Background document on the status of conservation and management of marine Areas Beyond National Jurisdiction (ABNJ) and marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ) in the western Indian Ocean

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ABBREVIATIONS

ABMT	Area based management tools
ABNJ	Areas beyond national jurisdiction
BBNJ	Biodiversity Beyond National Jurisdiction
IOC-UNESCO	Intergovernmental Oceanographic Commission - United Nations Educational, Scientific and Cultural Organization
IOTC	Indian Ocean Tuna Commission
IUCN	International Union for Conservation of Nature
MPA	Marine Protected Areas
MSP	Marine Spatial Planning
NC	Nairobi Convention
SIOFA	South Indian Ocean Fisheries Agreement
SWIOFC	South Western Indian Ocean Fisheries Commission
UNCLOS	United Nations Convention on the Law of the Sea (UNCLOS)
UNEP	United Nations Environment Programme
WIO	Western Indian Ocean
WIOMSA	Western Indian Ocean Marine Science Association
TK	Traditional knowledge
IPLC	Indigenous people and Local Communities
STB	Scientific and Technical Body

1. Introduction

The Western Indian Ocean includes the ten countries of Comoros, France, Kenya, Madagascar, Republic of Mauritius, Mozambique, Seychelles, Somalia, South Africa and the United Republic of Tanzania, which have continued to express an interest in the potential for marine protection both within and beyond national jurisdiction (UNEP-Nairobi Convention and WIOMSA. 2021). The Contracting Parties (CP) of the Nairobi Convention (NC) has mandated the secretariat to examine the role of the Nairobi Convention with respect to areas beyond national jurisdiction (ABNJ). However, it is worth noting that the NC's charter does not currently extend to coverage of the ABNJ. It may be worth considering whether a formal mandate should be sought to engage further with the discussion of MPAs in ABNJ.

The latest definition of MPAs is "a geographically defined marine area that is designated and managed to achieve specific long-term biodiversity conservation objectives and may allow, where appropriate, sustainable use provided it is consistent with the conservation objectives." (Article 1 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)). However, the definition does not specify what are the specific long-term biodiversity conservation objectives that a MPA can have that can in turn determine what activities need to be regulated in the defined marine area.

Through the use of science and consideration of socioeconomic interests, this background paper identifies areas with the potential to become an MPA. Based on the identified scenarios, it proposes potential governance mechanisms. This paper is authored after the adoption of the agreed text of the BBNJ.

This background paper can be read in conjunction with the 'State of the Ocean Governance in the Western Indian Ocean (UNEP and Nairobi Convention, 2020).

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2. Marine Protected Areas in Areas Beyond National Jurisdiction

The health of marine and coastal ecosystems is in serious decline from multiple human pressures, compromising the provision of essential goods and services for human persistence (Smith et al. 2023; Beaumont et al. 2019). In addition to rapidly growing coastal populations, the unregulated expansion of existing uses of the ocean, and the addition of emerging uses such as renewable energy, large-scale aquaculture and mining will further exacerbate the decline of marine ecosystems (Evans et al. 2023). While the consequences of marine and coastal environmental changes are perceived locally, nations now acknowledge the need for global management actions transcending national jurisdictions (O'Leary et al. 2020). Coordinated conservation actions across jurisdictions can be challenging (Bodin 2017, Marsac et al 2020), and requires strong regional commitment to conservation and a willingness to collaborate at a national level to achieve conservation goals both within and across national boundaries, particularly in the ABNJ (Murawski 2010).

A critical aspect of safeguarding biodiversity lies in the implementation of area-based management tools (ABMTs), which are defined by the International Union for Conservation of Nature (IUCN) as regulations that govern human activities within specific areas with the aim of achieving conservation or sustainable resource management objectives (Day et al. 2012). MPAs play a crucial role in safeguarding various regions of the ocean, both within national waters and ABNJ (Marshall et al. 2015). By implementing MPAs, we employ a valuable management tool that effectively limits human activities and usage within specific geographical boundaries in the ocean (Day et al. 2012). The levels of restrictions imposed within MPAs may vary, ranging from complete exclusion of human interactions (referred to as no-take areas) to allowing multiple uses such as tourism and fishing. It is worth noting that the majority of existing MPAs are situated within a country's exclusive economic zone (EEZ). Underlining the significance of MPAs, the international community took a substantial step forward in June 2023 by adopting the BBNJ Agreement that has seen over 80 signatories in early October. The new high seas treaty sets out a framework for establishing MPAs in ABNJ, further strengthening our ability to preserve the marine environment.

According to FAO, approximately 62 % of the Ocean surface and 95 % of their volume coincide with areas outside 200 miles from coastlines – the ABNJ (FAO, 2018; Gutierrez et

al., 2023). However, protected areas in ABNJ are substantially less significant, with only 1.18 per cent of the high seas under protection (UNEP-WCMC and IUCN, 2021). Currently (as of 2023) there are only 12 MPAs within the ABNJ (Smith and Jabour 2018). Two of these are in the Southern Ocean and were adopted by members of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in a complex, slow and challenging process of planning and negotiations (Smith and Jabour, 2018). Ten others were established in the North-East Atlantic under the OSPAR Convention, and although here the MPA network was established relatively swiftly, reports indicate they are a network of 'paper parks'(Matz-Luck and Fuchs, 2014). Design and implementation in ABNJ are complicated by: (i) the lack of knowledge on the intricate ocean ecosystems far offshore, and (ii) competing interests between resource extraction (i.e., fishing, mining) and conservation (Smith and Jabour, 2018). Furthermore, the evidence-based approach to protecting the high seas requires significant research, for example, to understand key processes such as structural and functional connectivity, biodiversity distribution and mapping of deep-seabed habitats (e.g. Harris et al. 2014). This could facilitate spatial planning using suitable biodiversity surrogates, precautionary principle, and functional connectivity as the main focus of the conservation goals guiding the identification of areas suitable for inclusion in ABNJ MPA (Álvarez-Romero et al. 2018).

2.1. ABNJ in the Western Indian Ocean region (WIO ABNJ)

There is no formal delineation of a 'WIO ABNJ' region since the eastern limit of the WIO has not been explicitly defined. However, the new BBNJ Agreement recognises the importance of the interests, roles and consultation of coastal states in relation to ABNJ adjacent to their maritime zones, based on the concept of 'adjacency' between the high seas and the EEZs, as well as the continental shelf and the Area (Humphries et al. 2020; Mossop and Schofield 2020). On this basis, for this study, we adopted WIO ABNJ region as an intersection of high seas regions of the FAO fishing zone 51, and the Regional Fisheries Management Organisation (RFMO) defined Southern Indian Ocean Fisheries agreement areas (SIOFA) (*Figure 1*). Consequently, the eastern and the southernmost boundaries were set to 75°E and -44°S, enclosing an ABNJ region of ~ 15.5 Million square km.

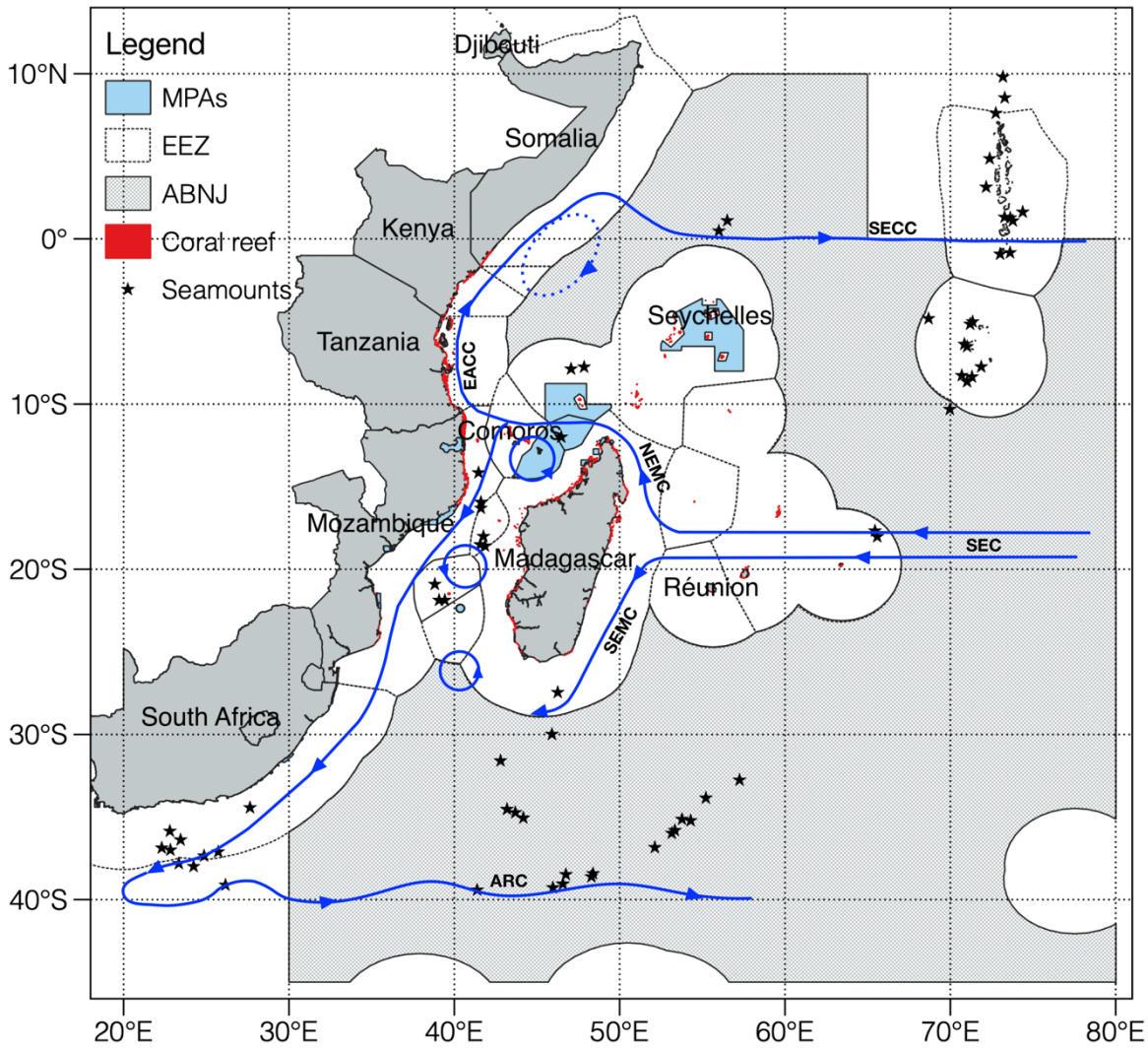


Figure 1. Map of the region showing the ABNJ, EEZ, MPA, geomorphic habitats and the main oceanographic circulation in the Southwest Monsoon adapted from Schott and McCreary, 2001. The major currents illustrated include the South Equatorial Current (SEC), the North East Madagascar Current (NEMC) and the South East Madagascar Current (SEMC), the East African Coastal Current (EACC), the Somali Current (SC). Further south is the Agulhas Current (AC) and the Agulhas Return Current (ARC). The SECC occurs only during the winter monsoon, and flows between latitudes 1° and 7°S.

2.1.1. Oceanographic processes in WIO ABNJ

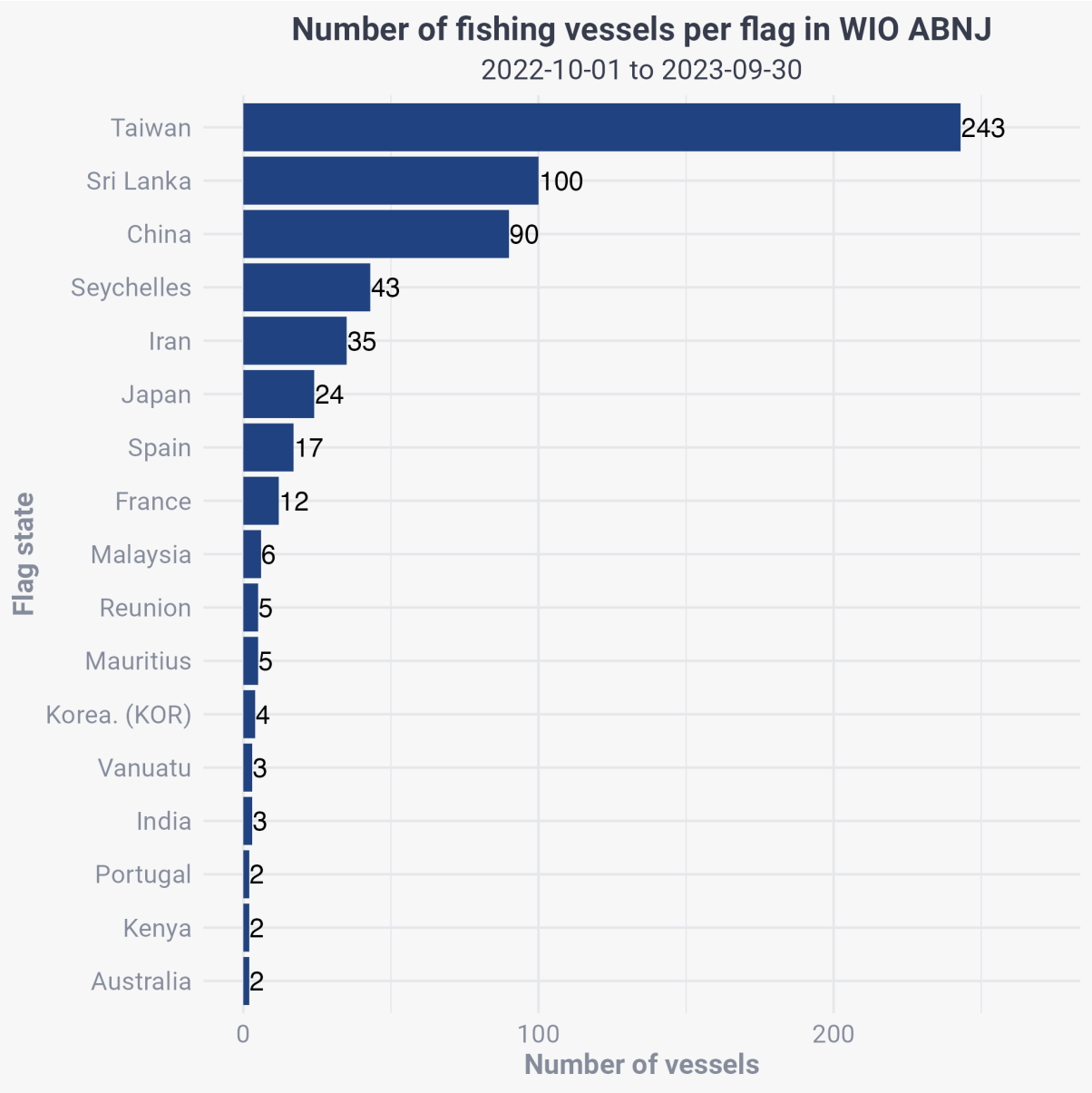
Oceanic processes play an important role in larval dispersal and connectivity among populations. The westward flowing South Equatorial Current (SEC) carries waters from the Indonesian region across the Indian Ocean between 10–20◦S (Schott et al. 2009) *(Figure 1*). This zonal flow creates a physical and functional connectivity barrier to dispersal between

Seychelles and the Mascarene islands. On the east coast of Madagascar, the SEC accelerates past the tip of Madagascar as the Northeast Madagascar Current (NEMC) while facilitating larval dispersal from the northeast tip of Madagascar into Comoros and further along the East African coast. Instabilities in the current result in formation of the Comoros eddies (Collins et al. 2014). These eddies have important implications for connectivity as they entrap larvae released within the Comoros Basin. On reaching the East Africa mainland coast, the NEMC splits into the northward flowing East African Coastal Current (EACC) and southwards as eddies in the Mozambique Channel. The NEMC creates a barrier between the reefs north and further south in Mozambique Channel. Along the East African coast (Tanzania, Kenya and Somalia), the dominant pattern of connectivity is south to north connectivity for coral reefs. This is due to constant northward flow of the East African Coastal Current (EACC). It is also worth noting north to south (Somali to Kenya) connections mostly for reefs found in the northern banks of Kenya. This is because the northern region is seasonally influenced by the reversal of the Somali Current (from northward flowing current in southwest monsoon to southward flowing during northeast monsoon). Therefore, the strength in the amount of north to south connections depends on the strength of the reversing Somali Current. Further south, the northwest coast of Madagascar and Mozambique coast show high level of connectivity with the high seas, and spatially explicit considerations for maintaining or restoring habitat diversity and connectivity across maritime jurisdictions.

2.1.2. Fishing activities in WIO ABNJ

WIO ABNJ experience high intensity of fishing, with an estimated cumulative effort of 265,000 hours by 19 countries, with a net revenue $537 Million (Sala et al. 2016). Analyses of the Global Fish Watch data in Google Earth Engine (Sala et al. 2016) reveals that of the 19 countries that fished in FAO zone 51 in 2016, only four countries (Tanzania, Seychelles, Comoros and Maldives) were from the WIO region and earned ~$5 Million (*Figure 2*). France and Spain earned over $200 million in net profits, while New Zealand, Korea and Taiwan earned >20 Million in 2016 (*Figure 2*). According to the data from SeaAroundUs database (Pauly et al. 2020), average fish landing within the EEZ from 2009-2014 was 682,265 tons/year with Tanzania, Mozambique, Madagascar and Somalia landing the highest amount. Industrial fishing, by comparison, was relatively low (21%) compared to artisanal (61%). The low industrial landing (primarily from the high seas) does not reflect the importance of the ABNJ to the WIO countries. The high functional connectivity demonstrated in this, and other studies suggest a high dependence between the EEZ and high

seas. Having WIO countries suffer the consequences of exploitation of the adjacent high seas, an area with significant impact on fish stocks and fisheries - and by extension socioeconomics - is unjust.



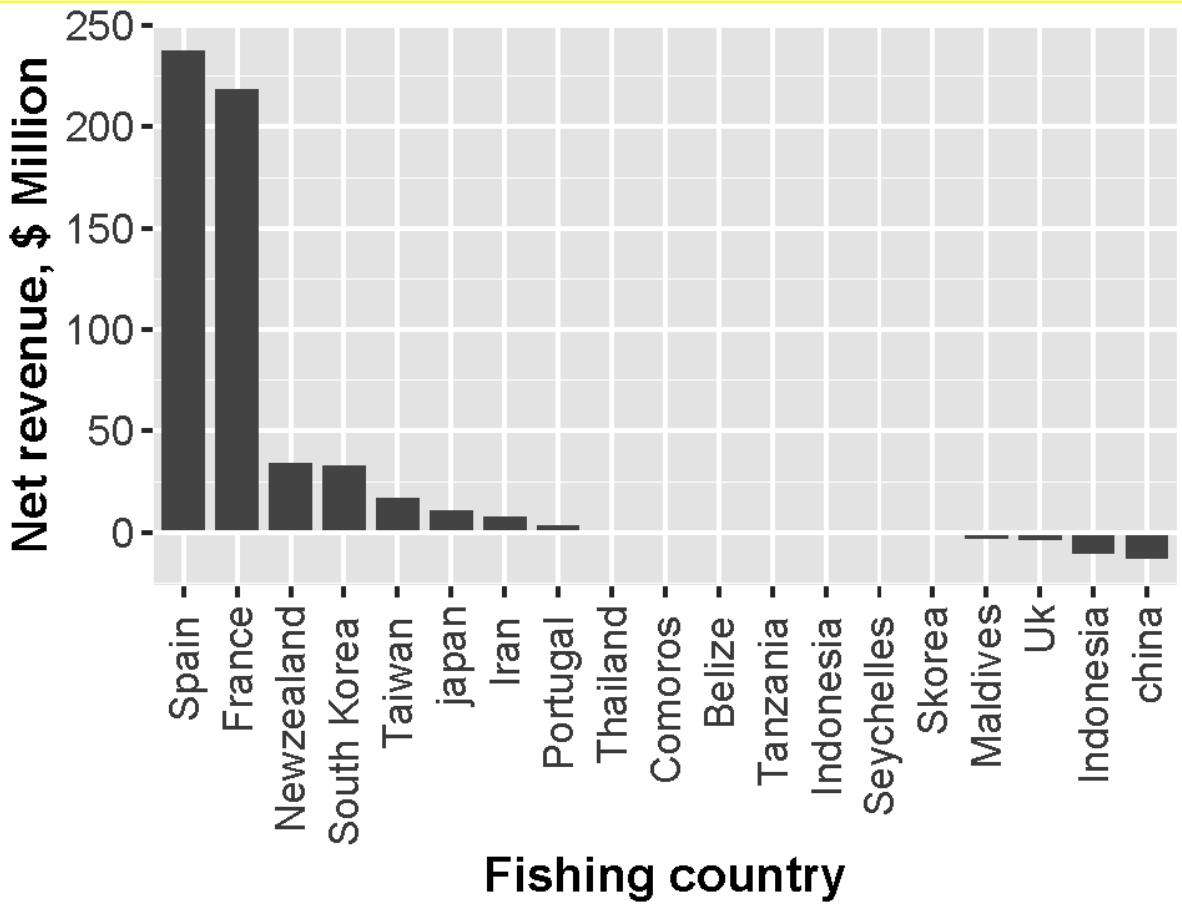


Figure 2 (a) Number of fishing vessels in the WIO ABJI per flag over a 1 year period during 2022-2023 (Data courtesy of Global Fishing Watch) (b) The economics of fishing in the WIO ABNJ showing the net revenue (including subsidies) of the countries that fished in the WIO ABNJ in 2020 (data source: Fishing effort data citation: Global Fishing Watch archived in Google Earth Engine (https://globalfishingwatch.org.) Economic data is based on Sala et al (2016).

2.1.3. Connectivity between ABNJ and EEZ

Marine functional connectivity, or the exchange of individuals among marine populations, transcends maritime boundaries to support the most fundamental ecological function of connecting ecosystems, including the highly migratory species such as tuna, some sharks and long-lived species that move between ABNJ and EEZs (Cowen et al. 2007, Calich et al. 2018). Due to this highly migratory nature, along with their use of the 'high seas', these species tend to be intensely fished and overexploited by multinational fishing fleets in ~60% of global

oceans that are beyond the control of any individual nation (Campana 2016, Dulvy et al 2014; White et al. 2019). Connectivity facilitates recovery processes after disturbance, through spillover of mobile juveniles and adults from MPAs into adjacent unprotected habitat and seeding of unprotected sites with larvae spawned within MPAs (Roberts et al. 2017). Recovery through resettlement depends largely on maintaining the supply of larvae, underpinning the need for functionally connected networks of marine reserves. Consequently, the long-term persistence of marine ecosystems and ecosystem services they provide hinges on identifying meso-scale connectivity patterns to link marine protected areas within networks across the maritime jurisdiction. The Kunming Montreal Biodiversity Framework calls for the protection of connectivity in order to ensure biological diversity persistence, socioeconomic development and genetic diversity as part of its broader goal of achieving harmony between humans and nature by 2050.

2.1.4. WIO Case study: Connectivity between ABNJ and EEZ

To evaluate connectivity among features in the WIO EEZ and the ABNJ, including the seamounts in the ABNJ and the EEZ, MPAs within the EEZ and ABNJ, and coral reefs connected to the ABNJ, we simulated larval dispersal and observed movement patterns. Spatial data for MPAs for the WIO were obtained from a recently constructed WIO MPA comprehensive database containing 143 MPA records (UNEP and WIOMSA, 2021). Coral reef data at 1x1km grid were obtained from UNEP-WCMC archives. We used the Mercator ocean data with a square grid size of ~25km. Consequently, the coral reef layer was re-sampled to 25km square grids. Seamounts data was obtained from global sea floor habitat database (Harris et.al. 2014). We used a subset of seamounts intersecting the study area at a depth range of 2000-1000m (*Figure 1*). Centroids from MPA, coral reefs and seamounts (N=143, 242, and 67 respectively) were set as the release and settlement locations of virtual larvae. To estimate connectivity between EEZ and the ABNJ, within Ocean modelling environment we released and tracked particles at every grid in both regions (~20000 grids in ABNJ and EEZ). We modelled larval dispersal using Itchyop v 3.3, an individual-based model designed to study the effects of physical and biological factors on the dynamics of fish eggs and larvae (Lett et al. 2008, Lett et al. 2019). One thousand virtual larvae were released from each centroid from January to December for 11 years (2010-2020), and tracked over 30 days (the average Pelagic Larval Duration (PLD) of fishes) with a time step iteration of 6 hours (i.e. ~14 million virtual larvae released across all release) (Andrello et al., 2017). We then summarised and mapped the

outputs of the simulations to illustrate the level of connections among the spatial features (i.e. Seamounts, coral reefs, MPAs and the EEZ and ABNJ regions).

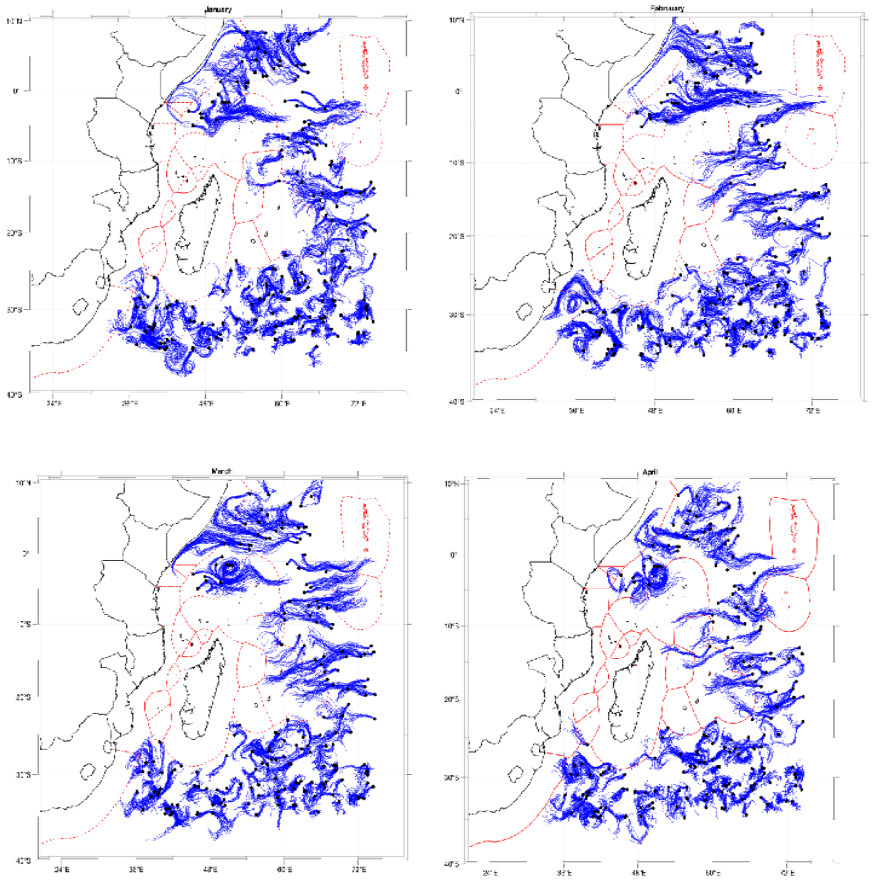


Figure 3. Simulating connectivity between ABNJ and EEZ in the WIO region. The figure illustrates particle movement across the jurisdictions. Panels represent the months of January to April. Particles are programmed to mimic biological traits and released at various locations in the ABNJ and the movement patterns as a function of oceanographic properties are mapped.

Most of the larvae released from ABNJ settled in Mauritius, Seychelles and Madagascar EEZ, while Somalia and Mozambique received relatively high proportion in comparison to other continental countries (*Figure 3*). Similarly, larvae release from the seamounts within ABNJ settled in Mauritius, Seychelles and Somalia EEZ (*Figure 3*). Overall, 55% of larvae released from ABNJ settled within the EEZ, with the majority (10%) settling in Madagascar, 7.3% in Mozambique, 7.20% in Seychelles, 5.45% in South Africa and 4.86% in Reunion (*Figure 3*).

A similar study undertaken by Popova et al (2019) indicated that up to 8 countries of the WIO are directly connected to ABNJ processes from the northern and eastern regions of the WIO, with lengths of coastline affected ranging from 1500 to 4000 km depending on the countries.

Seamounts were found to be highly connected to other seamounts, coral reefs and MPAs, approximately 34% of features identified as having a high regional connectivity value (i.e. 10 percentile of most seeding/receiving) were seamounts. Seamounts within the Mozambique Channel (MC), the South Indian Ocean Ridge (SIOR) and Chagos-Laccadive plateau (CLP) were connected (*Figure 1, 3*). Long distance connection was also evident where seamounts within Chagos-Laccadive plateau were connected to those in the Mid-Indian Ridge (*Figure 4)*. Similar to shallow populations along coastlines, steppingstones may be appropriate for many deep-sea species particularly those arranged linearly along mid-oceanic ridge or a linear array of sea mounts. In contrast, open ocean that separates linear arrays of seamounts creates an effective barrier to dispersal and connectivity creating regionally isolated populations. This scenario is evident in **Figure 4**. 15 seamounts were isolated, as they didn't receive larvae from other seamounts and 12 were non-seeding while seven, located off the South African coast along the path of the Agulhas current, were completely isolated (*Figure 4*). However, these results contrast with those of Crochelet et al (2020), which found a low connectivity between seamounts and coastal ecosystems (only 2.1% of seamount-originated larvae reaching a coast.)

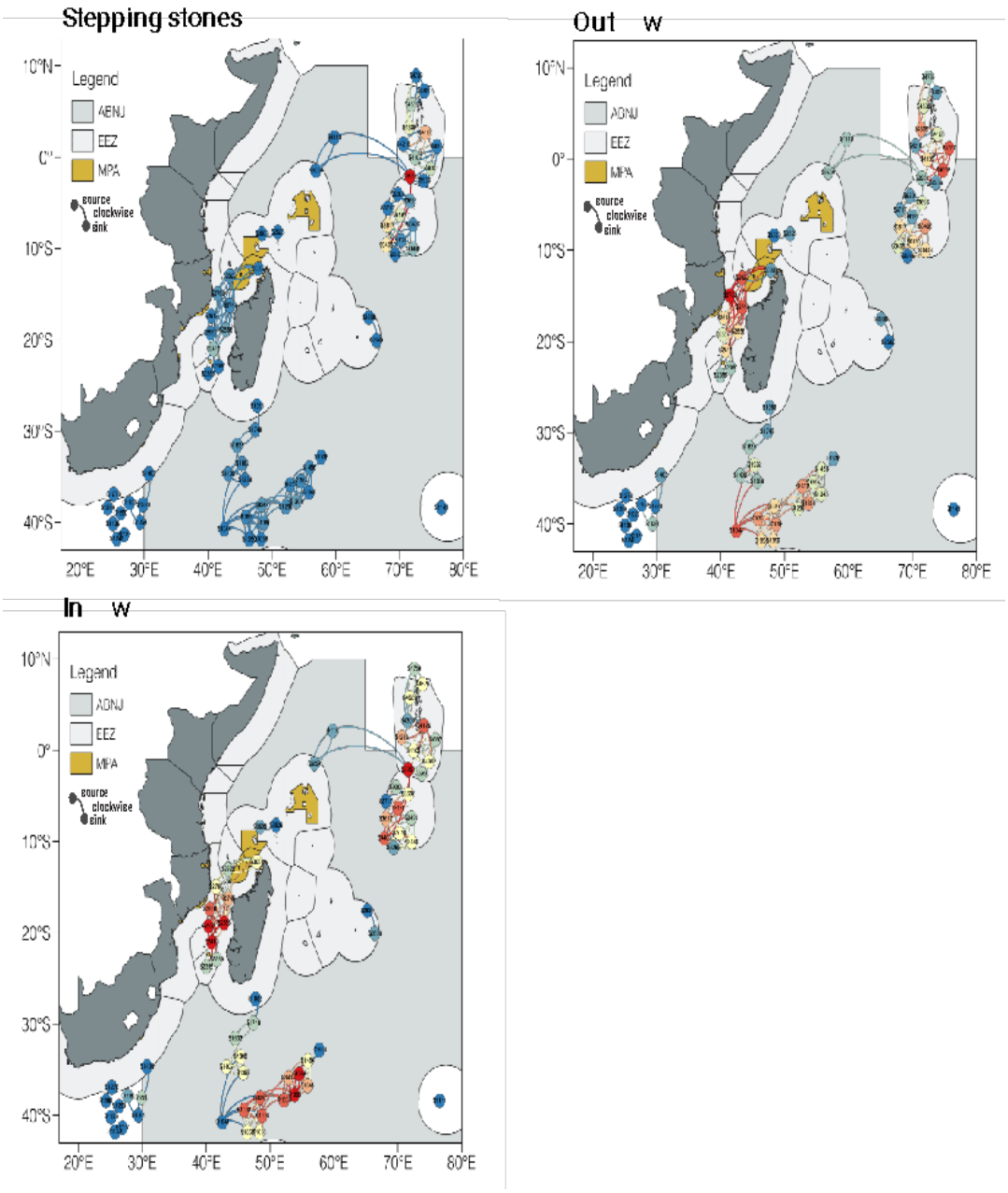


Figure 4. Connectivity of seamounts within the regions EEZ and ABNJ. The blue to red colour gradient illustrates low to high degree of (a) stepping stones or corridors connecting seamounts (b) outflowing connection to other sea mounts and (c) inflowing connection from other seamounts.

Scenario of MPA Network – In considering spatial design of the MPAs in the ABNJ, a key consideration is placing the MPAs within a network across national and maritime jurisdictions. This is critical because of connectivity that exists between the high seas and offshore and nearshore regions of the EEZ. We used a systematic conservation prioritization software,

Marxan with Zones that identifies potential areas that meet conservation objectives while minimizing the opportunity cost. The algorithm then tries to find a solution that includes areas that meet conservation objectives while avoiding those with a high "cost" associated with them. For more details on methods see Maina et al. (2020). The *Marxan* objective is to minimize the total *cost* of implementing the reserve network plan while ensuring the set conservation objectives are met. Therefore, connectivity should be considered in the planning process, and could be represented by migratory routes of marine mammals and other marine biodiversity included in The Convention on Migratory Species (CMS) policy instrument; larval connectivity; and bird migration routes. As part of the regional-wide prioritization process, we begun by defining spatially consistent information on habitat distributions across the planning domain. Given that we needed to prioritize areas within both EEZ and the high seas, we used Marxan with zones in order to differentiate between MPAs within EEZ and within the ABNJ. We did this for two reasons:
1) the types of governance arrangements needed to designate and enforce MPAs are different between these two areas, therefore zoning for them separately allows policy makers useful detail for appropriate decision making; 2) the types of human uses (and related cost measures) are different for these two regions and therefore to minimize the costs, Marxan with zones allowed us to differentiate these costs.

For conservation features, we used sea floor morphology habitat maps as they are found in varying proportions within and outside the EEZ *(Figure 5*). We defined three broad conservation goals as follows: (i) to represent geomorphic sea floor habitats by protecting 30% of their current distribution; (ii) to promote the long-term population viability of focal species by maintaining natural connections and connectivity corridors within marine reserve networks mediated by larval dispersal, and (iii) to minimize human pressure on ecosystems in the EEZs, while promoting consensus by selecting less fished areas in the high seas. We used *Betweenness Centrality* and *Degree* connectivity metrics to inform selection of important areas for connectivity. We set a 100% target for the connectivity measures to ensure that we designed a connected reserve system that would be self-sustaining. For the EEZ zone, we set the cost as the gravity of markets, which is a proxy for human pressure on marine ecosystems (Cinner et al. 2016, 2018). For the ABNJ zone, we set the cost as the fishing effort based on automatic vessel identification system for 2016 (Kroodsma et al. 2018). We selected an optimal Boundary Length Modifier (BLM) value (0.007) using the calibration method of Stewart and Possingham

(2005) which minimizes the trade-off in reduced boundaries and increased costs. We locked in all existing MPAS (Watts et al. 2009).

Table 1. Summary of the objectives used as the criteria of spatial design of MPAs.

Rationale	**Objective**	**Conservation features and data**
Protect biodiversity	Represent geomorphic sea floor habitats by protecting 30% of their current distribution, including 60% within the ABNJ.	Sea floor geomorphic habitats as a surrogate for biodiversity distribution (Harris et al. 2014)
Promote the long-term population viability of focal species by maintaining natural connections and connectivity corridors within marine reserves network mediated by larval dispersal	Protect 100% of highly connected features (represented as grids) and seamounts. Connectivity indicators used are measures of the degree of outflow, inflow and steppingstone.	Larval connectivity metrics across maritime jurisdictions
Cost	Minimize human pressure on ecosystems.	The Gravity of markets (Cinner et al. 2018)
Pragmatism and stakeholder management	Promote consensus, compliance and minimise potential conflicts by avoiding highly fished regions of the ABNJ	Global Fishing Watch effort data (Sala et al. 2016)

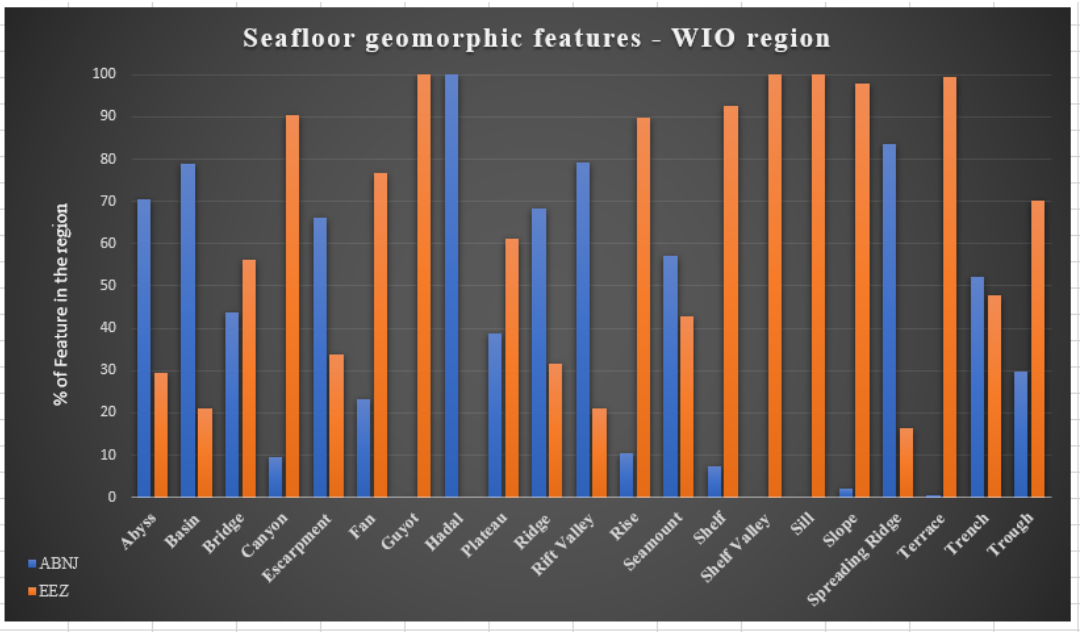


Figure 5. Proportional coverage of sea floor habitats across ABNJ and EEZ . Proportions were calculated using the freely available seafloor geomorphic features layers (Harris et al. 2014). TO generate this illustration, spatial layers from Harris et al. (2014) were processed for the proportional coverage.

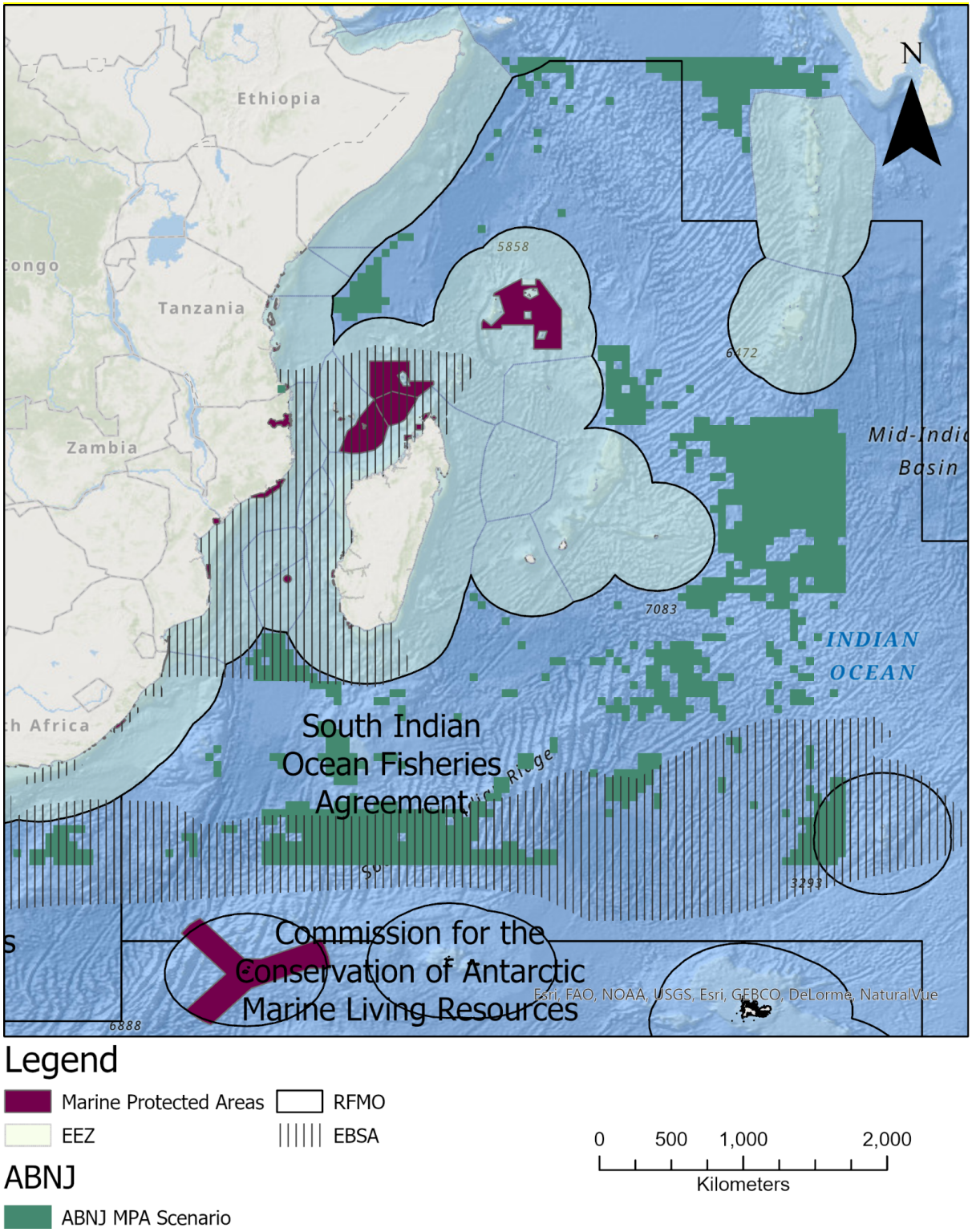


Figure 6. Marxan with Zones best solution (indicating areas selected within EEZ and ABNJ zones). Existing MPAs are also shown (locked into the Marxan with Zones solution).

The Marxan with Zones best solution presents one option for expanding protection within EEZs to 30% within ABNJ to meet biodiversity targets aligned with existing priority areas (EBSAs) and maintain connectivity by protecting connected reefs. EBSAs can contribute to a large

proportion of the targets. This means that establishment of MPAs may be more feasible within these areas by attracting funding and support. By including fishing pressure as a cost Marxan selected the least fished within ABNJ (i.e. to minimize costs) while meeting connectivity and sea floor habitat targets. In doing so this may also increase feasibility of implementing MPAs within the ABNJ as it promotes consensus by preventing loss of fishing ground which is one of the issues that complicates country negotiations (Smith and Jabour 2018). However, this may need to be balanced with ecological interests, where for instance thresholds of effort could be set such that the algorithm prioritises both extremely fished and least fished. In adopting evidence-based approach to protecting the high seas, research on migratory patterns of critical species and biological processes in the high seas should be promoted. Furthermore, studies on the feasibility, options and scenarios for the establishment of marine protected areas in ABNJ, in consultation with the countries involved is necessary. This may involve partnerships with the International Maritime Organization and UNCLOS, to facilitate identifying and designating as "particularly sensitive sea marine areas" which are of significance in terms of ecological, social, economic or scientific criteria and are vulnerable to damage by international shipping activities. Implementation of governance in the high seas will rely on effective satellite surveillance of fisheries activities on the open ocean. Using this work as a starting point, we can strive to protect 30 percent of the ocean with a network of well-connected MPAs.

3. Governance Arrangements for MPAs in ABNJ

The recently concluded 'State of ocean governance in the Western Indian Ocean' report (2020) highlights the complex, multi-layered web of international, regional and national policies, laws and institutional arrangements that exists in the WIO region. This Background Paper does not intend to duplicate this but, instead, by examining Figure 6 above, identifies potential governance arrangements that could be used to meet the ambition of protecting 30 per cent of the ocean with a network of well-connected MPAs.

Table 1 sets out a general overview of the global and regional legal frameworks that are relevant to the ABNJ of the WIO. For a more in-depth review of each instrument and framework, reference is made to the 'State of ocean governance in the Western Indian Ocean' report' (2020).

Table 1: List of relevant global and regional legal frameworks

International Law and Policies
• United Nations Convention on the Law of the Sea (UNCLOS) • BBNJ agreement • Implementing Agreement (Deep Seabed mining) • Fish Stocks Agreement • Port State Measures Agreement • Convention of International Trade in Endangered Species of Wild Flora and Fauna (CITES) • Convention on the Conservation of Migratory Species of Wild Animals • UN Decade for Ocean Science for Sustainable Development • International Convention for the Prevention of Pollution from Ships (MARPOL) • London Convention (Dumping)
Regional Law and Policies
• Indian Ocean Tuna Commission (IOTC) • South Indian Ocean Fisheries Agreement (SIOFA) • South Western Indian Ocean Fisheries Commission (SWIOFC)

Although there is a long list of international and regional agreements that covers the WIO region, not all WIO countries are party to these agreements. **Table 2** shows the Agreements that the WIO countries are a party to.

Table 2: Most relevant agreements that the WIO countries are party to.

Country	UNCLOS	SIOFA	2010 Amended Nairobi convention	Port State Measures Agreement	IOTC	SWIOFC
Comoros		Cooperating but not contracting				
France						
Kenya						
Madagascar						
Mauritius						
Mozambique		Cooperating but non contracting				
Seychelles						
Somalia						
South Africa						
Tanzania						

In the WIO region, some countries have focused on establishing MPAs in areas within national jurisdiction (UNEP and WIOMSA, 2021). However, there is no universal prioritisation of

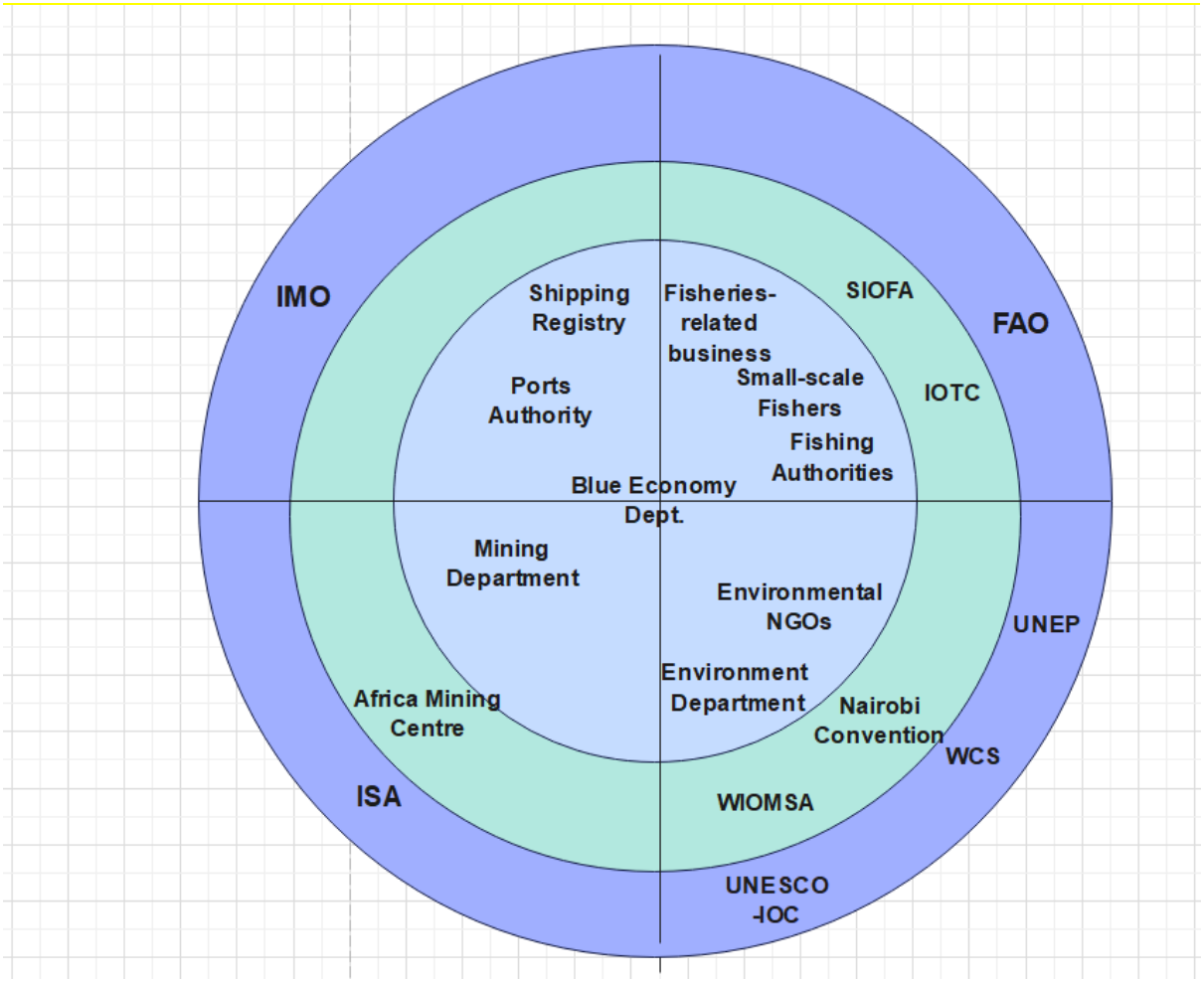
MPAs within the WIO. This is based on national contexts and interests. Furthermore, each country has its own process for the establishment of MPAs, including the process of identification, designation, and enforcement. Some have countries have employed, marine spatial planning (MSP) as a tool to engage national and other stakeholders in the process of designation of MPAs in the EEZ.

To move from a national to a regional outlook on MPAs in ABNJ, it is important to have a common understanding of the specific long-term biodiversity conservation objectives of the MPAs on the high seas. This will in turn determine what activities need to be regulated and thereby, what governance options are available. Hence, it is highly recommended that the Regional Ocean Governance Strategy of WIO is further supplemented with considerations of a regional outlook on marine protected areas on the high seas. Such discussions may include considerations of long-term biodiversity conservation objectives of MPAs on the high seas in the WIO, resource mobilisation, political engagement and issues of equity in the operationalisation of such MPAs.

To facilitate such discussions, Parties may consider the need for a regional platform where all WIO countries are convened to engage alongside other stakeholders within the region to establish a regional vision on marine protected areas. This could be an existing regional platform or the creation of a new regional platform that is dedicated to exploring issues relating to ABNJ. With the growing number of emerging industries, such as deep seabed mining, this regional platform may serve more than a focus on MPAs on the high seas but consider a broader range of issues without replicating any existing mandates.

3.1. Stakeholder Analysis

The high seas of the WIO region have multiple users and stakeholders at international and regional levels each with their very distinct interests. It is important that any effort to develop a regional vision on MPAs in the high seas includes a comprehensive stakeholder consultation process that includes the numerous stakeholders.



3.1.1. International Level

At the **international level**, there are a multitude of actors, some with an active stake and interest in any discussions on MPAs in the WIO region, whilst others may be able to provide support towards an endeavour for MPAs in the high seas.

3.1.1.1. International Seabed Authority (ISA)

The ISA is mandated under the UNCLOS to organise, regulate and control all mineral related activities in the Area, that is, the seabed area that is beyond national jurisdiction, for the benefit of human kind as a whole (Part 11 UNCLOS). UNCLOS approach to maritime zones ignores the connectivity of the ocean and its ecosystem, hence, the ISA is responsible for the seabed in ABNJ whilst the water column above it is not. The use of the high seas is governed by a multitude of provisions in UNCLOS and now, specifically the BBNJ agreement as it relates to the conservation and sustainable use of marine biodiversity in ABNJ. There are several areas in the WIO region where exploration for minerals is taking place. At the same time, there are no African States that are currently sponsoring seabed mining exploration or exploitation

activities, primarily due to a lack of an economic stake, hence, making African States an effective voice of issues of environment management and access and benefit-sharing. Nonetheless, in a recent cost benefit study of deep sea mining (Sumaila et al. 2023), it was reported that deem sea mining may provide short-term gains for a few, but in the long run it is a costly venture for coastal communities and states most reliant on a thriving, healthy ocean.

3.1.1.2. International Maritime Organisation (IMO)

The freedom of navigation on the high seas is enshrined in UNCLOS (Article 87 UNCLOS). The IMO is a UN specialized agency with the responsibility for safety and security of shipping and the prevention of marine and atmospheric pollution by ships. With increasing knowledge of the impacts of anthropogenic underwater noise on marine biodiversity, among other things, the IMO is likely to have an interest in understanding the vision of the countries in the region and whether this would have an effect on shipping. There are shipping lanes found in different parts of the WIO.

Other international private actors that may have a stake are those who lay submarine cables as they may be interested in how MPAs would affect whether this activity could be pursued in different areas.

In the discussions of MPAs on the high seas in the WIO region, other organisations, such as UN Environment Programme, IOC-UNESCO and FAO are likely to be interested parties that can provide technical support. For example, IOC-UNESCO is responsible for the Decade of Ocean Science for Sustainable Development and may be able to inform what programmes, projects and initiatives can support this broader regional endeavour.

3.1.2. Regional Level

At the **regional level**, there are several regional bodies that have a stake in this, including the regional fisheries management organisations in the region (IOTC, SIOFA). The Nairobi Convention (although it currently does not have a mandate for the high seas) also has an interest in the ABNJ through the concept of adjacency. It is also worth noting that there are international NGOs that have played active roles in the WIO region in support of different conservation and sustainable management objectives, such as World Wildlife Fund, The Nature Conservancy, Pew Charitable Trusts, Conservation International, Wildlife Conservation Society, among many others.

3.1.3. National Level

At the **national level**, because of the multiple interests that could be affected with the establishment of the MPA in the high seas, there are several line ministries that have a stake, including Ministries responsible for environment, climate change, fisheries, blue economy, mining, ports. It will also include private actors, such as industry or businesses linked to activities that may be affected, such as tuna canning factories, shipping registries and the small-scale fishers. Civil society actors, such as environmental NGOs and youth have also been engaged, to an extent, with discussions around MPAs nationally and beyond national jurisdiction.

The discussions of MPAs in the high seas is likely to be driven by varying interests of countries and organisations with a stake in certain activities. This will influence the willingness to establish MPAs, as well as the activities that will be regulated in such an establishment. The fishing industry and countries with significant fishing interests are likely to have significant influence and power over the establishment of the MPAs in the region. This is especially because of the tuna fishing industry in the WIO region.

Although the new BBNJ Agreement speaks of a consultation process, having a consultation process starting at the regional level may be more efficient and overcome constraints at the international level. The likely issues that will arise relate to fishing and fisheries interests, especially as there are countries and industrial interests at play that could potentially affect the economy in the short-term. Studies around the socio-economic impacts of MPAs on both industrial and small-scale actors may prove useful for evidence-based decision-making. Furthermore, countries may be dissuaded in engaging in such endeavours because of the additional responsibility of monitoring, compliance and surveillance that it may present. This would mean additional financial, capacity and technological needs. Hence, countries may seek to focus on having their implementation needs assessed first, before pursuing any particular option. All that said, with significant philanthropic interest in the MPAs in the high seas, this will also present an opportunity to present the WIO as front movers that could lead to significant resources channelled to the region with a view of making it a success and inspiring other regions to do the same. This will create an ongoing incentive by different actors to ensure its success.

3.2. Potential Governance Scenarios

In **Figure 6**, a map depicting some potential areas for consideration for MPAs presents some potential governance scenarios. Based on the location of the identified sites and the governance regimes that exist, three potential governance scenarios have been identified.

1. The Regional Fisheries Management Organisations
2. The BBNJ agreement
3. Other potential options

3.2.1. Through Regional Fisheries Management Organisations

Each area may have different conservation and management objectives. If the regulation and management of fisheries activities is the main objective then one possible governance scenario would be to use of RFMOs that have the jurisdiction, mandate and scope to establish conservation and/or management measures for fisheries. SIOFA and the IOTC are the two relevant RFMOs that have jurisdiction over areas beyond national jurisdiction.

3.2.1.1. South Indian Ocean Fishing Agreement (SIOFA)

The South Indian Ocean Fisheries Agreement (SIOFA) is an RFMO that is tasked with managing fisheries on the high seas only. It does not include tunas and other highly migratory species as this falls under the IOTC mandate. SIOFA has the mandate of adopting conservation and management measures. In 2019, it adopted measures for the interim management of Bottom Fishing in the Agreement Area to promote sustainable management of deep-sea fisheries resources and protect the marine ecosystem, including, prevention of significant impacts of vulnerable marine ecosystems (UNEP and Nairobi Convention, 2020).

3.2.1.2. Indian Ocean Tuna Commission (IOTC)

The Indian Ocean Tuna Commission was created by the Agreement for the establishment of the Indian Ocean Tuna Commission. The area of competence is the Indian Ocean as shown on the map in Annex A of the IOTC Agreement. This includes both areas within and beyond national jurisdiction. It also, applies to specific fish species including in Annex B of the IOTC Agreement, including different species of tuna, sailfish and swordfish. The IOTC also has the competence to adopt conservation and management measures concerning the management of tuna and tuna-like species under the IOTC mandate as well as the fisheries, which target them (Article V (2) (c) IOTC Agreement). Such measures can be in two forms, such as resolutions and recommendations. Resolutions are binding on the

Commission Members, unless there is a specific objection on the part of a member and requires a 2/3 majority of Members present and voting to adopt them (Article IX (1) IOTC Agreement). Recommendations, on the other hand, are slightly different in that they are not binding on the members and rely on voluntary implementation. The Commission may by simple majority of its members present and voting, adopt recommendations (Article IX (8) IOTC Agreement).

There are existing resolutions and recommendations linked to areas beyond national jurisdiction in the compendium of management measures. This includes where the alleged IUU activities occurred in areas beyond national jurisdiction within the IOTC Area, any concerned CPC may seek to include the vessel on the draft IUU list.

Such an approach of using RFMOs is not novel and can be seen in the north-east Atlantic where high seas MPAs have been declared. Although their success has been questioned (Matz-Luck and Fuchs, 2014), the process has enabled collaboration between the North Eastern Atlantic Fisheries Commission (NEAFC) and the Convention for the Protection of the Marine Environment of the North East Atlantic (the 'OSPAR) Convention. Hence, it is important to recognise that EBSAs and regional seas do not have mandates for management, so efforts must be anchored in resolutions by the RFMOs.

However, there are risks with opting for the RFMO governance scenario. First, decisions and the passing of resolutions are usually heavily influenced by fishing interests, politics and power. Furthermore, the resolutions passed in the RFMOs are usually restricted to species type, fishing gear, rather than a more holistic approach to the sustainable management of fisheries. Finally, there will be a learning-by-doing experience if there will be a need for some interaction between decisions made at the regional level and the international level under the BBNJ Agreement. Despite all the challenges with this governance scenario, it is the option that can be used in the immediate term, and possibly as an interim measure until the BBNJ Agreement enters into force.

3.2.2. Through the BBNJ Agreement

Another governance scenario would be the use of the newly adopted BBNJ Agreement. The BBNJ Agreement provides as process for the establishment of MPAs in ABNJ. The advantage of the BBNJ agreement route is the fact that it takes into account cumulative impacts. This is defined as combined and incremental impacts resulting from different activities, including known, past and present and reasonably foreseeable activities, or from the repetition

of similar activities over time and the consequences of climate change, ocean acidification and related impacts. This section sets out the steps that were recently agreed to by Parties.

3.2.2.1 Making a proposal for an MPA

Who can make a proposal?: Parties, individually or collectively, shall submit proposals to the Secretariat (Article 19 (1) BBNJ Agreement). Such proposals shall be undertaken in consultation and in collaboration with relevant stakeholders, including States and global, regional, subregional and sectoral bodies, as well as civil society, the scientific community, the private sector, Indigenous Peoples and local communities (Article 19 (2) BBNJ Agreement)..

Basis for a submission: The proposals must be based on the best available science and scientific information and relevant TK of IPLCs, taking into account the precautionary approach and ecosystem approach (Article 19 (3) BBNJ Agreement). According to Article 19 (4) of the BBNJ Agreement, the proposals shall include the following elements:

> (a) A geographic or spatial description of the area that is the subject of the proposal by reference to the indicative criteria specified in annex I;
>
> (b) Information on any of the criteria specified in annex I, as well as any criteria that may be further developed and revised in accordance with paragraph 5 of this article, applied in identifying the area;
>
> (c) Human activities in the area, including uses by Indigenous Peoples and Local Communities, and their possible impact, if any;
>
> (d) A description of the state of the marine environment and biodiversity in the identified area;
>
> (e) A description of the conservation and, where appropriate, sustainable use objectives that are to be applied to the area;
>
> (f) A draft management plan encompassing the proposed measures, and outlining proposed monitoring, research and review activities to achieve the specified objectives;
>
> (g) The duration of the proposed area and measures, if any;

(h) Information on any consultations undertaken with States, including adjacent coastal States and/or relevant global, regional, subregional and sectoral bodies, if any;

(i) Information on area-based management tools, including marine protected areas implemented under relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies;

(j) Relevant scientific input and, where available, traditional knowledge of Indigenous Peoples and Local Communities.

Additional indicative criteria for the identification of such areas may be further developed and revised as necessary and any further requirements regarding the adoption by the COP (Article 19 (5) BBNJ Agreement).

Preliminary review of proposals: Once received, the secretariat of the BBNJ Agreement shall make the proposal publicly available and transmit it to the Scientific and Technical Body (STB) for a preliminary review (Article 20 BBNJ Agreement). This preliminary review simply ascertains whether it contains the information in accordance with Article 19. The results of the preliminary review shall be made publicly available and communicated to the secretariat (Article 20 BBNJ Agreement).

Consultation on and assessment of proposals: The consultation process must be inclusive, transparent and open to all relevant stakeholders (Article 21 BBNJ Agreement). The secretariat is responsible for facilitating consultations and gathering inputs. This includes first, from States, in particular adjacent coastal States, who shall be notified and then invited to submit input, about, among other things, information regarding any existing measures or activities in adjacent or related areas within national jurisdiction and beyond national jurisdiction and views on the implications of the proposals for areas within jurisdiction. Second, bodies of relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies. Input from such bodies may be in relation to any existing measures applicable to the proposed area, if the measure or other element of the management plans falls within the competence of that body, instrument or framework. Third, indigenous peoples and local communities with relevant

traditional knowledge, the scientific community, civil society and other relevant stakeholders to provide any relevant TK of IPLCs (Article 21 (2) BBNJ Agreement). All the collected input will be made publicly available (Article 21 (3) BBNJ Agreement). It is then for the proponent to consider the contributions received during the consultation period and the information from the STB and revise the proposal as is necessary. Although not specific, the consultation period should take place in a certain time frame. Once revised, the proposal shall be submitted to the STB that is subsequently tasked with assessing the proposal and make recommendations to the COP (Articles 21 (4) - (7) BBNJ Agreement).

At the first COP, the STB has been tasked with elaborating the modalities for the consultation and assessment process (Article 21 (8) BBNJ Agreement).

Establishment of MPA in ABNJ: It is the COP that has the final decision-making power on the establishment of the MPA in ABNJ (Article 22 (1) (a) BBNJ Agreement). Their decision is on the basis of the final proposal and the draft management plan, contributions received and scientific inputs during the consultation period and scientific advice and recommendations of the STB. The COP has the power to either establish the MPA or take measures compatible with relevant existing legal instruments and framework and relevant global, regional, subregional and sectoral bodies that are in cooperation and coordination with those instruments, framework and bodies (Article 22 (2) BBNJ Agreement). In the event that the measures sought fall within the competence of other global, regional, subregional or sectoral bodies, it is proposed that those instruments, framework and bodies should be used to promote the adoption of the relevant measures in accordance with their respective mandates (Article 22 (4) BBNJ Agreement).

This is likely to be the case for the IOTC if one of the reasons is tuna specific and falls within this scope. The COP has to respect the competences of and not undermine existing competencies; it shall not undermine effectiveness of measures in respect to areas within national jurisdiction and shall be made with due regard for the rights and duties of all States, in accordance with the Convention.

There is also a provision that relates to if an area-based management tool, including an MPA established under this Part subsequently falls, either wholly or in part, within the national jurisdiction of a Coastal State, the part within national jurisdiction shall immediately cease to be in force (Article 22 (6) BBNJ Agreement). In the case that upon establishment of, or amendment to the competence of, a legal instrument or framework or relevant global, regional, subregional or sectoral body, any ABMTs, including MPAs or related measures adopted by the Conference of the Parties under this Part that subsequently falls within the competence of such instrument, framework or body, either wholly or in part, shall remain in force until the Conference of the Parties reviews and decides, in close cooperation and coordination with that instrument, framework or body, to maintain, amend or revoke the area-based management tool, including a marine protected area, and related measures, as appropriate (Article 22 (7) BBNJ Agreement)..

This is particularly relevant as there are pending article 76 applications to the Continental Shelf Limits Commission (see section 3.2.2.2.)

Decision-making: Generally, decisions made under this Part of the Agreement shall be taken by consensus. If consensus cannot be reached, the COP shall decide by a 2/3 majority of representatives and voting that every effort to reach agreement by consensus has been exhausted. Only then can the decisions and recommendations shall be taken by a ¾ majority of the representatives present and voting (Article 23 BBNJ Agreement).

The decisions taken shall enter into force 120 days after the meeting of the COP at which the decision was taken and shall be binding on all Parties. During the 120 days provided for in paragraph 3 of this article, any Party may, by notification in writing to the secretariat, make any objection with respect to a decision adopted under this Part, and that decision shall be binding on that Party. During this 120-day period, a Party can object to a decision adopted and that decision will not be binding on that Party. There are only three grounds that a Party can make an objection. They include that the decision is inconsistent with this Agreement or the rights and duties of the objecting Party in accordance with the Convention, the decision unjustifiably discriminates in form or in fact against the objecting Party and the Party cannot practically comply with the decision at the time of the

objection after making all reasonable efforts to do so. An objection to a decision may be withdrawn at any time by written notification to the secretariat and shall become binding 90 days following the date of the notification (Article 23 BBNJ Agreement).

Despite that a Party has made an objection, it shall still, to the extent practicable, adopt alternative measures or approaches that are equivalent in effect to the decision to which it has objected and shall not adopt measures nor take actions that would undermine the effectiveness of the decision to which it has objected unless such measures or actions are essential for the exercise of rights and duties of the objecting Party in accordance with the Convention. Such parties must also report to the COP how it is implementing the above obligations to inform the monitoring and review of the implementation of the ABMTs, including MPAs. If the Party intends that the objection remains in place, it shall renew the objection every 3 years after the entry into force of the decision. Failing to do this will lead to having the objection considered withdrawn (Article 23 BBNJ Agreement).

Implementation: To implement this Agreement, Parties shall ensure activities under their jurisdiction or control that take place in areas beyond national jurisdiction are conducted consistently with the decisions. This is likely to be through the development of national legislation in respect of nationals and vessels or with regards to activities under its jurisdiction or control (Article 25 BBNJ Agreement)

Monitoring and review: There is a mandatory reporting requirement on Parties individually and collectively to report to the COP on the implementation of the ABMTs. Other regional bodies shall also, be invited to provide information to the COP on the implementation of the measures that have been adopted. Based on the reports and information, the effectiveness of the area-based management tools will be assessed that will subsequently inform any decision or recommendation that the COP may seek to undertake to improve effectiveness (Article 26 BBNJ Agreement).

3.2.2.2. Transboundary considerations

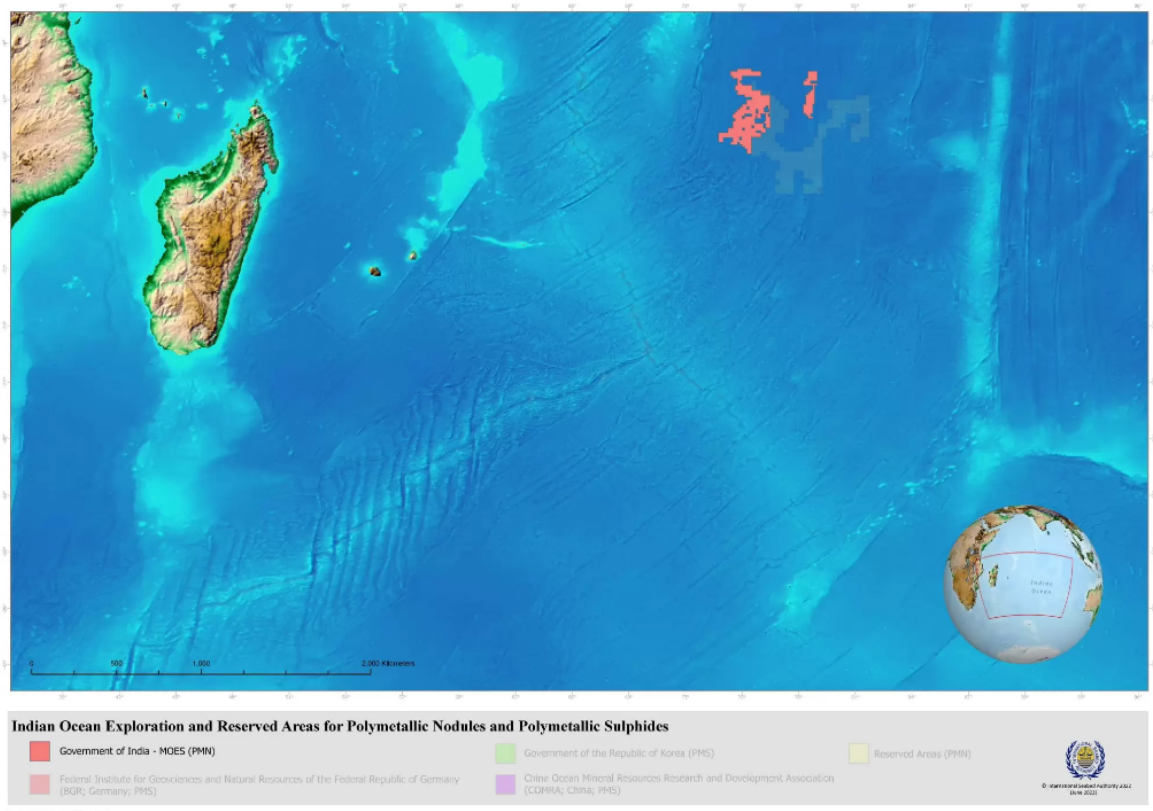
There are other activities that may affect the effectiveness of the MPAs. This may require regulations within the MPA itself or activities that are adjacent to the MPAs. Such activities

include deep seabed mining and the exploitation of other minerals and hydrocarbons that are in the seabed. This may be in the Area or in the extended continental shelves of some countries. Hence, it is important to identify these other activities not only for purposes of identifying whether MPAs can be located in those areas but also, whether there are threats of transboundary harm.

Deep Seabed Mining

On one hand, this possible governance scenario is potentially most comprehensive with the ability to regulate different activities that may affect the effectiveness of the MPA. For example, deep seabed mining activities in the WIO are present. First, there are several exploration contracts issued by the International Seabed Authority (ISA) for the purposes of deep seabed mining. They include exploration for polymetallic nodules and polymetallic sulphides in the Western Indian Ocean by the Republic of Korea, India, Germany and China. As seen in the maps below, many of the areas under exploration are relatively close to the outer limits of the EEZ and potential overlaps with areas in Figure 6.

Polymetalllic Nodules/Indian Ocean



Indian Ocean Exploration and Reserved Areas for Polymetallic Nodules and Polymetallic Sulphides

Government of India - MOES (PMN)

Government of the Republic of Korea (PMS)

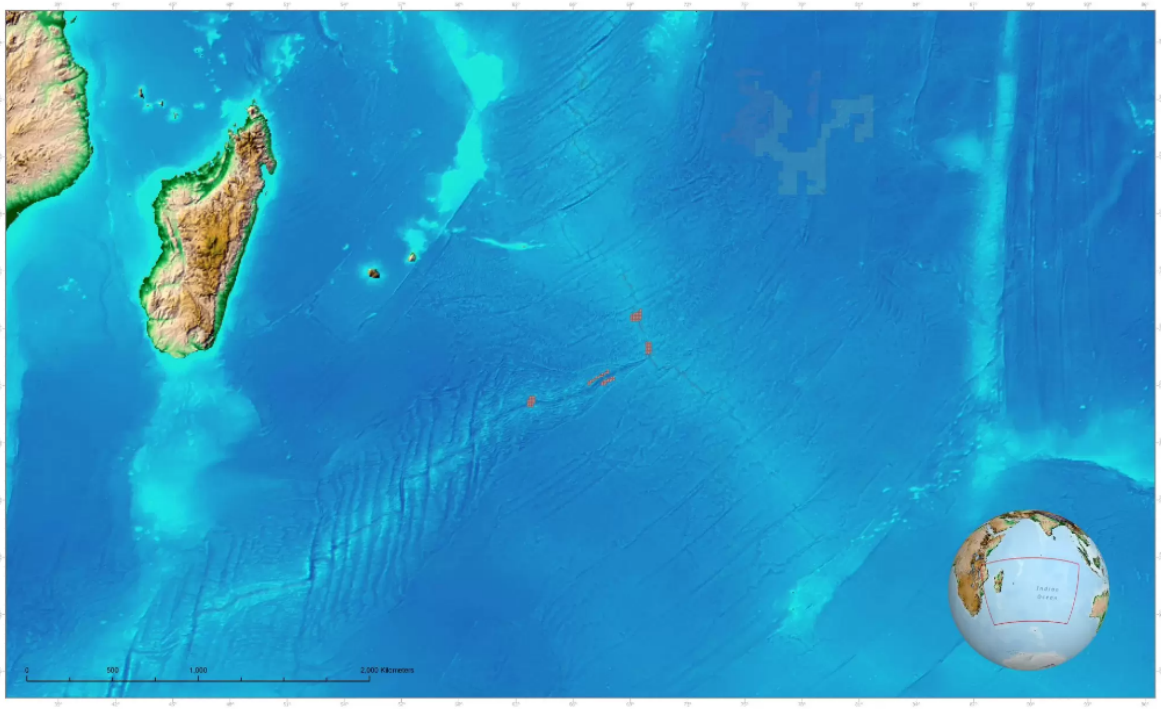
Reserved Areas (PMN)

Federal Institute for Geosciences and Natural Resources of the Federal Republic of Germany (BGR; Germany; PMS)

China Ocean Mineral Resources Research and Development Association (COMRA; China; PMS)

Basemap Sources: GEBCO, NOAA

Polymetallic Sulphides/Indian Ocean



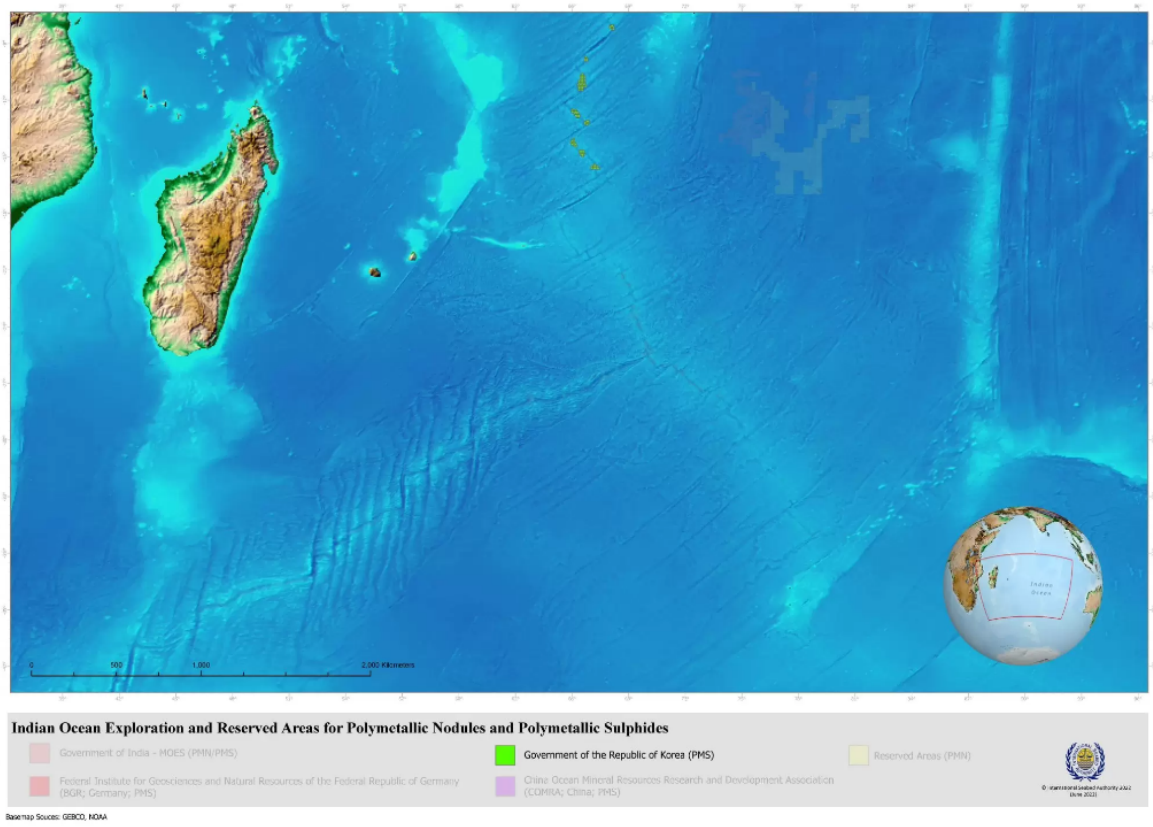
Indian Ocean Exploration and Reserved Areas for Polymetallic Nodules and Polymetallic Sulphides

Government of India - MOES (PMS)

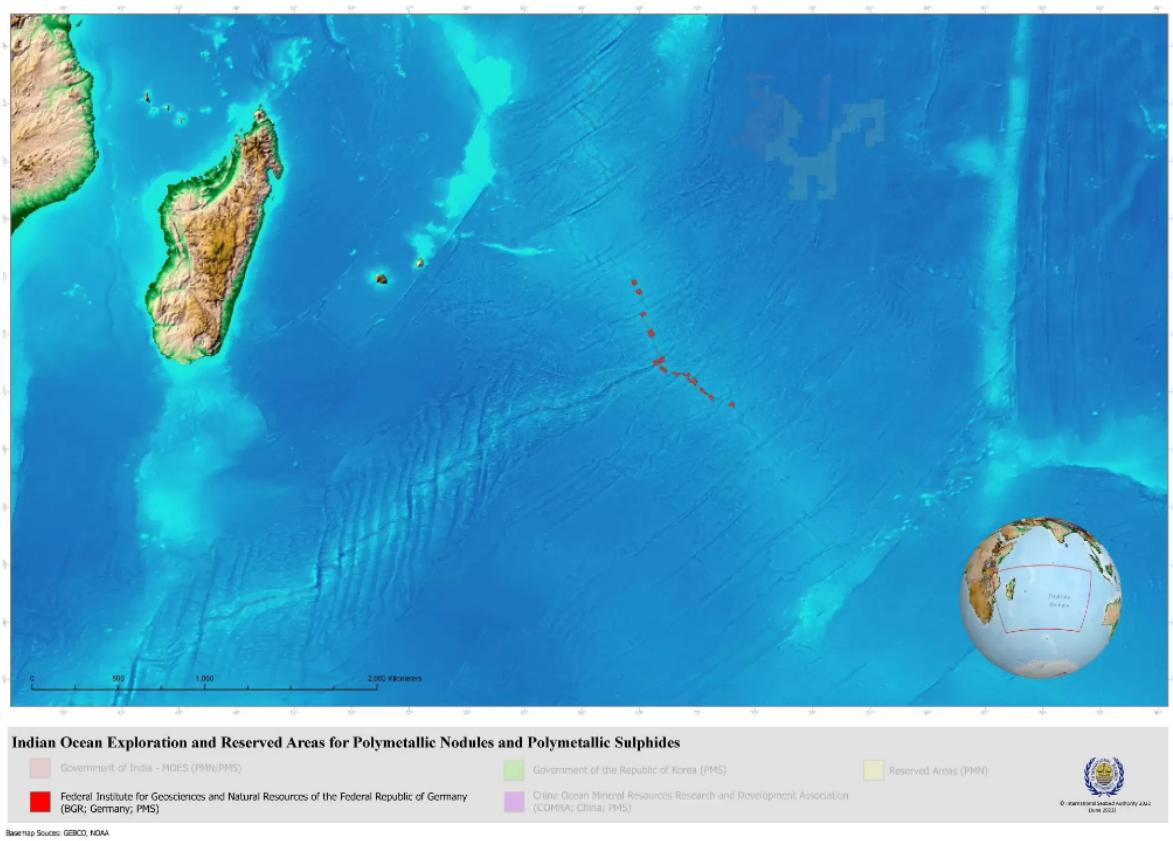
Government of the Republic of Korea (PMS)

Reserved Areas (PMN)

Polymetallic Sulphides/Indian Ocean



Polymetallic Sulphides/Indian Ocean



Article 194 (1) of UNCLOS, 1982 provides that States are obligated to take, individually or jointly, all measures consistent with UNCLOS that are necessary to prevent, reduce and control pollution of the environment from any source and article 194 (2) provides that all measures necessary shall be taken to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their environment. This has led to growing discussions around regional environment management plans (REMPs) for the regions, however, it will be a lesson of learning-by-doing to understand how the establishment of MPAs will interact with REMPs process undertaken at the ISA.

Extended continental shelves and Article 76 claims

The Saya de Malha Bank is often referred to for its unique ecosystem which hosts one of the world's largest seagrass areas. Hence, it is understandably identified as an area worthy of protection. However, this bank and other shallow-water banks lie within the boundaries of the joint-management area between Seychelles and Mauritius. In 2012, Mauritius and Seychelles entered into two treaty agreements, including (i) Treaty Concerning the Joint Exercise of Sovereign Rights over the Continental Shelf (ii) Treaty concerning the Joint Management Area of the Continental Shelf with a view of exercising sovereign rights over the seabed and subsoil (Art. 77 UNCLOS) for the purposes of exploring and exploiting the continental shelf and its natural resources.

Although Mauritius and Seychelles do not have sovereign rights to the high seas above the seabed and subsoil, the interconnectedness between the water column and the continental shelf cannot be ignored. On one hand, the designation and implementation of a marine protected area may affect the sovereign rights of Mauritius and Seychelles and undermine the article 76 claims and article 77 benefits of such claims. On the other hand, if certain types of activities take place on the Mascarene Plateau, it may have the potential to negatively affect the marine protected areas and undermine the conservation objectives. Hence, any attempt to establish this marine area as an MPA should be led or initiated by Mauritius or Seychelles, as it will otherwise, likely lead to unhelpful tensions that may hinder implementation. Depending on the conservation objectives for this area, the Saya de Malha is one area that could be established using the newly adopted BBNJ agreement. The BBNJ agreement sets out the process for doing this.

More broadly speaking, this proposal brings up the importance of considering Article 76 claims. Although the water column and the continental shelf are treated as two distinct areas in law, we cannot ignore the vertical connectivity that exists. An activity taking place on the

continental shelf may affect the water column and an activity on the water column may affect the rights of the States with the extended continental shelf. Hence, it is important to appreciate the completed and pending applications for an extended continental shelf by countries in the WIO.

There are claims that have already been adopted including,

7 May 2009	Seychelles - in respect to the Northern Plateau Region
5 May 2009	South Africa - in respect of the mainland of the territory of the Republic of South Africa.
1 December 2008	Joint submission by Mauritius and Seychelles - in the region of the Mascarene Plateau

There are pending claims for the Extended Continental Shelf that may also influence MPAs in ABNJ if they are to be approved. The pending claims are as follows:

12 April 2022	Mauritius - in respect of Northern Chagos Archipelago region
26 March 2019	Mauritius - in respect of Southern Chagos Archipelago region
21 July 2014	Somalia - in respect of Somalia
18 January 2012	Tanzania - in respect of Tanzania
29 April 2011	Madagascar - in respect of Madagascar
6 May 2009	Mauritius - in respect of region of Rodrigues Island
6 May 2009	France and South Africa - in respect of the area of the Crozet Archipelago and the Prince Edward Islands

Emerging and future activities

With the development of technology, we cannot know what activities may become viable in the ocean. The BBNJ Agreement attempts to deal with this through its provisions in

relation to the Environmental Impact Assessments (EIAs). Under the BBNJ Agreement, EIA means a process to identify and evaluate the potential impacts of an activity to inform decision-making (Article 1 BBNJ Agreement). EIA processes apply to whether activities taking place in national jurisdictions could have impacts on the marine environment in ABNJ (Article 28 BBNJ Agreement) and if activities in ABNJ will affect other areas in ABNJ. EIAs are not required for all activities but if a planned activity may have more than a minor or transitory effect on the marine environment or the effects of the activity are unknown or poorly understood, the Party with jurisdiction or control of the activity shall conduct a screening (Article 30 (1) BBNJ Agreement). There shall be notification of both the planned activities and the EIA reports through the clearing house mechanism of the BBNJ (Article 31 (1) (a) (i) BBNJ Agreement). Through this mechanism, Parties and other stakeholders are then notified of the planned activity and the EIA reports whereby they can then make substantial comments. These comments are subsequently considered and responded to by Parties (Article 32 BBNJ Agreement). The final decision-making of whether to proceed still sits with the Party under whose jurisdiction or control a planned activity falls (Article 34 (1) BBNJ Agreement). The decision documents shall clearly outline any conditions of approval related to mitigation measures and follow-up requirements. Decision documents shall be made public, including through the Clearing-House Mechanism (Article 34 (2) BBNJ Agreement).

The BBNJ Agreement offers an opportunity to approach MPAs in the high seas in a comprehensive and coordinated way alongside international and regional bodies. It does not focus primarily on fisheries but can seek to regulate and manage other activities taking place in the area designated and those adjacent to the MPA. However, the BBNJ Agreement was adopted on the 19 June 2023. It requires 60 ratifications to enter into force (Article 68 BBNJ Agreement). Although, there is a significant push for countries to sign and ratify this Agreement with many committing funding and technical assistance to this process, it may take some time before the BBNJ Agreement enters into force, hosts its first Conference of the Parties and takes the outstanding decisions as per the Agreement. Nevertheless, there is preparatory work that can be undertaken if this is the main governance scenario to pursue.

3.2.3. Other existing options

UNCLOS recognises the importance of protecting the marine environment, so each sectoral regime has developed some form of recognising marine ecosystems. They include:

3.2.3.1 Ecologically or Biologically Significant Marine Areas (EBSAs)

Under the Convention on Biological Diversity that identify areas that are either unique or rare, special importance for life, history stages of species, importance for threatened, endangered or declining species and/or habitats, vulnerability, fragility, sensitivity or slow recovery, or biological diversity. Saya de Malha Bank and parts of the Mozambique Channel in the WIO have been identified as EBSAs. The main constraint is that its identification is not accompanied by management measures. Hence, these are more useful for identification of potential areas for MPAs.

3.2.3.2. Particularly Sensitive Sea Area (PSSA)

This is an area that needs special protection because of its significance for recognised ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities. When an area is approved as a particularly sensitive sea area, the IMO can institute specific measures to control maritime activities in the area, such as routeing measures, strict applications of MARPOL discharge and equipment requirements for ships, such as oil tankers. There are no PSSA identified in the WIO region.

3.2.3.3. Vulnerable Marine Ecosystems

VMEs are defined as marine ecosystems that should be classified as vulnerable based on the characteristics that they possess (International Guidelines for the Management of Deep-sea Fisheries in the High Seas (FAO, 2009)). Such ecosystems include summits of seamounts, hydrothermal vents, among others. The WIO is well known for its hydrothermal vents. The non-legally binding resolution of the UN General Assembly A/RES/61/105 calls on States to take immediate action to protect vulnerable marine ecosystem using existing regional mechanisms such as the RFMOs. SIOFA has designated five Vulnerable Marine Areas, but the associated provisional 'no fishing' measures have not been approved. ISA has also designated seabed areas as reserves.

Finally, the adoption of BBNJ and a multitude of international and regional agreements also provide an option to establish a Treaty for a defined area of the WIO, in the same way that an Antarctic Treaty currently operates. However, this may take a significant amount of time and political lift to materialise.

4.0. Challenges

4.1. Regional outlook on marine protected areas and conservation objectives

The countries of the WIO have shown their political will in establishing MPAs in their national jurisdiction and it is assumed the active participation of the African Group in the BBNJ negotiations and the COP to the NC is indicative of the interest in MPAs in the ABNJ. However, at national level, there is limited indication of the political will for the installation of the MPAs in the ABNJ, especially with interests in the fisheries, maritime transportation sectors and the claims for the extended continental shelves. Hence, reaching a regional position on marine protected areas and conservation objectives may be challenging especially because of national interests. This will require an intensive consultation and sensitisation process to facilitate a process to reach a common understanding.

4.2. Capacity to make a proposal

In the above scenarios, we have identified potential leads of an application to BBNJ, such as that of the Seychelles and Mauritius, for the protection of the Saya de Malha ecosystem. The BBNJ Agreement sets out what is required for a successful application that is subsequently subject to screening. This raises the question of whether countries of the WIO have the necessary science, data and information required to meet the requirements as set out below:

> (a) A geographic or spatial description of the area that is the subject of the proposal by reference to the indicative criteria specified in annex I;
>
> (b) Information on any of the criteria specified in annex I, as well as any criteria that may be further developed and revised in accordance with paragraph 5 of this article, applied in identifying the area;
>
> (c) Human activities in the area, including uses by Indigenous Peoples and local communities, and their possible impact, if any;
>
> (d) A description of the state of the marine environment and biodiversity in the identified area;
>
> (e) A description of the conservation and, where appropriate, sustainable use objectives that are to be applied to the area;

(f) A draft management plan encompassing the proposed measures, and outlining proposed monitoring, research and review activities to achieve the specified objectives;

(g) The duration of the proposed area and measures, if any;

(h) Information on any consultations undertaken with States, including adjacent coastal States and/or relevant global, regional, subregional and sectoral bodies, if any;

(i) Information on area-based management tools, including marine protected areas implemented under relevant legal instruments and frameworks and relevant global, regional, subregional and sectoral bodies;

(j) Relevant scientific input and, where available, traditional knowledge of Indigenous Peoples and local communities.

This raises the question of what additional capacity and partnerships that may be required to bring forward an application.

4.3. Enforcement of marine protected areas (MPAs)

One of the main challenges of MPAs in both national and beyond national jurisdiction is enforcement of the measures in place. The framework of UNCLOS includes both flag state responsibility and port-state responsibility as the main means of enforcement. However, there are significant constraints to both flag state and port state responsibility. Furthermore, two countries of the WIO (Comoros and Tanzania) are not parties to the Port State Agreement. This may create a significant gap and opportunity to circumvent any of the measures. However, there are still significant efforts to address IUU fishing in the Indian Ocean, including by France and the Indian Ocean Commission which are supporting the island countries of the region through training and effective action against IUU fishing and crimes under bilateral agreements

4.4. Sustainable financing and technology for reviewing and monitoring

Designation of an MPA is a small part of the process for an effective MPA as this requires monitoring of effectiveness, and other activities to support the conservation objectives. In addition, the BBNJ agreement provides for parties to individually and collectively monitor

and review progress on the MPAs to the COP. Whilst the responsibility does not necessarily rest with any particular Parties, it is worth considering financing options, capacity and technology needs to meet this objective. The BBNJ Agreement provides potential funding options but they are unlikely to be sufficient to meet the funding gap for effective MPAs in ABNJ.

4.5. Equity Considerations

In designating the MPAs in the high seas, there will be equity considerations that will need to be addressed. This will range from whether some countries are likely to bear more burden than others, whether some countries are likely to benefit more than others, and whether some countries will have to access more benefits by virtue of this additional burden. Access to capacity development and technology transfer is currently open to all developing countries, noting the Agreement recognises key principles such as equity and the special circumstances of Small Islands Developing States and Least Developed Countries.

5.0 Recommendations

5.1. Establish spatial scope

Establish the spatial scope of influence of the WIO in the ABNJ. Currently, a WIO ABNJ does not exist in a practical sense. There is a need for setting a scope within which the management of the ABNJ by the WIO countries will be confined. Starting points can include the ones used by SIOFA.

5.2. National consultation

Although the BBNJ agreement has been adopted, it is still not adequately socialised at the national and regional levels. This is an opportunity to start a series of conversations on the Agreement, especially as many countries will be approached with offers of funding and technical assistance for the ratification of the Agreement. From a review of the national policies it is evident that most countries do not have a national policy or legislation that can cater for the designation of marine protected areas. One example is Seychelles' Protected Areas Policy that provides for the establishment of transboundary Protected Area. This is defined as an area of land and/or sea that straddles one or more boundaries between states, sub-national units such as provinces or regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed co-operatively through legal or other effective means.

It is important for discussions to take place at the national level before consultations are pursued at the regional level.

5.3. A regional platform and approach on BBNJ

One of the opportunities identified is the development of a common regional vision and understanding of MPAs beyond national jurisdiction. This would require bringing all the stakeholders together to help develop this vision. This can lead to the establishment of a platform where stakeholders in the region can come together to identify and propose areas for MPAs in the high seas. If such a platform brings members together, draws on expertise and scientists, proposals for an MPA can be brought by multiple Parties in the region. This approach can remove the potential resistance or objections that could take place by regional actors if only one or two countries brought a proposal together. This could also help ease the process once it reaches the international level. Such endeavours may require certain studies to be undertaken to support evidence-based decision-making, such as the socio-economic impacts of MPAs or costing assessments of MPAs in the area.

Although there is significant emphasis on signing and ratification of the BBNJ, most countries are considering the responsibilities that comes with implementation. It will be important to understand the finance, **capacity technology and data needs** of the WIO countries. The regional platform can also provide an avenue for a regional assessment of these needs and also for mobilising the resources, technology and partnerships to support the

region. This could lead to a pooling and sharing approach where there can be shared resources to support implementation. Organisations such as the Nairobi Convention (with the right mandate) and/or WIOMSA can provide such a function.

5.4. Existing lessons learned and recommendations

The regional Marine Protected Areas Outlook prepared by the Nairobi Convention provides informed pathways to designate and effectively manage protected areas, particularly in regards to MPA expansion. The most relevant is its call for WIO countries to collaborate to manage offshore areas. To overcome to cost and human resources constraints of enforcing offshore MPAs and patrolling oceanic waters, it recommends the sharing of intelligence and resources for enforcement. It points to examples such as the bilateral agreements between South Africa and France to monitor the Prince Edward Islands MPA. It further highlights that establishing a regional enforcement network can be used to monitor other activities in the region such as deep sea fishing, whaling and other activities (UNEP-Nairobi Convention and WIOMSA, 2021). Furthermore, to ensure effective management, it recommends having secure and adequate budgets, human resources, equipment and infrastructure, research and monitoring programmes and management plans. These will have to be supported by having sustainable resources to support these efforts (UNEP-Nairobi Convention and WIOMSA, 2021).

5.5. Other initiatives

There are interim initiatives such as the High Seas Coalition that can provide thought leadership and support in considering how to reach the regional vision of MPAs in the High Seas.

Further applied research to inform evidence-based decision-making may be required. This could include:

1. Assessments of all forms of connectivity between EEZ and ABNJ.
2. Threat mapping to understand human impacts and climate risks within the ABNJ.
3. Evaluate sociocultural significance of the ABNJ in the WIO.

6.0 Conclusion

With the adoption of the BBNJ Agreement and significant interest and resources in supporting MPAs in ABNJ, the WIO has an opportunity to be the front runner in these issues. By establishing a forum for discussions, it sends the right signal to partners and donors of the interest that lies within the WIO.

Nevertheless, it is important to ensure that MPAs on the high seas are well considered scientifically, with the appropriate governance model and supported by the necessary resources for effective implementation.

References

Álvarez-Romero, Jorge G., Adrián Munguía-Vega, Maria Beger, Maria del Mar Mancha-Cisneros, Alvin N. Suárez-Castillo, Georgina G. Gurney, Robert L. Pressey et al. "Designing connected marine reserves in the face of global warming." Global Change Biology 24, no. 2 (2018): e671-e691.

Andrello, M., Guilhaumon, F., Albouy, C., Parravicini, V., Scholtens, J., Verley, P., Barange, M., Sumaila, U.R., Manel, S. and Mouillot, D., 2017. Global mismatch between fishing dependency and larval supply from marine reserves. *Nature Communications*, *8*, p.16039.

Beaumont, N. J., Aanesen, M., Austen, M. C., Börger, T., Clark, J. R., Cole, M., ... & Wyles, K. J. (2019). Global ecological, social and economic impacts of marine plastic. *Marine pollution bulletin*, *142*, 189-195.

Bodin Ö. (2017) Collaborative environmental governance: Achieving collective action in social-ecological systems. *Science* **357**.

Calich, H., Estevanez, M. and Hammerschlag, N., 2018. Overlap between highly suitable habitats and longline gear management areas reveals vulnerable and protected regions for highly migratory sharks. Marine Ecology Progress Series, 602, pp.183-195.

Campana, S. E. (2016). Transboundary movements, unmonitored fishing mortality, and ineffective international fisheries management pose risks for pelagic sharks in the Northwest Atlantic. *Canadian Journal of Fisheries and Aquatic Sciences*, *73*(10), 1599-1607. Campana, S. E. (2016). Transboundary movements, unmonitored fishing mortality, and ineffective international fisheries management pose risks for pelagic sharks in the Northwest Atlantic. *Canadian Journal of Fisheries and Aquatic Sciences*, *73*(10), 1599-1607.

Cinner, J.E., Huchery, C., MacNeil, M.A., Graham, N.A., McClanahan, T.R., Maina, J., Maire, E., Kittinger, J.N., Hicks, C.C., Mora, C. and Allison, E.H., (2016). Bright spots among the world's coral reefs. Nature, 535(7612), p.416.

Cinner, J.E., Maire, E., Huchery, C., MacNeil, M.A., Graham, N.A., Mora, C., McClanahan, T.R., Barnes, M.L., Kittinger, J.N., Hicks, C.C. and D'agata, S., 2018. Gravity of human impacts mediates coral reef conservation gains. Proceedings of the National Academy of Sciences, 115(27), pp.E6116-E6125

Collins, C., Hermes, J.C. and Reason, C.J.C., 2014. Mesoscale activity in the Comoros Basin from satellite altimetry and a high-resolution ocean circulation model. Journal of Geophysical Research: Oceans, 119(8), pp.4745-4760.

Cowen, R. K., Gawarkiewicz, G., Pineda, J., Thorrold, S. R., & Werner, F. E. (2007). Population connectivity in marine systems an overview. *Oceanography*, *20*(3), 14-21.

Crochelet, E., Barrier, N., Andrello, M., Marsac, F., Spadone, A. and Lett, C. (2020). Connectivity between seamounts and coastal ecosystems in the Southwestern Indian Ocean. Deep-Sea research, 175, 104774

Day, J., Dudley, N., Hockings, M., Holmes, G., Laffoley, D. D. A., Stolton, S., & Wells, S. M. (2012). *Guidelines for applying the IUCN protected area management categories to marine protected areas*. IUCN.

Dulvy, N. K., Fowler, S. L., Musick, J. A., Cavanagh, R. D., Kyne, P. M., Harrison, L. R., ... & Pollock, C. M. (2014). Extinction risk and conservation of the world's sharks and rays. *elife*, *3*, e00590.

Evans, L. S., Buchan, P. M., Fortnam, M., Honig, M., & Heaps, L. (2023). Putting coastal communities at the center of a sustainable blue economy: A review of risks, opportunities, and strategies. *Frontiers in Political Science*, *4*, 1032204.

Food and Agriculture Organization (FAO) (2018). Common oceans – ABNJ: Global sustainable fisheries management and biodiversity conservation in areas beyond National

Jurisdiction. Available FAO, Rome, Italy (2018). http://www.fao.org/documents/card/en/c/CA0994EN

Gutierrez, D., Calado, H., & García-Sanabria, J. (2023). A proposal for engagement in MPAs in areas beyond national jurisdiction: The case of Macaronesia. *Science of The Total Environment*, *854*, 158711.

Harris, P. T., Macmillan-Lawler, M., Rupp, J., & Baker, E. K. (2014). Geomorphology of the oceans. *Marine Geology*, *352*, 4-24.

Humphries, F., & Harden-Davies, H. (2020). Practical policy solutions for the final stage of BBNJ treaty negotiations. *Marine policy*, *122*, 104214.

Kroodsma, David A., Juan Mayorga, Timothy Hochberg, Nathan A. Miller, Kristina Boerder, Francesco Ferretti, Alex Wilson et al. "Tracking the global footprint of fisheries." *Science* 359, no. 6378 (2018): 904-908.

Lett, C., Verley, P., Mullon, C., Parada, C., Brochier, T., Penven, P., & Blanke, B. (2008). A Lagrangian tool for modelling ichthyoplankton dynamics. Environmental Modelling & Software, 23(9), 1210-1214.

Lett, C., Barrier, N., Ourmières, Y., Petit, C., Labonne, M., Bourjea, J., & Darnaude, A. M. (2019). Modeling larval dispersal for the gilthead seabream in the northwestern Mediterranean Sea. Marine environmental research, 104781

Maina, J. M., Gamoyo, M., Adams, V. M., D'agata, S., Bosire, J., Francis, J., & Waruinge, D. (2020). Aligning marine spatial conservation priorities with functional connectivity across maritime jurisdictions. *Conservation Science and Practice*, *2*(2), e156.

Marsac, F., Galletti, F., Ternon, J-F., Romanov, E.V., Demarcq, H., Corbari, L., Bouchet P., Roest, W.R., Jorry, S.J., Olu, K., Loncke, L., Roberts, M.J. and Ménard, F. (2020). Seamounts, plateaus and governance issues in the southwestern Indian Ocean, with emphasis on fisheries management and marine conservation, using the Walters Shoal as a case study for implementing a protection framework. *Deep-Sea Res.* 176, 104715

Marshall, P. A. (2015). Value of ecosystem service benefits from the marine environment and the importance of MPAs. *Valuing Nature: Protected Areas and Ecosystem Services*, 84-89.

Matz-Lück, N., & Fuchs, J. (2014). The impact of OSPAR on protected area management beyond national jurisdiction: Effective regional cooperation or a network of paper parks?. *Marine Policy, 49, 155-166.*

Mossop, J., & Schofield, C. (2020). Adjacency and due regard: The role of coastal States in the BBNJ treaty. *Marine Policy*, *122*, 103877.

Murawski, S.A., 2010. Rebuilding depleted fish stocks: the good, the bad, and, mostly, the ugly. *ICES Journal of Marine Science*, *67*(9), pp.1830-1840.

O'Leary, B. C., Hoppit, G., Townley, A., Allen, H. L., McIntyre, C. J., & Roberts, C. M. (2020). Options for managing human threats to high seas biodiversity. *Ocean & Coastal Management*, *187*, 105110.

Pauly D, Zeller D, and Palomares M.L.D. (Editors) (2020) Sea Around Us Concepts, Design and Data (www.seaaroundus.org)

Popova, E., Vousden, D., Sauer, W., Mohammed, E.Y, Allain, V. et al. (2019). Ecological connectivity between the areas beyond national jurisdiction and coastal waters : safeguarding interests of coastal communities in developing countries. *Marine Policy* 104: 90-102

Roberts, C. M., O'Leary, B. C., McCauley, D. J., Cury, P. M., Duarte, C. M., Lubchenco, J., Worm, B. (2017). Marine reserves can mitigate and promote adaptation to climate change. *Proceedings of the National Academy of Sciences*, 201701262.

Sala, E., Mayorga, J., Costello, C., Kroodsma, D., Palomares, M. L., Pauly, D., ... & Zeller, D. (2018). The economics of fishing the high seas. *Science advances*, 4(6), eaat2504

Schott, F.A. and McCreary Jr, J.P., 2001. The monsoon circulation of the Indian Ocean. Progress in Oceanography, 51(1), pp.1-123.

Schott, F.A., Xie, S.P. and McCreary, J.P., 2009. Indian Ocean circulation and climate variability. Reviews of Geophysics, 47(1).

Smith, D., and Jabour, J. (2018). MPAs in ABNJ: lessons from two high seas regimes. *ICES Journal of Marine Science*, *75*(1), 417-425.

Smith, K. E., Burrows, M. T., Hobday, A. J., King, N. G., Moore, P. J., Sen Gupta, A., ... & Smale, D. A. (2023). Biological impacts of marine heatwaves. *Annual Review of Marine Science*, *15*, 119-145.

Stewart, R. R., & Possingham, H. P. (2005). Efficiency, costs and trade-offs in marine reserve system design. Environmental Modeling & Assessment, 10(3), 203-213.

Sumaila, U. R., Alam, L., Pradhoshini, K., Onifade, T. T., Karuaihe, S. T., Singh, P., ... & Flint, R. (2023). To engage in deep-sea mining or not to engage: what do full net cost analyses tell us?. npj *Ocean Sustainability*, 2(1), 19.

UNEP-WCMC, IUCN (2021). Protected Planet: Official MPA Map; The World Database on Protected Areas (WDPA)/The Global Database on Protected Areas Management Effectiveness (GD-PAME)

UNEP and Nairobi Convention, 2020. State of the Ocean Governance in the Western Indian Ocean

UNEP-Nairobi Convention and WIOMSA. 2021. Western Indian Ocean Marine Protected Areas Outlook: Towards achievement of the Global Biodiversity Framework Targets. UNEP and WIOMSA, Nairobi, Kenya, 298 pp.

Watts, M.E., Ball, I.R., Stewart, R.S., Klein, C.J., Wilson, K., Steinback, C., Lourival, R., Kircher, L. and Possingham, H.P., 2009. Marxan with Zones: software for optimal conservation based land-and sea-use zoning. Environmental Modelling & Software, 24(12), pp.1513-1521.

White, T.D., Ferretti, F., Kroodsma, D.A., Hazen, E.L., Carlisle, A.B., Scales, K.L., Bograd, S.J. and Block, B.A., 2019. Predicted hotspots of overlap between highly migratory fishes and industrial fishing fleets in the northeast Pacific. Science advances, 5(3), p.eaau3761.