

Chapter 4

The International Legal Framework for Area-Based Marine Management Tools



Nele Matz-Lück and Shams Al-Hajjaji

Abstract Area-based management tools (ABMTs) for the marine realm can comprise a multitude of different concepts. They have in common that their main purpose is the conservation of the marine environment and the balancing of different ocean uses. Although marine protected areas (MPAs) are a widely discussed concept and part of ABMTs, the latter term goes further. This is exemplified by the *Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction* (BBNJ Agreement) that includes a definition of ABMTs. Many such tools address specific human ocean uses in a geographically defined area, for example, shipping, fisheries, seabed mining, and other resource extraction. Others are designed to be cross-sectoral and pursue a broader objective such as balancing (all) relevant uses as part of marine spatial planning or more comprehensive protection of biological diversity. This chapter focuses upon international legal agreements that employ area-based management which addresses or potentially affects shipping to explore and compare their scope and purposes. This includes treaties with a global scope (e.g., UNCLOS, MARPOL, SOLAS, BBNJ Agreement) but also some regionally limited instruments (e.g., regional fisheries agreements). One of the leading questions is to what extent the international legal framework on ABMTs is set up in a coherent manner or whether—due to different purposes of ABMTs from different agreements and disconnection—it places burdens upon the shipping sector that are not necessarily justified to enhance sustainability in ocean governance.

Keywords Area-based management tools · MPAs · UNCLOS · IMO · Shipping · Vessel-based pollution

N. Matz-Lück (✉) · S. Al-Hajjaji
Walther Schücking Institute for International Law, Kiel, Germany
e-mail: nmatz@wsi.uni-kiel.de; salhajjaji@wsi.uni-kiel.de

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4.1 Introduction

The ocean is vital for human life on the planet. In addition to being the prime stabilizing entity for the world's climate, it is also being used for a variety of essential human activities. Coastal and high seas fisheries, the extraction of nonliving resources from the seabed and subsoil, the generation of renewable energy, and the transportation of goods and persons by ships are just some of them. Although area-based management tools (ABMTs) for the marine realm can comprise a multitude of different concepts and instruments, they have in common that their main purpose is the conservation of the marine environment and the associated sectoral or cross-sectoral regulation of different ocean uses. These objectives are inherently restrictive. The degree to which human activities are limited by relevant regulations depends upon the specific mechanism.

Navigation is one of the uses that can be targeted or at least affected by ABMTs. Those mechanisms with the clearest impact on shipping are those that specifically address vessel pollution or the safety of navigation. Often they require compliance with measures concerning the technical equipment or operation of the ship, for example, the use of particular fuels or scrubbers or compliance with speed limits. Other ABMTs, for example, concerning fisheries, could also affect navigation if they restricted vessel traffic through certain areas. Likewise, the establishment of marine protected areas (MPAs) to conserve biological diversity could include restrictions, for example, on anchoring or other vessel activities. The extent to which ABMTs affect navigation also depends upon the degree of jurisdiction that is exercised over different parts of the ocean and the authority that such instruments have over vessels flying the flags of third states, that is, nonmembers to a particular global or regional agreement.

Due to the horizontal approach to lawmaking on the international level, one likely presumption could be that ABMTs stemming from different instruments are not necessarily set up in a mutually reinforcing manner but lead to inconsistencies that impose additional burdens on global shipping. This hypothesis is, however, challenged from the outset as far as area-based restrictions explicitly target shipping. This is due to the institutional setup with the IMO being the primary competent organization to restrict the freedom of navigation by international agreements with a global scope. Nevertheless, questions remain, if different ABMT regimes can overlap, if incoherence could possibly affect shipping, and if implementation of the *Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction* (BBNJ Agreement, 2023) may add to a fragmented approach to ABMTs on the high seas.

This contribution assesses how the international legal framework for ABMTs, as established by different legal instruments at the global and regional levels, addresses or affects shipping. It does so by defining ABMTs (Sect. 4.2.1) and discussing their legal basis in the law of the sea (Sect. 4.2.2), before offering some background on the spatial dimension of jurisdiction over the ocean (Sect. 4.2.3). This is followed by

a discussion of the role of the IMO in the context of standard-setting for global shipping (Sect. 4.3.1), different sector-specific ABMTs that address vessel-based pollution (Sect. 4.3.2), as well as other ABMTs relevant for navigation (Sect. 4.3.3). ABMTs with a potentially more indirect effect on maritime transportation, that is, those related to the conservation of marine living resources (Sect. 4.4.1), the exploration and exploitation of nonliving resources (Sect. 4.4.2), and the BBNJ Agreement (Sect. 4.4.3), are then reviewed. This is followed by conclusions on legal framework and the degree to which legal instruments may develop in the future for ABMTs on the high seas (Sect. 4.5)

4.2 The Legal Background of ABMTs

4.2.1 Definitions

Until the conclusion of the BBNJ Agreement, 2023, there was no legal definition of ABMTs in an international treaty. The *United Nations Convention on the Law of the Sea* (UNCLOS) itself neither defines nor mentions ABMTs (UNCLOS, 1982). In contrast, Article 1(1) of the BBNJ Agreement defines “area-based management tool” as follows:

a tool, including marine protected areas, 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.

This definition clarifies that the designation of MPAs is one possible element of ABMTs and not a synonym. Indeed, the BBNJ Agreement defines an MPA for the purposes of the treaty in Article 1(9) as follows:

a geographically defined marine area that is designated and managed to achieve specific long-term biological diversity conservation objectives and may allow, where appropriate, sustainable use provided it is consistent with the conservation objectives.

While this underlines that the notion of ABMTs is wider than that of MPAs and has a slightly different notion (Johnson et al., 2018: 112), they have in common that both concern a geographically defined area and both include higher standards of environmental protection when compared to the surrounding waters.

The general objective of enhanced protection of the marine environment from one or more specific human uses is a commonly accepted characteristic of ABMTs, although this is not the only aim that is being pursued by area-based approaches toward the ocean. There are international treaties that include area-specific instruments and do not relate to the marine environment, for example, the establishment of search and rescue zones under the *International Convention on Maritime Search and Rescue* (SAR Convention, 1979). International instruments on the safety of navigation, for example, ships’ routeing established in accordance with Regulation V/10 under the *International Convention on Safety of Life at Sea* (SOLAS) and

traffic separation schemes (TSS) as expressly provided for in Regulation 10 of the *International Regulations for Preventing Collisions at Sea 1972* (COLREGs), serve two distinct but complementary objectives: preventing harm to humans at sea as well as environmental protection from the consequences of accidents (SOLAS, 1974; COLREGs, 1972). The scope of the International Code for Ships Operating in Polar Waters (Polar Code) is a rare example of an area-specific approach to standard-setting for vessels for northern and southern polar waters (Scott, 2019: 166–167), where the Code is mandatory both under the SOLAS Convention with the focus on maritime safety and under the *International Convention for the Prevention of Pollution from Ships* (MARPOL) in regard to the prevention of vessel-based pollution (Polar Code, 2014/15; MARPOL, 1973/1978).

Another relevant criterion is that ABMTs are sector-specific. A sector-specific approach, for example, concerning fisheries, vessel traffic, or commercial whaling in designated whale sanctuaries under the *International Convention for the Regulation of Whaling* (ICRW), does not necessarily mean that a management tool must be limited to just one sector (ICRW, 1946). The definition of ABMTs in the BBNJ Agreement consequently refers to “one or several sectors.” In contrast, an MPA, in principle, targets an area as such and not just a particular activity from one or more sectors of ocean use. In practice, however, such a division of objectives by ABMTs and MPAs is not always clearly displayed. The establishment of the Ross Sea MPA under the framework of the *Convention on the Conservation of Antarctic Marine Living Resources* (CCAMLR) seems sector-specific (CCAMLR, 1980). While the conservation objectives of this MPA go beyond resource recovery, the adopted measures in paragraph 7 of the Conservation Measure 91–05 only target the fishing sector by prohibiting or restricting fishing activities in the different conservation zones (CCAMLR, 2016).

There is currently no global legal instrument other than the BBNJ Agreement that defines the term “marine protected area.” Even regional conventions designed to deal with MPAs, such as the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (1995), refrain from including a definition in the treaty text (SPA Protocol, 1995). However, institutions like the Food and Agriculture Organization of the United Nations (FAO) and nongovernmental organizations (NGOs), such as the International Union for Conservation of Nature (IUCN), take other approaches to definition (Jakobsen, 2016: 6 et seq; see also Nocito et al., 2022: 3). The definition adopted by the Commission for the *Convention for the Protection of the Marine Environment of the North-East Atlantic* (OSPAR) (OSPAR, 1992) in Recommendation 2003/3 is a further example showing that the approach for defining an MPA is considerably narrower than a definition of ABMTs:

‘Marine protected area’ means an area within the maritime area for which protective, conservation, restorative or precautionary measures, consistent with international law have been instituted for the purpose of protecting and conserving species, habitats, ecosystems or ecological processes of the marine environment. (OSPAR, 2003: para 1.1)

Comparing this narrow approach with the more general one for ABMTs, it becomes apparent that an MPA is more specifically focused upon measures of protection,

conservation, restoration, or precaution on the one hand and species, habitats, ecosystems, and ecological processes on the other. In essence, MPAs focus on preservation, while conservation and sustainable use of marine areas under other ABMTs generally allow for a more flexible sector-specific approach. A further observation on the relationship between MPAs and ABMTs is that the establishment of an MPA can be a particularly viable approach to the protection of a specific area of the marine environment, if they are implemented and developed as part of a broader management strategy including further ABMTs.

4.2.2 Legal Basis in the International Law of the Sea

Despite the lack of an explicit reference, UNCLOS provides the legal basis of ABMTs (Caldeira et al., 2023: 2). As the “constitution of the ocean,” UNCLOS serves as the general foundation for more specific international regulations on the law of the sea. It establishes the legal framework defining the rights and responsibilities of states concerning the use of the ocean. While UNCLOS specifically dedicates Part XII to environmental protection—creating a framework for further, more specific regulations—it largely acts as a broad legal scaffold by establishing maritime zones with differing degrees of jurisdiction over the ocean. This creates a solid basis for other specialized organizations and standard-setting on the global and regional levels, since rights, obligations, and the jurisdiction to regulate and to enforce are clarified. The division of jurisdiction affects ABMTs for shipping. This may establish obstacles to a more integrated approach to environmental protection on the one hand and a lack of coherence in what is expected from vessels navigating through different zones on the other. Ecosystems exist independently from the human division of the ocean into jurisdictional zones. A vulnerable area that is protected by the establishment of an MPA within the exclusive economic zone (EEZ) of a coastal state may well extend to the high seas and would be more comprehensively protected by an integrated approach that restricts, for example, noise by vessel traffic in the adjacent high sea waters. However, it would need an international organization to take actions for this part of the area because the coastal state has no regulatory power. At the same time, shipping in areas that includes passing through high seas as well as different EEZs, and eventually the landing in ports, requires compliance with different sets of restrictions, for example, switching to fuel with a lower sulfur content when entering a Sulphur Emission Control Area or a European Union port.

Article 194(5) of UNCLOS on the protection of ecosystems and habitats indicates an area-based approach to environmental conservation without explicitly referring to specific tools. Likewise, for other parts of UNCLOS, ABMTs are a plausible approach to regulating ocean use, for example, with a view to implementing Article 145(b) on “the protection and conservation of the natural resources of the Area and the prevention of damage to the flora and fauna of the marine

environment.” Yet, UNCLOS is unspecific, which, in turn, grants flexibility to global and regional organizations to promote their environmental objectives through ABMTs. Again, the spatial dimension of the authority to regulate and enforce is of particular relevance in this context.

4.2.3 The Spatial Dimension of Jurisdiction over the Ocean

Tensions between sovereignty over ocean space and the exercise of traditional freedoms, such as the freedom of navigation, result in the need for balancing ocean uses in the different maritime zones. A sharp distinction exists between areas under national jurisdiction and the high seas in regard to states’ jurisdiction to regulate and enforce. Spatial jurisdiction in territorial waters and specific sovereign rights in the EEZ and for the continental shelf stand in contrast to flag state jurisdiction for the high seas. This distinction also affects the use of ABMTs and the enforcement of associated measures to the extent that they impose restrictions upon the freedom of navigation and the operation of ships in different areas of the ocean.

The scope of an international agreement at the “global” or “regional” level does not predetermine whether it is applicable to marine areas beyond or within national jurisdiction. Agreements with a regional scope, such as the OSPAR Convention (1992), may well employ ABMTs for the high seas—as is actually the practice with the network of OSPAR high seas MPAs—whereas IMO instruments with a global scope such as MARPOL (Annex VI) allow for the establishment of emission control areas (ECAs), which are currently all situated in waters under national jurisdiction, such as the Baltic and the EEZs of the United States and Canada.

As mentioned above, UNCLOS has few provisions that imply the possible use of tools for area-based management, for example, Article 194(5) on measures to protect and preserve rare or fragile ecosystems. The spatial dimension of the provision does not limit an area-based approach to a particular maritime zone.

In the territorial sea, the development and implementation of ABMTs is part of the exercise of coastal states’ sovereignty. While the right to innocent passage grants navigational rights to ships flying the flag of other states, Article 21 of UNCLOS provides authority for coastal state legislation for, inter alia, maritime safety, protection of navigational aids, fisheries, environmental protection, and pollution control. In addition to national legislation, Article 21(4) of UNCLOS requires foreign ships exercising innocent passage to comply with “generally accepted international regulations relating to the prevention of collisions at sea.”

While the contrast between sovereignty over the territorial sea by a coastal state and archipelagic waters of an archipelagic state and the freedoms of the high seas may be easy to explain, the status of the EEZ as an area with limited and purpose-specific sovereign rights is more complex. The area does not form part of the territory of the coastal state, and for some purposes, for example, search and rescue, the waters are treated like the high seas. For other purposes, the coastal state enjoys

exclusive sovereign rights, for example, concerning living resources. Such rights are supported by regulatory powers which can restrict shipping. Here, the coastal state can employ ABMTs based upon either national or international law, which then needs to be balanced with the freedom of navigation and other legitimate interests of other states, such as the laying of submarine cables and pipelines. In the EEZ, coastal state sovereign rights are limited to exercising specific functional rights (Article 56 of UNCLOS). Concerning the rights of other states, Article 58(1) of UNCLOS explicitly refers to the freedoms accepted for the high seas, in accordance with Article 87. The crucial balancing of interests in this context is contained in Articles 56 and 58(3) with their references to “due regard” and respect for the laws and regulations of the coastal states which may also include the use of ABMTs. The regulatory jurisdiction by the coastal state, in addition to the sovereign rights listed in Article 56(1)(a), extends to, inter alia, the protection and preservation of the marine environment (Article 56(1)(b)(iii)) as well as to artificial islands and installations (Articles 56(1)(b)(i) and 60). Jurisdiction to enforce national laws that are in accordance with UNCLOS is granted by Article 73. In addition to ABMTs allowed or granted under international agreements, the coastal state can hence adopt area-based measures based upon national law within the competencies UNCLOS establishes for functional jurisdiction in the EEZ.

In contrast to the spatial jurisdiction and sovereign rights to regulate and enforce measures for enhanced environmental protection, including ABMTs that affect shipping, flag state jurisdiction is the prevailing principle governing navigation in ABNJ. The coastal state is still obliged to protect the marine environment in accordance with Part XII of UNCLOS, but there is no central authority that regulates and enforces measures against ships, and, with few exceptions, only the flag state is responsible for compliance control. A common misunderstanding in this context refers to the alleged lack of legal regulation applicable to the high seas. Adoption of the BBNJ Agreement was accompanied by implications in the media that it was the first international legally binding instrument applicable to marine areas beyond national jurisdiction. That the agreement is popularly dubbed the “High Seas Treaty” is telling in this respect. This narrative does not take into account the fact that the 1958 *Geneva Convention on the High Seas*, UNCLOS, as well as other treaties, for example, on the protection of the marine environment, maritime search and rescue, maritime safety, and international customary law, are and have been applicable to the high seas long before the adoption of the BBNJ Agreement.

The high seas are not an unregulated space despite the reliance upon flag state jurisdiction for vessels. Neither are the high seas free from concepts of spatial management. As a result of the broad framework and flexibility in UNCLOS, organizations acting under different international treaties, with either a global and regional scope, can employ ABMTs for parts of the high seas. This would be the means to achieve their objectives, mainly concerning the protection and preservation of the marine environment including the conservation of living resources. One effect of a sectoral approach to ABNJ can be that each “regime has its own distinctive protection mechanisms,” which leads to “a plethora of distinct sectoral regimes designed

to protect specific areas of the ocean from individual sector-specific risks” (Freestone, 2016: 231, 236). However, in practice, sectoral ABMTs for the high seas are the exception. Most ABMTs, as well as the majority of MPAs, are established in areas under national jurisdiction (Nocito et al., 2022: 2).

Notable exceptions of high seas MPAs, which are mainly based upon regional initiatives, include the MPAs in the Southern Ocean under CCAMLR (1980) and the *Madrid Protocol on Environmental Protection to the Antarctic Treaty* (1995); the whale sanctuaries adopted under the ICRW (1946); the network of OSPAR high seas MPAs (OSPAR, n.d.); high seas protected areas in accordance with the *Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean* (Barcelona Convention, 1995); vulnerable marine ecosystems (VMEs), for example, those managed by the North-East Atlantic Fisheries Commission (NEAFC, n.d.); and Areas of Particular Environmental Interest (APEIs) on the deep seabed (ISA, 2011, paras 25–30). These regions have all made considerable progress compared to the lack of a global approach before the adoption of the BBNJ Agreement and compared to the majority of marine regions (Freestone, 2016: 231, 240). The *Convention on Biological Diversity* (CBD), despite the limitation of its spatial scope concerning biodiversity to areas under national jurisdiction in accordance with Article 4(lit. a), initiated the process to identify ecologically or biologically significant marine areas (EBSAs), which are not limited to waters under full or partial national jurisdiction but can include high seas (Lyons et al., 2019: 214–216; CBD, 1992). While the request for cooperation by states and international organizations concerning the management of such areas has been elaborated upon under the CBD process, there are no restrictions associated with the identification of such sites, since the freedom of navigation under UNCLOS prevails.

The limited competencies in regard to restrictions concerning the freedom of navigation are crucial. They have the effect that international instruments differ considerably in regard to the impact they may have on shipping on the high seas. They have in common that they must rely upon international law and international cooperation because no single state exercises spatial sovereignty over the area beyond national jurisdiction. Agreements must also respect the prohibition of third-party effect as established by the customary international law of treaties and codified in Article 34 of the *Vienna Convention on the Law of Treaties* (Vienna Convention, 1969). This results in the establishment of binding obligations only for states who gave consent to be bound (Scott, 2019: 173). Only a truly universal agreement for ABMTs would overcome these inherent limitations.

The IMO as the competent international organization is the main actor in setting legal standards for the regulation of shipping. Regulations adopted in agreements under the auspices of the IMO have substantive binding effect for all parties to UNCLOS as they are introduced into the scope of the Convention as internationally accepted standards. This gives the IMO a unique role and already indicates that none of the other ABMTs established under UNCLOS, as far as seabed mining is concerned, and regional arrangements, such as OSPAR or the Mediterranean Action

Plan, can put restrictions on shipping that reach beyond the parties to such an agreement. The mandate of the BBNJ Agreement to establish restrictive measures, including on shipping as part of high seas ABMTs and MPAs, is subject to interpretation. In the absence of a specific institutional architecture, it will most likely require measures by the IMO to implement relevant restrictions.

4.3 Sector-Specific ABMTs with Direct Relevance for Shipping

The first category of international legal instruments that rely upon ABMTs with relevance for navigation are those that are sector-specific and target shipping to achieve the objective of enhanced environmental conservation. For maritime transportation, differing area-specific standards during a voyage place additional pressure on legal compliance, potentially the technical equipment on board and the operation of the vessel without necessarily resulting in a coherent and sufficient level of environmental protection from pollution associated with shipping. The tension between shipping as a necessary economic activity and environmental concerns becomes apparent in this context. On the one hand, the development of ABMTs with direct relevance for vessels routing or operation has to take account of the significance of maritime transportation for the world economy. On the other hand, the significant contribution to marine pollution by shipping adds pressure to the deterioration of marine ecosystems and calls for international standards, including ABMTs, to protect vulnerable areas (see Krabbe, 2023: 394 with further references).

4.3.1 Maritime Transportation and the Role of the IMO

The shipping industry is a vital component of the global economy, facilitating trade across international waters and amounting to over 80% share of the world's trade in goods (Krabbe, 2023: 392 with further references). So far, however, this essential service often comes at a significant environmental cost, affecting marine biodiversity and water quality and contributing to air pollution and climate change. Compared to other means of transportation of goods, the sector provides a relatively environmentally friendly means of transportation, but the real environmental costs are not internalized. The example of oil pollution from ships serves as one example of the capability of causing serious harm to the marine environment by transport at sea (see also Harrison, 2017: 114). The greening of the shipping sector, pollution control, research into alternative fuels, and ambitious plans, for example, by the European Union, to become carbon neutral point toward innovation and potentially a cleaner and more sustainable way forward. In an effort to address the negative

impacts on the environment by shipping, different sets of ABMTs have been developed within different international legal frameworks.

UNCLOS itself does not provide for ABMTs which directly affect shipping. The IMO is the relevant organization for standard-setting in regard to pollution from vessels, including technical standards and the prevention of collisions and other accidents. The organization has a broad mandate to deal with maritime transportation. In this sense, UNCLOS and the IMO serve complementary roles. UNCLOS provides the foundational legal architecture, while the IMO provides additional layers of technical specifications and recommendations specifically designed for maritime activities by vessels, for example, specific ABMTs that address the unique challenges posed by shipping. However, it is essential to note the limitation of the IMO in that it primarily serves as a facilitator for regulations, for example, agreements and guidelines, which typically lack the capability for direct monitoring or enforcement (O’Leary et al., 2020: 7).

While the IMO is not explicitly mentioned in UNCLOS, the frequent reference to the “competent international organization” in the singular, for example, in Articles 22(3)(a) and 41(4)–(5) on the designation of sea lanes and traffic separation schemes and in Article 211(1) on pollution from vessels, is commonly understood as mandating the IMO to draft the necessary regulations. Moreover, the standards agreed upon under the umbrella of IMO are in turn incorporated back into UNCLOS as the “generally accepted international standards” that were established by the “competent international organization,” as in Article 60(3), and which state parties have to take into account. Hence, applicability reaches beyond the parties to particular IMO conventions. This adds to filling the framework deliberately left by UNCLOS concerning the specific details of vessel traffic, the safety of navigation, and the prevention of marine pollution. Effectively, global standards to prevent vessel-based pollution are primarily set by the IMO, with MARPOL being the most prominent treaty framework to address different sources and substances of pollution (MARPOL 73/78).

4.3.2 Area-Based Prevention and Reduction of Vessel-Based Pollution

Within the MARPOL regime, the IMO has already adopted different ABMTs to address vessel-based pollution, even if this applies to only a relatively small part of the ocean and, so far, with very few exceptions, for example, in Antarctic waters, not to the high seas. The IMO has established different areas with a higher level of protection and, hence, stricter sector-specific requirements for shipping. The designation of special areas under MARPOL, including emission control areas, and the establishment of particularly sensitive sea areas (PSSAs) under the authority of the *Convention on the International Maritime Organization* (IMO Convention, 1948; IMO, 2005) are at the core of IMO initiatives to adopt an area-based approach to

prevent and reduce pollution from ships. By integrating measures like discharge regulations or mandating cleaner technologies for ships upon entering a specific area, ABMTs are part of an antipollution strategy. Other mechanisms, such as instruments to prevent collisions, likewise serve to prevent large-scale pollution associated with accidents, as well as enhancing safety for seafarers.

Under MARPOL annexes, the designation of special areas serves to impose stricter measures for pollution control, for example, Annex I (oil pollution), Annex II (noxious liquid substances), Annex IV (sewage), and Annex V (garbage). The establishment of ECAs under Annex VI is another example of the designation of special areas granting a higher level of protection by imposing restrictions upon the operation of vessels (IMO, *n.d.*).

Likewise, the designation of PSSAs aims at enhanced protection of the marine environment in the relevant area. While there is no fixed catalog of measures, so-called associate protective measures, which apply to all PSSAs, include routing measures, strict application of discharge and equipment requirements under MARPOL, the installation of vessel traffic services, and regulations on speed limits to prevent collisions and mitigate the environmental risks associated with shipping activities. In this respect, the management of PSSAs can use an even larger and more diverse range of measures compared to other IMO ABMTs while at the same time being “less complicated” to declare (Krabbe, 2023: 402). The IMO is competent to declare PSSAs on the high seas, but has not yet done so (Roberts et al., 2010: 487; Scott, 2019: 167). In particular, there is potential for PSSAs to contribute to various Sustainable Development Goals (SDGs) in addition to SDG 14 (Gissi et al., 2022: 5–6).

One of the potentially most effective ABMTs concerning pollution control in certain parts of the ocean is the designation of ECAs due to an elaborated system of very specific restrictions. Incorporated into MARPOL Annex VI, ECAs aim to mitigate air pollution caused by shipping activities. ECAs are established in geographically sensitive or heavily trafficked waters where air and water quality is a significant concern. In these areas, stricter limits can be imposed on the emissions of sulfur oxides (SO_x), nitrogen oxides (NO_x), and/or particulate matter, depending upon the vulnerability of the area. In addition to this area-based approach, the IMO established strict global sulfur caps for marine fuels in a multiple step procedure over several years. ECAs in waters under national jurisdiction are designated upon proposal by the relevant coastal states. In November and December 2023, respectively, Canada (IMO, 2023a) and Norway (IMO, 2023b) submitted proposals to designate Arctic waters under their relevant jurisdiction as emission control areas. There are currently no ECAs on the high seas.

Since the criteria for the identification of either of these areas are not mutually exclusive, the designations of special areas, including ECAs, and PSSAs may well overlap so that a PSSA is established within a special area or vice versa. The Baltic and the North Sea are examples where there are special areas, ECAs, and, in the Baltic and the Wadden Sea, PSSAs. For the Baltic and some waters of the North Sea, regional organizations, namely, the OSPAR Commission for the North Sea as

part of the North-East Atlantic and HELCOM for the Baltic, play an important role in implementation and monitoring.

Not all pollution (e.g., underwater noise) that could be subject to ABMTs is addressed by legal instruments. Existing instruments such as special areas or PSSAs could, in principle, be used to lower noise emissions (O’Leary et al., 2020: 7). To enhance protection of the marine environment from underwater radiated noise (URN) emissions from commercial shipping, the IMO adopted revised guidelines in 2023 (IMO, 2023c). However, as member states are “invited” to use the guidelines, they cannot be considered to have legally binding effect. Neither do the guidelines take a spatial approach. Rather they address the ship as such and describe noise reduction management in paragraph 3.3. as “a tool that may be applied to the operation, design, construction and modification of ships.” A reference to spatial planning is made in paragraph 6.20, which states that “[h]ydrographic offices and maritime administrations should consider marking and updating national and international designated protected areas in charts to enable the seafarers and harbour users to plan voyages to minimize the impact of their ship’s URN on marine life.”

Regional agreements like OSPAR for the North Atlantic or the *Convention on the Protection of the Marine Environment of the Baltic Sea Area* (Helsinki Convention, 1994) use area-based tools for pollution control, but they cannot impose restrictions on shipping with third-party effect beyond the regulatory powers of the coastal states in areas under their respective jurisdiction. There are considerations by the OSPAR Commission concerning underwater noise, which may include area-based tools to address vessel noise, for example, by designating certain shipping lanes to keep certain areas free from this kind of pollution or other spatial-temporal restrictions or exclusions to protect species in a certain time of their life cycles (OSPAR Commission, 2020: 6). Yet, again, the jurisdictional limits are decisive for effectiveness. To the extent that MPAs in the network designated under OSPAR are located in areas beyond national jurisdiction, coordination with other international organizations is necessary to restrict human activities such as shipping, fishing, or seabed mining with effect beyond the OSPAR parties.

Speed reduction in certain marine areas is another ABMT to mitigate the environmental impacts of shipping. In ports and other areas under national jurisdiction, mandatory speed limits are standard. There is, however, no international convention that adopts an area-based approach to vessel speed beyond specific measures in PSSAs. Reduction of vessel speed could be a strategy with a multifaceted significance that would primarily deal with reducing greenhouse gas (GHG) emissions but would also cover maritime safety and sustainable tourism. So far, speed optimization is one factor that can be addressed by ships to enhance their rating concerning their Carbon Intensity Indicator (CII) in accordance with the 2021 amendments to MARPOL Annex VI, which entered into force November 1, 2022 (IMO, 2021), and the 2023 IMO Strategy on the Reduction of GHG Emissions from Ships (IMO, 2023d). This, however, is not an ABMT but a vessel-specific approach. Within the IMO, discussions on a mandatory speed reduction across the global shipping fleet

have not been successful and no longer feature prominently on the IMO agenda. Moreover, such a general global measure would not be considered an ABMT. While speed regulations in certain areas offer substantial promise for achieving a variety of objectives, including safety and accident prevention, they are no longer included in the 2023 IMO Greenhouse Gas Emission Strategy (IMO, 2023d). If the current Strategy is successfully implemented by switching to zero GHG emission fuels, restrictions of speed as a measure of emission reduction will be obsolete. Speed reductions could, however, remain a valid measure for accident prevention and, particularly, noise reduction in certain areas.

4.3.3 Other ABMTs Directed at Shipping

The prevention of accidents at sea serves a double purpose: enhancing safety for ships and seafarers as well as preventing environmental harm. Under the SOLAS Convention Regulation V/8, the IMO is the only international organization with the competence to establish international measures on the routing of vessels. The COLREGs apply to the high seas and all other waters connected thereto which are navigable (COLREGs, 1972). In Rule 1 (lit. d), traffic separation schemes are mentioned as one mechanism to pursue the objectives of the Convention. Since the amount of vessel traffic is one criterion for the establishment of special areas under the different MARPOL annexes, areas may overlap in which routing and traffic separation schemes are established, particularly, since in practice these areas are located within national jurisdiction. With the IMO as the relevant international organization establishing such schemes and monitoring effectiveness, inconsistencies and the assessment of the effectiveness should rest with this organization.

4.4 ABMTs with a Potentially Indirect Effect on Shipping

Sector-specific ABMTs for the exploration and exploitation of marine resources only address a certain activity, for example, fishing or seabed mining. As a result, the implications for shipping are currently irrelevant. However, since ABMTs, including MPAs, can theoretically address several sectors or even have a cross-sectoral approach, international instruments dealing with marine resources could have potential relevance for maritime transportation. It should be noted that cross-sectoral approaches to ABMTs, such as marine spatial planning or integrated coastal zone management, currently are not applied to ABNJ. A cross-sectoral approach for the high seas would require a significant amount of cooperation between institutions (Zhao, 2021: 19). The following observations mainly serve as the basis for assessment of future developments addressing more than one sector, particularly in ABNJ and in accordance with the BBNJ Treaty.

4.4.1 ABMTs for the Conservation of Living Resources

ABMTs can offer a strategic approach to mitigate some of the challenges associated with high seas fisheries, namely, overfishing; illegal, unreported, and unregulated (IUU) fishing; access inequality; and negative environmental impacts. First, establishing MPAs in regions known for overfishing can act as biological “savings accounts,” providing fish stocks the time and space needed to recover. Implementing seasonal closures, for example, during breeding seasons, can help maintain the reproductive viability of fish stocks. Second, it is easier to monitor and enforce regulations concerning IUU fishing within areas in which ABMTs are established than across the entirety of the high seas. Technological measures like satellite monitoring can be concentrated in these zones for more effective oversight. ABMTs often require more rigorous data reporting, making IUU fishing activities more transparent and easier to act upon. Third, ABMTs can be structured to allocate specific fishing zones for smaller and developing nations, ensuring they have equitable access to fish stocks. Developing states can be included in the governance of ABMTs, allowing them a say in the management and utilization of these high seas resources. Fourth, some ABMTs can specifically target ecologically sensitive areas such as coral reefs or seamounts that are most affected by destructive fishing practices like bottom trawling and restrict harmful activities, for example, bottom fishing in VMEs. By taking into account the entire ecosystem and not just individual species or habitat, ABMTs can offer more holistic solutions that mitigate broader environmental impacts. If and to the extent that they cover more than one sector, such benefits would potentially be enhanced. Yet, this would also require enhanced cooperation and coordination to maintain a balance with global shipping interests.

Currently, most fishing activities take place in the EEZs of states. Due to the functional nature of this zone, coastal states do not enjoy full sovereignty but only sovereign rights over living resources. This includes the regulation of access to and protection of living resources in these waters, including the establishment of MPAs with restrictions on fisheries and navigation therein. A comparison on national rules, however, is beyond the scope of this chapter, and there is no international legal instrument calling for the use of ABMTs in regard to fisheries in areas under national jurisdiction.

On the high seas, UNCLOS guarantees the freedom of navigation, the freedom of fishing, and further freedoms. The relationship between the different high seas freedoms is one of “due regard.” Articles 87 and 116–120 of UNCLOS specifically outline the freedoms and responsibilities connected with high seas fishing. Area-based approaches to living resources could theoretically interfere with the freedom of navigation, if restrictions upon vessel traffic—in contrast to restrictions on fishing activities only—were imposed. This, however, is beyond the mandate of international institutions establishing ABMTs in relation to high seas fisheries, particularly for flag states other than those who are parties to the relevant regional agreement.

As a global treaty on living resources, the 1995 UN Fish Stocks Agreement adds regulations on straddling and highly migratory fish stocks to UNCLOS and applies to ABNJ and, subject to Articles 6 and 7 of the Agreement, to areas under national jurisdiction (UN Fish Stocks Agreement, 1995 art 3(1)). Despite the global scope of the Agreement, the establishment of MPAs and other ABMTs with restrictions on fisheries on the high seas is largely governed by organizations with a regional scope. Neither UNCLOS nor the UN Fish Stocks Agreement adopts a spatial approach to conservation measures for living resources. The UN Fish Stocks Agreement, by establishing duties of member states to cooperate, transfers particular power to regional fisheries management organizations (RFMOs), subregional organizations, and comparable arrangements. These organizations may adopt ABMTs for the conservation and sustainable use of marine resources, including ABNJ (Scott, 2019: 166). At the same time, ABMTs imposed by other organizations could overlap with the regional scope of the RFMO and, instead of focusing on a specific living resource, may address other activities for the purpose of protecting a broader scope of marine ecosystems. In current practice, however, this is not generally the case.

Area-based elements of fisheries regulation include no-fishing zones or other special management areas, for example, vulnerable marine ecosystems, that address either all fishing activities with a general or temporal scope or specific fishing activities such as bottom trawling. As such, restrictions do not affect shipping, unless the IMO designates measures under, for example, a PSSA in the same region, which in turn would affect only the ships' mobility and not be integrated with other conservation objectives. From the perspective of noise reduction in areas that are relevant for certain fish stocks, measures encompassing both fisheries and shipping with at least a temporal scope could be beneficial to achieve a higher conservation status. Depending upon the location of the area, such measures could put an additional burden on shipping routes. The effective functioning of ABMTs beyond the regulatory scope of an RFMO and their area-based management would require a certain level of coordination and collaboration between different actors such as the IMO for shipping and an RFMO for fisheries, especially when their objectives and areas of operation overlap.

Two regional initiatives are particularly noteworthy, although neither includes restrictions on shipping: CCAMLR and NEAFC. The world's largest marine MPA has been established under CCAMLR in the Antarctic. Parties have adopted particularly strict restrictions on fisheries but not on vessel traffic. The vessel monitoring system in place for the convention area applies to fishing vessels and monitors compliance with conservation measures, but does not document or restrict other maritime traffic. The NEAFC is a good example of a RFMO that uses closures of areas for fishing and protects VME from bottom fishing. Again, the adopted measures do not concern maritime transportation. The entering into arrangements and memoranda of understanding with other organizations, such as the OSPAR Commission and the International Seabed Authority (ISA), is evidence of cooperation and coordination efforts that could eventually lead to ABMTs with measures that address more than one sector.

4.4.2 *Exploration and Extraction of Nonliving Resources*

Marine nonliving resources are part of what constitutes the “blue economy.” Their responsible management is crucial for global development as well as sustainability. This involves a balance between exploitation and conservation, and ABMTs can be a crucial element in the framework to strike this balance (Blanchard and Gollner, 2022: 2–4). ABMTs could offer a multifaceted approach to the governance of non-living marine resources by establishing zones for resource extraction while protecting ecologically sensitive areas, guide best practices, and provide the necessary legal framework for international cooperation. If accompanied by monitoring and adaptive management, dynamic ABMTs allow for responses to emerging challenges and technologies, making them an indispensable tool in the responsible management of nonliving resources in the ocean.

The current approach to employing ABMTs for nonliving marine resources is sectoral and does not target shipping. In regard to navigation, UNCLOS allows for the establishment of safety zones around platforms and installations in the EEZ in accordance with Article 60(4–6). While such a zone certainly contributes to the prevention of accidents and, as a result, can prevent pollution, it is not a strategic instrument to enhance the protection of the marine environment.

The development of commercial deep-sea mining for minerals like polymetallic nodules or sulfides has gained considerable attention for its economic potential but also raises serious environmental concerns (Blanchard and Gollner, 2022: 2–4). In regard to seabed mining in the Area, there are different approaches to ABMTs, including the establishment of APEIs as well as buffer zones and reference zones. The approach, however, remains sectoral. The ISA plays the decisive role in regulating mineral-related activities in the Area. It employs ABMTs as part of its mandate to establish a governance framework that not only allows for exploration and exploitation but also reserves sites of particular environmental value. The main difficulty is the lack of scientific insight on the viability of such area-based approaches. ABMTs, for example, as reference sites, can contribute to establishing standardized assessment criteria for environmental impacts and social implications of deep-sea mining operations (Ibid).

ABMTs include “no-mining zones,” for example, around ecologically sensitive areas like hydrothermal vent systems, which are rich in biodiversity (Christiansen et al., 2022: 4). This also protects the integrity of the surrounding marine environment (Harrison, 2017). The ISA does not grant licenses for exploration or exploitation of mineral resources in APEIs. Despite the considerable lack of knowledge, such proactive measures could have long-term benefits, including preserving these areas for scientific research and maintaining the health and balance of marine ecosystems (Ibid). With regard to the freedom of navigation, however, these areas do not impose any restrictions. This could change if different organizations, including the IMO, take a coordinated approach to ABMTs for specific areas of the ocean in the implementation process for the BBNJ Agreement.

Theoretically, ABMTs could also extend to Antarctica's significant nonliving resources, that is, minerals and fossil fuels, serving as a governance tool for future extraction debates (Rogers et al., 2021: 2 et seq). In this context, the Antarctic Treaty System is an example of a framework under which potential ABMTs specifically designed to protect biological diversity in accordance with the BBNJ Agreement could contribute to an even higher protections status (Gardiner, 2020: 2). Though the applicable treaties currently prohibit any commercial exploitation on nonliving resources, this might change in the future (ibid). In regard to shipping, the lack of competence of organizations within the Antarctic Treaty System to restrict navigation in certain areas prevents a multiple or even cross-sectoral approach.

4.4.3 ABMTs under the BBNJ Agreement

The use of ABMTs in marine areas beyond national jurisdiction to better protect marine biological diversity is one of the four pillars of the BBNJ Agreement. It has been argued that the establishment of ABMTs, including MPAs, under the BBNJ Agreement will not only fill certain gaps in prior agreements but also promote comprehensiveness, coherence, and consistency of marine ABMTs (Duan, 2024: 2). The issue of consistency has two elements, namely, from the perspective of adjacent MPAs under the jurisdiction by the coastal state and with regard to the potential overlap of the BBNJ Agreement's mandate with other international organizations.

It is a question of interpretation as to whether there is a mandate under the BBNJ Agreement to adopt measures as part of ABMTs, even if this duplicates or overlaps with the mandate of other regimes (Duan, 2024: 4–5). The crucial terms in Article 22(2) of the BBNJ Agreement are “respect the competencies of” and “not undermine” existing legal instruments and bodies on the global, regional, and subregional scale and sectoral bodies. The negotiations did not lead to the establishment of new institutions. Rather the Agreement relies upon existing institutional frameworks. One can conclude from this that preference must be given to a limited mandate that requires a high degree of cooperation with other existing organizations and bodies. In any case, far-reaching restrictive measures with a potential global impact on shipping, for example, closures of certain areas to transit, certainly cannot be implemented by the Conference of Parties of the BBNJ Agreement alone. The freedom of navigation on the high seas has not lost any of its legal relevance, and the BBNJ Agreement as an implementing agreement to UNCLOS does not implicitly override one of its basic principles. The last decades have seen the concentration of regulatory power with the IMO, and this is not undermined by the language of the BBNJ Agreement.

Since the BBNJ Treaty does not offer a new institutional architecture but instead relies on existing institutions, it will most likely again be the IMO with the relevant experience and “toolbox” to cooperate on and implement potential restrictions on

international navigation. The IMO is explicitly named as one of the organizations participating in the clearinghouse mechanism established by the Agreement to facilitate the exchange of information as the basis for closer cooperation. Given the current reluctance of the IMO to designate further PSSAs or special areas in ABNJ, one may question whether there will be an increase in such areas or other restrictions on shipping in the implementation of the BBNJ Agreement. Accordingly, some scholars urge for a broad interpretation of the BBNJ mandate (Duan, 2024: 5 with further references). While this more ambitious approach is justified by the need to better protect biodiversity in ABNJ, the compromise that states have reached with the adoption of the treaty does not necessarily support this view.

4.5 Conclusion

For the use of the ocean for the purpose of transportation of goods and passengers, ABMTs have emerged as one legal approach to balance economic and environmental interests. To this end, the involvement of multiple stakeholders, such as shipping companies and NGOs, is crucial for effective implementation but also adds complexity and potential conflicts of interest. Despite their potential, ABMTs face legal and practical challenges that require coordinated international efforts for successful implementation and enforcement by the competent international organizations.

Some stressors for marine ecosystems cannot be addressed by ABMTs alone. The effects of climate change, such as a rise in ocean temperature and acidification, cannot be addressed by MPAs or other area-based tools. However, by restricting human uses in certain particularly important or vulnerable areas, additional stress can be alleviated on these marine ecosystems. This may include restrictions on shipping with a view to prevent pollution, including noise emissions, in areas under national jurisdiction and beyond.

So far there are no cross-sectoral ABMTs for areas beyond national jurisdiction, and even ABMTs for more than one sector are currently not imposed by one organization alone. The fragmented nature of establishing current MPAs makes an integrated approach more difficult (Krabbe, 2023: 396). They would need to result from coordinated efforts, for example, by the OSPAR Commission establishing an MPA, the NEAFC restricting fisheries in the same area, and the ISA prohibiting seabed mining by designating the seafloor an APEI. The extent to which the BBNJ Agreement will lead to more cooperation and coordination remains to be seen when the treaty enters not only into force but reaches the implementation stage.

Currently, coherence and complementarity of ABMTs is primarily being discussed from the point of view of the new BBNJ Agreement and its implementation once it enters into force. If there are to be further sectoral ABMTs for the high seas, it is expected that they will be discussed and decided upon within this new framework. The crucial element for establishing ABMTs on the high seas that are targeted at a high conservation status by addressing more than one sector of human activities

or even adopting a cross-sectoral approach will be cooperation between the actors with different competencies who need to be involved in the process. For shipping, the prime responsibility rests, again, with the IMO. It already has the authority to establish high seas MPAs and apply other ABMTs, for example, as high seas PSSAs.

If there is no exchange of information or streamlined efforts between institutions, there is the risk that uses like shipping will be restricted in a manner not justified by the ecological benefits. The BBNJ Clearing House Mechanism is one important platform to provide such information services. Likewise, other arrangements on a bilateral or multilateral level between organizations acting within the same marine area, such as the cooperation agreements between NEAFC and OSPAR, can provide necessary structures for an exchange of information.

At the same time, apart from ABMTs, the greening of the shipping sector is more important than ever. ABMTs targeted at maritime transportation are a comparably small element in preventing pollution from shipping. The general greening of shipping and the transformation efforts concerning use of alternative fuels to reduce GHG emissions should be the priority rather than fragmenting the ocean with uncoordinated ABMTs.

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