026.

BOX 2: IMO STRATEGIC DIRECTION 4 — CONTINUE TO ENGAGE IN OCEAN GOVERNANCE

29. The use of the world's oceans has intensified as a result of the continuing increase in the exploration and use of marine resources given the opportunities they present. It is important to preserve the ocean for its users and those that are dependent on it.
30. To support the sustainable development of activities in marine spaces, such activities have to be balanced with the capacity of the ocean to remain healthy and diverse in the long term.
31. IMO will continue to actively engage, collaborate and cooperate with the United Nations, its agencies and other relevant bodies to address ocean governance issues, including promoting the sustainable development of activities in and use of marine spaces. In doing so, IMO will endeavour to ensure that the use of marine spaces does not disproportionately limit the ability of shipping to support and contribute to the global economy, socioeconomic progress and development, and to assist in delivering related aspects of the SDGs.
32. Safe, secure and sustainable shipping is integral to ocean governance. IMO will continue to take action to improve maritime safety and security, to prevent pollution from ships, and to reduce threats to biodiversity, in order to support the protection of marine spaces that helps preserve the marine environment and human health.

Excerpt from IMO Strategic Plan Resolution A.1173(33), Adopted on 6 December 2023[4]

***Recommendation 1**: Prompted by a champion/early mover Member State submission to MEPC, IMO could consider allocation of time in the appropriate subcommittee(s) for BBNJ matters with a remit to provide information papers to assist Member States with implementing the BBNJ Agreement in relation to international shipping and driving enhanced co-operation.*

4. Area-based Management Tools, including Marine Protected Areas

Area-based management tools (ABMTs), including marine protected areas (MPAs), are widely recognised as a key measure to conserve marine biodiversity and enhance resilience to climate change impacts. A significant body of work has examined where MPAs should be located, as well as their optimal size, effectiveness, strength of protection, ecological coherence within a network, management planning and practices (Diz et al., forthcoming). In response to steep declines in biodiversity, reaching projected environmental tipping points and exacerbated by loss of ocean ecosystems' resilience to external shocks and change (such as marine heatwaves), governments have made concerted efforts to work

[4] https://wwwcdn.imo.org/localresources/en/About/strategy/Documents/A%2033-Res.1173.pdf

towards targets for increased protected area coverage. The CBD's Aichi Biodiversity Target 11, which aimed for 10% protection of total marine area, has been superseded by KMGBF Target 3 requiring 30% protection by 2030 (the so-called 30x30 target). While this aspirational target is ambitious it still has shortcomings, such as not adequately considering the three-dimensional nature of the ocean (Brito-Morales et al., 2022). Furthermore, to date in many areas management effectiveness is lacking. However, the KMGBF target has generated significant political will and has been a major driver to secure the BBNJ Agreement, given that the 30% target is impossible without ABMTs established in ABNJ.

To support States striving to meet the protected area target, the CBD facilitated the process of describing ecologically or biologically significant marine areas (EBSAs), bringing together scientific and technical information through a series of regional workshops (Johnson et al., 2018; Secretariat of the Convention on Biological Diversity, 2021). To date, 338 EBSAs have been described in different jurisdictions (Figure 2). Those in ABNJ (including areas in both international and national waters) are generally large areas, often recognising dynamic oceanographic features. EBSAs have no associated management implications but instead provide validated data to support proposals for ABMTs by States and competent international organisations (Johnson and Barrio Froján, 2020; Dunn et al., 2025). It has been suggested that EBSAs might form the basis of a network of MPAs in ABNJ.[5] An advantage is that the EBSA scientific process is state-driven and peer-reviewed. However, the wide range of biodiversity recognised is not universally affected by international shipping, so establishing a link between scientific significance and appropriate conservation measures has proved difficult (e.g., Roe et al., 2022).

Some scientific groups, focusing specifically on different taxa, have undertaken expert-driven initiatives to bring together disparate information that can inform and feed into official government-led processes. To this end, BirdLife International has collated seabird tracking data (Davies et al., 2021; Carneiro et al., 2024) to support identification of Important Bird and Biodiversity Areas and inform MPA proposals including the North Atlantic Current and Evlanov Sea basin MPA,[6] and the International Union for Conservation of Nature (IUCN) Marine Mammal Protected Areas Task Force has successfully identified a suite of Important Marine Mammal Areas.[7] Important Shark and Ray Areas and Important Marine Turtle Areas are in the process of being recognised. The Global Ocean Biodiversity Initiative (GOBI)[8] has supported these efforts and encouraged cross-fertilisation between these taxa-specific efforts and the EBSA process (GOBI, 2024) to inform policy and management measures (Figure 3).

[5] Joint GOBI-HSSG Workshop, Duke University, 12–14 March 2025: Building scientific foundations for ecologically representative and well-connected High Seas ABMT networks.

[6] www.ospar.org/convention/ministerial-statements/ministerial21/deliverables/naces-mpa

[7] IMMAs are defined as discrete portions of habitat, important to marine mammal species, that have the potential to be delineated and managed for conservation. They are not legal designations but independent, peer-reviewed assessments based on criteria supported by the best data.

[8] www.gobi.org

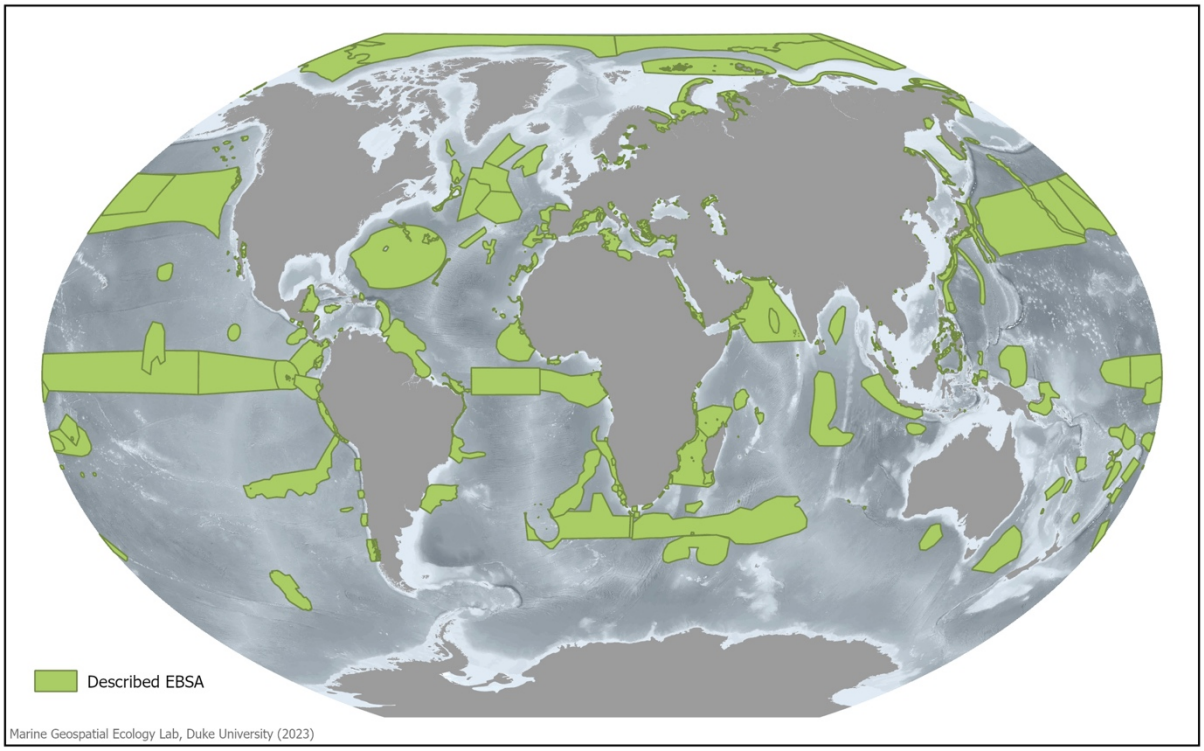


Figure 2: The global CBD EBSA portfolio. Map courtesy Marine Geospatial Ecology Lab, Duke University.

In 2018, recognising the value of biodiversity conservation measures being taken by sectoral and non-governmental bodies, the CBD Conference of the Parties (COP) defined other effective conservation measures (OECMs) as "*a geographically defined area, other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity, with associated ecosystem functions and services and where applicable, cultural, spiritual, socioeconomic, and other locally relevant values*". This contrasts with the notion of protected areas, which must have a primary biodiversity conservation objective, whereas OECMs should achieve the long-term conservation of biodiversity regardless of their intended objectives (Johnson et al., 2024). In April 2025, setting a precedent that IMO could follow, the North East Atlantic Fisheries Commission established the first High Seas RFMO (regional fisheries management organisation) OECMs,[9] recognising the protection afforded to vulnerable marine ecosystems by a ban on bottom contact fisheries.

[9] www.neafc.org/oecm

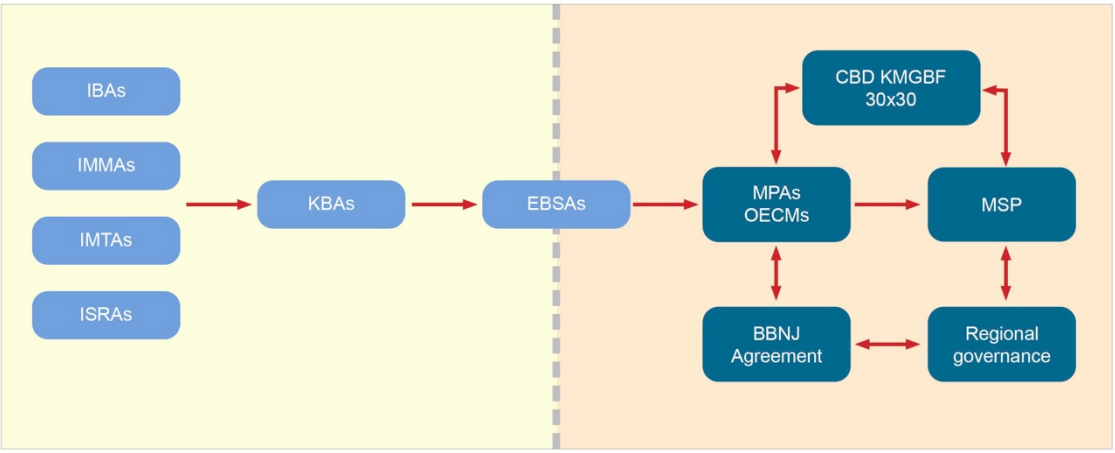


Figure 3: Schematic of the marine science-policy interface. IBAs (Important Bird and Biodiversity Areas); IMMAs (Important Marine Mammal Areas); IMTAs (Important Marine Turtle Areas); ISRAs (Important Shark and Ray Areas); KBAs (Key Biodiversity Areas); EBSAs (ecologically or biologically significant areas); MPAs (marine protected areas); OECMs (other effective conservation measures); BBNJ (biodiversity beyond national jurisdiction) Agreement; KMGBF (Kunming-Montreal Global Biodiversity Framework); MSP (marine spatial planning).

The legal lacuna prior to the BBNJ Agreement has frustrated the designation of high seas MPAs. Two regional intergovernmental organisations — the CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources) (Brooks, 2013) and the OSPAR Commission (O'Leary et al., 2012) — have pioneered MPAs in ABNJ within their convention areas, but until now no mechanism has existed to progress further. As a result, less than 1% of ABNJ is designated as an MPA. However, by (perhaps controversially) factoring in sectoral area-based management tools — measures taken by regional fisheries management organisations and the International Seabed Authority —the United Nations Environment Programme World Conservation Monitoring Centre estimates that some 77% of ABNJ is covered by some form of ABMT. Of this, an estimated 75% is accounted for by the large size of RFMO regulatory areas, a small fraction of which contains bottom fisheries closures over vulnerable marine ecosystems (Chris McOwen, pers. com.).

ABMTs, including MPAs, are defined in the BBNJ Agreement as "…*a tool, including a marine protected area, for a geographically defined area through which one or several sectors or activities are managed with the aim of achieving particular conservation and sustainable use objectives in accordance with this Agreement"*. Part III of the BBNJ Agreement sets out articles on measures such as area-based management tools, including marine protected areas (Table 2).

Article(s)	Notable elements (abbreviated)
Objectives (Art. 17)	• Establish a comprehensive system of ABMTs, with ecologically representative and well-connected networks of MPAs (Art. 17a) • Strengthen resilience to stressors, including those related to climate change, ocean acidification and marine pollution (Art. 17c) • Support food security and other socioeconomic objectives, including the protection of cultural values (Art. 17d)
Application process (Art. 19)	• ABMT proposals to be formulated on the best available science and scientific information, taking into account the precautionary and ecosystem approach (Art.19.3) • Proposal shall include Information on any of the criteria specified in Annex I, as well as any criteria that may be further developed and revised (Art. 19.4b); human activities in the area (Art. 19c); a description of the state of the marine environment and biological diversity in the identified area (Art.19.4d); a description of the conservation and, where appropriate, sustainable use objectives that are to be applied to the area (Art. 19.4e) • Proposals must include draft management plans encompassing the proposed measures and outlining proposed monitoring, research and review activities to achieve the specified objectives (Art. 19.4f); information on any consultations undertaken (Art. 19.4h)
Consultation on and assessment of proposals (Art. 21)	• Inclusive time-bound consultations (Art. 21.1, 21.6) • Review by the Scientific and Technical Body (Art. 21.7, 21.8)
Establishment and decision-making (Art. 22, 23)	• Arrangements for regular consultations among relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies (Art. 22.3) • Where proposed measures are within competence of other management bodies, COP may consider to develop a mechanism regarding existing ABMTs (Art. 22.4). • Decisions and objections to those decisions shall be transmitted to all States and relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies (Art. 23.10).
Implementation (Art. 25)	• Parties to ensure that activities under their jurisdiction or control that take place in ABMTs are conducted consistently with the decisions on ABMTs (Art. 25.4)
Monitoring and review (Art. 26)	• Established ABMTs to be monitored and regularly reviewed by the Scientific and Technical Body (Art. 26.3).

Table 2: BBNJ Agreement Part III — Selected articles and abbreviated text

The principal ABMT designated by IMO is a Particularly Sensitive Sea Area. PSSAs are designated on the basis of meeting ecological, socioeconomic or scientific criteria and are given legal significance by a required Associated Protective Measure (APM), which is authorised by an existing IMO instrument such as the International Convention for the Safety of Life at Sea (SOLAS) or MARPOL (IMO, 2007).[10] A review of shipping accidents by Southampton Solent University (2012) concluded that the main contributors to ships foundering are vessel age, vessel type, area of operation and challenging sea conditions, as well as a suite of poorly performing flag States. To date PSSAs have responded to this and have been designated to recognise and reduce the risk of collision close to sensitive shorelines or grounding on coral atolls and other shallow features, prompting such APMs as traffic separation schemes, pilotage requirements, mandatory reporting and areas to be avoided.

In 2023 a precedent was established with the designation of the NW Mediterranean PSSA, which extends beyond the territorial waters of France, Italy, Monaco and Spain (waters beyond the territorial seas but not beyond 200 nautical miles — in other words, waters that have not been claimed as EEZs). This PSSA, also promoted by the CMS daughter Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area, uses voluntary measures intended to reduce vessel collisions with cetaceans (ship strikes) in the North-West Mediterranean Sea Slope and Canyon System Important Marine Mammal Area (IMMA), including part of the Pelagos Sanctuary MPA. More research is needed to evaluate the effectiveness of these new measures, that is, the behaviour of ships in terms of implementing the voluntary measures, as well as any evidence of reduced impacts on mammal populations. The research is complicated by operational requirements of different categories of vessels (e.g., cargo ships versus ferries).

MEPC 83 (April 2025) agreed in principle to proposals by Peru to designate the Nazca Ridge National Reserve and the Grau Tropical Sea National Reserve as PSSAs (they had already been designated as MPAs in 2021 and 2024, respectively). APMs proposed were "*to prohibit discharge of oil, oily mixtures and sewage, the off-loading or dumping of residues, pollutants, waste or garbage and the changing of ballast water while transiting the areas*". Each PSSA proposal is peer-reviewed by an MEPC Technical Group on the basis of PSSA Proposal Review Form (MEPC 55/23, annex 20), which in this case concluded that the APMs need to be further developed and submitted to MEPC. In theory PSSAs can be established in ABNJ. To date none have been established, although their potential has been recognised for some time (Roberts et al., 2012). Both the established NW Mediterranean and prospective Peruvian PSSA cases have implications for potential future PSSAs in ABNJ.

Art. 22.4 of the BBNJ Agreement provides scope to recognise "*existing area-based management tools, including marine protected areas, adopted by relevant legal instruments and frameworks or relevant global, regional, subregional or sectoral bodies*". To qualify as an ABMT under the BBNJ Agreement (as per BBNJ Agreement Art. 22.4), first, for a defined geographic area, it seems likely that any PSSA proposal would need to qualify against the BBNJ Agreement Annex I indicative criteria. While there is a high degree of commonality between the respective sets of criteria, the PSSA criteria are almost exclusively site-based, whereas the BBNJ Agreement indicative criteria mix site and network criteria. The BBNJ Agreement indicative criteria strongly reflect the CBD EBSA criteria, however the latter clearly differentiate between site (IX/20 Annex I) and network (IX/20 Annex II) criteria (including representativeness, ecological connectivity, replication, adequacy and viability). This differentiation has not yet been articulated in the BBNJ Agreement, but it may be something for the BBNJ Scientific and Technical Body to consider. As illustrated in Table 3, there is strong compatibility between the ecological PSSA criteria and indicative BBNJ Agreement criteria, some overlap with socioeconomic criteria (including aspects related to food security) but none in terms of the PSSA's scientific and educational

[10] Revised PSSA Guidelines (resolution A.982[24], as amended by resolution MEPC.267[68]) supported by information required by the guidance document of the submission of PSSA proposals to IMO (MEPC.1/Circ.510).

criteria. With a criterion on the existence of conservation and management measures, the BBNJ Agreement indicates a link to marine spatial planning (a link that is also reflected in Art. 25 and 26).

PSSA criteria	BBNJ Agreement Annex I indicative criteria
1. Ecological criteria	
1.1 Uniqueness or rarity	(a) Uniqueness; (b) Rarity
1.2 Critical habitat	(d) Special importance for the species found therein (e) The importance for threatened, endangered or declining species or habitats
1.3 Dependency	(k) Dependency
1.4 Representativeness	(j) Representativeness
1.5 Diversity	(i) Biological diversity and productivity
1.6 Productivity	(i) Biological diversity and productivity
1.7 Spawning or breeding grounds	(c) Special importance for life history stages of species
1.8 Naturalness	(l) Naturalness
1.9 Integrity	
1.10 Fragility	(g) Fragility
1.11 Bio-geographic importance	(n) Important ecological processes occurring therein
2. Social, cultural and economic criteria	
2.1 Social or economic dependency	(o) Economic and social factors
2.2 Human dependency	
2.3 Cultural heritage	(p) Cultural factors
3. Scientific and educational criteria	
3.1 Research	
3.2 Baseline for monitoring studies	
3.3 Education	

Others	
Vulnerability to impacts of international shipping, both in terms of vessel traffic characteristics and natural factors (hydrographical, meteorological, oceanographic) is a separate specific consideration relating to risk management (PSSA Guidelines, Annex 2, Section 3.4)	(f) Vulnerability, including to climate change and ocean acidification; and (h) sensitivity NB: The CBD EBSA criteria interpretation of vulnerability relates to the traits and inherent characteristics of species and habitats concerned (e.g., low fecundity), not threats from human activities
	(m) Ecological connectivity
	(q) Cumulative and transboundary impacts

	(r) Slow recovery and resilience
	(s) Adequacy and viability; and (u) Sustainability of reproduction

Table 3: Simplistic mapping of PSSA and BBNJ Agreement Annex I indicative criteria

In line with the PSSA Guidelines, the vulnerability of biodiversity in the high seas to impacts of international shipping needs to be established, which is broadly compatible with BBNJ Agreement requirements to establish the state of the environment and conservation objectives. The NW Mediterranean PSSA precedent confirms the opportunity to use best available science indicating high potential for ship strikes of charismatic marine megafauna. As in the NW Mediterranean case, this could be correlated with IMMAs (information available on the IMMA e-Atlas[11]). An appropriate APM such as mandatory speed limits could be considered. Perhaps more acceptable to industry would be use of new technology to convey real-time information to vessels, which could prompt voluntary measures such as speed reduction; temporary cessation of activities generating impulsive noise; reporting of collisions or near collisions to coastal authorities and the International Whaling Commission (IWC), which holds a global cetacean ship strikes database; enhanced watchkeeping arrangements such as use of infrared binoculars; or creating alert systems to notify authorities and mariners to cetacean presence and behaviour.

Finally, as stated, any ABMT proposed under the BBNJ Agreement requires a draft management plan. This is not a requirement for PSSAs, although management plans that confirm APMs would be relatively straightforward to draft, should make provision for monitoring and review of effectiveness, and could be subject to periodic review by both the IMO Marine Environment Protection Committee and the BBNJ Agreement Scientific and Technical Body established by Art. 49 of the BBNJ Agreement. This could also prompt an update of the PSSA Guidelines.

***Recommendation 2**: Establish, through the BBNJ Agreement COP (initially in discussion with the BBNJ Scientific and Technical Body) that any areas in ABNJ qualifying as a PSSA should go through appropriate assessment with a view to being recognised as an ABMT by the BBNJ Agreement (consistent with BBNJ Agreement Art. 22.4).*

***Recommendation 3**: As ABMTs including MPAs are approved on a case-by-case basis by the BBNJ Agreement COP (which in any event will involve consultation and scrutiny by IMO Member States, subject to the implementation/consultation protocol yet to be elaborated by the BBNJ Scientific and Technical Body per BBNJ Agreement Art. 21), the IMO Secretariat should acknowledge each ABMT and, as appropriate, make relevant information available through pertinent bodies such as MEPC to international shipping to facilitate appropriate measures or subsequent monitoring or both. It should be noted that any such ABMT proposals should also be subject to review by other MEAs with relevant biodiversity conservation competency.*

A complementary approach, in line with the precautionary principle, could also consider recognition of sensitive or significant areas for which dynamic management measures are more appropriate than

[11] https://www.marinemammalhabitat.org/imma-eatlas/

measures within fixed geographical coordinates (Klerk et al., 2024). This acknowledges that in some cases, perhaps especially in the high seas, species and pelagic habitats may not be present year round (ephemeral features) or are dependent on currents, mobile oceanographic fronts and upwelling phenomena, or dynamic/mobile features that may shift location.[12] Increased resolution, sensitivity and frequency of satellite remote sensing, multi-frequency acoustics and improvements to underwater imaging can all contribute to more sophisticated assessment and monitoring (Estes Jr. et al., 2021). Global Fishing Watch is a leading actor producing new open source, near real-time data sets combining satellite imaging, vessel GPS and machine learning. Open source technology fostering cooperation and visualisation is providing new opportunities and capacity for uptake of artificial intelligence,[13] however, a balance must be struck between efforts to conserve without compromising safety or by introducing further complexity.

***Recommendation 4**: Explore how IMO can collaborate with remote sensing expertise to take measures to protect ephemeral and dynamic biodiversity hotspots as an important contribution to safeguarding BBNJ.*

5. Environmental Impact Assessment

Environmental impact assessment (EIA) is a well-established methodological tool to assess significant adverse effects of a planned activity or development. It should be applied prior to any such activity taking place and can help evaluate whether the activity should go ahead and, if appropriate, mitigation measures to be put in place. EIA seeks to engender sustainable use, including the exclusion of some activities or introducing higher environmental standards and thresholds in sensitive locations.

The BBNJ Agreement defines EIA as "*a process to identify and evaluate the potential impacts of an activity to inform decision-making"*. Part IV of the BBNJ Agreement sets out Articles on Environmental Impact Assessment (Table 4).

The BBNJ Agreement is very clear that conducting EIA is an obligation placed on parties (Art. 28), thus, in terms of international shipping, on flag, coastal and port States. Standards and guidelines developed and agreed by IMO to prevent and mitigate environmental impacts are highly relevant (Art. 29), as is two-way communication and transparency using the BBNJ clearing-house mechanism (once established; Art. 51). Furthermore, Art. 31.3 states that "*a roster of experts shall be created under the Scientific and Technical Body"*.

***Recommendation 5**: Consider how shipping expertise might be represented on the roster of experts to be established under the BBNJ Agreement Scientific and Technical Body.*

[12] Examples of these features have been articulated in the CBD EBSA portfolio. Classic ephemeral features include turtle migration corridors and seabird foraging zones. Dynamic features include the Subtropical Convergence Zone in the South Atlantic Ocean and the North Pacific Transition Zone, both oceanographic features that exhibit seasonal shifts.

[13] See, for example, https://www.skylight.global/

Article(s)	Notable elements (abbreviated)
Objectives (Art. 27)	• Operationalise the provisions of UNCLOS on EIA by establishing processes, thresholds and other requirements (Art. 27a) • Prevent, mitigate and manage significant adverse impacts (Art. 27b) • Support the consideration of cumulative impacts (Art. 27c)
Scope of parties' obligation to conduct EIA (Art. 28)	• Planned activities in ABNJ • Planned activities within national jurisdiction if the activity may have an impact on BBNJ
EIA thresholds, standards and guidelines (Art. 30)	• An initial screening is required if planned activities "may have more than a minor transitory effect on the marine environment, or the effects of the activity are unknown or poorly understood" (Art. 30.1) • An initial analysis of the potential impacts, including consideration of cumulative impacts and, as appropriate, alternatives to the planned activity (Art. 30.1a,ii) • If there are reasonable grounds for believing that the activity may cause substantial pollution or significant and harmful changes to the marine environment, a full EIA is needed (Art. 30.1b) • Parties shall consider the characteristics and ecosystem of the location including areas of particular ecological or biological significance or vulnerability (Art. 30.2d)
Monitoring and review (Art. 35, 36, 37)	• Parties to monitor authorised activities, report on impacts and review authorised activities and their impacts
Strategic environmental assessment (Art. 39)	• The Conference of the Parties may conduct a strategic environmental assessment of an area or region to collate and synthesise the best available information about the area or region, assess current and potential future impacts and identify data gaps and research priorities (Art. 39.2)

Table 4: BBNJ Agreement Part IV — Selected articles and abbreviated text

The IMO Marine Environment Protection Committee (MEPC) has sought to recognise and address the environmental impacts of international shipping. Regulations to reduce or eliminate significant adverse impact can apply universally (e.g., Anti-fouling Convention) or to specific sensitive areas. Under MARPOL certain sea areas are defined as Special Areas detailed in Box 3.

Higher environmental standards of operation in Special Areas, which can be extensive, have cost implications for commercial shipping. The most recent example is the Emission Control Area (ECA) proposal approved by MEPC 83 (April 2025), which will designate a swath of the North-East Atlantic (connecting similar ECAs in the Canadian Arctic, Norwegian Sea, North Sea and Baltic Sea waters). This designation will apply to sulphur oxides (SOx), particulate matter and nitrogen oxides (NOx) against criteria set out in section 3 of appendix III to MARPOL Annex VI.[14]

[14] In this instance draft amendments to MARPOL need to be forwarded for adoption at a forthcoming session of MEPC (extraordinary session of MEPC scheduled for October 2025) as part of revised MARPOL Annex VI in order to enter into force at the earliest possible date (1 March 2027, 16 months).

BOX 3: MARPOL SPECIAL AREAS

In Annex I (Prevention of pollution by oil), Annex II (Control of pollution by noxious liquid substances), Annex IV (Prevention of pollution by sewage from ships) and Annex V (Prevention of pollution by garbage from ships), MARPOL defines certain sea areas as ""special areas"" in which, for technical reasons relating to their oceanographical and ecological condition and to their sea traffic, the adoption of special mandatory methods for the prevention of sea pollution is required. Under the Convention, these special areas are provided with a higher level of protection than other areas of the sea.

Annex VI (Regulations for the Prevention of Air Pollution from Ships) establishes certain sulphur oxide (SOx) Emission Control Areas (ECAs) with more stringent controls on sulphur emissions and nitrogen oxides (NOx) Emission Control Areas for Tier III NOx emission standards.

Source: www.imo.org/en/OurWork/Environment/Pages/Special-Areas-Marpol.aspx

In addition to the MARPOL Annexes, direct operational impacts of shipping adversely affecting biodiversity include ship strikes and underwater radiated noise (URN). Researchers considering ship strike risk reductions for selected cetacean species have considered the merits of routeing changes and speed restrictions. Redfern et al. (2024) concluded that a speed restriction of 10 nautical miles per hour reduced risks for multiple species. Nisi et al. (2024) mapped whale movement ranges with global shipping activity. They concluded that the highest risk areas are predominantly within EEZs but that whale migration corridors, which extend into ABNJ, also need protecting. Underwater radiated noise emissions from global shipping are considered to be increasing, based on an analysis from 2014 to 2020. This varies in different regions, though, increasing rapidly in the Arctic, for example, with the largest contributors judged to be container ships, dry bulk and liquid tanker vessels (Jalkanen et al., 2022). For ABNJ it is pertinent that noise can reach significant depths by coupling into sound propagation channels in which sound may transmit over long ranges (Erbe et al., 2019), affecting pelagic and deep-diving marine mammals.

Solutions are the subject of ongoing research,[15] and new technologies include pressure pores (small holes placed in propellor tips to reduce tip vortex cavitation), bubble curtains and air lubrication systems. To reduce underwater noise from commercial shipping to address adverse impacts on marine life, IMO developed guidelines in 2014 that were revised in 2023 (Revised URN Guidelines).[16] To address barriers to their uptake, an Action Plan for the Reduction of Underwater Noise from Commercial Shipping was approved in 2024. This URN Action Plan outlines tasks to be carried out by Member States through relevant IMO organs and includes establishing an experience-building phase to share lessons learned and best practices that have emerged in the implementation of the Revised URN Guidelines. In addition, Cruz et al. (2021) noted "*first mover States (e.g., US and Canada) have made attempts to regulate ship*

[15] For example https://www.saturnh2020.eu/research

[16] Revised Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life (MEPC.1/Circ.906).

speed in national waters, and some shipping companies[17] are proactively introducing noise reduction technology". Voluntary efforts could be encouraged in sensitive areas.

For international shipping, a synergy can be envisaged between the objectives of EIA and voyage planning. Both seek an optimal activity and require due consideration before that activity takes place. Voyage planning (IMO Resolution A.893[21]; STCW Code Section A VIII/2 part 3–1), laying out a vessel's voyage from start to finish, includes an obligation to recognise dangerous waters and important marine habitats. For each voyage, SOLAS Chapter V Regulation 34, Annexes 24 and 25, states that prior to proceeding to sea, the Master shall ensure that the intended voyage has been planned using the appropriate nautical charts and publications for the sea areas concerned, taking into account the guidelines and recommendations developed by IMO. ABMTs agreed under the BBNJ Agreement should therefore be established on nautical charts and notices to mariners, as per the current protocol for PSSAs, to allow mariners to plan their passage and determine the vessel's speed and course in protected areas accordingly.

Electronic Chart Display and Information System (ECDIS) technology to support voyage planning has been in place since 2018. Relevant information from digital marine atlases can identify important marine habitats (for example, the IMMA e-Atlas), which has the potential to assist with consideration of voluntary measures. In this way, map-based information can inform place-specific measures reflecting obligations and commitments set out in decisions of relevant MEAs such as CMS and IWC. Those implementing the BBNJ Agreement should, however, be aware of the commercial operational tensions associated with voyage planning (e.g., Masters' decisions balancing safety such as weather routeing, deviation to avoid sensitive areas and charters' orders).

Of particular note is the IMO International Code for Ships Operating in Polar Waters (Polar Code), which is mandatory under SOLAS and MARPOL for certain ships and supplements existing IMO instruments.[18] The Polar Code, which entered into force in 2017 (with amendments scheduled to come into force in 2026), encompasses comprehensive elements and recognition that polar waters may impose additional navigation demands. Guidelines are in place for detailed voyage planning using a risk-based approach. Plans should include safe areas and no-go areas, surveyed marine corridors, if available, and contingency plans for emergencies in the event of limited support being available for assistance in areas remote from International Convention on Maritime Search and Rescue facilities. Specific routeing measures (voluntary for all ships of 400 gross tonnage and above) have been adopted for the Arctic region where the Polar Code applies in the Bering Sea and Bering Strait — including six two-way routes and six precautionary areas, as well as three areas to be avoided. Marine mammal avoidance using dedicated risk assessment tools such as SeaSketch[19] and communicating marine mammal data to Masters in a format like Notices to Mariners showing walrus haulout locations (Ahmasuk et al., 2018) that is accessible and useful for route planning has been promoted as a tool in voyage planning.[20]

An associated issue is biofouling management in PSSAs and MPAs, which was highlighted in 2024 at MEPC 82 by several Member States (MEPC 82/12/1). The threat of invasive aquatic species transferred as biofouling to remote and protected areas could be addressed by measures such as correlating high-risk species with certain pathways and more detailed guidance on monitoring and rapid response to incursions of invasive aquatic species. Standards pioneered in national waters — the Galapagos Marine

[17] For example, efforts by Maersk in collaboration with Scripps Institution of Oceanography.

[18] https://www.imo.org/en/MediaCentre/HotTopics/Pages/Polar-default.aspx

[19] https://www.seasketch.org/

[20] International Whaling Commission RS6689-SC/67A/HIM/09: The Polar Code and Marine Mammal Avoidance Planning in the International Maritime Organization, authors Hubbell, D. and Portley, N.

Reserve (Ecuador), Kermadec and Subantarctic Islands (New Zealand) and the Papahānaumokuākea Marine National Monument (United States) — could be extended to biologically sensitive and significant areas in ABNJ. An industry view on "in-water cleaning" highlights the disadvantages of an uncoordinated patchwork of national regulations that has emerged under the 2023 IMO Biofouling Guidelines. Operators have a vested interest in ensuring hull efficiency, and the Glofouling Partnerships Project[21] organised by the Global Environment Facility (GEF), United Nations Development Programme (UNDP) and IMO, is exploring performance monitoring of antifouling coating failure as one element of a step towards a unified framework. The Glofouling Partnerships Project took an official step forward at MEPC 83, which agreed on development (starting in 2026) of a legally binding framework for the control and management of ships' biofouling to minimise the transfer of invasive aquatic species — a biofouling Convention — as well as adopting in-water cleaning guidance.

***Recommendation 6**: All ABMTs established under the BBNJ Agreement should be displayed on nautical charts/ECDIS. This could be extended to include established (migratory) Important Marine Mammal Areas covering migration corridors in the high seas.*

***Recommendation 7**: Detailed voyage planning (as undertaken under the Polar Code) should be encouraged to incorporate additional voluntary measures where operational impacts of ships can affect threatened and endangered species and unique ecosystems. This could recognise a synergy with the emerging network of "green shipping corridors" to expand their remit from climate change emissions reduction (a current priority for IMO) to include biodiversity conservation through operational practices.*

6. Capacity Building and Transfer of Marine Technology

Governance of the high seas and implementation of the BBNJ Agreement will involve stakeholders, including developing States Parties, landlocked developing States and Small Island Developing States, coastal African States and archipelagic States. Some of these State actors may be less familiar than others with high seas issues, and they may have capacity needs. Ocean literacy is also perceived as essential for changing human behaviours and practices to improve sustainability (Shellock et al., 2024). From a scientific viewpoint this includes understanding environmental baselines (and their limitations including data gaps) to inform ABMTs and EIAs, as well as acquiring the capacity to interrogate databases such as the Ocean Biodiversity Information System (OBIS) and the CBD EBSA Repository to source relevant information. In terms of shipping, capacity issues include understanding pressures — shipping density, traffic characteristics and movements, risk assessments — informed by automatic identification system and vessel monitoring system data and measures. Relevant shipping and shipping-related technologies, including monitoring and surveillance, are evolving as shipping transitions to meet new standards. For example, new technologies are under development to reduce underwater noise, but they need evaluating to substantiate their benefit-cost ratio and effectiveness (Smith and Rigby, 2022).

The BBNJ Agreement (Art. 1.10) defines marine technology as shown in Box 4; Part V of the BBNJ Agreement sets out articles on capacity building and the transfer of marine technology (Table 5).

[21] https://www.glofouling.imo.org/

BOX 4: BBNJ AGREEMENT DEFINITION OF MARINE TECHNOLOGY

Marine technology includes, inter alia, information and data, provided in a user-friendly format, on marine sciences and related marine operations and services; manuals, guidelines, criteria, standards and reference materials; sampling and methodology equipment; observation facilities and equipment for in situ and laboratory observations, analysis and experimentation; computer and computer software, including models and modelling techniques; related biotechnology; and expertise, knowledge, skills, technical, scientific and legal know-how and analytical methods related to the conservation and sustainable use of marine biological diversity.

Source: BBNJ Agreement, Part 1 General Provisions, Art. 1.10

Article(s)	Notable elements (abbreviated)
Objectives (Art. 40)	• Enable inclusive, equitable and effective cooperation and participation in the activities undertaken under this Agreement (Art. 40b) • Develop the marine scientific and technological capacity including through access to marine technology by, and the transfer of marine technology to, developing States Parties (Art. 40c) • Increase, disseminate and share knowledge on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (Art. 40d)
Cooperation in capacity building and the transfer of marine technology (Art. 41)	• Parties shall cooperate at all levels and in all forms, including through partnerships with and involving all relevant stakeholders
Modalities for capacity building and for the transfer of marine technology (Art. 42)	• A country-driven, transparent, effective and iterative process that is participatory, cross-cutting and gender responsive. It shall build upon, as appropriate, and not duplicate existing programmes (Art. 42.3)

Table 5: BBNJ Agreement Part V — Selected articles and abbreviated text

The BBNJ Agreement provides for the establishment of a committee on capacity building and transfer of marine technology (Art. 46) and sets out different types of capacity building and transfer of marine technology (Art. 44 and Annex II), together with obligations for monitoring and review (Art. 45).

IMO already has well established capacity-building mechanisms enshrined in its Integrated Technical Cooperation Programme, a principal aim of which is to improve the implementation of existing measures.[22] Priority is given to human resources development and institutional capacity building in line with the UN Sustainable Development Goals. Support given to both regional and global programmes is

[22] Other strategic directions are integrating new and advancing technologies in the regulatory framework; responding to climate change; engaging in ocean governance; enhancing global facilitation and security of international trade; ensuring regulatory effectiveness; and ensuring organisational effectiveness.

targeted (to the particular needs of Africa, Small Island Developing States and Least Developed Countries) and audited. Global programmes focus on specific technical issues undertaken from a global perspective. Working with Member States, IMO has successfully implemented targeted programmes such as the GloBallast Programme, an international public-private cooperation to implement effective measures to control the introduction of alien marine species.[23] Capacity building is also facilitated through individual memorandums of understanding, such as that established between IMO and Canada to deliver regional capacity-building workshops. The latter are intended for States and maritime training institutions, providing training for trainers on operating in polar waters and implementing the Polar Code.

IMO-associated institutions are also well placed to further capacity building and technology transfer. For example, in May 2024 the World Maritime University (WMU) convened a roundtable to consider the future of shipping at the biodiversity-climate nexus (Wisz et al., 2025). Key findings included the need for cross-disciplinary capacity building and sharing with the shipping sector to engender ecosystem-based approaches and opportunities for the shipping sector to consolidate BBNJ Agreement-relevant actions and work towards KMGBF targets.

At the time of writing, the position is that "*until such time as the BBNJ Agreement commences its functions, the Secretary-General of the United Nations, through the Division for Ocean Affairs and the Law of the Sea (UN DOALOS) of the United Nations Secretariat, shall perform the secretariat functions under this Agreement"* (BBNJ Agreement, Art. 50.2). As interim secretariat, UNDOALOS has a capacity-building function with a current focus on promoting better understanding of the BBNJ Agreement and supporting States' ratification of the treaty. A programme of regional workshops and information sharing has been complemented by an EU-funded project. A principal objective is inter-agency coordination and cooperation within the UN system as well as partnerships and synergies with relevant global and regional organisations, civil society, academia and the private sector.

Recommendation 8: Lessons learned from the delivery of international shipping competence-based training programmes should inform a capacity-building package, developed within the framework of the BBNJ Agreement, with the objective of raising ocean biodiversity literacy for mariners.

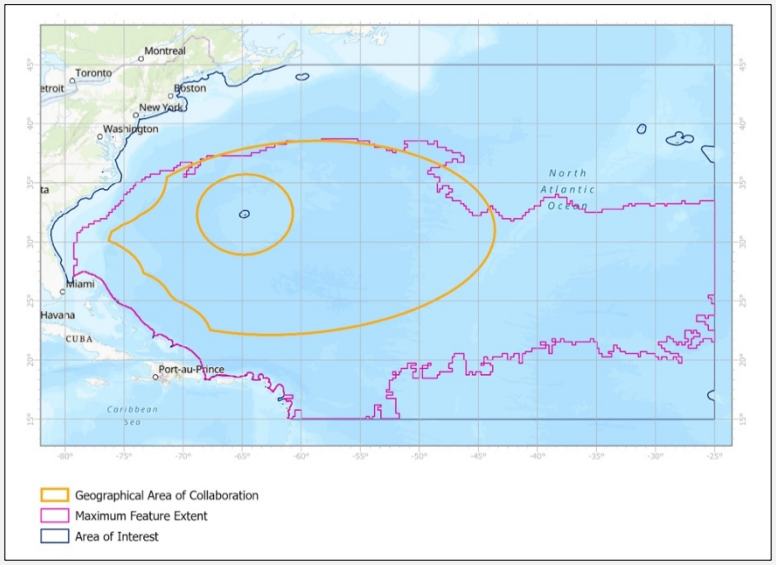
[23] https://www.imo.org/en/ourwork/partnershipsprojects/pages/globallast-programme.aspx

7. Sargasso Sea Case Study

A pre-eminent area to which the BBNJ Agreement will apply is the Sargasso Sea. The case study presented in Box 5 illustrates how the elements of this discussion document apply and resonate with a specific high sea situation.

BOX 5: SARGASSO SEA CASE STUDY

The 2 million square mile Sargasso Sea is an extensive and dynamic unique ecosystem, described as an EBSA in 2012 for its epipelagic community significance as well as being a foraging area and migratory corridor for several threatened and endangered species. The socioeconomic importance for fisheries, shipping and tourism and the scientific importance for global-scale ocean processes (and their changing parameters) are summarised in a dedicated section of the second World Ocean Assessment (UN, 2021).



Above: The full extent of the Sargasso Sea. Map courtesy Marine Geospatial Ecology Lab, Duke University.

For the past 24 years or more, the Sargasso Sea has been repeatedly identified as a high seas area whose conservation would benefit from internationally legally binding protection. This resulted in a philanthropically funded project, which started in 2010 and, through sustained trust building with governments and other stakeholders, evolved into the Sargasso Sea Commission, supported by the 2014 Hamilton Declaration. Under this Declaration, 10 signatory Governments led by Bermuda affirmed their intent to work collaboratively in a voluntary capacity to conserve the Sargasso Sea and "*to exercise a stewardship role for the Sargasso Sea and keep its health, productivity and resilience under continual review*" (Freestone, 2021).

The Commission has compiled and refined best available science for the Sargasso Sea, assisted by longstanding ocean timeseries data held by the Bermuda Institute of Ocean Sciences and biological records from OBIS and other sources. Most recently, this baseline information has been updated and added to by the GEF-UNDP-IOC (Intergovernmental Oceanographic Commission) project under the Food and Agriculture Organization of the United Nations (FAO) Common Oceans Program and the French Facility for Global Environment SARGADOM project. The added information on human uses includes quantification of shipping traffic noting de facto

established transatlantic shipping routes and a threats analysis of Sargasso Sea shipping. This information is summarised in a socioecosystem diagnostic analysis, which will inform the basis for a Strategic Action Plan — an agreement on concrete steps for more effective stewardship. The Plan could also easily form the basis of an ABMT management plan. In addition to baseline data reports such as a detailed vessel summary, and threats analysis of Sargasso shipping, the Marine Geospatial Ecology Lab at Duke University has created a data portal (https://sargasso-sea-mgel.hub.arcgis.com/) that is interoperable with different data sets in ArcGIS online allowing for bespoke integration of different information sources.

Research contributing to the socioecosystem diagnostic analysis (for the period 2019–2021) concludes that mean vessel speed transiting the area has increased and recognises the risk to cetaceans from ship strikes and underwater radiated noise. In November 2023 the Sargasso Sea Commission co-hosted, with IMO and WMU, a workshop on PSSAs. Until now it has proved to be a challenge to quantify adverse impacts of shipping in the open ocean and thus to relate any APM to a mobile, dynamic feature. However, the 2024 Important Marine Mammal Area workshop for the North-West Atlantic and Caribbean (co-sponsored by the Sargasso Sea Commission) described a huge North Atlantic humpback whale migratory corridor that crosses the Sargasso Sea, informed and validated by detailed citizen science observations. A PSSA proposal, similar to that compiled for the NW Mediterranean PSSA, could now be envisaged (potentially as an action under the Strategic Action Plan). Furthermore, stakeholder engagement with the shipping industry as part of a GEF-funded project (see section 8 below) has established industry willingness to consider voluntary measures in areas such as this to protect cetaceans and test innovative monitoring technologies (Freestone et al., 2024), as well as contemplating a potential PSSA. This sustained effort to secure conservation and sustainable use has strong parallels to marine spatial planning methodology (Weaver and Johnson, 2012; Wright et al., 2019), suggesting the Sargasso Sea as a model way forward for better understanding and protecting other areas of the high seas that are ecologically or biologically significant.

***Recommendation 9**: In response to a request from an IMO Member State, the IMO Secretariat should facilitate the Sargasso Sea Commission as part of its Strategic Action Plan under the GEF-UNDP-IOC Project under the FAO Common Oceans Program to promulgate a PSSA proposal. This would be a first for the high seas, drawing on the NW Mediterranean PSSA and seeking voluntary measures to safeguard the humpback whale migration corridor identified as an IMMA (with potential to also be proposed as a CBD EBSA).*[24]

[24] CBD COP 16 Decision 16/16 agreed new modalities for modifying EBSA descriptions and describing new EBSAs.

8. Responses to the BBNJ Agreement from and on Behalf of International Shipping

Recent commitments on behalf of IMO Member States and the political will expressed in many formal statements at IMO meetings reflect a collective understanding of the need to better conserve and sustainably use marine biodiversity. This includes an appreciation by some States of the need to articulate the regulation of international shipping with the provisions of the BBNJ Agreement. It also implies additional coordination by States of their obligations as delivered by different ministries and departments.

Overall, the reaction of representatives of the shipping industry to the BBNJ Agreement has been positive, with the International Chamber of Shipping (ICS), the World Shipping Council and other industry bodies seeking to foster a holistic approach with enhanced cooperation and coordination. At the same time there is the expectation of a level playing field. For example, ICS stated an expectation that "*emerging high seas industries will be as well-regulated as shipping is by IMO, with the detail of any measures that may be needed for ships to be discussed and agreed at IMO*" (Emily Rowley, ICS Policy Manager, 23 June 2023).[25] Industry consensus is that, where possible, the BBNJ Agreement should work with existing instruments, acknowledging the already complex and onerous regulatory system for international shipping. For example, BIMCO (Baltic and International Maritime Council) is in discussion with the International Hydrographic Organization on how to show voluntary slowdown areas (e.g., PSSAs) on ECDIS. Innovative ideas under consideration also include whether commercial contractual flexibility can play a part in delivering biodiversity benefits. For example, a whale strike clause within commercial contracts could be envisaged whereby no financial penalties are imposed if the Master decides on deviations or slowdowns due to cetacean presence. The role of appropriate risk assessment is important to guide operational practices. This can be technically complex. For most larger ship classes, for example, engines are designed to rapidly reach low load thresholds, which maximises efficiency and reduces emissions. Slower speeds to reduce the risk of vessel strikes may therefore increase emissions.

A strong NGO contribution to the BBNJ negotiations was to stress "enhanced co-operation" (reflected in BBNJ Agreement Art. 8.1). This envisages a more proactive interpretation of UNCLOS, including the obligation to take actions to help other bodies implement their decisions.[26] Wary reactions have also been expressed from some stakeholder organisations (e.g., the Caribbean Natural Resources Institute voicing issues for Caribbean stakeholders) stressing the importance of the shipping sector to GDP (i.e., avoiding negative impacts on the freedom of navigation), insisting on opportunities for enhanced collaboration and requesting specialised technical input from IMO.

As part of its GEF-funded project, the Sargasso Sea Commission has embarked on a series of well-attended and well-received externally facilitated stakeholder engagement exercises[27] with the shipping industry. These exercises have explored the characteristics of a good voluntary measure (considered to be impactful, realistic, measurable, recognised, communicable, scalable) and associated recognition

[25] https://www.ics-shipping.org/press-release/20042/

[26] As part of the BBNJ Agreement negotiations, with an emphasis on a two-way flow of information to support cross-sectoral coordination, the World Wildlife Fund suggested that the BBNJ COP should recognise the pervasive nature of the UNCLOS general duty for relevant agreements and international bodies to cooperate and *"establish a schedule with a list of such agreements and such bodies* that could be maintained and updated by decision of the BBNJ Conference of the Parties (COP)" (WWF, 2019).

[27] To date Nick Lambert Associates International have facilitated three stakeholder meetings, in London, Copenhagen and Singapore.

and positive incentives for taking such measures, such as recognised supply chain transparency and implication on charter party clauses. Feedback strongly favoured voluntary measures aligned to infrastructure and technology, and encouraging transparency using a SMART framework of goal-based guidelines, rather than adding to the already complex and onerous mandatory regulatory burden.

The biological science community have expressed concern for endangered subpopulations of cetaceans and see a need to identify more high-risk areas intersected by high maritime traffic use. These are different from migratory corridors that cover extensive areas. The former can benefit from measures such as traffic separation schemes (directing traffic away from resident populations); the latter from reporting of sightings to trigger impact mitigation. Variability of biological data decreases offshore but satellite technology is evolving fast. Innovative monitoring techniques, such as the use of hydrophones to detect marine mammal presence, have significant potential. Mutual understanding between science and shipping requires strategies for capacity building and technology transfer in ABNJ, such as using alert apps that share sightings of marine mammals with other vessels. A complementary initiative to the Sargasso Sea pilot is taking place in the Arabian Sea, where scientists are working with interested coastal States on prospective measures to reduce vessel strikes of Arabian Sea humpback whales while at the same time discussing routeing measures to reduce the risk of an oil spill.

***Recommendation 10**: Convene a webinar to share and elaborate upon ideas in this discussion document with flag States and with IWC, IUCN and other relevant intergovernmental organisations.*

9. Key Insights and Policy Recommendations

Key Insights

1. It should be broadly acknowledged by the shipping sector that adoption, by consensus, of the BBNJ Agreement in 2023 was an historic achievement for multilateralism that complements existing organisations and institutions including IMO. Furthermore, IMO has a vested interest in being involved with the BBNJ Agreement, and IMO Member States should be proactive, giving due consideration to how commercial shipping perspectives can be accommodated.

2. In anticipation of ratification of the BBNJ Agreement and its entry into force (with a predicted first Conference of the Parties in the third quarter of 2026), a better understanding of the new treaty by the shipping sector would be advantageous. UN General Assembly resolution 78/272 established a BBNJ Preparatory Commission (PrepCom), and at an organisational meeting in June 2024 it was decided to hold PrepCom meetings in April and August 2025 and at least one session in 2026. In addition to an IMO presence at PrepCom, this discussion paper suggests ways to be proactive, putting in place mechanisms to enhance cooperation and collaboration using existing IMO structures and processes as implementation of the BBNJ Agreement is agreed and evolves into a community of practice.

3. Existing established measures to regulate impacts of international shipping on high seas biodiversity that merit most attention in the context of the BBNJ Agreement include the establishment of PSSAs (through their APMs) and voyage planning practices. There is potential to use existing measures and update current voluntary practices to mitigate or reduce harmful impacts on marine biodiversity, including vessel strikes, underwater radiated noise and biofouling. Efforts should be made to build

on this work and develop synergies (including links to KMGBF targets) to optimise environmental soundness and efficiency of maritime activities and to enhance marine environmental protection. The IMO approach, incorporating an experience-building phase to help socialise new regulations supported by new technology, is a useful learning by doing practice.

4. Pioneering tools for remote monitoring that are supported by the shipping industry can contribute towards establishing an ecologically representative and well-connected high seas MPA network. For example, evidence of shipping patterns and interaction with cetaceans can be visualised in collaboration with known data sources.

5. Consideration is being given to the constitution and operation of the BBNJ Scientific and Technical Body (e.g., Hassanali et al., 2025). It will be important to include shipping expertise as part of the pool of experts.

6. It would be advantageous for States to understand the position of shipping stakeholders vis-à-vis the BBNJ Agreement by recognising the merits of a comprehensive ecosystem-based approach. This could be achieved by building on the WMU future of shipping roundtable and the Sargasso Sea Commission shipping stakeholder engagement exercise to apply and promulgate conclusions to the high seas more generally. The Arctic Council's Arctic Shipping Best Practice Information Forum could be a useful model for the BBNJ Agreement to consider.

Policy Recommendations

Recommendation 1: Prompted by a champion/early mover member State submission to MEPC, IMO could consider allocation of time in the appropriate subcommittee(s) for BBNJ matters with a remit to provide information papers to assist Member States with implementing the BBNJ Agreement in relation to international shipping and driving enhanced co-operation.

Recommendation 2: Establish, through the BBNJ Agreement COP (initially in discussion with the BBNJ Scientific and Technical Body), that any areas in ABNJ qualifying as a PSSA should go through an appropriate assessment with a view to being recognised as an ABMT by the BBNJ Agreement (consistent with BBNJ Agreement Art. 22.4).

Recommendation 3: As ABMTs including MPAs are approved on a case-by-case basis by the BBNJ Agreement COP (which in any event will involve consultation and scrutiny by IMO Member States, subject to the implementation/consultation protocol yet to be elaborated by the BBNJ Agreement Scientific and Technical Body per BBNJ Agreement Art. 21), the IMO Secretariat should acknowledge each ABMT and, as appropriate, make relevant information available through pertinent bodies such as MEPC to international shipping to facilitate appropriate measures or subsequent monitoring or both. It should be noted that any such ABMT proposals should also be subject to review by other MEAs with relevant biodiversity conservation competency.

Recommendation 4: Explore how IMO can collaborate with remote sensing expertise to take measures to protect ephemeral and dynamic biodiversity hotspots as an important contribution to safeguarding BBNJ.

Recommendation 5: Consider how shipping expertise might be represented on the roster of experts to be established under the BBNJ Agreement Scientific and Technical Body.

Recommendation 6: All ABMTs established under the BBNJ Agreement should be displayed on nautical charts/ECDIS. This could be extended to include established (Migratory) Important Marine Mammal Areas covering migration corridors in the high seas.

Recommendation 7: Detailed voyage planning (as undertaken under the Polar Code) should be encouraged to incorporate additional voluntary measures where operational impacts of ships can affect threatened and endangered species and unique ecosystems. This could recognise a synergy with the emerging network of "green shipping corridors" to expand their remit from climate change emissions reduction (a current priority for IMO) to include biodiversity conservation through operational practices.

Recommendation 8: Lessons learned from the delivery of international shipping competence-based training programmes should inform a capacity-building package, developed within the framework of the BBNJ Agreement, with the objective of raising ocean biodiversity literacy for mariners.

Recommendation 9: In response to a request from an IMO Member State, the IMO Secretariat should facilitate the Sargasso Sea Commission as part of its Strategic Action Plan under the GEF-UNDP-IOC Project under the FAO Common Oceans Program to promulgate a PSSA proposal. This would be a first for the high seas, drawing on the NW Mediterranean PSSA and seeking voluntary measures to safeguard the humpback whale migration corridor identified as an IMMA (with the potential to also be proposed as a CBD EBSA).

Recommendation 10: Convene a webinar to share and elaborate upon ideas in this discussion document with flag States and with IWC, IUCN and other relevant intergovernmental organisations.

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