EBSAs to inform application for IMO Measures

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Executive Summary

The identification of Ecologically or Biologically Significant Areas under the Convention on Biological Diversity (the EBSAs process) can contribute to the fulfilment of states' obligations under international law as well the Aichi Biodiversity Targets and UN Sustainable Development Goals within and beyond national jurisdiction.

This study examined the extent to which the information gathered in the context of the description of nine EBSAs (Table 1 below) can support applications for shipping measures through the IMO, in order to limit impact from international shipping on the features identified in EBSAs. The analysis is based on applicable rules of international law and past practices at the IMO.

	EBSA Name	**Location**
E1	**Churna-Kaio Island Complex**	NW Indian Ocean and Adjacent Gulf
E2	**Oman Arabian Sea**	NW Indian Ocean
E3	**Southern Strait of Malacca**	E Asian Seas
E4	**Clipperton Fracture Zone Petrel Foraging Area**	WS Pacific
E5	**Corridor Marino Del Pacifico**	E Tropical Pacific
E6	**Salas y Gomez and Nazca Ridges**	E Tropical Pacific
E7	**Sargasso Sea**	Wider Caribbean and W Mid-Atlantic
E8	**Coastal Habitats of the Neritic Zone of Mauritania and the Far North of Senegal (Banc d'Arguin)**	SE Atlantic
E9	**North-Western Mediterranean Pelagic Ecosystems**	Mediterranean Sea

Table 1 - EBSAs considered in this study

Each EBSA presents different characteristics. These include differences in the nature of ecological or biological features and shipping traffic type and density as well as the maritime zone concerned as they involve internal waters, international strait, territorial sea, exclusive economic zones and high seas. For each EBSA, this study identifies:

- Ecological or biological features on the basis of which the EBSA identified was made and subsequent complementary data available;
- Characteristics of the shipping traffic within the EBSA and of likely and known adverse impacts from shipping to the features identified in this EBSA
- relative importance of other sources of pollution or environmental stressors from other human activities or otherwise;
- relevant measures that may be available, applicable rules of international law, IMO practice and the adequacy of possible measures in this context; and,
- possible IMO measure(s), if any, that may remove or limit the risk identified.

These nine case studies show that the IMO has already adopted a number of shipping measures to limit adverse impacts from shipping activities on marine biodiversity through Special Areas under MARPOL, Particularly Sensitive Sea Areas (PSSAs) and their Associated Protected Measures (APMs) or direct navigation measures including routeing

measures and Ship Reporting Systems (SRS). Commonly-used routeing measures are two-way route, traffic separation scheme, precautionary area, area to be avoided and recommendatory speed.

A key finding and recurring issue of the study of these nine EBSAs is the difference in geographic scale between the EBSA mechanism under the CBD and IMO measures. Whilst these two mechanisms are complementary in providing an overall approach of protection of the marine environment, their different focus limits the extent to which EBSA information can be readily used to support IMO measures. EBSAs focus on the scientific demonstration of the ecological or biological characteristics of marine systems. By contrast, IMO measures are focused on ensuring freedom of navigation whilst limiting shipping impacts. Additional research is therefore necessary to fill the missing link: to what extent are the ecological or biological characteristics identified in an EBSA affected by shipping? Are some types of vessels more relevant? Is this impact or risk of impact clear enough that it justifies consideration of an IMO measure? Would this IMO measure alleviate the impact? Can other measures be taken that would restrict other activities at sea and would be more effective? Have any of these other measures already been taken? What is the cost to shipping? How acceptable might these IMO measures be to the international shipping community?

The recurring difficulty encountered in answering these questions highlights the following challenges:

- Cost of additional scientific research and lack of resources;
- Currency of existing scientific research;
- Complexity and combined impacts from different activities;
- Complexity and combined impacts from the same activity: such as noise and ship strike from vessels;
- Attribution of the status of a species, population of component(s) of a marine system to one particular source of stress;
- Monitoring and evaluation of actual benefits from a proposed measure compared to expected measures.

The nine case studies included in this report also highlight specific gaps and opportunities to support or develop applications for IMO measures to protect the marine environment including features of EBSAs. These include ship strikes, noise pollution, light pollution, and control of invasive species as well as enhanced cooperation between different competent bodies; for the protection of whales, these include in particular the International Whaling Commission, the Convention on Migratory Species and relevant regional seas organizations. Several IMO measures are already in place to limit the risk of ship-strikes. However, more research is needed to identify specific measures that may reduce impact from noise pollution, light pollution and invasive species (from hull-fouling and in addition to the provisions of the Ballast Water and Sediment Management Convention).

Overall, the elements provided for each case-study investigated in this report are insufficient to prepare a successful application for new IMO measures to protect some of the features identified in each EBSA. However, the case for IMO measures to limit ship strikes to whales in the Oman Arabian Sea and the North Western Mediterranean Pelagic Ecosystem looks the most promising at this stage. Communication of an information paper at MEPC 75 to update Member States of the results of the study of ship strikes in these two areas may be useful, especially if this is followed by an informal consultation of relevant states on

measures that they may consider to be acceptable. An education and outreach side event organised by IWC and ACCOBAMS and any other relevant organisation on the margin of MEPC 75 may also be useful to raise the profile and interest in the topic.

With respect to other features in these two EBSAs that may also be subject to adverse impacts from shipping, IMO measures may be considered if and when specific adverse impacts or likely impacts from shipping these features have been identified. Potential measures that could limit this impact or likely impact may then be investigated. In the meantime, several steps may be considered to progress in this direction including:

- Peer-reviewed and open source paper on the potential for IMO measures to protect biodiversity in EBSAs;
- Engagement of relevant research communities involved in respective potential threats from shipping that have already been identified (such as noise from vessels, light and invasive species) with shipping communities, governments and industry; and,
- Regular information papers to the MEPC as new research is released and progress is made to characterise impact from shipping and potential measures.

1 Introduction

The identification of Ecologically or Biologically Significant Areas under the Convention on Biological Diversity (the EBSAs process) can contribute to the fulfilment of states' obligations under international law as well the Aichi Biodiversity Targets and UN Sustainable Development Goals within and beyond national jurisdiction. In this context, international law includes the United Nations Convention on the Law of the Sea (UNCLOS), treaties adopted under the auspices of the International Maritime Organization (IMO), the Convention on Biological Diversity) CBD as well as other obligations under international and regional marine and maritime environmental law.

This study examines the extent to which the description and identification of EBSAs in the context of the CBD can support applications for shipping measures through the IMO, in order to limit impact from international shipping on the features identified in EBSAs. The analysis is based on applicable rules of international law and past practices at the IMO.

Nine EBSAs have been selected for this study. They are located in different parts of the world and/or maritime zones and are exposed to different human activities. Prior to the systematic review of these EBSAs, the first two parts of this report set out first, the scope and methodology for this study, second, some necessary backgrounds on the identification of EBSAs and IMO measures available to protect the marine environment. Discussion of each EBSA is followed by a comparison of their feature and presentation of the findings for future consideration. Recurring issues are also discussed in greater detail in this part.

1.1 Scope

This report is a desk-based study focused on actual or potential threats that may be posed by international shipping to EBSA features. This study assesses the extent to which and conditions for IMO measures to be adopted to limit adverse impact from shipping on these EBSAs. Measures that may be adopted are also discussed. For the purpose of this study, the nine EBSAs have been grouped geographically and considered in the order set out in Table 1.1 below.

Several criteria have driven the selection of this sample of EBSAs: proposal and data provided by GOBI's partner institutions, data available and interest in these areas and representativity of different parts of the ocean.

For each EBSA, the analysis is divided into three steps:

Step 1. Ecological or biological features on the basis of which the EBSA identified was made and subsequent complementary data available: data published in the context of the EBSA identification were reviewed along with subsequent publications relating to this EBSA, and where possible, primary sources and relevant documents made available subsequently on the same features. Due to time constraints, some of the figures of population occurrence and status provided in different reports could not be verified against source documents in which case the expert opinion was relied on;

Step 2. Consideration of shipping traffic within the EBSA and of its likely and known adverse impacts to the features previously identified in Step 1. The relative importance of other sources of pollution or environmental stressors from other

human activities or otherwise are also considered. The analysis is based on the data that was made available. Where this data may not be sufficient to demonstrate clear adverse impact from shipping, additional data that could be useful is identified;

Step 3. Consideration of possible IMO measure(s), if any, that may remove or limit the risk(s) identified in Step 2. This takes into account relevant measures that may be available, applicable rules of international law, IMO practice and the adequacy of possible measures in this context. Such measures presuppose that adequate evidence of impact from shipping can be provided.

	EBSA Name	**Location**
E1	**Churna-Kaio Island Complex**	NW Indian Ocean and Adjacent Gulf
E2	**Oman Arabian Sea**	NW Indian Ocean
E3	**Southern Strait of Malacca**	E Asian Seas
E4	**Clipperton Fracture Zone Petrel Foraging Area**	WS Pacific
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E9	**North-Western Mediterranean Pelagic Ecosystems**	Mediterranean Sea

Table 1.1 - EBSAs considered in this study

1.2 Methodology

The analysis below brings together international law of the sea, regulations of the International Maritime Organisation (IMO) and the scientific evidence provided for its implementation. This evidence is composed of:

- Case study responses from all partners (including some specific reports),
- Workshop reports on the identification of the relevant EBSAs,
- Publication references included in the above documents (where necessary and time-permissible),
- EBSA identification summary attached to the resolution of the COP,
- EBSA information sheet on the CBD Clearing-House Mechanism.

Case studies prepared by GOBI and its partners provided the basis for this study. The analysis was also sent to all partners in a draft format for comments and discussions in order

to verify its accuracy with respect to the specific ecosystem and species that they are monitoring.

With respect to species mentioned in the descriptions as being endangered, they have been considered based on the following

- Species have been considered as depleted, threatened or endangered according to Article 194(5) of the United Nations Convention on the Law of the Sea (UNCLOS) and therefore triggering an obligation on states to take adequate measures to protect them and their habitat, when they were listed in appendices of the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) or the Convention on the Conservation of Migratory Species of Wild Animals (CMS).[1]
- Species that are listed as endangered on the IUCN Redlist could also be considered if additional scientific information is provided to justify this status. This is because the Redlist is not a legal instrument that has been vetted by states and cannot therefore be considered as being part of international law. However, it can be a persuasive source of evidence if completed with suitable proof.

As the purpose of this study is to identify potential shipping measures that may be adopted to protect EBSA features and/or the evidence needed, the features of each EBSA which are considered for this study were selected on the basis of their potential vulnerability to specific shipping activities. For example, a feature of high biodiversity would only be adequate to characterise impact from a shipping activity if a specific adverse impact or likely impact on biodiversity can be demonstrated- for example the demonstration that a loss in species biodiversity or distribution is directly attributable to shipping activities and that a specific measure would be likely to remedy the situation. This may be the case for a marine system that could be vulnerable to invasive species or oil spills (subject to the characteristics of this biodiversity). However, a general risk of biodiversity loss based on the risk of an oil spill is unlikely to be sufficient to characterise a shipping measure that may appear disproportionate in cost to the industry compared to the ecological benefit. A risk of collision with a vessel would also need to consider the marine life that may suffer from it, the extent of the risk and the status of the population of that species.

On this basis, consideration of impact from shipping on particular components of biodiversity is particularly adapted to an application for IMO measures. This analysis and selection of EBSA characteristics is also guided by past examples of IMO measures adopted to protect the marine environment, bearing in mind that in several cases the main basis provided in the application for the measure focused on safety of navigation, a paramount concern with the additional benefit of also protecting the marine environment.

This study did not focus on EBSA characteristics such as benthic communities, fish, and bathypelagic species. However, if more specific scientific data gathered in the future shows impact from shipping on these components of the marine environment, it is expected that they would be considered for appropriate new IMO protective measures.

[1] To determine whether species can be considered to have a status of depleted, threatened or endangered species under international law, the following record of listing by the Conference of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and that of the COP to the Convention on the Conservation of Migratory Species of Wild Animals (CMS): https://speciesplus.net/

2 Background of EBSAs and IMO Measures

2.1 EBSAs and the EBSA Process

2.1.1 The purpose of EBSAs

The CBD is based on the premise that the conservation of biological diversity is a common concern of humankind, given its importance for evolution and for maintaining life-sustaining systems of the biosphere. Significant reduction of biodiversity by certain human activities and the need to anticipate, prevent and combat this significant reduction motivated the adoption of the CBD. Its objectives include the conservation of biodiversity and the sustainable use of its components, which applies to both the terrestrial and marine realms.

Emphasis on vulnerable marine ecosystems in numerous intergovernmental meetings including the Conference of the Parties (COP) to the CBD, the 2002 Earth Summit and the United Nations General Assembly (UNGA), resulted in the adoption by the COP to the CBD of criteria for identifying EBSAs and scientific guidance for designing representative networks of Marine Protected Areas (MPAs).[2] 196 states are parties to the CBD, including most members of the IMO.

CBD COP9 (2008) adopted seven criteria for the identification of EBSAs (Table 2.1 below). Guidance has also been developed and acknowledged by the following COP for the application of these criteria (the Ottawa Workshop Report and Guidance). The Training Manual for the Description of EBSAs in Open-ocean Waters and Deep-sea Habitats (the EBSA Training Manual) was reviewed by CBD COP11. These guidance documents provide, for each criterion, complementary information on the criterion definition, application of the criterion and methodology, including expected primary data sources and acceptable data sources and methodology in case of insufficient data or knowledge. Since 2008 GOBI has supported CBD Secretariat to generate new scientific information and build capacity for applying EBSA criteria.

EBSA Criteria		**Definition**
1	**Uniqueness or rarity**	Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features
2	**Special importance for life history of species**	Areas that are required for a population to survive and thrive
3	**Importance for threatened, endangered or declining species and/or habitats**	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of such species.

[2] CBD COP9 Decision IX/20. Available https://www.cbd.int/decision/cop/?id=11663

4	**Vulnerability, fragility, sensitivity, slow recovery**	Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery
5	**Biological productivity**	Area containing species, populations or communities with comparatively higher natural biological productivity.
6	**Biological diversity**	Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity
7	**Naturalness**	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation

Table 2.1 - EBSAs' criteria

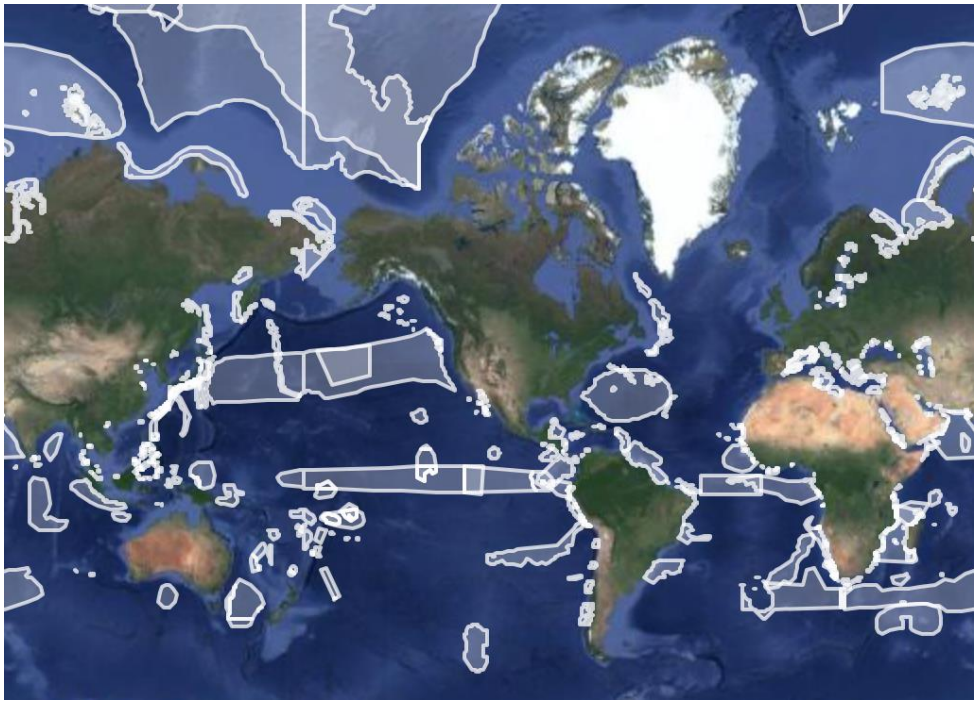
2.1.2 The EBSA process

Further to COP10 Decision X/29 the CBD Executive Secretary has organised regional workshops to facilitate the description of EBSAs. Following regional workshops, the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) prepares reports based on scientific and technical evaluation of information from the workshop, setting out details of areas that meet the EBSA criteria.

These reports are considered and acknowledged in a transparent manner by the CBD COP, with a view to including EBSAs identified in the EBSA repository created for this purpose. The reports are also conveyed to all relevant international bodies and organisations such as the UNGA, IMO, UN Environment and regional organisations.

2.1.3 EBSAs around the world

The size of EBSAs ranges between a few km^2 and over 10 million km^2. Since 2012 and until the last CBD COP14 in December 2018, 321 EBSAs have been identified and listed in decisions of the CBD COP. (See Map 2.1 and Table 2.2 below). Another workshop is planned in September 2019 to facilitate the description of EBSAs in the Northeast Atlantic. These new potential EBSAs are expected to be considered at CBD COP15 in 2020. By then, most oceans would have been studied in workshops to facilitate the identification of EBSAs. The only exceptions are the South Western Atlantic and the Southern Ocean, which has its own process under the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). It is also noted that some oceans' areas and regional seas may not have been fully considered in all workshops due to procedural constraints.



Map 2.1 - Extract of CBD EBSA website (https://www.cbd.int/ebsa/) - 15 May 2019

Regional Workshops	Date	EBSAs identified at the workshop	EBSAs in COP Report	COP Date
Western South Pacific	22-25 Nov 2011	26	26	COP11 - 2012
Wider Caribbean and Western Mid-Atlantic region	28 Feb- 2 Mar 2012	22	21	COP11 - 2012
Southern Indian Ocean	30 Jul- 3 Aug 2012	39	39	COP12 -2014
Eastern Tropical and Temperate Pacific	27-31 Aug 2012	21	21	COP12 - 2014
North Pacific	25 Feb- 1 Mar 2013	20	20	COP12 - 2014
South East Atlantic	8-12 Apr 2013	45	44	COP12 - 2014
Arctic	3-7 Mar 2014	11	11	COP12 - 2014
NW Atlantic	24-28 Mar 2014	7	7	COP12 - 2014
Mediterranean	7-11 Apr 2014	17	15	COP12 - 2014
NE Indian Ocean	22-27 Mar 2015	10	10	COP13 - 2016

Regional Workshops	Date	EBSAs identified at the workshop	EBSAs in COP Report	COP Date
NW Indian Ocean	19-25 Apr 2015	31	30	COP13 - 2016
East Asian Seas	13-18 Dec 2015	36	35	COP13 - 2016
Black and Caspian Seas	24-29 Apr 2017	33	33	COP14 - 2018
Baltic Sea	19-24 Feb 2018	9	9	COP14 - 2018
Northeast Atlantic	*September 2019*	-	-	*COP15 - 2020*
Total		**327**	**321**	

Table 2.2 - EBSAs around the world

2.2 IMO measures

Rights and obligations of states with respect to the protection and preservation of the marine environment and marine and maritime activities at sea are determined in UNCLOS, including international shipping. UNCLOS has been adopted by 168 states. Despite not having been adopted by the United States, most of its provisions are also considered to be mandatory for non-signatory states as customary international law.

The IMO is the United Nations specialized agency responsible for the promotion of safe, secure, environmentally sound, efficient and sustainable shipping through cooperation and the adoption of guidelines and standards. As such, the IMO has overseen the development of several mechanisms to provide increased protection from shipping in areas that are considered to be particularly sensitive.

However, according to international law, the nature of shipping measures that may be adopted by states and the need to consult the IMO depend on the maritime zones in which the measures would apply. Three situations must be distinguished:

1. Maritime zones where all states benefit from freedom of navigation, i.e. Exclusive Economic Zone (EEZ) and high seas,
2. Straits used for international navigation and other areas where transit passage applies (including archipelagic sea-lanes of passage used for international navigation), and
3. Maritime zones under the sovereignty of a coastal state: internal waters, territorial sea and archipelagic waters outside sea-lanes used for international navigation.

The rules set out below are based on international law, the language of UNCLOS and the rules on the interpretation of treaties. Nevertheless, some states have developed different national positions on maritime zones that they have enacted in their national laws. These positions can impact the type of maritime zone (internal waters where a stricter reading of UNCLOS would apply) or the rights of other states in their territorial sea (such as limits of innocent passage that are not included in UNCLOS). Such national positions must be taken

into account as they are expected to influence the nature of measures that IMO member states may be ready to apply for.

2.2.1 IMO Measures in different maritime zones

Regime of freedom of navigation

The freedom of navigation is one of the fundamental high seas freedom. All states also enjoy this freedom in other states EEZs. Exercise of this freedom is subject to the obligation to pay due regard for the interests and rights of other states in accordance with UNCLOS.[3] It is also subject to the obligation to protect and preserve the marine environment. A corollary to this freedom of navigation is that it cannot be limited unilaterally by states. Restrictions to navigation can only apply to all vessels if they are adopted by the IMO.

Restrictions to navigation in the high seas or EEZ in order to protect the marine environment require IMO measures. However, states are free to unilaterally impose restrictions to navigation to protect the marine environment in particular areas on vessels flying their flag.

Transit passage through straits and archipelagic waters

All ships enjoy the right of transit passage through straits used for international navigation.[4] Transit passage means the exercise of freedom of navigation solely for the purpose of continuous and expeditious transit of the strait. Ships in transit must comply with generally accepted international regulations, procedures and practices for the prevention, reduction and control of pollution from ships. States bordering straits may also adopt laws and regulations relating to transit passage through straits for the prevention, reduction and control of pollution by giving effect to applicable international convention.[5]

Approval for routeing or other navigational measures during transit passage must therefore be requested according to IMO regulations and involve an application to the IMO (jointly with other bordering states if there are several). However, in international straits, measures that may be adopted remain constrained by the limited jurisdiction of straits bordering states and the right to continuous and expeditious transit of the strait enjoyed by user states. Measures adopted in straits used for international navigation have until now been limited to traffic separation schemes or two-way routes, precautionary areas and ship reporting systems. As an example, Jomard entrance is a strait used for international navigation which has been designated as a Particularly Sensitive Sea Area (PSSA)[6] following earlier successful application for a two-way route in the strait and a precautionary area leading onto it.

A comparable regime of transit passage also applies to normal passage routes used as routes for international navigation through archipelagic waters or archipelagic sea lanes designated by archipelagic states according to UNCLOS and following consultation of the IMO. Outside these sea-lanes or routes, foreign vessels enjoy the right of innocent passage.

[3] UNCLOS Articles 87 and 58

[4] UNCLOS Part III. Transit passage is replaced by innocent passage in straits used for international navigation between part of the high seas or an EEZ and the territorial sea of a foreign state.

[5] UNCLOS Articles 39 and 42

[6] See section 2.2.3 below

Sovereignty of the coastal state and innocent passage

States have sovereignty over their internal waters, territorial sea and archipelagic waters (outside archipelagic sea lanes) and foreign states' navigation right is one of innocent passage. The coastal state has jurisdiction to adopt regulations relating to the innocent passage over a range of issues, including the preservation of the marine environment and prevention, reduction and control of pollution from ships.[7]

Navigational measures can therefore be unilaterally adopted by coastal states in their internal waters, territorial sea and archipelagic waters without prior application to the IMO for approval, provided that it does not interfere with other states' right of innocent passage through their territorial sea and archipelagic waters.[8] There are examples of applications to the IMO for mandatory routeing measures in a territorial sea that have been changed to recommendatory measures. Furthermore, publication of such regulation is necessary as is respecting IMO rules and procedure on navigation, charting, etc.

Three different IMO mechanisms have been relied on until now to protect areas more sensitive than their surrounding against impact from shipping (in addition to the numerous IMO Conventions that apply equally in the oceans and seek to protect the marine environment. The first mechanism, developed in the International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978 (MARPOL Convention), is the definition of certain sea areas as 'Special Areas' in which authorised discharges are further limited. The second mechanism is the PSSA and its Associated Protection Measures (APMs). The third mechanism is the direct use of IMO navigational measures to limit shipping impact on sensitive areas: routeing measures, vessel traffic services and ship reporting systems.

2.2.2 Special Area under MARPOL

Source

The MARPOL Convention regulates both operational discharges and accidental pollution through six technical annexes, each devoted to a specific type of pollution. Special Areas can be designated to further limit pollution from oil (Annex I), noxious liquid substances in bulk (Annex II), harmful substances in packaged form (Annex III), sewage (Annex IV), garbage (Annex V) and air pollution (Annex VI). 'Special Areas' are sea areas where for recognised technical reasons in relation to [their] oceanographic and ecological conditions and to the particular character of [their] traffic', the adoption of a higher level of protection than (in other areas of the sea) is necessary.[9] These 'Special Areas under MARPOL' have increased restrictions or complete prohibitions on the discharge of oil, noxious liquid substances, sewage and garbage. 'Emission Control Areas' have also been designated with

[7] UNCLOS Articles 21 and 52

[8] In the designation of sea lanes and prescription of TSS, coastal States must however take into account recommendations of the IMO. UNCLOS Article 22.

[9] MARPOL Annex I Regulation 1(10) and Annex V Regulation 1(3). A similar definition is included in MARPOL Annex II Regulation 1(7); the 'particular character of the traffic' is changed to the 'peculiar transportation traffic'. The initial draft of MARPOL Annex IV did not include specific provisions for Special Areas; these were added by amendment to the Annex by Resolution MEPC 200(62) adopted on 15 July 2011. It defines 'Special Area' with the same language as Annexes I and II. Available http://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/Marine-Environment-Protection-Committee-(MEPC)/Documents/MEPC.200(62).pdf

more stringent restrictions on specific atmospheric emissions from ships (sulphur emissions and nitrogen oxides) in Annex VI.[10]

Conditions

Several guidelines have been adopted by the Marine Environmental Protection Committee (MEPC) of the IMO for the designation of Special Areas. The last guidelines (which are currently applicable) are devoted solely to Special Areas under MARPOL: 2013 Guidelines for the Designation of Special Areas under MARPOL (the Special Area Guidelines).[11] They set out in details the conditions to be met for an area to qualify as a Special Area under MARPOL Annexes I, II, IV and V.[12] The conditions for the designation of a Special Area are grouped into three cumulative categories of oceanographic conditions, ecological conditions and vessel traffic characteristics as set out in Table 2.3 below.

The area needs to meet all three categories of conditions but does not need to fulfil all the ecological criteria listed. Meeting any one of the ecological criteria would be sufficient, provided that the oceanographic conditions and the vessel traffic characteristics demonstrate the threat posed by the discharge.

	Conditions	Criterion	Description
1	**Oceanographic conditions**	-	May cause concentration or retention of harmful substances in the water or sediments of the areas e.g. convergence zones or gyres, low flushing, extreme ice state, etc.
2.1	**Ecological conditions**	Depleted, threatened or endangered marine species	
2.2		High natural productivity	
2.3		Spawning, breeding and nursery areas for important marine species	Includes migratory marine species and migratory birds
2.4		Rare or fragile ecosystems	E.g. corals reefs, mangrove, seagrass beds and wetlands
		Critical habitats for marine resources	Includes fish stocks and areas of critical importance for the support of large marine ecosystems
3	**Vessel traffic characteristics**	-	Discharge would be unacceptable in the light of existing conditions

Table 2.3 - Conditions for the designation of Special Areas under MARPOL

[10] MARPOL Annex VI. Regulations for the Prevention of Air Pollution from Ships, 26 September 1997, included in Protocol of 1997 to amend International Convention for the Prevention of Pollution from Ships of 2 November 1973, as modified by the Protocol of 17 February 1978. It entered into force on 19 May 2005. In October 2008 (MEPC 58), a revised Annex VI which significantly tightened emissions limits was adopted. It entered into force on 1 July 2010. Available http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Air-Pollution.aspx

[11] Adopted by IMO Assembly Resolution A.1087(28), 4 December 2013

[12] There is no record of guidelines for the designation of Emission Control Areas other than Appendix III to MARPOL Annex VI 'Criteria and Procedures for Designation of Emission Control Areas' as amended. See MEPC58/23/Add.1

In order to meet the third condition relating to vessel traffic conditions, the proposal must include an assessment of impacts from the vessel source discharges from vessels allowed by MARPOL outside Special Areas on the species or resources needing increased protection. This assessment of impact must also include a cumulative impact assessment of existing stressors on the marine species, resources, or ecosystems.[13] The 2013 Guidelines indicate that the description of the area included in the proposal should also provide information on the social and economic value, scientific and cultural significance, all environmental pressures and the measures already taken to protect this area.

Procedure

An amendment of the relevant Annex to MARPOL is necessary for a new Special Area to be designated; the geographic coordinates of each Special Area and Emission Control Area should subsequently be included in the body of the relevant Annex. It must be proposed by one or more states and then discussed at the next meeting of the MEPC. A Special Area may encompass the maritime zones of several states or even an entire enclosed or semi-enclosed sea area, such as the Baltic Sea, the North Sea, the Gulfs Area and the Mediterranean Sea.

2.2.3 PSSAs and Associated Protective Measures

Source

A PSSA is an area 'which needs special protection through action by IMO because of [its] significance for recognized ecological or socio-economic or scientific reasons and which may be vulnerable to damage by maritime activities'.[14] Therefore, this includes ship-source pollution, as well as, environmental hazards associated with shipping, such as physical damage to marine habitats or organisms.

The PSSA concept has been developed by the IMO to attract attention on sensitive areas and provide a basis on which associated protective measures (APMs) may be recognised and endorsed by the IMO. Part of the early thinking, as it is clearly stated in the first guidelines adopted in 1991, framed PSSAs as a means to adopt complementary measures in Marine Protected Areas, be they national or adopted in the context of global or regional seas agreements. The 1991 Guidelines refer specifically to MPAs designated in the context of the World Heritage Convention, Ramsar Convention and CMS. The criteria for the identification of EBSAs under the CBD have been included in revised guidelines. Therefore, the designation of PSSAs includes criteria developed under these other instruments to identify sensitive areas.

[13] Special Area Guidelines para. 2.9

[14] Definition from the MEPC 36th session in 1986 as reiterated in the 1991 Guidelines. The initial 1991 Guidelines (IMO Assembly Resolution A.720(17)) as amended in 1999 by IMO Assembly Resolution A.885(21) have been revoked and replaced by the 2001 Guidelines for the Designation of Special Areas under MARPOL 73/78 and Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas adopted on 29 November 2001, IMO Assembly A.927(22). These were in turn superseded in 2005 by the 2005 Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas by IMO Assembly Resolution A.982(24), adopted on 1 December 2005, themselves subsequently amended in 2015 by MEPC Resolution MEPC 267(68). The 2005 Revised Guidelines are available at http://www.imo.org/en/OurWork/Environment/PSSAs/Documents/A24-Res.982.pdf

Alternative criteria categories		Criteria	Description of corresponding area's characteristics
1.1	**Ecological**	**Uniqueness or rarity**	'The only one of its kind'; rare means that it occurs in a few locations or has been seriously depleted across its range. Can be habitats of rare, threatened or endangered species that only occur in one area or nurseries/feeding/breeding/spawning areas
1.2		**Critical habitat**	Essential for the survival, function, or recovery of fish stocks or rare or endangered species or for the support of large marine ecosystems
1.3		**Dependency**	Ecological processes are highly dependent on biotically structured systems (e.g. coral reefs, mangrove forests, seagrass beds). Includes migratory routes of marine species and birds
1.4		**Representativeness**	Outstanding and illustrative example of specific biodiversity, ecosystems, ecological or physiographic processes or community or habitat types, etc.
1.5		**Diversity**	May have an exceptional variety of species or genetic diversity or highly varied ecosystems/habitats/communities
1.6		**Productivity**	Particularly high rate of natural biological production; e.g. relatively high biomass in oceanic fronts, upwelling areas and some gyres
1.7		**Spawning or breeding grounds**	Critical spawning/breeding/nursery area for marine species that may spend the rest of their life cycle elsewhere or for migratory routes for marine species or birds
1.8		**Naturalness**	Relative lack of human-induced disturbance or degradation
1.9		**Integrity**	A biologically functioning unit, an effective, self-sustaining ecological entity
1.10		**Fragility**	Highly susceptible to degradation by natural events or human activities. Some biotic communities may have low tolerance to changes in environmental conditions or exist close to the limits of their tolerance. Existing stress can justify need for special protection from further stress
1.11		**Biogeographic Importance**	Contains rare biogeographic qualities or representative of a biogeographic 'type(s)' or contains unique or unusual biological, chemical, physical or geological features
2.1	**Social, cultural and economic**	**Social or economic dependency**	Environmental quality and use of living marine resources are of particular social or economic importance, incl. fishing, recreation, tourism, people livelihoods, etc.
2.2		**Human dependency**	Particularly important for traditional subsistence or food production or the protection of the cultural resources of the local populations
2.3		**Cultural heritage**	Particularly important due to the presence of significant historical and archaeological sites
3.1	**Scientific and educational**	**Research**	Has high scientific interest
3.2		**Baseline for monitoring studies**	Provides suitable baseline conditions: no substantial perturbations or steady state such that considered to be in a natural or near-natural condition
3.3		**Education**	Offers exceptional opportunity to demonstrate particular natural phenomenon

Table 2.4 - Criteria for the identification of an area as potential PSSA

Conditions

The PSSA mechanism and procedure are described in guidelines developed by the MEPC which have been reviewed several times to increase the rigour of the process and respond to criticisms. The applicable guidelines are the 2005 Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas, as amended in 2014 (the PSSA Guidelines).

The PSSA Guidelines set out three cumulative conditions for the designation of PSSAs:

1. One of the alternative criteria for the identification of a PSSA must be met, i.e. any one of the 11 ecological criteria, three social, cultural and economic criteria or three scientific and educational criteria; (Table 2.4 above)

2. The area demonstrates its vulnerability to impact from international shipping: this involves consideration of several factors such as vessel traffic characteristics (type of maritime activity, vessel type, harmful substances carried, volume, etc.), natural factors, evidence of impact from shipping or history of incidents and analysis of actual or expected benefits from past or prospective measures.

3. The area has one or several appropriate APMs that the IMO has competence to approve.

APMs

The PSSA application must identify the existing and/or proposed APM(s) and describe how they provide the needed protection from shipping impacts in the proposed PSSA area. APMs must have an 'identified legal basis' in an existing or new IMO instrument or in Article 211(6) of UNCLOS, or be proposed for adoption in the Territorial Sea. Possible APMs include:

- routeing measures,
  such as area to be avoided (ATBA), no-anchoring area, precautionary area or two-way routes under the 1974 International Convention for the Safety of Life at Sea (SOLAS Convention) and in accordance with the General Provisions on Ships' Routeing[15] (GPSR). Routeing measures are generally recommendatory unless the request demonstrates compelling reasons for the measures to be mandatory. Traffic separations schemes (TSS) are an exception as they are mandatory by default and adopted by the IMO according to Rules 1(d) and 10 of the 1972 Collision Regulations (COLREGs);[16]

- reporting systems,
  under SOLAS and the Guidelines and Criteria for Ships Reporting Systems, which aim to provide information to coastal states on all or specific categories of vessels present in a given area as well as provide coastal states with the possibility to provide mariners with information about specific environmental conditions;[17]

[15] Regulation 10 of SOLAS Chapter V provides the IMO with the authority for the adoption of ship routeing systems. General provisions on ships' routeing adopted by IMO Assembly Resolution A 572(14), as amended. See also the IMO Guidance Note for the Preparation of Proposals on Ships' Routeing Systems and Ship Reporting Systems for Submission to the Sub-Committee on Safety of Navigation, MSC/Circ.1050, 6 January 2003.

[16] 1972 International Regulations for Preventing Collisions at Sea

[17] Regulation 11 of SOLAS Chapter V provides the IMO with the authority for the adoption of ship reporting systems. Guidelines and Criteria for Ship Reporting Systems – MSC Resolution MSC 43(64) as amended by MSC 111(73)

- discharge (or emission) restrictions,
  on the basis of MARPOL Annexes I, II, IV, V or VI or possibly the 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments (The Ballast Water Convention) to limit the risk of transfer of harmful aquatic organisms and pathogens through a ship's ballast water and sediment in a particularly vulnerable area through compliance with the additional standards or requirements under the Convention; more restrictive discharge requirements may also be possible if circumstances justify; and

- vessel traffic management services (VTS) including pilotage services.[18]

APMs that may be successfully proposed by states depends on their adequacy to the evidence provided to justify it. Acceptability depends on a number of factors including the proof of environmental sensitivity and of impact from shipping, the perception of the usefulness of the measure applied for, the maritime zone concerned, the number of states concerned (as coastal states, flag states or more generally user states) and the impact on shipping traffic. It must not constitute an unnecessary burden against rights to transit passage or freedom of navigation.

Procedure

An application to IMO for designating an area as a PSSA may be submitted only by - Member State(s) of the IMO. The application must be submitted to the MEPC and meet all three conditions of an eligible sea area, the impact from shipping and a proposal for an APM. While the MEPC addresses environmental issues under IMO's remit, the Sub-Committee on Navigation, Communications and Search and Rescue (NCSR) addresses all matters related to navigation and communication including ship routeing measures and ship reporting systems.[19] A separate application must therefore be submitted to this body for approval by the MSC of APMs that fall within its authority, unless the measure has been previously granted this approval. For example, routeing measures had already been granted for the Jomard Entrance (Papua New Guinea) prior to the application for a PSSA; these measures became APMs for the purpose of the PSSA procedure without an additional application to NCSR being necessary.[20] By contrast, with respect to the designation of the Tubbataha Reefs Natural Park as a PSSA, the proposal for an APM (an ATBA) was submitted to NCSR 4 after the initial PSSA proposal was submitted to MEPC 60.[21]

[18] SOLAS Chapter V Regulation 12 provides the legal basis for this APM, associated with IMO Guidelines for Vessels Traffic Services, 27 November 1997, adopted by IMO Resolution A 857(20). However, SOLAS does not indicate the role of the IMO in this respect. VTS include a wide range of shore-based communication system from one-way messages to vessels to exchange and even management of traffic. VTS services and recommendatory pilotage have been approved by the IMO in several areas

[19] NCSR is a Sub-Committee to the Maritime Safety Committee (MSC), created from the merger of the Sub-Committees on Navigation (NAV) and Radio communications and Search and Rescue (COMSAR). The first meeting of NCSR (took place in 2014 (NCSR 1/28) and the last meeting of NAV in 2013 (NAV 59/20). Prior to NCSR 1, applications for routeing measures and ship reporting systems were submitted to NAV.

[20] With respect to the proposal from Papua New Guinea for the designation of the Jomard Entrance as a PSSA, the report of MEPC 30 notes that two routeing systems (four two-way routes and a precautionary area) has already been adopted at MSC 94 and entered into force on 1 June 2015. MEPC 70/18, 11 November 2016, Section 8. See also joint application by Australia and Papua New Guinea for the routeing measures in NCSR 1/3/8, 28 March 2014.

[21] MEPC 71/17, Sections 8.1-8.2

As of MEPC 74 in May 2019, 15 marine and coastal PSSAs have been identified since the first identification of the Great Barrier Reef of Australia in 1990[22]: seven are located in the Indo-Pacific, five in Europe and the Mediterranean seas and three in the Atlantic Ocean and Caribbean Seas. These PSSAs employ a diversity of APMs, including a number of mandatory routeing measures, nine ATBA, several mandatory non-anchoring areas and five mandatory and recommendatory Ship Reporting Systems. See examples in section 2.2.5 below.

Off note, several PSSAs have been identified after routeing measures had been granted in the same area. These measures became the APM(s) of the PSSA.

2.2.4 Routeing Measures and other IMO Measures without a PSSA or Special Area under MARPOL

The first measures approved by the IMO to protect sensitive sea areas date from 1978, more than 10 years before the first PSSA Guidelines. Ever since, states have continued to successfully propose to the IMO voluntary or mandatory routeing measures designed to protect the marine environment, without engaging in a PSSA procedure. Examples include ATBA to protect whales against ship strike, sensitive coastline environments or marine reserves and mandatory no-anchoring areas. Between 1998 and 2016, IMO measures have been adopted in at least 14 sensitive areas to protect the marine environment. (Table 2.6 below)

However, new guidance has been adopted by the IMO for proposals primarily related to matters of the protection of the marine environment and wildlife. Submissions must now be first made to the MEPC with a view to establishing a PSSA.[23] Application for APMs is submitted to the NCSR sub-committee following the 'in principle' decision of the MEPC to designate the PSSA, pending consideration of detailed proposals for APMs by the NCSR. For example, the designation of the Tubbataha Reefs Natural Park as a PSSA and adoption of APMs followed this process.[24]

This change appears to have resulted from on-going discussions at the IMO on the respective role and expertise of the MEPC and NCSR sub-committee. Several reports have highlighted the preference for routeing measures aimed to protect the marine environment to be submitted to the MEPC. Since 2017, no application for IMO measures outside PSSAs refers solely to the protection for the marine environment. They all refer to safety of navigation as first objective. For example, routeing measures which have been successfully applied for by Indonesia in the Lombok Strait were primarily motivated by safety of navigation although they had been the subject of two earlier papers by Indonesia sharing intention to make an application for a PPSA in this area given their environmental sensitivity.[25]

Whereas many IMO measures designed to protect the marine environment may also be framed as a measure for the safety of navigation, this may be more difficult for routeing measures designed to avoid ship strikes. It seems that application for such measures may

[22] Extensions to existing PSSAs are not counted as separate PSSAs
[23] MSC.1/Circ.1608 adopted by MSC 101 in June 2019.
[24] IMO Secretariat MEPC 71/8, Outcome of BCSR 4 in relation to the APM for the Tubbataha Reefs Natural Park as a PSSA
[25] MEPC 71/INF.39 and MEPC 73/INF.18

now require successful prior application for the designation of a PSSA. However, routeing measures to protect the marine environment have been made possible under SOLAS and the GPSR over 20 years ago.[26] Further research on this point would therefore be useful.

2.2.5 Examples of IMO measures adopted to protect the marine environment

Special Area under MARPOL

The status of Special Area under MARPOL has been granted to a number of enclosed and semi-enclosed seas. These include: The Baltic Sea, the Black Sea, the Mediterranean Sea, the North Sea and the Red Sea.

It has also been granted to marine systems which include areas of open ocean (and high seas) such as: the Antarctic area (south of latitude 60°S), North American Emission Control Area and the Wider Caribbean Region.

PSSA

Applicants	**Name / Location**	**Date**	**APM(s)**
Northeastern coast of Australia	Great Barrier Reef (GBR) (extended twice)	1990	ATBA, two-way routes, compulsory pilotage for GBR, SRS Recommendatory pilotage in Torres Strait
Cuba	Sabana- Camaguey	1997	ATBA, TSS, Discharge prohibitions
Colombia	Malpelo Island	2002	ATBA
USA	Sea Around Florida Keys	2002	ATBAs, no anchoring areas
Denmark, Germany, Netherlands	Wadden Sea	2002	Mandatory Deep-Water route, SRS, MARPOL Special Areas
Peru	Paracas National Reserve	2003	ATBA
Western European states	Western European Waters	2004	48H SRS (single-hull tankers), TSSs, Deep Water Routes, ATBAs
Spain	Canary Islands	2005	ATBA, TSS, Recommended tracks, mandatory SRS
Ecuador	Galapagos Archipelago	2005	ATBA with recommended tracks, mandatory SRS, 2 TSSs for the approach to the ATBA
Coastal states (8)	Baltic Sea	2005	ATBAs (non-mandatory), TSSs, Deep Water Route, mandatory SRS, localised mandatory pilotage,
USA	Papahanaumokuakea Marine National Monument	2007	ATBA, mandatory and non-mandatory SRS
France and Italy	Strait of Bonifacio	2011	Non mandatory pilotage

[26] Whilst the GPSR provides for the possibility to adopt routeing measures to protect environmentally sensitive areas, it does not require prior recognition by the IMO of this 'environmentally sensitive area', which may for instance have been recognised by another body. However, the new practice encouraged by the IMO suggests that the IMO would have to validate the characterisation as 'sensitive area'.

Netherlands	Saba Bank	2012	ATBA, mandatory no anchoring area (TS/EEZ)
Papua New Guinea	Jomard Entrance	2016	TSS and Precautionary Area (strait used for international navigation)
Philippines	Tubbataha Reefs Natural Park	2017	ATBA

Table 2.5 Examples PSSAs and corresponding APMs

Routeing measures without a PSSA

Examples included below were selected on the basis that protection of the marine environment motivated the application for these measures specifically. By contrast, most routeing measures are motivated by maritime safety.

Applicant	**Location**	**Date**	**Measure(s)**	**Motivation**
USA	Off northeastern and southeastern coast of the USA	1998	Two mandatory SRS	Reduce the threat of ship strikes of northern right whale. One of the SRS is seasonal
UK	Shetland Islands	2001	ATBA	Avoid risk of oil pollution and severe damage to the environment (within 12NM of an island/rock)
Finland	Gulf of Finland (Baltic Sea)	2002	TSS	Safety and prevention of pollution (within 12NM)
Canada	Bay of Fundy	2002	Change in TSS location	Reduce ship strikes of northern right whales (within 12NM)
New Zealand	NE of the North Island	2003	Mandatory ATBA	Ecologically sensitive area (mostly within 12NM)
Norway	In Barents Sea	2006	Recommendatory Route	Sensitive marine area including fish breeding ground. 500NM+ long within 12NM. Compulsory TSS initially proposed
Canada	South Nova Scotia	2007	Seasonal ATBA	Reduce ship strikes of right whales
Iceland		2007	ATBA	Protect fisheries and environment (within 12NM)
Australia	Nigaloo Reef	2012	ATBA	Protection of the marine environment (within 12NM)
USA	Los Angeles San Francisco Santa Barbara	2012	Several TSS	Avoid whale strikes and protect biodiversity area
Norway and Russia		2012	Mandatory SRS	Oil spill response and contingency planning
Panama	Gulf of Panama	2013	TSS & Recommendatory speed (10kn max)	Prevent strike with cetaceans (International strait/within 12NM)
USA	Aleutian Islands	2015	5 ATBAs	Protect sensitive marine environment
France and Italy	Corsica Channel	2016	TSS and Precautionary Area	Protect sensitive habitat and species (within 12NM)
Costa Rica	Off Pacific coast	2017	ATBA	Maritime safety and protection of the marine environment (including ship strikes)
Russia and USA	Bering Strait	2018	ATBAs, Two-Way Routes, Precautionary Areas	Safety of navigation and protection of the marine environment sensitive areas)

Applicant	Location	Date	Measure(s)	Motivation
Norway and Sweden	Kattegat	2018	TSS, Deep-Water Route, Recommended Routes and Precautionary Area	Safety of navigation and protection of the marine environment sensitive areas
Indonesia	Sunda Strait	2019	Precautionary Areas with Recommended Directions of Traffic Flow and TSS	Safety of navigation and protection of the marine environment (strait used for international navigation)
Indonesia	Lombok Strait	2019		

Table 2.6 Examples of IMO measures adopted to protect the marine environment without a PSSA

2.2.6 EBSAs and other non-IMO marine environmental protection mechanisms developed under international law at the IMO

The focus of the IMO on the protection of marine sensitive areas against shipping impact dates back to the late 70s.[27] Furthermore, when the concept of 'sensitive sea area' was fleshed out in the 80s during the development of PSSA guidelines, it was clear that the term was designed to be very inclusive. Part of the early thinking, clearly stated in the first guidelines adopted in 1991, framed PSSAs as a means to adopt complementary measures in MPAs,[28] be they national or adopted in the context of global or regional seas agreements. The 1991 Guidelines refer specifically to MPAs designated in the context of the World Heritage Convention, Ramsar Convention and CMS.[29] Later updates of criteria for the designation of PSSAs include new criteria developed under these other instruments to identify sensitive areas, especially EBSAs under the CBD. The 11 ecological criteria, on the basis of which an area may be selected for a PSSA application, are all either included in one of the seven EBSA criteria or in the criteria for the establishment of networks of MPA under the CBD.

These common criteria in the identification process of EBSAs and PSSAs can facilitate the adoption of a PSSA in EBSAs. This potential has been the subject of several studies and at least two papers submitted to the MEPC:

- Paper submitted by WWF, the IUCN and ACOPS in February 2016 for consideration by MEPC 69 (MEPC 69/10/2) and a supporting report by N Butt and P Wright of Solent University UK, Protecting EBSAs and opportunities for the IMO: The use of EBSAs for informing designation of IMO PSSAs;[30] and,

[27] Increased protection of 'particularly sensitive sea areas' including the new Special Areas under MARPOL is highlighted in Resolution 9 of the Final Act of the International Conference on Tanker Safety and Pollution Prevention 1978

[28] See Gjerde and Freestone's recount of the early meetings on the legal implications of PSSA. K Gjerde and D Freestone (1994) Particularly Sensitive Sea Areas – An Important Environmental Concept at a Turning Point, The International Journal of Marine and Coastal Law 9(4): 431-468 [433]

[29] 1991 Guidelines para. 1.3.2 to 1.3.5. Unlike the following guidelines, the 1991 Guidelines include a very informative description of the historical development of the PSSA concept as well as examples of situations it may be used in and specific measures which may be taken

[30] Report available https://wwf.panda.org/our_work/oceans/publications/?260910/REPORT%2DProtecting%2DEBSAs%2Dand%2Dopportunities%2Dfor%2Dthe%2DIMO. This was also the spirit of an earlier paper submitted to the MEPC by WWF in 1999 to highlight the fact that PSSAs provided a means to implement UNCLOS and the CBD with respect to impact from shipping (MEPC 44/7/3)

- Information paper from the IMO Secretariat on the EBSA process and communication of regional workshop reports organised to describe EBSAs (MEPC 66/ INF 6, 20 November 2013).

Several applications for PSSAs illustrate this approach. Two recent examples are the Tubbataha Reefs Natural Park PSSA (Philippines) and the application for the designation of a PSSA for the protection of Pulau Kukup and Tanjung Piai (Malaysia). In its application for the designation of the Tubbataha Reefs Natural Park as a PSSA, the government of the Philippines relied on the prior designation of this area as a World Heritage Site and a Ramsar Wetland of International Importance (MEPC69/10/1, 15 January 2016). In describing how the area meets each ecological criterion, the application mentions several of the UNESCO documents prepared in the context of the status of this area as a World Heritage Site. Of note, this area has also since been considered to meet the EBSA criteria; it was attached to the report of the Conference of the Parties to the CBD at the end of 2016, therefore after the meeting of MEPC 69. Similarly, Malaysia's recent PSSA application relies on the listing of Pulau Kukup and Tanjung Piai under Ramsar as wetlands of international importance and of information gathered in the context of the management of this status.[31]

Most EBSAs (or features they contain) are expected to meet one of the PSSA ecological criteria to select a candidate area. However, proof of existing or potential serious impact from shipping is the essential second step of a PSSA designation. In the following section 3, this study discusses nine EBSA case studies and their potential for IMO measures for sensitive areas.

3 Case Studies: Findings

3.1 Churna-Kaio Island Complex (E1)[32]

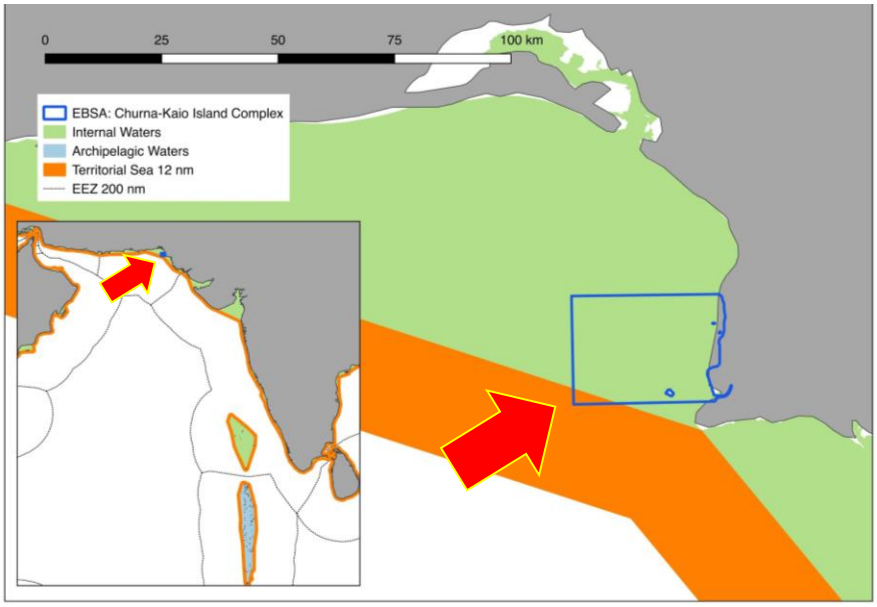
3.1.1 Identification and location

The Churna-Kaio Island Complex has been identified as EBSA 10 during the workshop to facilitate the description of EBSAs in the northwest Indian Ocean and adjacent Gulf Areas, held in Dubai on 20-25 April 2015. It was subsequently attached to decision XIII/12 of COP13 (2016).

According to Pakistan's regulations, this EBSA is located in its internal waters and territorial Sea. It is located west of Karachi, at the outer eastern part of the Gulf of Oman, in the north of the Arabian Sea.

[31] MEPC 71/INF 24, 28 April 2017

[32] The CBD documents on the identification of this EBSA include: the EBSA description sheet (https://chm.cbd.int/database/record?documentID=200052), the Workshop report (https://www.cbd.int/doc/meetings/sbstta/sbstta-20/information/sbstta-20-inf-23-en.pdf) and COP13 decision



Map 3.1 - Location of Churna-Kaio Island Complex (Maritime zones based on Pakistan's baseline declaration)

3.1.2 Ecological or biological significance

Summary of EBSA characteristics

The Churna–Kaio Islands Complex has marine waters with a maximum depth of 30 metres whereas most of the bottom is predominantly sandy. It includes two islands (Churna Island and Kaio Island), the delta of the River Hub, sandy shores, coral patches, rocky stretches and intermittent rocky outcrops. There are coral assemblages around the islands and subtidal rocky patches. The coast is influenced by the repeated reversal of the monsoon, which causes deep convective mixing. The EBSA was described on the basis of high uniqueness or rarity, high importance for threatened, endangered or declining species and/or habitats and high biological productivity.

Features highlighted in the CBD documents are:

- Unique and isolated assemblages of rare coral;
- With respect to threatened, endangered or declining species, the workshop report mentions specifically:
  - Whale shark (*Rhincodon typus*), CITES Appendix II and CMS Appendix I,
  - Mobulids (*Manta sp.* and *Mobula spp*.), CITES Appendix II and CMS Appendix I,
  - Sunfish (*Mola mola* and *Mola ramsayi*), not on lists of CITES or CMS,
  - Blue whale (*Balaenoptera musculus*), Appendix I of both CITES and CMS,
  - Arabian sea humpback whales (*Megaptera novaeangliae*), Appendix I of both CITES and CMS, and
  - Bryde's whale (*Balaenoptera edeni*), CITES Appendix I and CMS Appendix II
- biological productivity inferred from the presence of predator's species (many of which are endangered or threatened). The productivity is believed to be influenced by the repeated reversal of the monsoon, which causes deep convective mixing, especially during the north-east monsoon, when nutrient-rich water is brought to the surface, supporting high productivity in the Arabian Sea

Of note, studies of marine mammals in the Arabian Sea based on their distribution, abundance and life-history stages do not show this EBSA as an area of interest for

recognition as an Important Marine Mammal Area (IMMA) by the IUCN Joint SSC-WCPA Marine Mammal Protected Areas Taskforce (IMMA Task Force) following a GOBI sponsored workshop that took place in Salalah, Oman on 4-8 March 2019.[33] (Map 4.1 below) This could be used to attempt to challenge findings under the CBD.

Site stability

Some of these ecological and biological features are fixed (coral reefs) whereas others are dynamic (e.g. marine mammals, fish).

Other measures under international and national laws

No such measures to protect the marine environment in this area are mentioned in the World Database on Protected Areas (available at www.protectedplanet.net) or the IUCN's Handbook on Pakistan's Coastal and Marine Resources.[34]

3.1.3 Impact from shipping

Shipping traffic

The shipping report prepared for this study indicates three main sources of shipping activities in the area:

1. Shipping related to Gadani ship breaking industry,
2. New single point mooring and facilities located 7NM from shore; and,
3. Support to the coastal coal-fired plants on the mainland and, in the future, planned LPG terminal on Churna Island.

However, mapping of shipping density in this area does not suggest much international shipping.

Established or likely impact from shipping

Impact (actual or expected on the basis of sound and specific evidence) of specific shipping activity on specific resources needs to be demonstrated to provide grounds for an IMO measure.

Reports from the local press in October 2018 describe an oil spill of eight tons of bunker oil and its impact on the coastline of Mubarak village, eight kilometres southeast of Churna Island. It is suspected to have been discharged intentionally by a vessel coming to the coast. The two most likely sources appear to be Gadani ship-breaking operations and the coastal refineries. However, the fact that it was bunker fuel rather than crude oil suggests that the first source is more likely.

There is no IMO routeing measure in this area. Reports relating to this area (which were made available to the author) do not mention physical impact or other impact from shipping activities other than the coastal ship-breaking industry.

[33] An IMMA is defined by the IMMA Task Force as 'discrete portions of habitat, important to marine mammal species that have the potential to be delineated and managed for conservation'. The IMMA Task Force is composed of scientific experts.

[34] Available https://www.iucn.org/sites/dev/files/pk_coastal_resources_handbook.pdf

Other sources of pollution and activities

A 2018 report on ship dismantling in South Asia (Kumar, 2018) presents Gadani as one of the three main sites of ship dismantling in South Asia. However, it is the smallest of the three (25 vessels compared to 4,176 in Bangladesh and 2,548 in India in 2018).[35]

With respect to the ship-breaking industry, additional information on the nature of environmental impacts from this activity would assist in the identification of the most adequate response measures and whether they should be primarily local or how the international community could contribute. For example, is the pollution coming from coastal operations or is it coming from vessels coming for ship-breaking? What is the status of the vessels under international law? Are they still flagged and on their last international voyage?

The EBSA description also mentions fishing activities and highlights the fact that fishing is the most important economic activity for the local population, particularly gillnetting for Indian mackerel using monofilament nets.

3.1.4 Considerations for protective measures

Restrictions to local/domestic shipping or fishing traffic can be adopted by coastal states unilaterally without consulting the IMO (provided that it does not interfere with their right of innocent passage in the territorial sea. (See section 2.2.1 above) The extent of obligations, rights and responsibility of the flag state and of the coastal state under international law, in the context of the last voyage of a ship to a ship-breaking and recycling facility, are important considerations for the protection of the marine environment. Whilst these are outside the scope of this report, it is worth noting the adoption in 2009 of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (not yet entered into force). This convention aims to ensure that ships, when being recycled after reaching the end of their operational lives, do not pose any unnecessary risks to human health, safety and to the environment.

3.2 Oman Arabian Sea (E2)

3.2.1 Identification and location

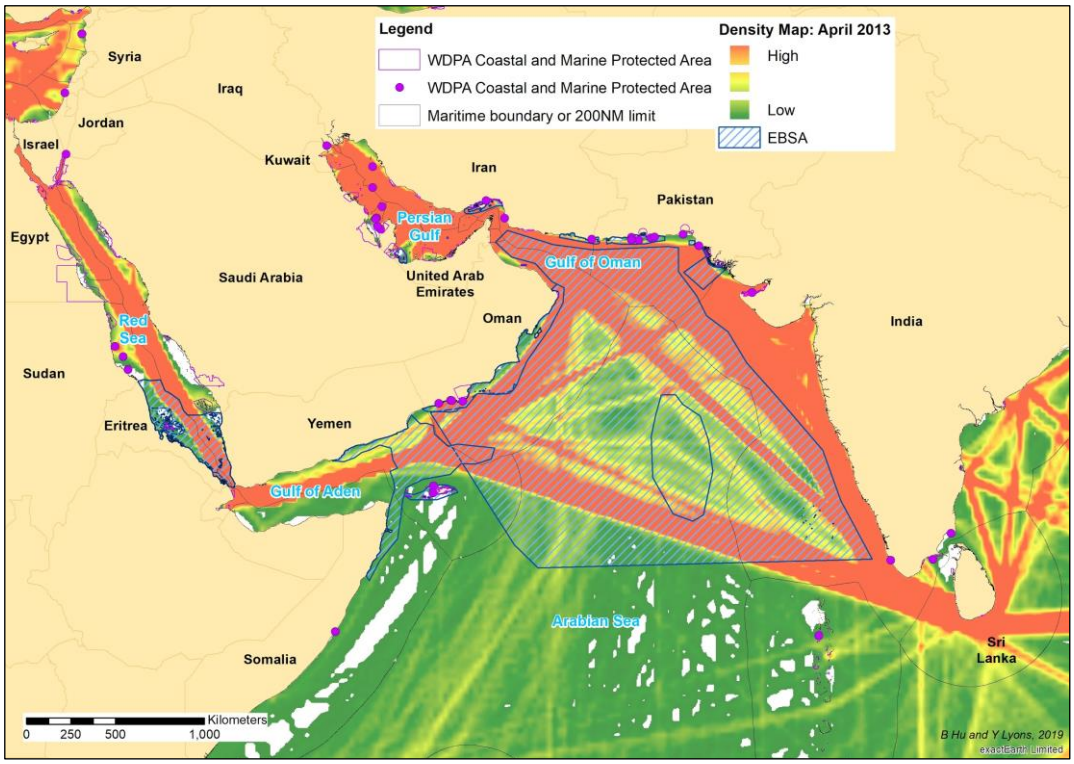
The Oman Arabian Sea has been identified as EBSA 29 during the workshop to facilitate the description of EBSAs in the northwest Indian Ocean and adjacent Gulf Areas, held in Dubai on 20-25 April 2015. It was subsequently attached to decision XIII/12 of COP13 (2016). It is located off the south of Oman between the Ra's al Hadd peninsula to the north and the Oman-Yemen border to the south, and extends several hundred kilometres offshore. This EBSA is surrounded by other EBSAs, especially the Arabian Sea Oxygen Minimum Zone which is contiguous (on its seaward side) and occupies most of the northern side of the Arabian Sea.

[35] Available https://www.shipbreakingplatform.org/wp-content/uploads/2018/11/ship_dismantling_en.pdf

3.2.2 Ecological or biological significance

Summary of EBSA characteristics

The Oman Arabian Sea EBSA is situated at the heart of one of the five largest upwelling areas of the world, which occurs both coastally and up to 400 km offshore and influences the water column to a depth of about 250 m. The high primary productivity associated with the monsoon-driven upwelling in the Arabian Sea fuels the ecosystem of the wider region. It also creates conditions suitable for feeding by at least 20 species of cetaceans, including the world's most isolated whale, the endangered Arabian Sea humpback whale.

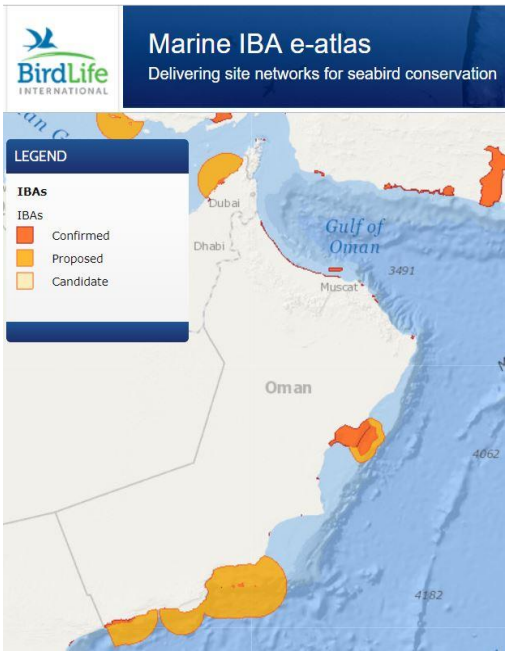


Map 3.2 Shipping traffic density and EBSAs in the Arabian Sea, Red Sea and Gulf Areas

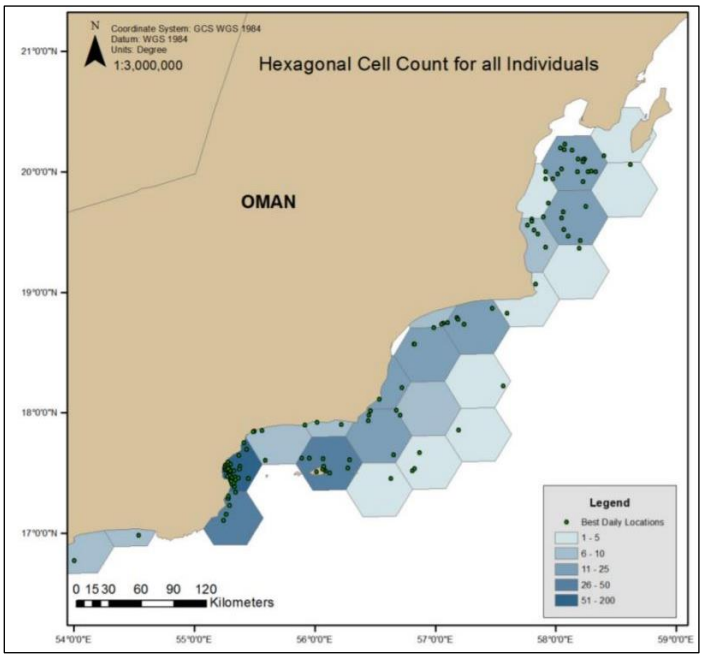
Features highlighted in the CBD documents are:

- Unusual mix of tropical and neo-temperate species which form a community that is globally unique;
- Unusual heterogeneity of habitats in three distinct sections of the EBSA, each one showing combinations, for example, of rocky and sandy shoreline habitats, shelf and deep-water environments, embayment, peninsulas and other such biogeographic features;
- Endemic species including fish, macroalgae and coral communities. As an example, a particular coral community which represents perhaps the largest monospecific coral stand known in the oceans, exclusively made up of mostly yet to be described species of cabbage coral;
- High biodiversity of fish fauna, from the genetic, population and species level to the community and ecosystem levels;
- High level of biological productivity and naturalness;
- Resident seabirds including some key populations of the regionally endemic near threatened Jouanin's petrel and vulnerable Socotra cormorant; (Map 3.3)

- Migratory shore birds and seabirds: in winter, the coastal wetlands host half a million birds or more, predominantly gulls, terns and shorebirds; (Map 3.3)
- Essential corridors environments and critical habitats for endangered migratory species, especially:
  - sea turtles: nesting and foraging habitat for the green, loggerhead, hawksbill and olive ridley sea turtles, all listed on Appendix I of both CITES and CMS. The beaches of this EBSA are reported to host 10 to 40% of the world's total annual nesting by these species
  - whales: in particular the declining Arabian Sea humpback whale, a genetically distinct subpopulation of humpback whales. Map 3.4 shows habitat use by this species within the Oman Arabian Sea EBSA



Map 3.3 Extract of BirdLife International Marine IBA e-atlas. Available https://maps.birdlife.org/marineIBAs/default.html



Map 3.4 Habitat use of humpback whales in Oman (Wilson et al, 2014)

Since the EBSA workshop, more research has been carried out on whales in the Arabian Sea including through the Arabian Sea Whale Network[36] and in the context of the identification of IMMAs. This research has a particular interest in the Arabian Sea humpback whale population but it also includes other species of whales. (Andy Wilson, 5Oceans, 2019) The workshop of the IMMA Task Force organised for the Western Indian Ocean and Arabian Seas on 4-8 March 2019 identified an area off Hasik as a marine mammal hotspot and a candidate IMMA. This area seems to be included in the Oman Arabian Sea EBSA. (IUCN Marine Mammal Protected Area Task Force, 2019)

Site stability

The upwelling process which appears to be driving much of the biological productivity results partly from the topography of the continental shelf, a static feature. However, occurrence of individuals of a species is always dynamic. Multi-year data and understanding of the processes can support predictions necessary for the adoption of management measures.

[36] https://arabianseawhalenetwork.org/

Other identifications or recognitions under international and national laws

Ras Al Hadd Turtle Nature Reserve is located on the coast, at the northern end of the Oman Arabian Sea EBSA and there are routeing measures off the point.

The Oman area of the Arabian Sea is also a Special Area under MARPOL Annex I[37] which is larger and includes this EBSA. However, it has not come into force yet due to a lack of notification of the existence of adequate reception facilities.

While the identification of IMMAs is an independent scientific exercise, the 12th meeting of the Conference of the Parties (COP12) to the Convention on Migratory Species of Wild Animals (CMS) has adopted several decisions that refer expressly and seek to integrate IMMAs into the programmes under CMS. COP12 Resolution 12.13 acknowledges IMMAs criteria and identification process, request Parties and invites all Range States to identify areas where the identification of IMMAs would be beneficial.[38] COP12 also adopted a Concerted Action for Humpback whales of the Arabian Sea.[39] It is therefore possible that an IMMA in this area become endorsed by the COP to CMS.

3.2.3 Impact from shipping

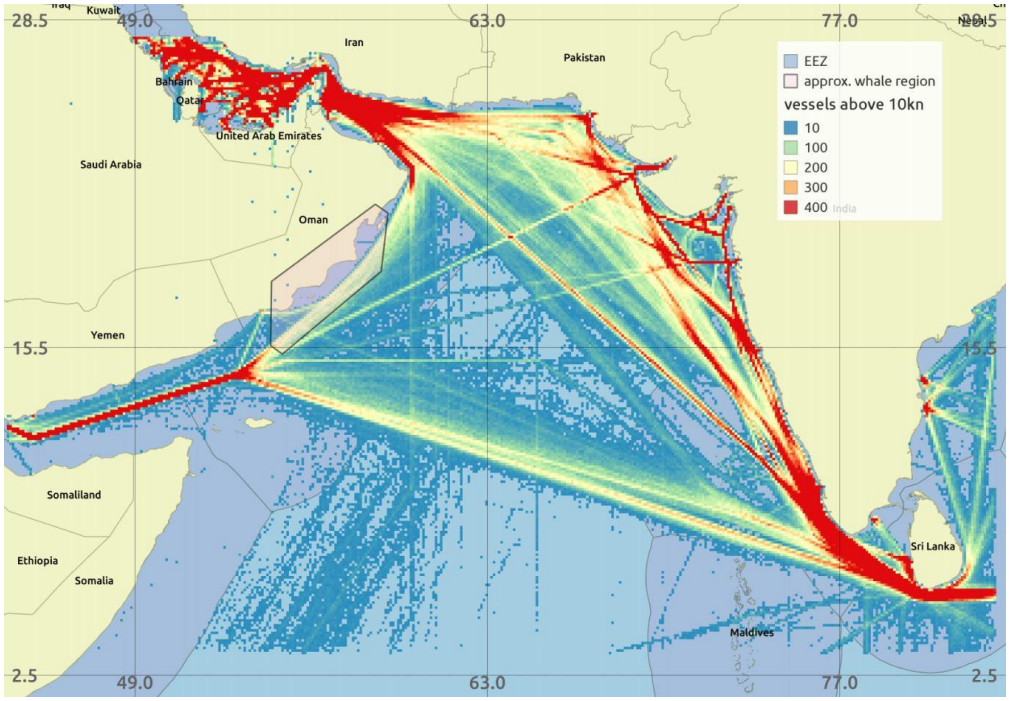
Shipping traffic and likely impact

The data available for this study focus on international shipping rather than local or regional traffic. Map 3.2 above shows high shipping traffic density within the EBSA in the areas of occurrence of whales and other species. Map 3.5 below also shows a fairly high frequency of vessels transiting through the area at a speed superior to 10 knots. Studies suggest that the risk of ship strikes of whales decreases if they operate below this speed.

There are two existing routeing measures applicable at the northern tip of this EBSA, off Ras Al Hadd where the Ras Al Hadd Turtle Nature Reserve is located: a TSS and an inshore traffic zone. Three small coastal parks and one large one are also located around Salalah. Their relevance to the features identified in the EBSA needs verification: do they demonstrate efforts from Oman in protecting ecological features for which additional IMO measure would be considered?

Potential benefits from shipping measures to limit ship strikes should be investigated on the basis of the data referenced in this case study.

[37] MEPC117(57) adopted on 15 October 2004
[38] UNEP/CMS/Resolution 12.13
[39] UNEP/CMS/Concerted Action 12.4



Map 3.5 Heat Map of AIS data from vessels with speed >10 knots (NAVAMA GmbH, 2015)
Extracted from IWC SC/66b/HIM/10

Other impact from shipping that could be further investigated are:

- Shipping impact on resident and migratory populations of shore and seabirds;
- Impact on sea turtles;
- Vulnerability to invasive species from ballast water exchange or otherwise; and
- Impact from noise on whales (including dolphins).

Relative importance of other sources of pollution and other activities in the area

Other sources of pollution to this area and their impact on the species and environmental features discussed in this section need to be considered. This would include fishing, coastal tourism and local traffic with smaller ships compared to international shipping. This clarification is necessary to determine the extent of shipping impact on the EBSA features, identify shipping measures adapted to the appropriate type of traffic and project the benefit that may be gained from these shipping measures.

3.2.4 Considerations for protective measures

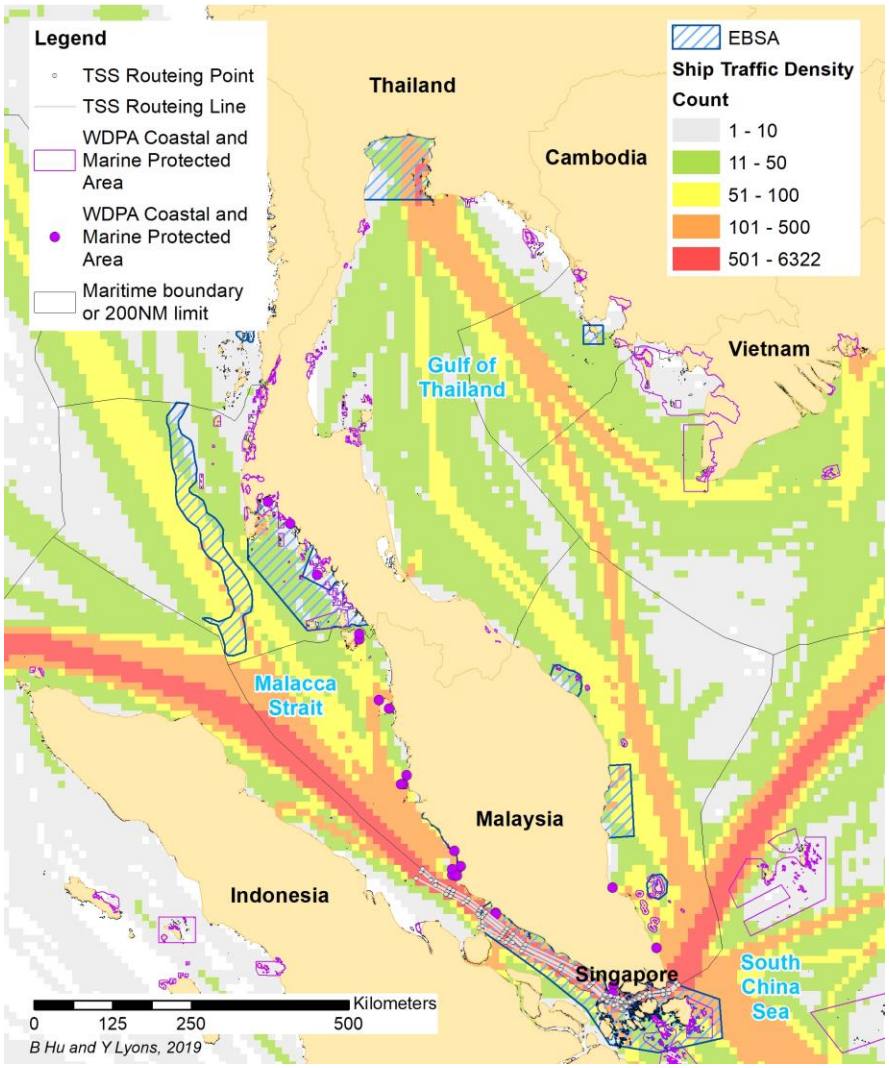
Based on the evidence consulted for this case study and precedents for the protection of whales against shipping in the US and Canada, routeing measures designed to limit ship strikes on the endangered Arabian Sea humpback whale may be seriously envisaged (see section 5 on ship strikes). However, depending on the maritime zone affected by the measure(s) and its scope, additional proof of whale stranding or of other impact on whales in the region (rather than other humpback populations elsewhere) is needed to strengthen the application. Measures that have been used in a similar context include recommendatory tracks, TSS or two-way routes, recommendatory or mandatory ATBAs, SRS and maximum speed.

Based on the three-fold growth in traffic in this region in the last 10 years, the risk of ship strikes generated by the general high speed of operations and the time and cost involved in the gathering of additional data on this topic, applications for recommendatory tracks and maximum speed may be envisaged to raise the awareness of mariners, pending sufficient evidence for mandatory measures.

3.3 Southern Strait of Malacca (E3)[40]

3.3.1 Identification and location

EBSA 9 Southern Strait of Malacca was identified during the regional workshop to facilitate the description of EBSA in the Seas of East Asia in December 2015 in Xiamen, China and described in UNEP/CBD/EBSA/WS/2015/3/4*. It was subsequently attached to decision XIII/12 of COP13 (2016).



Map 3.6a Straits of Malacca and Singapore

This EBSA covers close to half of the length of the Straits of Malacca and Singapore (SOMS) along a stretch of more than 400km which involves three coastal states: Indonesia, Malaysia and Singapore. This stretch is slightly smaller than the length of the Traffic Separation Scheme (TSS) followed by maritime traffic in this area; the TSS is located in the

[40] The CBD documents on the identification of this EBSA include: the EBSA description sheet https://chm.cbd.int/database/record?documentID=237848, the workshop report https://www.cbd.int/doc/meetings/mar/ebsaws-2015-03/official/ebsaws-2015-03-04-en.pdf, the compilation of the relevant scientific information submitted by Parties, other governments and relevant organizations in support of the workshop objectives https://www.cbd.int/doc/meetings/mar/ebsaws-2015-03/official/ebsaws-2015-03-02-en.pdf [29-38], EBSA additional information https://chm.cbd.int/api/v2013/documents/0474485D-D86C-4F09-7B17-1461CF505964/attachments/Southern%20Straits%20of%20Malacca.pdf and COP13 decision

southern and narrowest part of the straits (generally less than 20NM and as narrow as 5NM or less). The overall length of the SOMS is close is over 800 kilometres long and also borders Thailand. It is the longest strait in the world and also one of the busiest. The southern part is characterised by large estuarine environments, soft-bottom habitats, fringing coral reefs, seagrass beds and mangrove.

3.3.2 Ecological or biological significance

Summary of EBSA characteristics

The EBSA description emphasises the important foraging and inter-nesting habitat of one of the few viable populations of hawksbill turtles of peninsular Malaysia and comparable to the protected nesting population of the Turtle Island Parks in Sabah. However, it also includes a number of other features including coral communities and species composition that are unique and differ from the coral communities of the eastern coast of Peninsular Malaysia. They are also resilient and able to survive under turbid and high stress conditions. The EBSA description also mentions painted and river terrapins and seagrass beds and sub-tidal flats and associated biodiverse communities.

When turning to the geographic scope of this EBSA, sea turtles appear to have been the main indicator. Mappings of the nesting and foraging grounds of hawksbill sea turtles in the SMOS which are attached to the EBSA description (based on a satellite tracking study conducted by WWF-Malaysia from 2006-2013) and provided in Malaysia's submission to the workshop fit the final EBSA's contour. The description indicates that the nesting beaches in Melaka, such as Tanjung Kling, Pulau Upeh and Pulau Besar, have been recognized as crucial for species protection since the 1970s. Several turtle hatcheries have been established in this area since the late 80s.

Four of the seven EBSA criteria are considered to be met at a high level in the SOMS. In particular for:

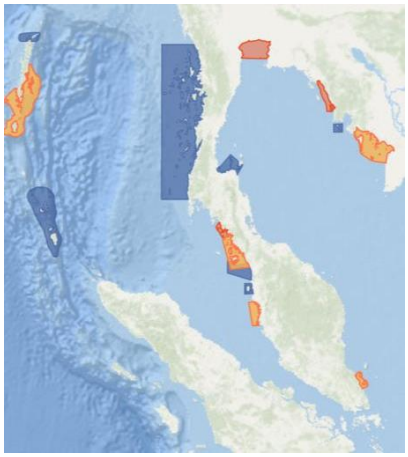
- Nesting and foraging habitat of the hawksbill turtle, listed in Appendix I to CITES and CMS,
- Occurrence of the painted and river terrapins in rivers and estuaries,
- Vulnerability of these species and of coral colonies that are the subject of a number of anthropogenic pressures.

Site stability

From a geophysical perspective, the SOMS is a stable site. Turtle nesting sites are generally also stable unless they are destroyed or become unfit for purpose (such as in the case of erosion or coastal development). However, foraging sites of sea turtles are subject to variations depending on the movement of high productivity areas.

Other measures under international and national laws

The SOMS includes some small coastal protected areas along Malaysia's coastline, especially coastal mangrove areas, some sandy beaches and wetlands (see Maps 3.6a and b). However, the SOMS is the subject of complex set of navigation regulations in order to control and limit risk of navigation incidents or accidents. These are described under section 3.3.3 below. Whilst these measures have a primary objective of safety of navigation, they also serve to protect the marine environment.



Map 3.7 Extract of IMMA e-Atlas https://www.marinemammalhabitat.org/imma-eatlas/

On-going research work which may become relevant in the context of IMO measures in the SOMS and more generally Southeast Asia is the work done by the IMMA Task Force in that part of the world. The IMMA Task Force met on 16-18 March 2018 in Kota Kinabalu, Malaysia to consider the Northeast Indian Ocean and Southeast Asian seas region.[41] (See Map 3.7) This resulted in the identification of an IMMA seaward of the Matang mangroves, over a shallow and productive mudflat coastal region, in the northern part of the TSS in the SOMS. Other IMMAs and areas of interest were also identified further north in the Andaman Sea, along the coast and islands of Malaysia, Thailand and Myanmar, as well as in the Andaman Islands, India. A small workshop took place to consider specifically the Andaman Islands on 12-20 November 2018.[42] IMMAs in the southern part of the Andaman Islands and along the coast of Thailand and Malaysia may be in the proximity of shipping traffic into the SOMS. As the work on these areas develop, more data on potential shipping impact is expected.

3.3.3 Impact from shipping

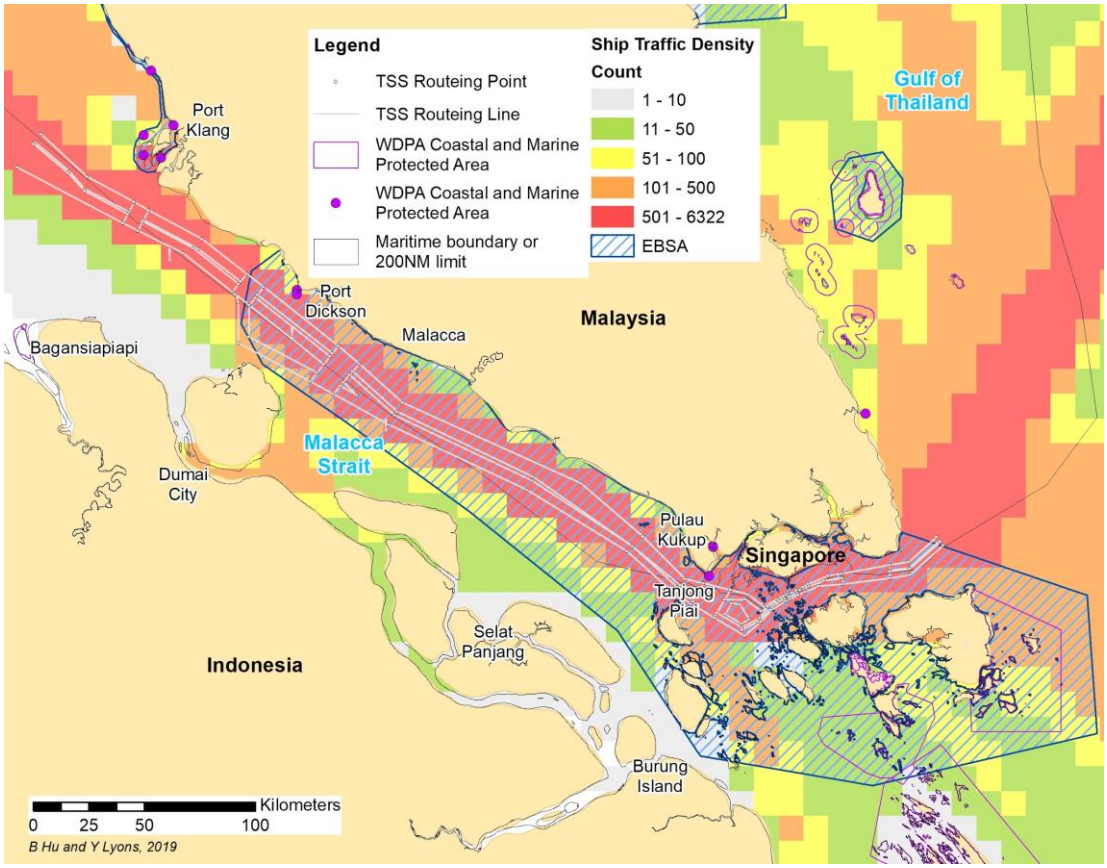
Shipping traffic

The SOMS is one of the busiest straits in the world. It is also a strategic sea lane of communication that facilitates global trade, including the transport of oil from the Indian Ocean to north Asia. Annually, more than 130,000 ships call at Singapore. International shipping transit through the SOMS counted more than 80,000 vessels in 2016 and is expected to rise by as much as 50% by 2030. There have been several suggestions that additional measures would be necessary to limit the increased risk of collision and grounding in the event of such increase in traffic.

International traffic operates within the TSS. However, shipping activities in the SOMS also include local and coastal shipping inside and outside the TSS.

[41] Final Report of the Third IMMA Workshop available https://www.marinemammalhabitat.org/download/report-of-the-regional-workshop-for-the-north-east-indian-ocean-and-south-east-asian-seas-important-marine-mammal-areas/

[42] Draft Report on Working to Implement Conservation Actions in IMMAs of the Andaman Islands, India available https://www.marinemammalhabitat.org/download/working-to-implement-conservation-actions-in-important-marine-mammal-areas-immas-of-the-andaman-islands-india/



Map 3.6b Shipping density (based on daily average from April 2016) and Traffic Separation Scheme in the SOMS

Established or likely impact from shipping

Environmental stressors in the SOMS that have been identified in the EBSA description include eutrophication via untreated sewage discharged into the bay, climate change (i.e., high sea surface temperatures and ocean acidification) as well as high sedimentation and turbidity.

In 2017, Malaysia made an application to the MEPC for the designation of Pulau Kukup and Tanjung Piai as a PSSA with the following two APMs: an ATBA and a mandatory no anchoring area.[43] These two areas are wetlands of international importance under the 1971 Ramsar Convention. They are composed of mangrove and intertidal mudflats which support fisheries, aquaculture and tourism.

There is little doubt that these areas meet the ecological, socio-economic and cultural criteria for identification as a PSSA under IMO regulations. The complexity here is the assessment of the extent of the impact from international shipping and from coastal shipping and of comparative impacts from other human activities such as coastal developments and local fisheries activities. Questions were also asked by Indonesia and Singapore at MEPC 72 and the three states were invited to engage in further consultation and agree on the proposal prior to further review by the MEPC. Whilst the measures proposed by Malaysia are located with its internal water or Territorial Sea, one of the concerns raised with respect to the ATBA is whether it would impact safety of navigation in the TSS. This could be the case for example if the establishment of an ATBA resulted in the displacement towards the TSS of vessels that used to sail through the area considered as a potential ATBA.

[43] MEPC 71/8/1 and MEPC 71/INF.24

Malaysia's application for a PSSA and some other publications (e.g. MHNM Rusli, 2012) highlight other established and potential impacts from shipping such as:

- regular navigation incidents (such as collisions) resulting in oil pollution along the coast on mangrove and other intertidal habitats;
- illegal operational discharges of oil;
- invasive species; and,
- coastal erosion.

Of note, Malaysia's application for a PSSA did not refer to the natural features highlighted in the EBSA description.

Other sources of pollution and activities

Anthropogenic activities other than shipping that also impact the status of the marine environment in the SOMS include road-building, infrastructure development and dredging, as well as intense collection of reef organisms and fisheries.

3.3.4 Considerations for protective measures

Existing measures

IMO measures adopted for safety of navigation that are applicable to shipping in the SOMS include:

- TSS,
- Precautionary Areas,
- Inshore Traffic Zones, and
- Mandatory SRS (STRAITREP).

The SOMS is a strait used for international navigation. Transit passage must therefore be respected by bordering states in compliance with UNCLOS (for further details on this regime, see 2.2.1 above). States bordering the narrowest part (southern half) of the SOMS have been cooperating for nearly 50 years to ensure the safety of navigation in the SOMS; these are Indonesia, Malaysia and Singapore. Following a joint statement in 1971, these states established a Tripartite Technical Experts Group (TTEG) in 1977. The TTEG sets guidelines for senior officials and technical experts to work to enhance the safety of navigation, cooperate and coordinate on anti-pollution policy and measures and initiate consultation with the IMO. It later developed a cooperation forum to promote dialogue, identify and prioritise projects for safety of navigation and environmental protection in the straits and oversee their implementation. This cooperative forum also involves user states, the shipping industry and other stakeholders which can contribute towards funding and projects.

Potential additional measures

None of the IMO measures focus specifically on the protection of the marine environment in the SOMS or address the protection of the natural features highlighted in the EBSA description such as sea turtles and coral reefs. However, they benefit from the greater safety of navigation permitted by existing measures.

In the absence of scientific evidence of the impact from shipping activities to the natural features highlighted in the EBSA description, no application for additional measure can be

done. Additional evidence would also be needed to demonstrate how measures that could be envisaged would alleviate the risk identified. With respect to marine turtles, research studies undertaken in Australia suggest that slower traffic may facilitate escape by sea turtles and avoid collision. However, collision between sea turtles and commercial traffic in the SOMS does not seem to have so far been identified as a risk to sea turtles that is linked to traffic in the TSS.

Furthermore, hawksbill turtle habitats in the SOMS do not appear to have been highlighted or discussed in the context of the development of a network of sites of importance by parties to the 2001 Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (IOSEA Marine Turtle MOU); although its range includes the SOMS.

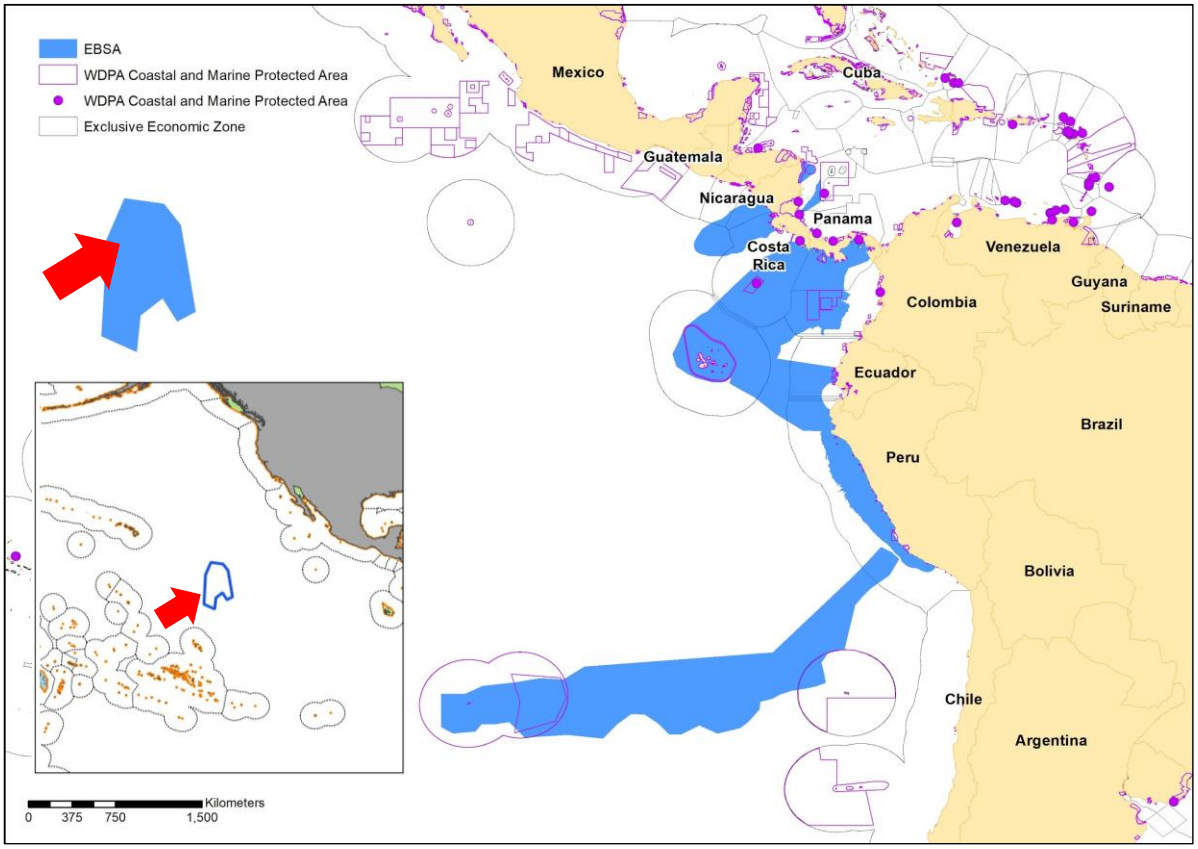
As more data becomes available on other migratory species and macro fauna in the Andaman Sea and the Straits of Malacca and Singapore, other IMO measures may be considered if and when risks from shipping are established.

Past publications have also discussed the opportunity to have the SOMS designated as a Special Area under MARPOL. For example, this could be considered to limit the risk of pollution from oil and garbage through the prohibition of any discharge of oil or garbage for the whole length of the Straits (from the Phuket-Aceh axis to the exit into the SCS). However, this would also require adequate reception facilities to collect the waste at the entrance and/or throughout the Straits.[44] In order to protect marine biodiversity against invasive species, prohibition of ballast water discharge may similarly be considered with the same requirement of adequate reception facilities. Any of these measures would need to be proposed jointly by the states bordering the SOMS to the IMO for the proposal to be considered by the IMO.

[44] GEF/UNDP/IMO, Malacca Straits: Special Area? The need and feasibility of designating the Malacca Straits as a Special Area under MARPOL 73/78 (MPP-EAS/Info/99/194, GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, 1997). Available http://www.pemsea.org/sites/default/files/mppeas-info-1999-194.pdf

3.4 Clipperton Fracture Zone Petrel Foraging Area (E4)[45]

3.4.1 Identification and location



Map 3.8 - Location of Clipperton Fracture Zone Petrel Foraging Area

EBSA 19 Clipperton Fracture Zone Petrel Foraging Area was identified during the regional workshop to facilitate the description of EBSA in the western south Pacific in November 2011 in UNEP/CBD/SBSTTA/16/INF/6. It was subsequently attached to decision XI/17 of COP11 (2012). This EBSA covers an area of 749,270km^2 located in the high seas of the south western Pacific region, beyond any country's EEZ. The average depth is 4624m.

3.4.2 Ecological and biological significance

Summary of EBSA characteristics

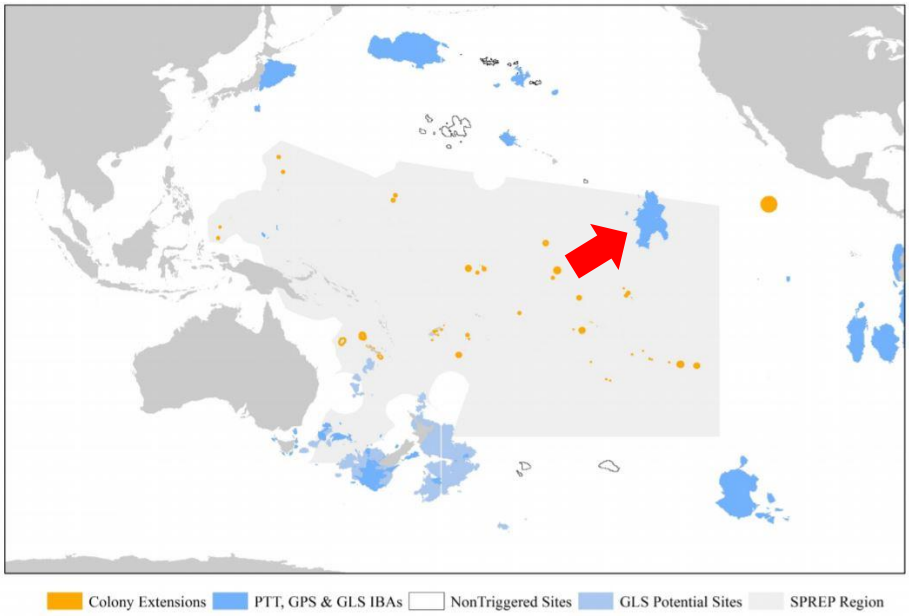
This EBSA has been identified primarily for its supply of critical foraging ground for Pycroft's petrel. It is also a foraging ground for black-winged petrels. These are two transoceanic migratory birds which breed in New Zealand. The species of Pycroft's petrel is classified as 'vulnerable' because it has a very small range when breeding, being restricted to five tiny island groups, with the majority of the population on one island; the introduction of invasive predator species could therefore drive the species towards extinction within a very short time.

[45] The CBD documents on the identification of this EBSA include: the EBSA description sheet (https://chm.cbd.int/database/record?documentID=237781), the Workshop report (https://www.cbd.int/doc/meetings/sbstta/sbstta-16/information/sbstta-16-inf-06-en.pdf) and COP11 decision

Other threatened species also transit the area during migration to distant non-breeding areas. These include sooty shearwater, Gould's petrel and Cook's petrel. According to the EBSA documents, the 'threatened' status of these bird species is based on the IUCN Redlist, which lists most of them as vulnerable or near threatened. None of these bird species are listed on appendices to CITES or CMS.

This area has been identified on the basis of satellite tracking data and two criteria: (1) where tracked birds spend the most intense 50% of their time at sea; and (2) where tracked birds represent 1% of the global population. This area is also the core non-breeding foraging area of Pycroft's petrel that nest on Red Mercury Island, New Zealand, a site that holds around 80% of the global population.

While seabirds occur at the water's surface and in the upper water column, their distribution can often be explained by a range of ecological and oceanographic processes such as sea surface temperature, wind speed and direction, as well as ocean currents.



Map 3.9 Important Bird Areas in the Pacific (Extract from the Compilation of submissions on scientific information to describe EBSAs in the Western South Pacific [4]. https://www.cbd.int/doc/meetings/mar/rwebsa-wspac-01/official/rwebsa-wspac-01-02-en.pdf

Site Stability

The EBSA workshop report indicates that the two years of tracking (2009 and 2010) of Pycroft's petrel show some inter-annual stability, which, coupled with the fact that such high proportions of tracked individuals used this area, suggests that the site may be relatively static. However, meteorological disruptions such as quasiperiodic El Niño Southern Oscillation events, which send warm waters west through the area, could affect this stability. A potential increase in such events in the future, due to climate change, may affect the area's integrity. No analysis of modelled ENSO scenarios and their potential impact on this site have been conducted at this time.

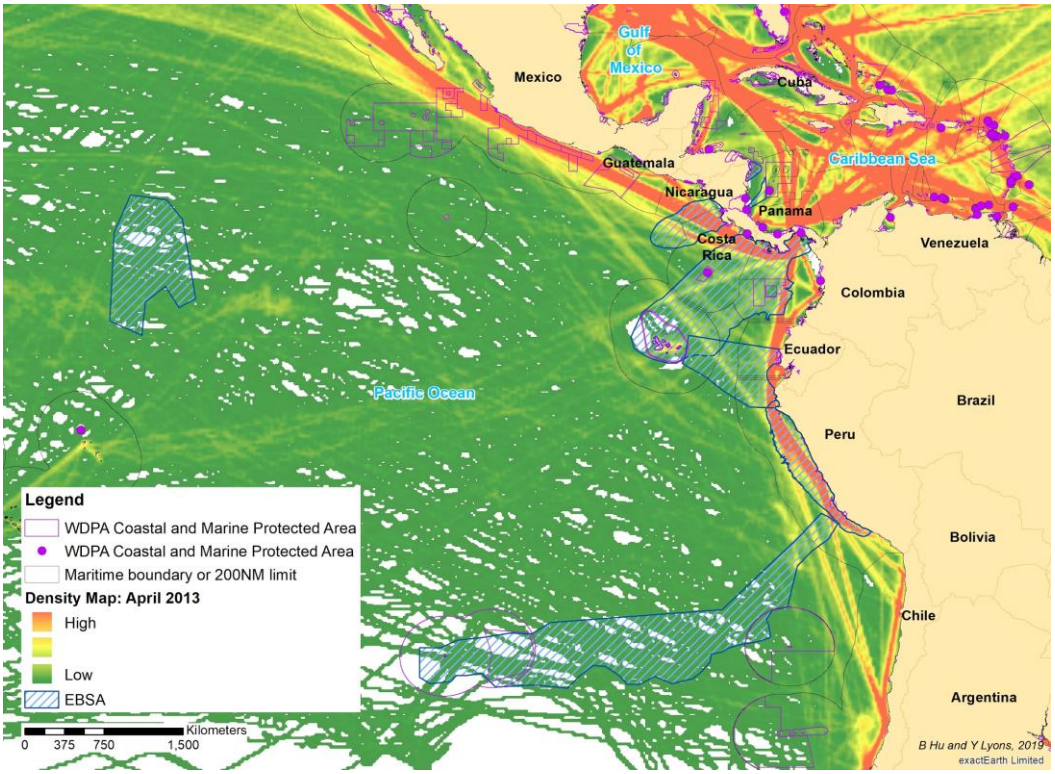
Other identifications and protective measures under international and national laws

This EBSA appears to have been primarily based on data on marine Important Bird Areas (IBA) from BirdLife International which seeks to identify, document and conserve sites that are critical for the long-term viability of bird populations. New Zealand is mentioned as the breeding country of Pycroft's petrel where one site holds 80% of the population. The perspective (and support) of New Zealand on these findings would therefore be useful in the context of potential consideration for IMO measures.

3.4.3 Impact from shipping

Shipping traffic

The area is located in proximity to several shipping routes in the North Pacific. Shipping traffic through this area is generally low but covers the entire area. (Map 3.8 below)



Map 3.10 - Shipping activity through the Clipperton Fracture Zone Petrel Foraging Area

Established or likely impact from shipping

The documents available for this study demonstrate a general overlap between the seabird foraging area and widespread shipping activity. However, they only provide coarse-resolution information on the type of shipping traffic (fishing, tankers and cargo), the nature of interference with seabirds (collision, light or oil discharges or spills) or the impact from shipping compared to other threats.

It is also unclear to what extent this area may be a critical feeding area for a number of migratory birds (other than the Pycroft's petrel) and whether there are other similar foraging sites in this part of the Pacific. Do (or could) other sites such as those identified in Map 3.9 above be substitute foraging sites for the birds that forage in the Clipperton Fracture Zone Petrel Area? An application for measures may be strengthened if it includes a study of

foraging sites on the scale of the geographic range of these populations and build-in climate predictions and their impact on the ocean currents that drive this key Clipperton Fracture Zone Petrel Foraging Area. Specific data is needed for different populations that use this EBSA as a foraging ground.

There is a growing body of scientific literature that discusses the impact of light pollution from vessels as well as static installations at sea, such as those engaged in mining operations, whether oil and gas or future seabed mining). However, light is particularly relevant to nocturnal feeders and it is unclear whether the Pycroft's petrel or other species that forage in this area are nocturnal feeders. Hutton and Priddel (2002) suggest that it is the case of the black-winged petrel.

The seabirds present in this area all feed by diving for their prey and are therefore vulnerable to potential discharges or spills of oil, lubricants, dispersants or other noxious substances that can attach to their feathers. Study of oil sludge in this area, the type of vessels they come from and the number of tankers sailing through may provide useful indicators for a risk assessment.

Of note, this area also overlaps with part of EBSA 16, Equatorial High-Productivity Zone, an area identified for its geomorphological characteristics. Potential relevance of the characteristics of this area may be useful.

Other sources of pollution or activities

Other relevant sources of pollution or activities include adverse impacts from other activities in this EBSA. One such activity that is expected to occur in the near future is deep seabed mining of polymetallic nodules in the Clarion-Clipperton Zone. Several contract areas and reserve areas are located in the northern part of this EBSA, especially contract areas managed under the sponsorship of Singapore as well as sections of contract areas under the sponsorship of the United Kingdom and the Russian Federation. Expected impacts include increase in shipping traffic, light pollution from ships and installations, water siltation resulting from nodule removal and associated fine-grained mud as well as possible decrease in biodiversity linked to nodule removal as well as suspension of sediments in an otherwise stable habitat. All these stresses have potential impacts on seabirds foraging in the area.

Other threats that may be linked to a declining population or a weakening of the resilience of the population of Pycroft's petrel or other species to different stressors may also need to be taken into account. Are these populations particularly affected by impact from climate change or ingestion of plastic, for example?

3.4.4 Considerations for protective measures

Measures available

Assuming that light pollution and potential discharge or oil pollution in this area are demonstrated threats, shipping measures that would reduce the presence of ships in this area would reduce the risk of adverse impact on the seabirds present in this area.

A routeing measure such as an ABTA, also used to avoid collision of ships with marine mammals, could reduce both risks linked to light pollution and oil pollution and more

generally all exposure to and risk from shipping. However, unless smaller hotspots can be identified to restrict the ATBAs, it is unlikely to be an acceptable measure to IMO Member States. Potential benefits of recommendatory tracks would have to be investigated in light of a more detailed analysis of the characteristics of the shipping traffic. A more targeted measure designed to limit the risk of oil pollution or garbage could be the designation of a Special Area under MARPOL Annex I but the requirement of available reception facilities may be difficult to satisfy.

The possibility of a special area under MARPOL may also be worth some consideration, especially under Annex I (oil) and/or IV (garbage) given the sensitivity of diving seabirds to oil and plastic litter. Different restrictions can apply to different classes of vessels. As the area is located in the open ocean, particular attention would need to be given to the requirements of qualifying oceanographic conditions as well as adequate reception facilities. (See the discussion on this under the case study on the Sargasso in section 3.7.4 below)

Adequacy of the measure and states concerned

To be adequate, a measure must be seen as useful and necessary. Although there is sufficient evidence to show threats posed by light and oil pollution to seabirds' populations, this is unlikely to be sufficient to justify an IMO measure without additional evidence on the status of the populations concerned and some assessment of the risk to the population.

Protection of the breeding sites of the species concerned by the countries where they are located may also be raised as a condition for IMO measures, especially if known risks exist in these countries. With respect to Pycroft's petrel, the fact that 80% of the global population breeds on one island of New Zealand, making it vulnerable to invasive species suggests that effective measures in this location may be seen as a prerequisite to additional measures at the IMO.

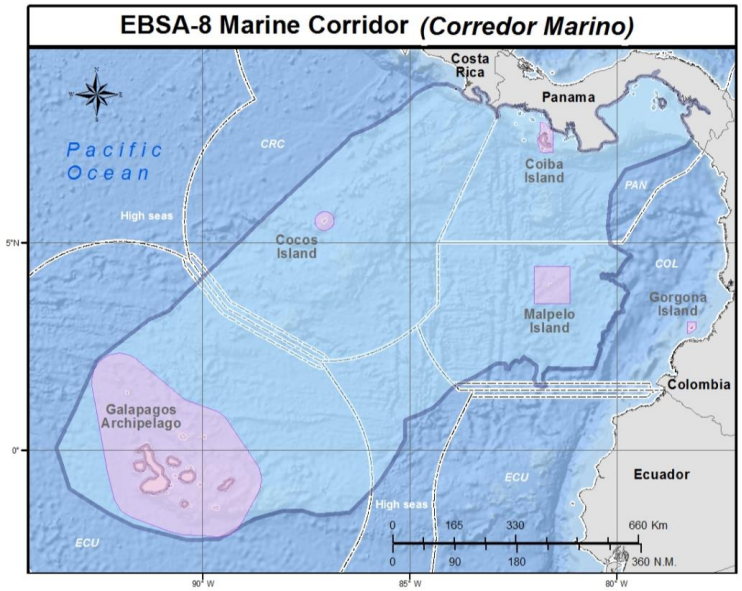
If IMO measures that are contemplated were to trigger additional cost, this cost must be seen as proportionate to the threat. This judgement may be seen as containing an element of subjectivity and may evolve with the general understanding of environmental threats faced by marine systems and marine life. As examples of IMO measures has so far been limited in the context of protection of the marine environment in the High Seas[46] (especially with respect to PSSAs and routeing measures, for lack of applicants rather than there being a legal obstacle), the first cases presented may be the subject of particular scrutiny by the shipping community as it will set a new precedent. IMO measures in this EBSA are likely to be more acceptable if they focus on a subset of this EBSA so as to not interfere with the freedom of navigation.

[46] See section 3.7.4 on Special Areas in High Seas areas

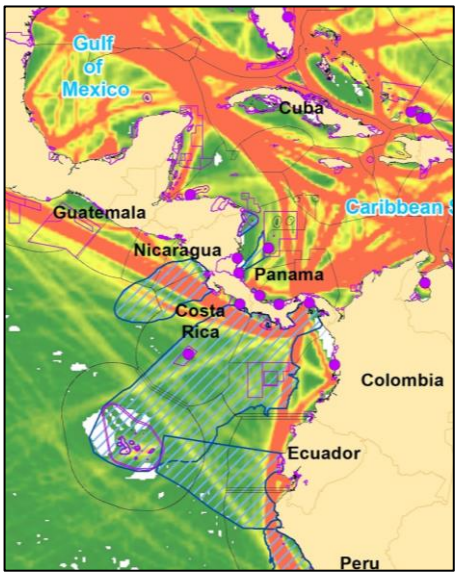
3.5 Corredor Marino Del Pacifico (E5)[47]

3.5.1 Identification and location

The Eastern Tropical Pacific Marine Conservation Corridor (CMAR in Spanish) has been identified as EBSA 8 during the regional workshop to facilitate the description of EBSA in the Eastern Tropical and Temperate Pacific in August 2014 (UNEP/CBD/RW/EBSA/ETTP /1/4). It was subsequently attached to decision XII/22 of COP12 (2014).



Map 3.11 - Corredor Marino Del Pacifico



Map 3.10a - Marine traffic (extract of Map 3.10)

CMAR is a regional conservation initiative developed by Costa Rica, Panama, Colombia and Ecuador, covering approximately 3.5million km^2 and including part of the EEZ of these four states as well as territorial sea areas and high seas. It expands over 750NM southwestward from Panama. It is a body of waters characterised by its isolation from the Western Pacific; it is separated from the Western Pacific by the Eastern Pacific Barrier and from the Atlantic by the Central American Isthmus.

3.5.2 Ecological or Biological Significance

Summary of EBSA characteristics

The isolation of the CMAR results in a unique assemblage of species. This isolation also results in species located in the east and west of this Barrier being genetically dissimilar. This increases the risk of extinction of species located in the CMAR, should they be subjected to important natural or anthropogenic stressors.

Given the very large size of the CMAR, identification as an EBSA is based on a variety of ecological and biological characteristics; some are located in the same sub-area and others are located in different sub-areas. This area scores high on five of the criteria for the

[47] The CBD documents on the identification of this EBSA include: the EBSA description sheet (https://chm.cbd.int/database/record?documentID=204045), the Workshop report (https://www.cbd.int/doc/meetings/mar/ebsa-ettp-01/official/ebsa-ettp-01-04-en.pdf) and COP12 decision

identification of EBSAs and medium on the other two (vulnerability, fragility and sensitivity as well as on biological productivity).

The main features that are expected to be most vulnerable to shipping activities are the following:

- Numerous migratory species, including sharks, whales, turtles, seabirds and fish such as tuna and billfish, many of which are listed on Appendix I of both CITES and CMS;
- Nursery ground for Humpback whales (also listed on Appendix I of both CITES and CMS); and,
- Possibly coastal mangroves if shipping activities result in pollution and/or erosion.

Much of the supporting evidence of the ecological and biological characteristics of this EBSA refers to both features of ETP and CMAR. As CMAR is only a portion of ETP, the description needs to be specific to CMAR to be taken into account in the context of this EBSA. Alternatively, additional explanation would be necessary to justify the relevance of this evidence to the CMAR.

Site Stability

Whilst the very large size of this EBSA may allow for these shifts to remain within the boundary, some of the features for which IMO measures may be envisaged are dynamic. As an example, the occurrence of migratory species varies in time and space, according to other forces, including climate forces such as El Niño.

Other measures under international and national laws

All coastal states of the CMAR have established large Marine Protected Areas (MPAs) which have also been designated as World Heritage Sites under the World Heritage Convention as follows:

- The Galapagos National Park and Marine Reserve - 138,000km^2 (Ecuador);
- Cocos Island National Park (Costa Rica);
- Coiba Island National Park and a large special zone of marine protection (west of Coiba Island National Park - Panama)
- Malpelo Fauna and Flora Sanctuary - >800km^2 (Colombia).

Several IMO measures have also already been adopted. They are described in section 3.5.4 below.

3.5.3 Impact from shipping

Shipping traffic

Publicly available AIS ship-tracking data (displayed on Maps 3.8 and 3.9b) suggests that there would be two shipping routes used by dense international traffic in the CMAR, one that tracks from the Panama Canal to Ecuador along the eastern side of Malpelo Island. The other one tracks westward along the southern coast of Panama, south of Coiba Island. However, commercial vessels (cargo and tankers) are visible throughout the entire area albeit with a lesser traffic density.

Actual or likely impact

Actual and likely impact from shipping activities differ according to the types of features (e.g. whale migration, fish stocks, sea turtles, corals or mangrove) and their exposure to different types of shipping traffic (local traffic vs international traffic including tankers).

Given the size of the CMAR, the occurrence of migratory and/or endangered and threatened species in the area must be completed to identify candidate (smaller) areas for potential shipping measures. Additional ways to characterise demonstrated or likely impact from shipping include:

- Proof of collision with these species or of other impact such as stranding that can be linked directly to shipping;
- GIS tracking of species migration or other mapping that demonstrate that shipping occurs in the same location as those species at particular times of the year.

Current reports seem to focus primarily on whales. There is little on seabirds, for example.

Other sources of pollution and activities

Fishing (including Illegal Unregulated and Unreported (IUU) fishing) is mentioned as another source of anthropogenic stressors on this EBSA. Respective impact from shipping and fishing activities on different ecological or biological features is therefore worth investigation so as to verify the usefulness of shipping measures that may be envisaged.

Activities of the whale watching industry can also pose safety risks for both humans and whales. Good whale watching practices may be helpful in this context. However, not all IMO rules apply to small vessels operating out of one state and remaining in its territorial sea. The question of the competent (and most appropriate) body or bodies to adopt such industry best practice rules is outside the scope of this report.

3.5.4 Consideration for IMO protective measures

Existing measures

In the context of marine mammals or the protection of large marine migratory species for which there is a characterised risk of collision, routeing measures that have been adopted in the past include voluntary Areas to Be Avoided (ATBA), Ship Reporting System and recommended tracks to limit shipping to designated shipping corridors. These measures can be seasonal.

Both Malpelo Sanctuary and the Galapagos Park already benefit from IMO measures:

- Sea Area Around Malpelo Island PSSA adopted by MEPC 47/97(2002), the ATBA was confirmed by MSC75/24(2002). Malpelo is a rocky island (1km+ in length) and the square ATBA that surrounds it covers not more than 4-7NM;
- Galapagos Archipelago PSSA adopted by MEPC53/136 in March 2004; three types of APMs were adopted: non mandatory ATBA, mandatory ship reporting system for ships entering the ATBA and recommended tracks.

Two other IMO measures were also adopted expressly to ‘reduce the risk of lethal strikes with cetaceans’ in the Gulf of Panama by NAV59/20 (2013) and subsequent MSC93 (2014):

- Traffic Separation Scheme (TSS);

- Seasonal reduction on speed to reduce the potential risk of collisions between ships and cetaceans in the TSS (no more than 10knots from 1 August to 30 November every year).

These measures appear to have drawn on Guzman's work.[48]

Potential new measures

Other areas of concentration of marine life or of other specific features may also be considered, depending on evidence. Areas to be avoided could perhaps be envisaged along the Coiba islands for the traffic linked to the Panama Canal (assuming a case could be built for this area). Of note, the 2012 CPPS/PNUMA report cited suggests a low density of blue and brydes whales in the CMAR compared to areas located south, southwest and northwest of it. With respect to humpback whales, concentration areas appear to be located primarily where PSSA and APMs have already been put in place. However, the data relied on dates from before the establishment of these measures. Updated assessments would be very necessary to inform further. The IMMA workshop which is planned for this area in 2020 is expected to contribute to providing these.

There is also some data on sperm whales' concentrations but no data on impact from shipping on them.

Given the existence of measures already in place in this EBSA, application for any additional measures to the existing ones that would be motivated on the same grounds would have greater chances of success if the benefits gained from the existing measures can be demonstrated. In order to demonstrate benefits, monitoring of vessels that respect and do not respect the measures, as well as monitoring of whales' presence and potential ship strikes would be beneficial. If benefits are difficult to measure, other approaches would include a focus on the risk level and whether it has increased and on a precautionary approach.

In the context of an SRS, the example of Ecuador's application in 2006 is informative (NAV 52/3/1). It includes a detailed review of the mechanisms in place in Ecuador for the management of this compulsory SRS for all vessels (including tourist vessels).

Adequacy of the measure

In order to assess the adequacy of the measure, the IMO considers the cost of the measure to the shipping industry and the extent to which all other relevant measures that concern other activities at sea are also put in place or pursued.

The extent to which vessels would have to reroute is of particular relevance for ATBAs.

States concerned

The location of the area focused on determines the state or states who may apply for an IMO measure or must be consulted in case of such application by another state. Elements to take into consideration are the maritime zone(s) where the measure would apply and whether this area is used for transit passage of foreign vessels.

[48] Guzman et al (2013) Potential vessel collisions with Southern Hemisphere humpback whales wintering off Pacific Manama, Marine Mammal Science 29(4): 624-642

3.6 Salas y Gomez and Nazca Ridges (E6)[49]

3.6.1 Identification and location

The Dorsal de Nazca y de Salas y Gómez (Salas y Gómez and Nazca Ridges), off the coast of Peru in the Eastern Pacific has been identified as EBSA 18 during the regional workshop to facilitate the description of EBSA in the Eastern Tropical and Temperate Pacific in August 2014 (UNEP/CBD/RW/EBSA/ETTP /1/4). It was subsequently attached to decision XII/22 of COP12 (2014).

Map 3.12 - Salas y Gomez EBSA and projected maritime zones

This EBSA extends southwestward from the EEZ of Peru then westward (overall 2900km) up to Easter Islands and the EEZ of Chile that surrounds them. In addition to a significant high seas' component, it also includes part of the Chilean EEZ of St Felix Island.

3.6.2 Ecological or biological significance

Summary of EBSA characteristics

The EBSA is extensive and includes a diversity of ecological or biological features of importance that surround the Salas y Gómez and Nazca ridges, a long chain of tall seamounts and guyots that vary greatly in depth, and are isolated from the nearest continental margin by a deep trench. Combined with strong currents, this trench has limited the exchange of small animals between the ridge and the continental margin. This EBSA is described as a biogeographical province much more closely related to the Indo-West Pacific than to the eastern Pacific and as a biological hotspot, with one of the highest levels of marine biological endemism (41.2% in fishes and 46.3% in invertebrates) in the world. The seamounts of the ridges were also found to host aggregations of vertically migrant, seamount-associated mesopelagic fishes and migratory pelagic fishes including a number of low-resilience and long-lived species.

[49] The CBD documents on the identification of this EBSA include: the EBSA description sheet , (https://chm.cbd.int/database/record?documentID=204100), the Workshop report (https://www.cbd.-int/doc/meetings/mar/ebsa-ettp-01/official/ebsa-ettp-01-04-en.pdf) and COP12 decision

This EBSA is considered a stepping stone for some marine mammals (e.g. blue whale), and it has been identified as a foraging area for leatherback turtles and several species of seabirds. In addition, it has been described as a recruitment and nursery area for swordfish and a breeding zone for Chilean jack mackerel, an overexploited species. It also includes the Easter Island Ecoregion which is vulnerable due to its ultra-oligotrophic characteristic, being at the centre of the South Pacific gyre.

Its importance to science has also been highlighted.

Overall this EBSA is considered to score high on five of the EBSA criteria and medium on the other two (uniqueness and productivity).

Site Stability

A critical characteristic of this EBSA is the chain of seamounts it encompasses, and it may be considered as a static feature EBSA category from this perspective. The importance of ocean circulation on the area may however lead to changes in locations. More data may later identify variable aspects of characteristics identified in the area.

Other measures under international and national laws

The database available on Protected Planet (WDPA) shows three large MPAs established by Chile which overlap with Salas Y Gomez. These MPAs cover the entire territorial sea of the three islands of Easter Island, Salas y Gomez and San Felix and a large part of their EEZ. The grounds on the basis of which these areas have been designated for protection and their management goals may provide some information on impact from shipping and inform potential IMO measures that could be envisaged.

3.6.3 Impact from shipping

Shipping traffic

The area is used for international, regional and local traffic. (Map 3.8 above) Data available on Marine Traffic portal shows a majority of fishing vessels and pleasure crafts compared to cargo and tankers vessels.

Established or likely impact from shipping

Potential shipping impact on this EBSA requires further investigation including:

- proof of occurrence in this large area must be completed with an identification of areas where whales are more concentrated for selection of candidate areas for IMO measures (even for blue whales); the work undertaken by the IMMA task force might provide this information;
- Impact on sea turtles;
- Impact on seabirds;
- Potential impact on endemic species from invasive species brought by shipping (ballast water or hull fouling) in this naturally separated sub-ecosystem.

Other sources of pollution or activities

Impact from fishing seems to be a primary concern. As fishing activities fall within the purview of the FAO, the IMO may not be the appropriate forum to deal with impact from fishing, unless the impacts are linked to vessel operations for which IMO has purview over. However, in practice the distinction can sometimes be unclear. Some activities of fishing vessels can arguably be considered to belong to both categories. A typical example is the disposal of fishing gear (whether intentional or not) which is, to some extent, regulated under the IMO regulations on garbage disposal under MARPOL, as an operational discharge. It is also regulated by the FAO seen as a pollution from fishing activities.

3.6.4 Considerations for protective measures

Measures available

Additional information is needed to characterise impact from shipping and relevant measures available.

States concerned

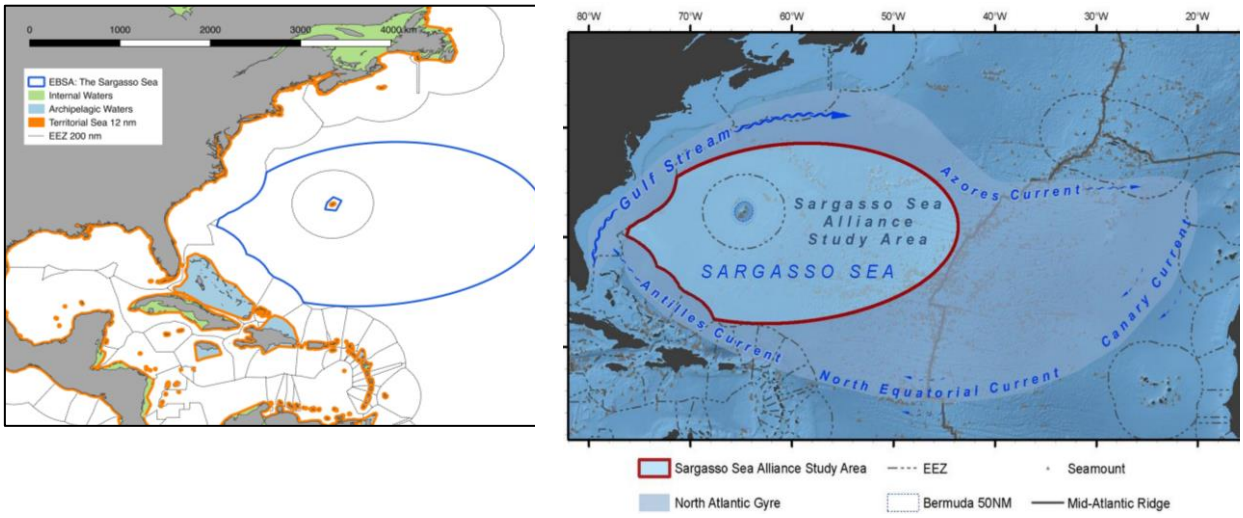
Peru, Chile and states who have jurisdiction over nationals, entities or vessels operating in this area. However, part of this EBSA is located in the high seas.

3.7 Sargasso Sea (E7)[50]

3.7.1 Identification and location

The Sargasso Sea has been identified as EBSA 13 during the workshop for the identification of EBSAs in the Wider Caribbean and Western Mid-Atlantic, held in Brazil from 28 February to 2 March 2012. It was subsequently attached to decision XI/17 of COP11 (2012).[51]

The Sargasso Sea EBSA includes most of the EEZ of Bermuda and covers a large area of high sea in the Western Mid-Atlantic. It extends over 2500km along its southwest-northeast axis and occupies 4,163,499km^2.



a) maritime zones b) oceanographic and geological features

Map 3.13 - Sargasso Sea EBSA with a) maritime zones; and b) oceanographic and geological features (Ardron et al, 2011)

3.7.2 Ecological or biological significance

Summary of EBSA characteristics

The Sargasso Sea is described in the CBD report as a fundamentally important part of the world ocean, located within the North Atlantic sub-tropical gyre with its boundaries defined by the surrounding currents. Its importance derives from a combination of physical and oceanographic structure, complex pelagic ecosystems, and its role in global ocean and earth system processes. The Sargasso Sea is home to an iconic pelagic ecosystem with the floating *Sargassum* seaweeds, the world's only holopelagic algae, as its cornerstone. It hosts a diverse community of associated organisms that includes ten endemic species, and provides essential habitat for key life stages of a wide diversity of species, many of which are endangered or threatened. The Sargasso Sea is the only breeding location for European and American eels, the former being listed as critically endangered, and is on the migration route of numerous other iconic and endangered species. A variety of oceanographic

[50] The CBD documents on the identification of this EBSA include: the EBSA description sheet , (https://chm.cbd.int/database/record?documentID=200098), the Workshop report (https://www.cbd.int/doc/meetings/sbstta/sbstta-16/information/sbstta-16-inf-06-en.pdf) and COP11 decision

[51] Seamounts within the Sargasso Sea (Corner Rise and New England) were also identified within the NW Atlantic EBSA Workshop

processes impact productivity and species diversity, and the area plays a disproportionately large role in global ocean processes of oxygen production and carbon sequestration. Water retention within the gyres is estimated to be around 50 years which leads to concentration of pollutants over time in the gyres.

Specific characteristics highlighted in the workshop report prepared for the identification of this EBSA (and which may be most relevant in the context of shipping) include:

- *Sargassum* and *Sargassum* communities - a characteristic surface ecosystem based on *Sargassum*, which hosts its own unique communities, acts as a nursery and feeding area for many species, and serves as a migration route for others; quantitative investigations were made late 19th century and these algae and associated communities have since fascinated generations of scientists;
- *Sargassum* has been recognized by ICCAT as an important fish habitat and ICCAT has requested that Contracting Parties assess the ecological status of *Sargassum* as habitat for tuna, billfish and sharks;

The Sargasso Sea: The golden floating rainforest of the Atlantic (Credit: David Shaw)
http://www.sargassoseacommission.org/index.php

- Resource for key life stages of large predatory species including fish and cetaceans and nursery for numerous fish species;
- Breeding ground for the European and American eels; the former, *Anguilla anguilla*, is listed in CITES' Appendix II. Threats on eels include the degradation of their breeding habitat, the Sargasso Sea;
- Nursery habitat and feeding grounds for juveniles of endangered species, in particular four of the five species of endangered sea turtles globally;
- Resting habitat, critical nursery habitat or on the migratory route of several depleted, threatened or endangered species of sharks and rays as well as whale species:
  - Manta ray, CITES Appendix II and CMS Appendix I
  - White sharks, CITES Appendix II and CMS Appendix I
  - Porbeagle sharks, CITES Appendix II
  - Basking shark (seasonally) listed on CITES Appendix II and CMS Appendix II indicating that this species requires cooperation and protective measures,
  - Whale shark, CITES Appendix II and CMS Appendix I,
  - Humpback whales (seasonally) listed on Appendix I of both CITES and CMS
- Foraging habitat for seabirds including the endemic Bermuda petrel which is listed on CMS Appendix (but not on CITES or in the SPAW Protocol);
- Tracking data from Birdlife International show that the western Sargasso Sea is an important feeding area for Audubon's shearwater and white-tailed tropicbirds from the Bahamas.[52] The Audubon's shearwater is included in the list of endangered species of the SPAW Protocol which require the highest level of protection; and more generally,
- Habitat for endemic species and yet to be listed species of many taxa, sizes and functions in this ecosystem.

[52] www.seabirdtracking.org

Site Stability

The location of the Sargasso Sea and its characteristics are influenced by a variety of oceanographic features and processes that influence its ecology and biology on different spatial and temporal scales. However, this EBSA is only a subset of the overall Sargasso Sea selected for its most stable nature (excluded the variable eastern boundary currents) and the occurrence of the full range of ecologically important features. As a sensitive habitat for a number of species, there is a rationale to consider it as a whole. However, the coverage of pelagic *Sargassum* in the Sargasso Sea is variable. Some papers suggest that the most valuable parts as a habitat for a greater number of species including larger individuals are the thickest and largest mats of *Sargassum* (Moser et al, 1998) which may also be the most stable. Their identification is however unclear.

If specific features are considered for protection individually such as the ocean fronts favoured by eels and other species, their location vary according to meteorological and oceanographic processes.

Other measures under international and national laws

The Sargasso Sea EBSA corresponds to the Sargasso Sea Alliance Study Area (the scientific case which informed the EBSA workshop), an area now under the stewardship of the Sargasso Commission established pursuant to the 2014 Hamilton Declaration signed between the Governments of Bermuda, Azores, Monaco, the United Kingdom and the United States.[53] In this Declaration, the signatory states recognise that the Sargasso Sea is an important open ocean ecosystem, the majority of which lies beyond national jurisdiction, which deserves recognition by the international community for its high ecological and biological significance, its cultural importance and its outstanding universal value. They also affirm that the guiding principle of the Hamilton Declaration is to conserve the Sargasso Sea ecosystem for the benefit of present and future generations.

The Sargasso Sea Commission has engaged in discussions and exchange of scientific information with the International Commission for the Conservation of Atlantic Tunas (ICCAT), an intergovernmental fishery organization responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas; its coverage includes the Sargasso Sea and around 30 species of fish inhabiting it. This exchange which started in 2011 involved the submission of scientific papers on the importance of the Sargasso Sea to the target fish species of ICCAT and participation to technical meetings. ICCAT Ecosystem Subcommittee has welcomed this input on Sargasso Sea research and recognised that the Sargasso Sea is an important and unique ecosystem for some ICCAT species.[54] Collaboration is progressing to consider proposals on how to protect the habitat of commercially important fish species such as swordfish, albacore tuna and white marlin which use the Sargasso Sea for spawning.

Domestic recognition of the Sargasso Sea as ecologically sensitive with measures adopted by Bermuda within its EEZ may further strengthen an application for IMO measures.

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[53] (http://www.sargassoseacommission.org/storage/Hamilton_Declaration_with_signatures_April_2018.pdf)

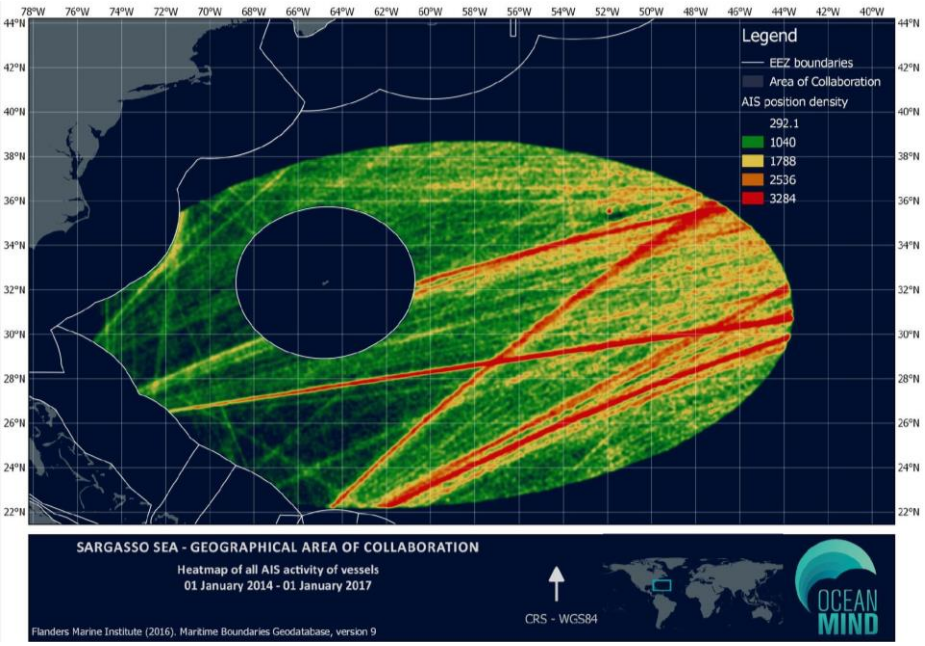
[54] 2015 ICCAT Inter-sessional Meeting of the Sub-Committee on Ecosystems, 812 June 2015, Madrid, Spain. http://www.sargassoseacommission.org/storage/documents/2015_SCECO_REPORT_ENG.pdf and subsequent ICCAT Ecosystem Subcommittee, Resolution 16-23 - Resolution by ICCAT on Ecosystems that are Important and Unique for ICCAT Species. https://www.iccat.int/Documents/Recs/compendiopdf-e/2016-23-e.pdf

3.7.3 Impact from shipping

Shipping traffic

Map 3.12 below shows traffic density through the Sargasso Sea EBSA between 2014 and 2017. It highlights in particular preferred routes used by international shipping to traverse this EBSA.

The 2011 report on maritime traffic in the Sargasso Sea (Roberts, 2011) indicated an increase in shipping traffic between 2000 and 2010. Such increases were also observed between 2014 and 2019 with no significant seasonal variations. However, this overall traffic includes a number of vessel types, some of which are more frequent users of these shipping routes. Container ships appear to be the most significant vessel type followed by bulk carriers, tankers and refrigerated cargo vessels.



Map 3.14 - Shipping traffic in the Sargasso Sea in 2014-2017 (OceanMind)

Established or likely impact from shipping

Among potential threats from shipping identified in the 2011 report on maritime traffic in the Sargasso Sea (Roberts, 2011), the following seem the most pertinent:

- Oil and hazardous and noxious substances (HNS) pollution discharge and spills;
- Garbage discharge;
- Sewage discharge, especially from cruising vessels;
- Air Emission;
- Risk of invasive species propagation through ballast water discharge and hull fouling;
- Ship strikes;
- Noise;
- Physical damage, especially the breaking up of large *Sargassum* mats by large vessels and the dispersal of animals associated with them.

Another important feature of shipping data with respect to environmental impact is that different types of vessels have different impacts due to their sailing characteristics. The number of vessels of each type is also needed to assess their overall impact. Whereas the

risk of oil discharges is mostly comparable across all vessel types, discharges that are linked to the number of crew or passengers vary depending on the vessel types. Impact from sewage discharge can for example be considered generally low for commercial shipping vessels with 10 to 30 on-board personnel as compared to those generated by large cruise ships. However, impact should not be considered at the scale of one vessel. The total number of vessels using the area must be taken into consideration. Cargo vessels being the most numerous, their overall impact can be substantial (even if the individual contribution is not). The risk of invasive species also varies by vessel types according to the need they may have to deballast during the voyage and whether they are likely to carry potentially invasive species (depending on where they come from). The risk of hull fouling also increases with slower speed of the vessel.

Of note, a study by Halpern et al (2008) found the Sargasso Sea is one of the most impacted marine areas from shipping. Review of the sources and the analysis may provide support to application for IMO measures.

Other sources of pollution and activities

Both pelagic and benthic ecosystems are reported to be impacted by a range of human activities with the main activities being shipping and fishing. Assessment of respective impact of each on different features of this EBSA would be valuable to determine the most appropriate potential shipping measure.

3.7.4 Considerations for protective measures

Measures available

Three approaches can be considered, which are not mutually exclusive. First, a threat-to-feature specific approach. Second, a more holistic approach through a PSSA and a series of APMs. Third, another holistic approach using a Special Area under MARPOL.

The threat-to-feature approach would focus on specific components of the EBSA such as some chosen endangered species and their critical habitats. This approach would require evidence focused on the occurrence of the targeted species and status of the population, risk from shipping on this species and identification of suited location(s) for IMO measures that may alleviate the risk of impact. Routeing measures such as ATBA, recommendatory tracks or SRS could be considered. This may need to involve the designation of a PSSA but any PSSA proposal could be limited to the critical habitat of the species considered. The advantage of this approach could be to initiate the protection at a smaller scale and avoid facing delay in trying to protect the entire Sargasso Sea.

The second approach would also focus on components of the EBSA relevant for different APMs but envisaging the overall Sargasso Sea as a PSSA. The first approach could also evolve into the second one.

The third approach would focus on the establishment of a Special Area under MARPOL under Annex I (oil), IV (untreated sewage), and/or V (garbage). Different restrictions can apply to different classes of vessels. As an example, the Baltic Sea Special Area under

Annex IV (untreated sewage) has been adopted specifically for passenger ships.[55] Particular attention would need to be given to the requirement of adequate reception facilities. Whilst historically Special Areas were adopted in enclosed or semi-enclosed seas, several now include some or mostly open ocean waters (e.g. Antarctic area, northwest European waters, southern South African waters and the Wider Caribbean region), and it seems that the oceanographic conditions of the Sargasso Sea could be considered similarly.

Adequacy of the measure

Any application for an IMO measure should be sure to demonstrate research progress since the CBD workshop report and in particular some quantification of shipping pressure that would justify the measure being proposed. This would pre-empt an argument against any application that would be based on the following extract of this EBSA's description sheet that considers that there is no urgent need to take protective measures and additional monitoring should be done first:

'(...) Research is clearly needed to quantify the degree of pressure that shipping exerts on the Sargasso Sea. Despite these concerns regarding the condition of the Sargasso Sea, the ecological and biological functionality of the ecosystem remain intact, allowing this unique area to still fulfil its role as a home and an essential resource for a great diversity of species, many of which are of considerable conservation interest. (...)'.[56]

Another important element to consider in an application is the current problem faced by Caribbean's' states who suffer from large quantities of *sargassum* that accumulate and decompose on their beaches. This affects coastal communities and tourism and is a priority for the region. The success of an application for IMO measures designed to protect *sargassum* in the high seas would therefore rely on the applicants' ability to demonstrate how the vulnerability of the *sargassum* located within this EBSA beyond 200NM is not linked to the coastal deposits and that the measures proposed would not exacerbate the severity of coastal deposits of *sargassum*.

States concerned

The states concerned will depend on the location of the measure being applied for, whether in the EEZ of Bermuda or in the high seas. Consultation of other relevant regional management organizations including Regional Fisheries Bodies may also be appropriate.

3.8 Banc d'Arguin / Coastal Habitats of the Neritic Zone of Mauritania and the Far North of Senegal (E8)[57]

3.8.1 Identification and location

The Coastal Habitats of the Neritic Zone of Mauritania and the Far North of Senegal has been identified as EBSA 1 during the workshop to facilitate the description of EBSAs in the south-eastern Atlantic, held in Namibia on 8-12 April 2013. It was subsequently attached to

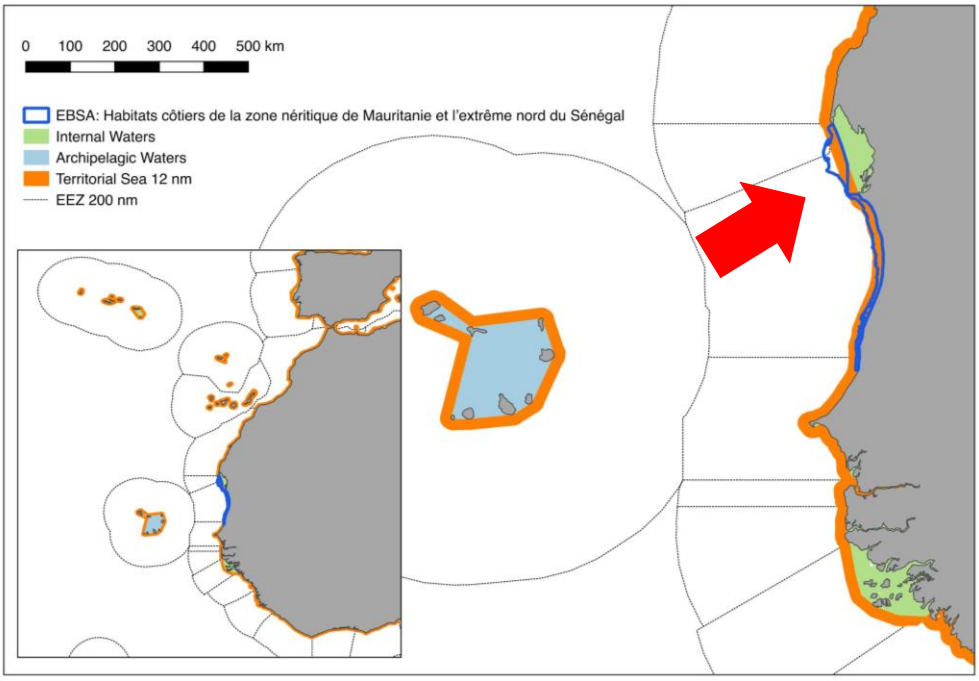
[55] MEPC 200(62) in 2011 and 275(69) in 2016

[56] See note 50

[57] The CBD documents on the identification of this EBSA include: the EBSA description sheet , (https://chm.cbd.int/database/record?documentID=204026), the Workshop report [36-43] (https://www.cbd.int/doc/meetings/mar/ebsa-sea-01/official/ebsa-sea-01-04-en.pdf) and COP12 decision

COP12 (2014). It is a long and narrow EBSA mostly located in the territorial sea of Mauritania. It extends over 550km along the entire coastline Mauritania.

The northern part of this EBSA is contiguous with the Banc D'Arguin National Park which extends 150km along the north-south axis and extends east over the internal waters of Mauritania, until the coast. This National Park is also a Ramsar Wetland of International Importance and a World Heritage Site.



Map 3.15 - Location of Coastal Habitats of the Neritic Zone of Mauritania and the Far North of Senegal

3.8.2 Ecological or biological significance

Summary of EBSA characteristics

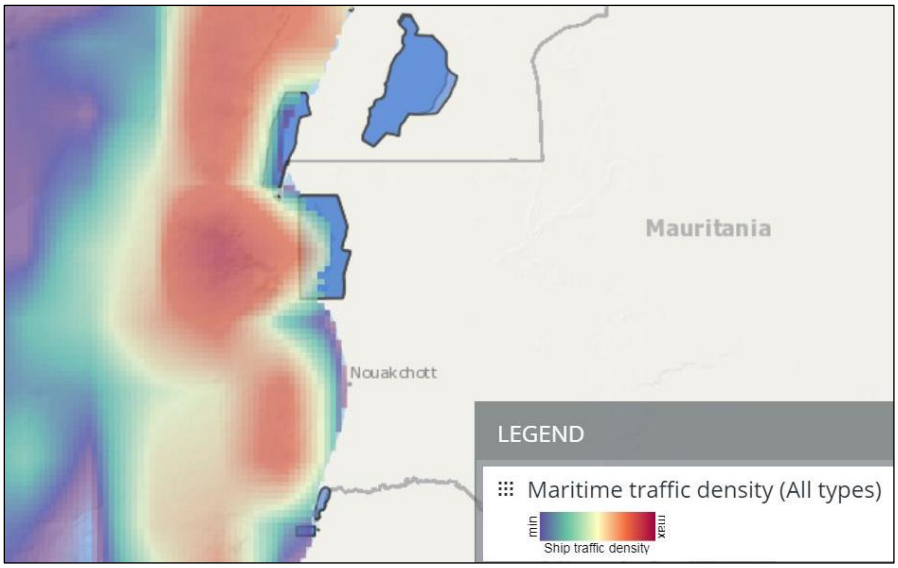
This EBSA is described as having extremely varied environmental conditions in terms of temperatures, salinity, suspended matter, nutrients and turbulence which would explain its high level of biological diversity. It is characterized by high productivity (euphotic zone). It provides nurseries and habitats for the fisheries resources on which the country's economy is based, and for emblematic species of great ecological value such as monk seals, humpback dolphins and sea turtles. This zone is of great economic and social interest to Mauritania, since it the primary source of income for artisanal fishing. The zone is adjacent to several confirmed and planned protected coastal and marine areas (including the Banc d'Arguin National Park) and thus serves as a buffer zone. Another characteristic of this EBSA is its connectivity with the marine and coastal parks on its eastern side and another EBSA on its northwestern side; the latter is characterised by a permanent (and critical) upwelling area.

Other measures under international and national laws

Several national parks have been established in this area which involved restrictions to the activities authorised in this area. This suggests that the ecological and biological values of this EBSA are well recognised by Mauritania.

3.8.3 Impact from shipping

Shipping traffic and impact from shipping



Map 3.16 Shipping traffic along the coast of Mauritania
(From https://octopus.zoo.ox.ac.uk/beta/apps/ode)

Map 3.16 above shows a small section of the shipping route which stretches along western Africa with a denser spot of activity facing the area of the Banc d'Arguin. Information is needed on the characteristics of the traffic, taking into account the shallow waters of the EBSA (maximum depth of 20 metre) and maritime zone boundaries.

Other sources of pollution and activities

Trawling is, for the most part, forbidden. However, strong human pressure (from urban centres and multi-use buildings as well as artisanal fishing) is also reported.

3.8.4 Considerations for protective measures

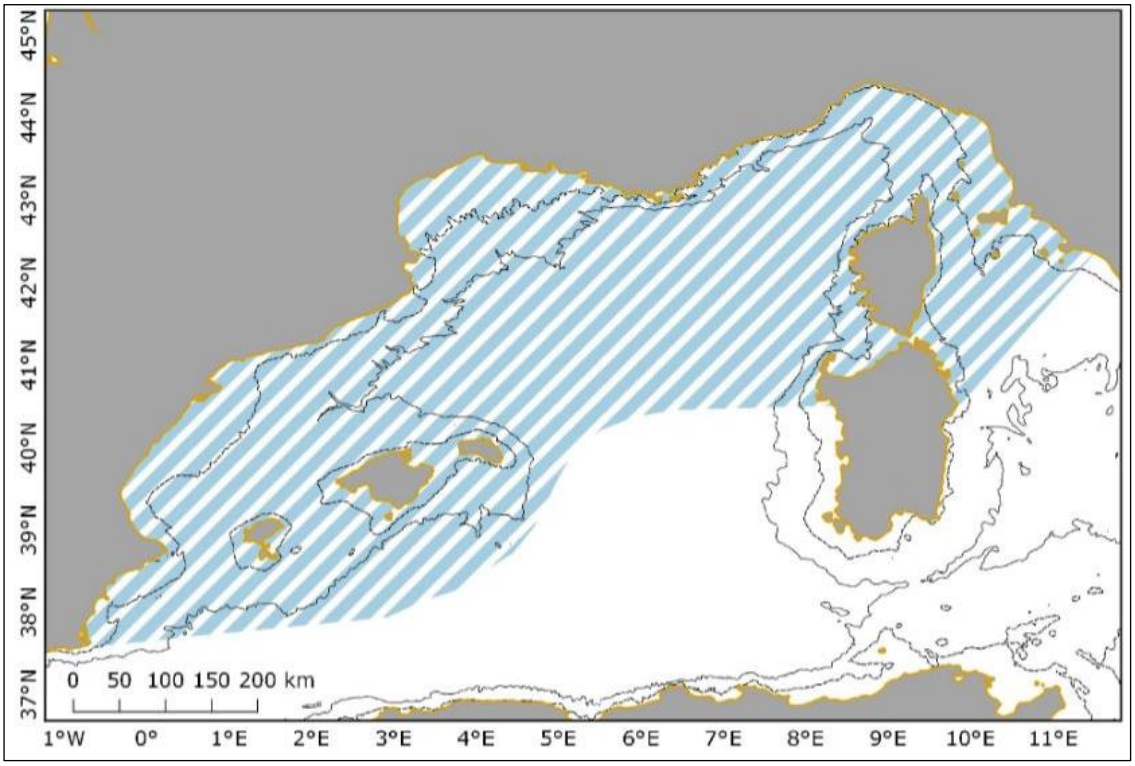
Subject to additional information on the characteristics of the shipping traffic and on its impact, different IMO measures may be considered. If appropriate, a TSS or recommended track could be considered in the territorial sea and internal waters along the coast as well as toward the coast. Other measures may be considered in case of shipping incidents such as collision or congestion or as a response to other shipping impacts.

North-Western Mediterranean Pelagic Ecosystems (E9)[58]

3.8.5 Identification and location

The North-Western Mediterranean Pelagic Ecosystems has been identified as EBSA 6 during the workshop to facilitate the description of EBSAs in the Mediterranean Sea, held in Spain in April 2014. It was subsequently attached to decision XII/22 of COP12 (2014). This EBSA includes a large area of coastal and deep water which include the territorial sea of Spain, France, Monaco and Italy and their respective islands (the Balearic Archipelago, Corsica, the Tuscan archipelago and the north of Sardinia. However, the parts of the EBSA area which extends beyond the territorial seas (up to150NM offshore-the outer boundary of the EBSA) has a complex legal status as coastal states have not all decided to declare an EEZ where they are entitled to. This EBSA therefore involves territorial seas, a fisheries zone (Spain), an EEZ (France) and high seas with an ecological protection zone (Italy).

This case study focuses primarily on shipping impacts on large whales in this EBSA.



Map 3.17 - NW Mediterranean Pelagic Ecosystem

3.8.6 Ecological or biological significance

Summary of EBSA characteristics

This EBSA is characterized by a set of geomorphological and oceanographic characteristics which enable it to host marine mammal species at levels of species diversity and abundance that can be considered exceptional in comparison to other Mediterranean areas. The

[58] The CBD documents on the identification of this EBSA include: the EBSA description sheet https://chm.cbd.int/database/record?documentID=204125, the workshop report https://www.cbd.int/doc/meetings/mar/ebsaws-2014-03/official/ebsaws-2014-03-04-en.pdf and COP12 decision.

oceanography of the water masses in the area is at the base of its productivity and extraordinary biological and ecological significance. For some groups of large pelagic taxa, including tuna and tuna-like species, the western Mediterranean represents an important reproduction and feeding area. This area has been considered to meet six of the seven EBSA criteria at high level; naturalness is the only criterion at medium level.

Notable species highlighted in the EBSA identification documents and the study are:

- Marine mammals

Species	CITES	CMS	SPA-BD Protocol[59]	Life cycle
Fin whale (*Balaenoptera physalus*)	App. I	App. I	Annex II	Feeding, breeding and nursing ground
Sperm whale (*Physeter macrocephalus*)	App. I	App. I	Annex II	Feeding and breeding ground
Cuvier's beaked whale (*Ziphius cavirostris*)	App. II	App. I	Annex II	Feeding and breeding, hotspots in Easter part
Striped dolphin, (*Stenella coeruleoalba)*	App. II	App. II	Annex II	All year round
Common bottlenose dolphin (*Tursiops truncatus*)	-	App. II	Annex II	All year round w. greater concentration on east
Short-beaked Common dolphin[60] (*Delphinus delphis*)	App. II	App. I	Annex II	Eastern part, all year round
Risso's dolphin (*Grampus griseus*)	App. II	App. II	Annex II	All year round

- Sharks

  A total of 71 species of cartilaginous fishes live and breed in the Mediterranean and many of these are present in the Balearic region. Aggregations of basking shark (*Cetorhinus maximus*) have been observed in the northern Balearic region (Walker et al, 2005). However, for many species, there is very little information available on population dynamics and behaviour. Aerial surveys have demonstrated the importance of this area for giant devil rays (*Mobula mobular*) (Notarbartolo di Sciara et al., 2015).

[59] Annex II of SPA-BD provides the list of endangered or threatened species under the Protocol whereas Annex III provides the list of species whose exploitation is regulated

[60] Mediterranean population of the common dolphin (*Delphinus delphis)*

- Marine turtles
  The monitoring conducted both by the French marine turtle network and in the framework of the PACOMM program has highlighted the strong presence of marine turtles in the area (figure 3; Oliver, 2010). The Balearic Archipelago is an important developmental habitat for loggerhead turtles from both Atlantic and Mediterranean origins. Aerial surveys have also demonstrated the importance of this area for turtles, at least in the Pelagos Sanctuary (Lauriano et al., 2011).

- Seabirds
  In particular, the Balearic shearwater (*Puffinus mauretanicus*), the Scopoli's shearwater (*Calonectris diomedea*), listed on Annex I of the EU Birds Directive and Annex II of the SPA/BD Protocol to the Barcelona Convention, Audouin's gull (*Larus audouinii*) and the Yelkouan shearwater (*Puffinus yelkouan*) are all included on Annex I of the EU Birds Directive and the Annex of Barcelona Convention. Other species found here listed under the Birds Directive and Barcelona Convention include gull-billed tern, little tern, Mediterranean gull, sandwich tern, slender-billed gull, Mediterranean yelkouan shearwater or Mediterranean shag and European storm-petrel.

- Pelagic fish
  Migrating Bluefin tuna (BFT) (*Thunnus thynnus*) as a spawning and nursery habitat. Other pelagic species that are also known to reproduce in summer around the Balearic Islands include albacore (*Thunnus alalunga*), common dolphinfish (*Coryphaena hippurus*), small tuna such as frigate tuna (*Auxis spp.),* little tunny, skipjack tuna, other large scombroids breeding in the area include Swordfish (*Xiphias gladius*) and *Tetrapturus spp.* (Alemany et al., 2006). Small pelagic species spawning in these waters include anchovy (*Engraulis encrasicolus*) and round sardinella (*Sardinella aurita*).

Of note, four IMMAs have been identified that cover more than half of this EBSA:

- Shelf of Gulf of Lion IMMA for common bottlenose dolphins,
- North West Mediaterranean Sea, Slope and Canyon System IMMA for fin whales, sperm whales and Risso's dolphins;
- Western Ligurian Sea and Genoa Canyon IMMA for Cuvier's beaked whales; and,
- Balearic Islands Shelf and Slope IMMA for sperm whales.[61]

Site stability

As this EBSA is large and based on a complex marine system, it may be considered as generally stable provided that it can be maintained. However, it is expected to encompass geographic variations in the location of different processes and occurrence in specific species.

Other measures under international and national laws

Activities and protection of the marine environment in the Mediterranean Sea are subject to a regional governance system with binding regulations adopted by the coastal states and completed by regional agreements agreed on in the context of international instruments. The framework instrument is the 1976 Barcelona Convention on the Protection of the

[61] Records available on the website of the Marine Mammal Protected Areas Task Force, https://www.marinemammalhabitat.org/imma-eatlas/

Mediterranean Sea Against Pollution (renamed Convention for the Protection of the Mediterranean Marine and Coastal Environment and called the Barcelona Convention), subsequent amendments and seven specialised protocols. Of particular relevance in the context of EBSAs is the 1995 Protocol concerning Special Protected Areas and Biological Diversity in the Mediterranean (or SPA/BD Protocol) and its provisions for the establishment of Special Protected Areas of Mediterranean Importance (SPAMIs).

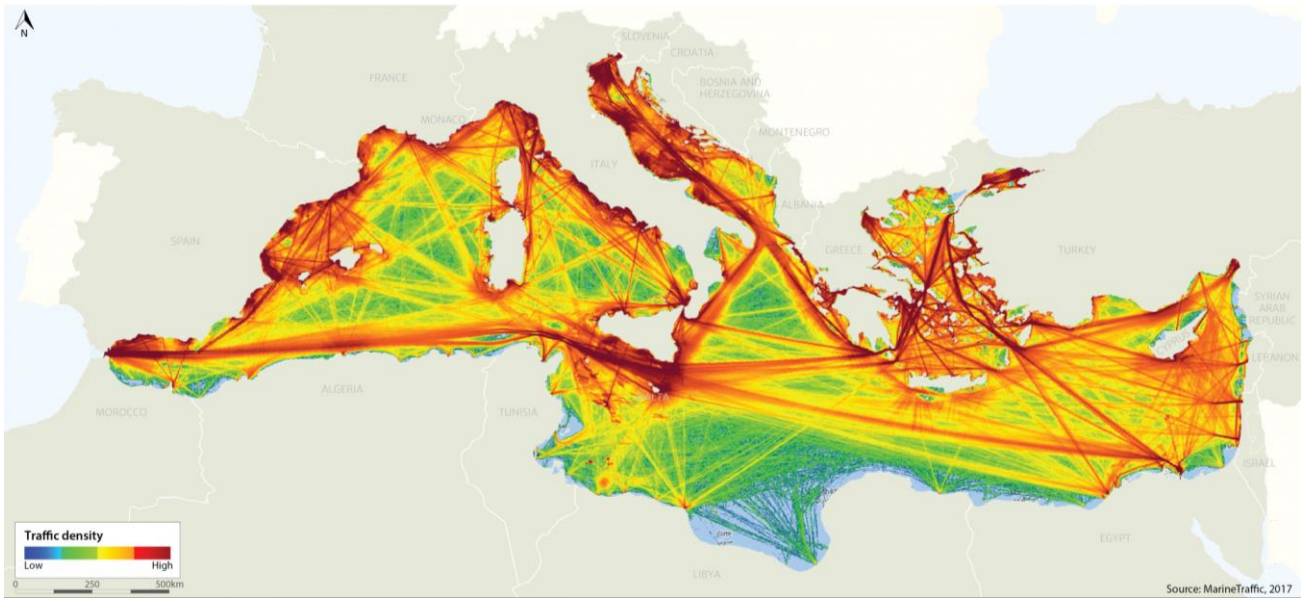
The 1996 Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) complements and supports the Mediterranean regional framework to focus on cooperation to reduce threats to cetaceans. ACCOBAMS results from consultations between Secretariats of four conventions: the Barcelona Convention, the CMS, the Convention on the Conservation of European Wildlife and Natural Habitats and the Convention on the Protection of the Black Sea Against Pollution.

Also relevant to this developed framework is the Pelagos Sanctuary, an international sanctuary established by a treaty between Italy, France and Monaco in 2001, located in the eastern part of this EBSA.

Finally, several IMO measures are already in place: a Special Area under MARPOL Annex I (oil) and V (garbage) and several routeing measures.

3.8.7 Impact from shipping

Shipping traffic



Map 3.18 Density of Maritime Traffic in the Mediterranean Sea (UN Environment Mediterranean 2017 Quality Status report - https://www.medqsr.org/background-ci19)

The NW Mediterranean Pelagic Ecosystems EBSA is characterised by relatively high volumes of commercial, passenger, recreational and military traffic. Summer months are generally the busiest in terms of maritime traffic, especially for the transit of cruise ships and passenger ferries connecting tourist destinations with the main shipping routes often overlapping with critical cetacean habitats. Recreational traffic also peaks during the summer

months from coastal and foreign states. There is also a medium to high commercial traffic including cargo, containers and tanker vessels.

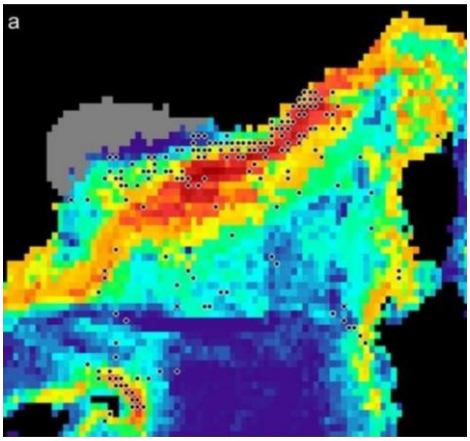
Of note, the shipping route from the Gibraltar Strait to the Suez Canal can be observed outside this EBSA, along the coast of northern Africa.

Established or likely impact from shipping

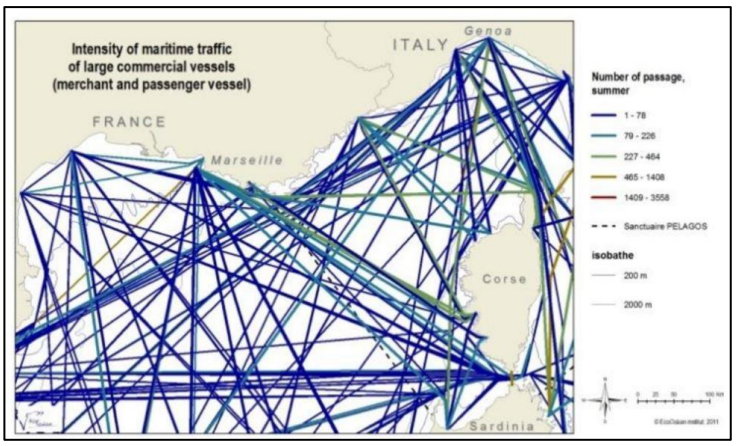
Two main impacts from shipping activities on whales have been highlighted in this case study:

- ship strikes, particularly for fin whales (Panigada et al, 2006) and sperm whales (Di-Meglio et al, 2018), and
- underwater noise pollution (Panigada et al, 2008).

Several studies have mapped the co-occurence of whales and shipping traffic in this EBSA. They show that both cover the entire area. Additional research has been carried out to identify hotspots of likely collisions through different modelling methodology. Research has been undertaken by the UN Environment Programme for the Mediterranean Action Plan (David, Di-Meglio, 2013)



3.18(a) Sighting rate of sperm whales in number of sightings per km
Map 3.17 From David, Di-Meglio, 2013



3.18(b) Route of commercial vessels and summer intensity in number of passage

Despite several papers discussing this topic and a general consensus for recommendatory routeing measures including maximum speed limit, there seems to be no consensus on priority areas for IMO Measures or specific proposal to prevent ship strikes of whales. See also section 5.3.1 below on ship strike and noise.

Of note, this case study does not discuss the potential impact of shipping on sharks, sea turtles and birds. As critical characteristics of this EBSA, they are expected to meet the ecological criteria for a PSSA so that potential impact from shipping on them may also provide grounds for IMO measures. Another study by the IUCN focuses on maritime traffic effects on biodiversity in the Mediterranean Sea and discusses shipping impacts on sea turtles. However, it is unclear whether the vessel traffic involved is from small recreational vessels or commercial shipping. (Panigada et al, 2008)

Other sources of pollution and activities

It is reported that the coastal waters of the Gulf of Lion and along the Catalan coast of Spain are also moderately used by vessel traffic linked to the presence of wind farm projects and oil and gas drilling platforms. Seismic survey activity, may also potentially affect the area.

Military areas cover large portions of the Western Mediterranean Sea. Naval exercises in the Ligurian Sea and the noise they generated appear to have had a particular effect on Cuvier's beaked whales. Several strandings occurred concomitantly or shortly after military sonar exercises.

3.8.8 Considerations for protective measures

Measures available and adequacy

Several IMO measures can be considered to limit ship strikes. Key questions in determining the most adequate one relate to the impact of this measure on shipping traffic and what the expected benefits to the local environment might be.

A PSSA under the IMO framework would seem to be the most appropriate measure given the main purpose of protection of the marine environment. However, if routeing measures that would also decrease ship strikes can be justified on the basis of safety of navigation, this path may also be possible.

The seasonality and temporal variability in large whale densities should be taken into consideration when suggesting mitigation measures for ship strikes. Slowing down while crossing high density areas may be an adequate way to reduce risk, as the cost to shipping from designating an area to be avoided may be seen as unacceptable.

States and other entities concerned

The main states concerned are Italy, France, Monaco and Spain, and any one of them may unilaterally initiate a routeing measure designed to apply in its territorial sea. However, a PSSA the size of the EBSA would have to be jointly proposed by all three.

Furthermore, given the density of activities in the Mediterranean Sea and the level of co-occurrence of marine and maritime activities in the same location, any initiative designed to protect the marine environment should be considered in consultation with relevant bodies with a mandate over this area. This would include Barcelona Convention-related bodies and ACCOBAMS, along with the IMO, in order to integrate this measure into the existing framework and ensure adequate communication and outreach that will support compliance. Consultation of international bodies overseeing the protection of whales globally such as the International Whaling Commission and the CMS would also be valuable for the same reason, but at the global scale.

4 Conclusions and some considerations for future work

A comparative table of all EBSAs and key characteristics in the context of potential IMO measures is included in Appendix 1.

4.1 Difference in scale and purpose

A striking feature of this analysis is the difference in geographic scale between the EBSA mechanism under the CBD and IMO measures. Whilst they are complementary in providing an overall approach for protection of the marine environment, their different focus limits the extent to which EBSA information can be readily used to support IMO measures. EBSAs focus on the scientific demonstration of the ecological or biological characteristics of marine systems. By contrast IMO measures are focused on ensuring freedom of navigation whilst limiting shipping impacts. Additional research is necessary to fill the missing link: to what extent are the ecological or biological characteristics identified in an EBSA affected by shipping? Are some types of vessels more relevant? Is this impact or risk of impact clear enough that it justifies consideration of an IMO measure? Would this IMO measure alleviate the impact? Can other measures be taken that would restrict other activities at sea and would be more effective? Have any of these other measures already been taken? What is the cost to shipping? How acceptable might these IMO measures be to the international shipping community?

The recurring difficulty encountered in answering these questions highlights the following challenges:

- Cost of additional scientific research and lack of resources;
- Currency of existing scientific research;
- Complexity and combined impacts from different activities;
- Complexity and combined impacts from the same activity: such as noise and ship strike from vessels;
- Attribution of the status of a species, population of component(s) of a marine system to one particular source of stress;
- Evidence of expected benefits from a proposed measure.

Applying a precautionary approach to requests for IMO measures made in such circumstances may help support a case for recommendatory measures such as tracks, ATBA or speed restrictions, pending additional results. Applying precaution means that lack of scientific certainty is no reason to postpone action to avoid potentially serious or irreversible harm to the environment.[62]

The nine case studies included in this report also highlight some other unclear or unresolved situations and point to opportunities to support applications for IMO measures to protect the marine environment including features of EBSAs as discussed below.

[62] 1992 Rio Declaration on Environment and Development, Principle 15

4.2 From ship strikes to noise and cooperation between relevant international and regional organisations

Ship strikes are not a new issue but reports of cetacean strandings, studies substantiating the numerous threats these species are under and the globally recognised declining or endangered status of many species have made the issue more pressing. Several countries have successfully applied for routeing measures designed to prevent ship strikes. These developments have also triggered more research and new data that link the risk of ship strikes to noise, a possible path for different measures.

Research shows that ship strikes can have varying negative effects from behavioural responses to physical damages, both at the individual and population level (Panigada et al, 2008). Research suggests that adverse effects of underwater noise pollution can be severe and can include: the masking of social communications used to find mates or identify predators, temporary and permanent hearing loss or impairment (TTS, PTS), displacement from preferred habitat, disruption of feeding, breeding, nursing and communication, strandings, death and serious injury from haemorrhaging and tissue trauma.[63] Research carried out in the context of the Mediterranean Sea suggests that noise may play an important role in the risk of collisions between cetaceans and vessels (Panigada et al, 2008). However, the risk of collision varies widely depending on the species of interest, the behaviour of cetaceans and the size and speed of the vessels as well as the levels of background noise and potential hearing damage affecting the target species. The great majority of collisions leading to severe injury or death happen at speeds of 14 knots or more, with most lethal or serious injuries being caused by large ships (80m length or more) (Vanderlaan and Taggart, 2007 and Ritter, 2012). Of note, impact from ship-strikes on other species than whales, such as sea turtles, would need more information for IMO measures to be envisaged.

A number of on-going initiatives are expected to be in a position to provide useful guidance. At the global level, the International Whaling Commission (IWC) has been working on ship strikes of whales for a number of years and is developing a ship strike database and additional research to improve responses to this impact from shipping. As early as 2001, IWC has also submitted a paper to the IMO to share some of its work and invite Member States to use information from SRS to assess further mitigation steps to reduce ship strikes. IWC Resolution 2000-8 also emphasised the importance of educational programs to help mariners actively avoid collisions.[64] In response to this threat, in 2009, the MEPC issued guidance on minimizing the risk of ship strikes to cetaceans.[65] This guidance document also highlights education and outreach, the gathering of relevant information as well as other

[63] CMS, Technical support information to the CMS Family Guidelines on Environmental Impact Assessment for marine Noise-Generating Activities, 2017 – UNEP/CMS/COP12/Inf.11

[64] IWC Resolution 2000-8, MEPC NAV 47/INF.3 (2001). A similar resolution has been adopted by ACCOBAMS in 2013; ACCOBAMS-MOPS/2013/Res.5.11

[65] MEPC.1/Circ.674, 31 July 2009. Available http://www.imo.org/en/MediaCentre/HotTopics/Documents/674%20minimizing%20the%20risk%20of%20ship%20strikes.pdf

See also the IWC Strategic Plan to Mitigate the Impacts of Ship Strikes on Cetacean Populations: 2017-2020, K Cates, DP DeMaster, RL Brownell Jr, G Silber, S Gende, R Leaper, F Ritter and S Panigada, March 2017. This plan includes 12 whale species (western North Atlantic right whale, eastern North Pacific right whale, Chile-Peru right whale, Arabian Sea humpback whale, western grey whale, blue whale-Sri Lanka and Arabian Sea, blue whale-Chile, sperm whale-Mediterranean Sea, fin whale-Mediterranean Sea, Bryde's whale-Gulf of Mexico, Omura's whale-northwestern Madagascar and sperm whale-Canary Islands region)

possible operational measures. MEPC 66 approved new Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life.[66] The IWC also submitted a paper to MEPC 69 (2016) and provided an update its work on the minimization of ship strikes to cetaceans.[67] In this document, the IWC highlights the finding that the only proven, effective mitigation measures are to avoid areas with known concentrations of whales, and reduce speed while transiting those areas.[68]

The COP to CMS adopted a detailed resolution in 2017 to highlight the work on-going on this topic in a number of bodies, endorse new guidelines for Environment Impact Assessments for noise-generating activities and urges state parties to prevent adverse effect on CMS-listed species.[69]

Parties to the CBD COP have also adopted resolutions to highlight the importance of this topic and of cooperation with relevant organisations.[70] At regional level, a number of regional seas organisations have a programme. This includes OSPAR, ACCOBAMS[71] and others.

Also at the global level, IMMAs are being identified by the IMMA Task Force through regional workshops planned from 2016 to 2021[72]. IMMAs are defined as discrete portions of habitat, important to marine mammal species that have the potential to be delineated and managed for conservation. They are identified on the basis of criteria developed by the IMMA Task Force. CMS COP12 acknowledged the importance of these criteria and the identification process described in the IMMA guidance document.[73] Representatives of CMS also participate in IMMA workshop meetings as observers.

Map 4.1 below provides a snapshot of results from an investigation into areas that would meet both the criteria for an IMMA and an EBSA in the Indian Ocean. The Oman Arabian Sea EBSA discussed in section 3.2 above is shown as one of the areas selected. These analyses may be useful to support applications for routeing or other IMO measures to protect marine mammals.

These multiple scientific and policy research efforts point to the need for increased communication and cooperation at the IMO, including briefings to informal working groups that have been meeting in the margins of the MEPC during the last few years to discuss impact from shipping noise. Effective coordination may also limit the risk of inconsistent findings or overlapping decisions between international organisations.

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[66] MEPC.1/Circ.833, 7 April 2014. Available https://www.ascobans.org/sites/default/files/document/AC21_Inf_3.2.1_IMO_NoiseGuidelines.pdf

[67] MEPC69/10/13, 12 February 2016

[68] Further progress of IWC until June 2019 is summarized in the Report of the Scientific Committee of the IWC, 17 June 2019, Annex J, Report of the Sub-Committee on non-deliberate human-induced mortality of cetaceans [15-20] See also R Leaper, 2019

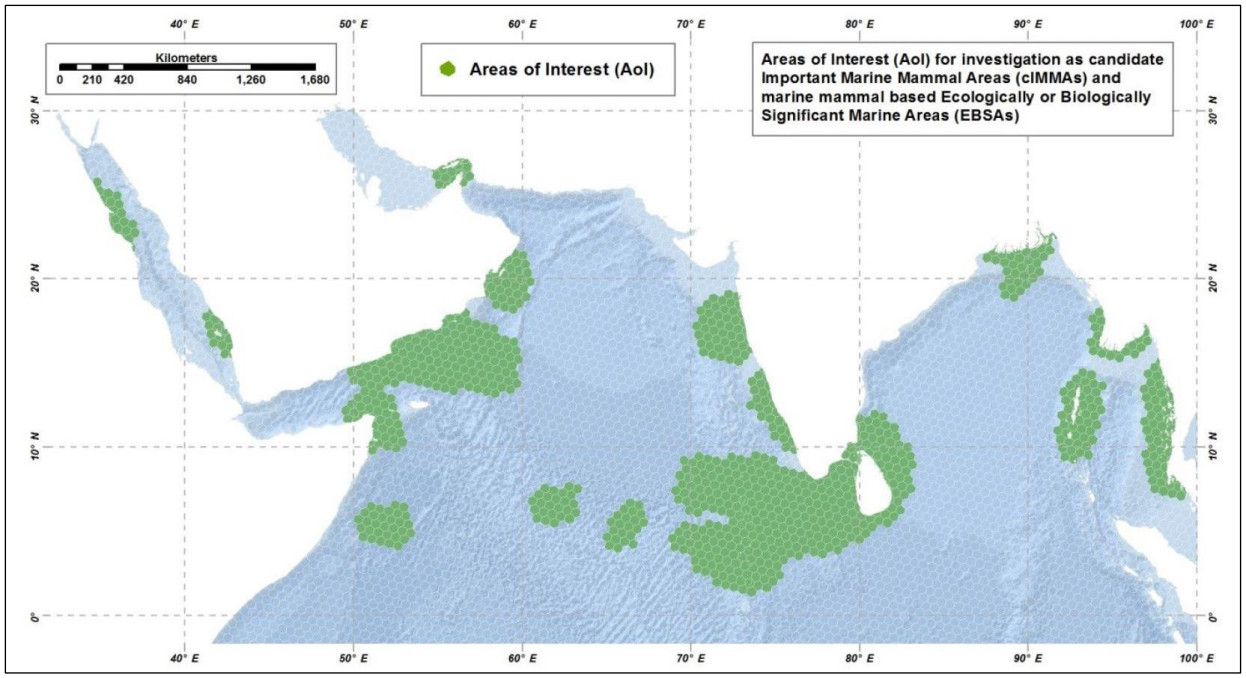
[69] CMS Resolution 12.14 on adverse impacts of anthropogenic noise on cetaceans and other migratory species (October 2017), https://www.cms.int/sites/default/files/document/cms_cop12_res.12.14_marine-noise_e.pdf

[70] UNEP/CBD/COP/11/35 [206] and UNEP/CBD/SBSTTA/16/INF/12

[71] See for example research programme on ship strikes and noise http://www.accobams.org/conservations-action/anthropogenic-noise/ and proceedings of the ECS/ASCOBANS/ACCOBAMS Joint Workshop on Introducing noise into the marine environment: What are the requirements for an impact assessment for marine mammals, Belgium, 2014. https://www.ascobans.org/sites/default/files/document/AC22_Inf_4.2.a_ECS_Proceedings_NoiseEIA.pdf

[72] https://www.marinemammalhabitat.org

[73] CMS Resolution 12.14, see note 69



Map 4.1 Areas of interest for candidate IMMAs and marine mammal-based EBSAs in the Indian Ocean

4.3 Seabirds and light pollution from shipping

The case study on the Clipperton Fracture Zone Petrel Foraging Area is the only one that focuses primarily on seabirds and impact from shipping. Research references provided in this case study focus on light pollution, as collision or bycatch are additional impacts that may be linked to fishing activities rather than the normal operation of a vessel. They indicate that interaction of seabirds with artificial light is clear for Procellariforms, which include albatrosses, petrels, shearwaters, storm petrels and diving-petrels. At least 21 species of this group would have been described as having had negative interaction with this type of pollution. Vulnerability to artificial lighting varies between different species and age classes and according to the influence of season, lunar phase and weather conditions. In general, young birds are more likely to become disorientated by man-made light sources. Most collisions occur in poor weather, when the moon is new or during periods of peak migration.

At sea, vessels are among the major sources of artificial light. Fishing vessels, for instance, frequently use intense artificial lighting to attract fish at night, consequently attracting birds. There is a comprehensive account on the evidence of detrimental effects of artificial lighting on seabirds which highlights the various observations of seabird collision in fishing boats worldwide (see BirdLife review: http://datazone.birdlife.org/light-pollution-has-a-negative-impact-on-many-seabirds-including-several-globally-threatened-species). A dramatic case is reported where over 6,000 crested auklets (*Aethia cristatella*) landed aboard a crab-fishing vessel, in Alaska, with a combined weight of around 1.5 metric tons, making the crew believe the boat would capsize.

Light shielding, for instance, is reported to have decreased attraction of seabirds to light, with effective benefit for the user. This measure increases light reflection downwards, also increasing the efficiency of lighting for human purposes. Workshops have been organised on this topic and mitigation measures proposed focus on reduction of numbers, intensity and spectrum of light at night. Safety of navigation may not be compromised in the design of these mitigation measures. However, light pollution may not be only attributed to shipping. It

can also concern other activities at sea such as operation of windfarms, offshore mining or aquaculture installations.

Further research on this topic would be useful to determine to determine the extent of shipping impact on seabirds and what measures may be considered to limit this impact.

4.4 Legal, procedural and technical findings

4.4.1 Training, education and outreach to mariners

Another recurring and relevant point made in a number of policy papers is the need for education and outreach to mariners who sail over EBSAs or other sensitive marine areas. This point is linked to the need for better coordination between all relevant bodies involved in the protection of the marine environment as discussed below. However, it is more specific as it seeks to inform mariners in particular. In addition to considering including marine environmental components in mariners' training programmes (already part of discussions at the IMO in the context of marine plastics), it may be worth considering the extent to which sailing directions, (digital) nautical charts or other guidance documents normally consulted by mariners could include greater details on this topic.

Chapter 11 of the Polar Code, which requires mariners to plan voyages which results in the least amount of harm to marine life, may provide a useful guide or example of measures or an approach which could be followed in non-polar sensitive marine areas.

4.4.2 Endangered species

Whether a species qualifies as being depleted, threatened or endangered or whether an ecosystem can be considered as rare or fragile under international law can be debatable. However, for those species and ecosystems that qualify, states have a clear obligation under UNCLOS to adopt measures to protect and preserve them. The rights to transit passage, freedom of navigation or innocent passage are subject to this obligation.

Applications for IMO measures may be more compelling when there is a risk of irreversible harm to species or ecosystems which would qualify. In this context, the first authoritative lists under international law are the appendices to CITES or CMS, as well as relevant binding instruments in a regional sea context. Appendices to CITES and CMS have been adopted by COPs to the relevant convention and are therefore validated by a political consensus which gives them greater authority. As such, impacts from shipping on those species may be good priority candidates for consideration of additional IMO measures. The IUCN Redlist is also based on solid expert evidence (that is often used in the adoption of CITES and CMS appendices). However, it does not enjoy the same status under international law or political vetting.

4.4.3 Discharge measures in PSSAs

None of the APMs adopted until now relates to the limitation of discharges at sea. Limitation of operational discharges has always been a MARPOL-related concern and the understanding is that the Special Area approach would be the most adequate.

However, Special Areas tend to be large bodies of seas or oceans rather than discrete sensitive marine areas. Since 1973, 11 geographic sea areas have been designated globally as Special Areas. Furthermore, a new type of discharge is regulated by the Ballast Water and Sediment Management Convention which has now come into force. Invasive species have also become a topic of concern in a number of fragile or vulnerable ecosystems. In this context, new APMs may be considered to limit discharges from ships beyond the standard requirement of MARPOL and outside Special Areas.

4.4.4 IMO measures in the High Seas

There is a general consensus that there is no theoretical obstacle to the adoption of PSSAs and APMs or routeing measures in the high seas although there are none to date. In fact, some Special Areas under MARPOL already apply to high seas areas: the Antarctic Area and the Mediterranean Sea (where no EEZ has been declared by coastal states).

Five of the EBSAs considered in this study have high seas components supported by data on shipping traffic. However, one state or a group of states needs to take the initiative to make any proposal to the IMO for measures designed to protect the marine environment against adverse impact from shipping. Several categories of states may have a particular interest in this topic. For example, those in the jurisdiction of where breeding grounds are located, especially if relevant species are protected under their domestic regulation system (for example New Zealand for the Clipperton Fracture Zone Petrel Foraging Area or the riverine countries of eels for the Sargasso Sea). Another example of a state with a vested interest is the coastal state of the EEZ adjacent to the high seas considered, such as Bermuda for the Sargasso Sea.

4.5 Overall Recommendations

Overall, the elements provided for each case-study investigated in this report are insufficient to prepare a successful application for new IMO measures to protect some of the features identified in each EBSA. However, the case for IMO measures to limit ship strikes to whales in the Oman Arabian Sea and the North Western Mediterranean Pelagic Ecosystem looks the most promising at this stage due to the amount of scientific evidence already available. Communication of an information paper at MEPC 75 to update Member States of the results of the study of ship strikes in these two areas may be useful, especially if this is followed by an informal consultation of relevant states on measures that they may consider to be acceptable. An education and outreach side event organised by IWC and ACCOBAMS and any other relevant organisation on the margin of MEPC 75 may also be useful to raise the profile and interest in the topic. Canada and New Zealand who have been organising informal group meetings on this topic may also be interested in engaging on this topic.

Scientific data released on ship strikes and the experience gained on benefits of routeing measures to avoid ship strikes since the negotiation and adoption of the current IMO Guidelines on ship strikes may convince states to revise the guidelines in light of this new evidence. However, their willingness to engage in this process may be dependent on the identification and availability of new measures that may be reasonably considered to reduce ship strikes. Revisions of the guidelines could also provide a platform for a greater understanding of issues linked to ship strikes in different parts of the world and acceptability of new measures to limit them. Finally, a useful approach might be to link the current

discussion on the potential review of the existing guidelines on underwater noise with the risk of ship strikes.

With respect to other features in these two EBSAs (that may also be subject to adverse impacts from shipping) and the other case studies, IMO measures may be considered if and when specific adverse impacts or likely impacts from shipping on specific features of these EBSAs have been identified. Potential measures that could limit this impact or likely impact may then be investigated. In the meantime, several steps may be considered to progress in this direction including:

- Peer-reviewed and open source paper on the potential for IMO measures to protect biodiversity in EBSAs;
- Engagement of relevant research communities involved in respective potential threats from shipping that have already been identified (such as noise from vessels, light and invasive species) with shipping communities from governments and industry;
- Engagement with relevant shipping industry groups, trainers and publishers of charts and sailing directions on avenues to inform mariners of the environmental sensitivity of areas they sail through;
- Regular information papers to the MEPC as new research is released and progress is made to characterise impact from shipping and potential measures, including the monitoring and evaluation of existing measures; and
- Research paper on the possibility to apply for routeing measures for the protection of the marine environment outside a PSSA.

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CBD instruments and documents

CBD instruments

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CBD COP9 Decision IX/20 (2008) Marine and Coastal Biodiversity. Available at https://www.cbd.int/doc/decisions/cop-09/cop-09-dec-20-en.pdf

EBSA documents

EBSA Name	Workshop Report	COP Decision	CBD EBSA Repository
Churna-Kaio Island Complex (Pakistan)	https://www.cbd.int/doc/meetings/sbstta/sbstta-20/information/sbstta-20-inf-23-en.pdf [117]	COP13 (2016)	https://chm.cbd.int/database/record?documentID=237781
Clipperton Fracture Zone Petrel Foraging Area	https://www.cbd.int/doc/meetings/mar/rwebsa-wspac-01/official/rwebsa-wspac-01-sbstta-16-inf-06-en.pdf [93]	COP11 (2012)	https://chm.cbd.int/database/record?documentID=200052
Coastal Habitats of the Neritic Zone of Mauritania and the Far North of Senegal (Banc d'Arguin)	https://www.cbd.int/doc/meetings/mar/ebsa-sea-01/official/ebsa-sea-01-04-en.pdf [36]	COP11 (2012)	https://chm.cbd.int/database/record?documentID=204026
Corredor Marino Del Pacifico	https://www.cbd.int/doc/meetings/mar/ebsa-ettp-01/official/ebsa-ettp-01-04-en.pdf	COP12 (2014)	No information sheet available
North-Western Mediterranean Pelagic Ecosystems	https://www.cbd.int/doc/meetings/mar/ebsaws-2014-03/official/ebsaws-2014-03-04-en.pdf [75]	COP12 (2014)	https://chm.cbd.int/database/record?documentID=204125
Oman Arabian Sea	https://www.cbd.int/doc/meetings/sbstta/sbstta-20/information/sbstta-20-inf-23-en.pdf [344]	COP13 (2016)	https://chm.cbd.int/database/record?documentID=237825
Salas y Gomez and Nazca Ridges	https://www.cbd.int/doc/meetings/mar/ebsa-ettp-01/official/ebsa-ettp-01-04-en.pdf	COP12 (2014)	https://chm.cbd.int/database/record?documentID=204100
Sargasso Sea	https://www.cbd.int/doc/meetings/mar/rwebsa-wcar-01/official/rwebsa-wcar-01-sbstta-16-inf-07-en.pdf [107]	COP11 (2012)	https://chm.cbd.int/database/record?documentID=200098

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Annex 1 - Comparative table of EBSAs' characteristics

EBSA Name	Location	Size (km^2)*	Maritime zone	EBSA criteria**	Static/ dynamic
Churna-Kaio Island Complex	NW Indian Ocean and Adjacent Gulf Areas	400	Internal/ TS	Uniqueness Threatened species Productivity	Depends on the resource considered
Oman Arabian Sea	NW Indian Ocean	72,000	Internal/ TS/EEZ	Uniqueness Life-history stages Threatened species Vulnerability Productivity	Depends on the resource considered
Southern Strait of Malacca	E Asian Seas	>15,000	Internal/ TS	Uniqueness Life-history stages Threatened species Vulnerability	Depends on the resource considered
Clipperton Fracture Zone Petrel Foraging Area	WS Pacific	700,000	HS	Life-history stages Threatened species	Dynamic
Corredor Marino Del Pacifico	E Tropical Pacific	>1Mi	TS/EEZ /HS	Life-history stages Threatened species	Depends on the resource considered
Salas y Gomez and Nazca Ridges	E Tropical Pacific	>1.5Mi	EEZ/ HS	Life-history stages Threatened species Vulnerability Biodiversity Naturalness	Depends on the resource considered
Sargasso Sea	Wider Caribbean and W Mid-Atlantic	>4Mi	EEZ/ HS	Uniqueness Life-history stages Threatened species Productivity Biodiversity	Depends on the resource considered
Coastal Habitats of the Neritic Zone of Mauritania (Banc d'Arguin)	SE Atlantic	8,572	TS/EEZ	Uniqueness Life-history stages Threatened species Productivity	Depends on the resource considered
NW Mediterranean Pelagic Ecosystems	Mediterranean Sea	341,481	TS/EEZ /HS	Uniqueness Life-history stages Threatened species Productivity Biodiversity	Depends on the resource considered

* Approximative value to indicate a range rather than exact size - Based on the EBSA's shapefile

** Only criteria met at high level are listed in this table