Protecting EBSAs and opportunities for the IMO:

The use of EBSAs for informing designation of IMO PSSAs

A report compiled for the WWF

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EXECUTIVE SUMMARY

This report considers the extent to which existing criteria for Ecologically or Biologically Significant Marine Areas (EBSAs) could be used by the IMO/member states for review of existing or identification of potential Particularly Sensitive Sea Areas (PSSAs). This was completed by undertaking a comparative analysis of the criteria for both designations, a spatial analysis of their present co-occurrence, and a mapping of global shipping density data onto current EBSA distribution. Results showed that whilst, conceptually, both designations share some common features around ecological sensitivity, the co-occurrence of EBSAs and PSSAs is limited. This is, in part, due to the fact that significant numbers of EBSAs currently lie beyond Areas of National Jurisdiction, whereas no PSSAs currently fall within this space. Analysis of global shipping density data suggested that there are areas that may be 'at risk' from shipping activity and are defined as ecologically significant, such as the coast of Southern Africa and the Mediterranean.

The report recommends that further analysis of shipping activity is required, particularly at a more local level, since the granularity of present data is too large. It also suggests that furthering the scientific description of EBSAs in coastal areas, where appropriate, may facilitate greater usage of the PSSA concept. However, the PSSA designation still requires clear demonstration of vulnerability to shipping activities and identification of Associated Protected Measures.

CONTENTS

1. INTRODUCTION

This report is undertaken on behalf of WWF to identify synergies and correlations between the scientific description of EBSAs and designation of PSSAs, both existing and future. The aim is to enhance the PSSA designation process and afford protection to EBSAs (or EBSA features) from international shipping activities when needed. This report establishes commonalities between the designations, geographic crossover and identifies potential to share data and avoid replication of effort.

The development of marine environmental protective mechanisms such as PSSAs have their beginnings as a result of the United Nations Conference on the Environment in 1992, which highlighted the need to instigate management related activities to prevent, reduce and control degradation of the marine environment from both land and sea based activities, including shipping within Agenda 21, Chapter 17[1]. This resulted in a number of legislative frameworks and designations being developed from an array of global Conventions[2], governed by a range of organisations and varying levels of legislation, all having in common the aim of protecting vulnerable or biologically important marine areas. These include *inter alia* National Marine Parks (NMP), Special Protected Areas (SPAs), Special Areas of Conservation (SACs), World Heritage marine sites, RAMSAR designations, Marine Protected Areas (MPAs), Special Areas (SA) and Particularly Sensitive Sea Areas (PSSAs).

2. ADDRESSING SIMILARITIES BETWEEN EBSA AND PSSA SELECTION CRITERIA

2.1. Ecologically or Biologically Significant Marine Areas (EBSAs)

The "EBSAs" concept was developed within the Convention on Biological Diversity[3] with a view to support area-based management measures in the marine realm. In 2002 the

[1] Chapter 17. Protection of the Oceans, all kinds of seas, including enclosed and semi enclosed seas, and coastal areas and the protection, rational use and development of their living resources

[2] E.g. London Dumping Convention (LDC), International Convention for Prevention of Pollution from ships (MARPOL 73/78), Convention on Biological Diversity (CBD), Conservation and Management of Straddling Fish Stock and Highly Migratory Fish Stocks (United Nations Fish Stocks Agreement), Convention for the Protection of the Marine Environment of the North east Atlantic (OSPAR Convention), Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Agreement), EU Habitats and Birds Directive (Natura 2000)

[3] The original agreement of the CBD contained no specific articles relating to marine and coastal biodiversity, however this was noted as a priority issue with respect to Article 8 of the Convention, and was addressed at the first Conference of the Parties in 1995, which saw a policy decision relating to the Conservation and Sustainable Use of the Marine and Coastal Biological Diversity (Jakarta Mandate)

Johannesburg Plan of Implementation advocated the ecosystem approach and the need for establishing marine protected areas, consistent with international law and based on scientific information. (Dunn *et al.*, 2014). In Ottawa, in 2005, it was proposed that a broad overarching set of criteria should be established that could be utilised by several different organisations including the Food and Agricultural Organisation (FAO), Convention on Biological Diversity (CBD) and the International Maritime Organisation (IMO), thereby creating a commonality with the supposed aim of avoiding replication of effort. Within the CBD this led to the development of a suite of criteria which could be utilised for identifying areas of ecological or biological importance to support conservation and sustainability, which were presented within Annex 1 of CBD Decision IX/20. 14 (CBD, 2015).

At CBD COP 9, which took place in Bonn, 2008, it was also decided that there should be separation of site level criteria and network level approaches, a development seen as unique to the CBD. This separation of site and network levels remains the only internationally agreed criteria system to formally recognise a clear distinction between approaches.

2.1.1 Criteria and capacity building to inform process

Capacity building was identified by UNESCO (2008, pp18-19) in their Operational Guidelines for Implementation of the World Heritage Convention, as key to the success of a designation as without understanding, the ability to successfully identify, assess, manage and monitor an area is limited. Over the years many workshops have been held to describe areas that meet the EBSA criteria and a key finding from the earliest workshops related to the need for capacity building with regards to understanding the criteria and use of data sets. This was seen as critical if the workshops to describe potential EBSAs were to be successful, therefore actions were put in place to improve understanding of criteria, which in turn led to more EBSAs being described at the workshops.

2.1.2 Data Sharing

At CBD COP 10 in 2010, it was decided that all data relating to EBSAs should be stored in a CBD EBSA repository. This went ahead and in 2011 a web based tool was established. This repository should have enabled sharing of information through open access, however this process was seen as 'philosophically incompatible' (Dunn *et* al, 2014.p141) with the State

based regional process for describing EBSAs (as agreed at COP10). The result being that there is currently no open access for external use of EBSA supporting data.

This lack of willingness and/or ability to share data between States which have a common aim (description of EBSAs) is further exacerbated through an overall lack of an integrated approach to marine governance where policy is developed and implemented at differing levels i.e. much European fisheries policy is formulated at the EU level and implemented at a national level; shipping policy being set at both an international level and national level (van Tatenhove, 2010). These type of cross sectoral conflicts lead to an overall fragmented approach to collection and free exchange of data between parties and without data exchange between stakeholders the ability to assess and monitor a dynamic environment is hampered.

2.1.3 Criteria

Evaluating criterion requires both temporal and spatially explicit data, where data is available, however interpretation of data can be subjective as it is based on individual interpretation – for instance, what is rare or unique? Furthermore sampling coverage may be limited to small discrete areas (Clarke *et al*, 2004). Understanding of criteria for EBSAs has been addressed through capacity building, but it is suggested that the criteria are rather broad and open to a broad range of interpretations.

2.1.4 Size of EBSAs

The size of EBSAs vary greatly, which in turn dictates that management approaches must be tailor made based on the extent of the area and its physical attributes. In some cases, for instance the Equatorial Upwelling Zone in the Pacific, it is argued that protection of the described area is virtually impossible under the current fragmented governance regime, due to its physical size, a problem compounded by the fact that the area also falls largely in an Area Beyond National Jurisdiction. However, if competent organisations (e.g. regional fisheries management organisations, International Seabed Authority, IMO, etc.) and respective coastal states identify conservation and management measures to avoid or minimise the impacts of their regulated activities, enhanced protection of the entire EBSA would then be achievable.

2.2. Particularly Sensitive Sea Areas (PSSAs)

The concept of the PSSA was an initiative put forward at the 1978 International Conference on Tanker Safety and Pollution Prevention (TSPP). At this conference the Swedish delegation proposed that special protection should be afforded to '...areas of particular value because of their renewable natural resources or their importance for scientific purposes.' (Peet, 1994, p. 475). However very little progress was made until Friends of the Earth International (FoEI) and the International Union for the Conservation of Nature and Natural Resources (now the IUCN) submitted papers to the Marine Environmental Protection Committee (MEPC) of the IMO in 1985, identifying and discussing the possible way forward for developing the PSSA concept (Roberts, 2007). The following years saw much work on development of guidelines and sets of criteria (ecological, socio-economic or scientific and vulnerability to impacts from international shipping) which would be used for identifying and designating a PSSA with the first successful designation (the Great Barrier Reef) being in 1990. In response to issues of interpretation of guidelines for designation and understanding of the criteria to be met for designation there followed a series of revisions with the most recent being 2005. For the purpose of this report the criteria as identified in Resolution A. 982 (24) are applied.

PSSAs are designated with the specific intention of protecting a sensitive area from 'vulnerability from international shipping activity'. Therefore, there is a need for any designation to be supported by data that demonstrates not only that it meets the set criteria but which also identifies vulnerability from shipping. However, what makes an area vulnerable and how this is measured is open to a range of interpretations.

The PSSA designation itself has no legal basis as it is derived from a non-binding IMO Assembly resolution. However they can be afforded protection through the use of Associated Protective Measures (APMs) that have been approved or adopted by the IMO as they provide the legal basis for regulatory control of shipping. These include *inter alia*: Discharge restrictions through designation of MARPOL Special Areas (Annex I – V), Ships routeing and reporting, Areas to be Avoided, compulsory pilotage, Traffic separation (Roberts, 2007; Gjerde & Rulska-Domino, 2012). However if considering designation of a PSSA in an ABNJ, the measures adopted would need to fall under an IMO Convention which has a global application[4] . It is suggested that in such a case there may be potential to utilise discharge restrictions associated with designations such as Special Areas (Annex I, II, IV, V), as a protective measure, as these fall under the MARPOL Convention thereby

[4] For States that have signed up to the identified Convention

requiring compliance by all signatories to the Convention. Currently there are no PSSA designations in ABNJ.

2.3. Correlation between designation criteria

From Table 1 it is evident that there is a clear correlation between criteria for both EBSAs and PSSAs when considering biological and ecological indicators across many areas. A point when considering correlation of criteria is the somewhat limited definitions provided within the EBSA criteria but with provision of rationale and examples, where the PSSA criteria is far more expansive but little or no rationale/examples. A key element that differentiates the overarching criteria to be met are those relating to 'vulnerability from international shipping activity' as specified within PSSA designation guidelines.

	EBSA	PSSA	
Criteria	**Definition**	**Definition**	**Criteria**
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	An area or ecosystem is unique if it is "the only one of its kind". Habitats of rare, threatened, or endangered species that occur only in one area are an example. An area or ecosystem is rare if it only occurs in a few locations or has been seriously depleted across its range. An ecosystem may extend beyond country borders, assuming regional or international significance. Nurseries or certain feeding, breeding, or spawning areas may also be rare or unique.	**Uniqueness or rarity**
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.	An area that may be a critical spawning or breeding ground or nursery area for marine species which may spend the rest of their life-cycle elsewhere, or is recognized as migratory routes for fish, reptiles, birds, mammals, or invertebrates.	**Critical Habitat**
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.	A sea area that may be essential for the survival, function, or recovery of fish stocks or rare or endangered marine species, or for the support of large marine ecosystems.	**Spawning or breeding grounds**

Vulnerability, fragility, sensitivity, or 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.	An area that is highly susceptible to degradation by natural events or by the activities of people. Biotic communities associated with coastal habitats may have a low tolerance to changes in environmental conditions, or they may exist close to the limits of their tolerance (e.g., water temperature, salinity, turbidity or depth). Such communities may suffer natural stresses such as storms or other natural conditions (e.g., circulation patterns) that concentrate harmful substances in water or sediments, low flushing rates, and/or oxygen depletion. Additional stress may be caused by human influences such as pollution and changes in salinity. Thus, an area already subject to stress from natural and/or human factors may be in need of special protection from further stress, including that arising from international shipping activities	**Fragility**
Biological productivity	Area containing species, populations or communities with comparatively higher natural biological productivity.	An area that has a particularly high rate of natural biological production. Such productivity is the net result of biological and physical processes which result in an increase in biomass in areas such as oceanic fronts, upwelling areas and some gyres. 2.An area that is a biologically functional unit, an effective, self-sustaining ecological entity	**1. Productivity** **2. Integrity**
Biological diversity	Area contains comparatively higher diversity of ecosystems, habitats, communities, or	1. An area that may have an exceptional variety of species or genetic diversity or includes highly varied ecosystems, habitats and communities.	**1. Diversity** **2. Dependency**

	species, or has higher genetic diversity.	2. An area where ecological processes are highly dependent on biotically structured systems (e.g. coral reefs, kelp forests, mangrove forests, seagrass beds). Such ecosystems often have high diversity, which is dependent on the structuring organisms. Dependency also embraces the migratory routes of fish, reptiles, birds, mammals, and invertebrates	
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.	1. An area that has experienced a relative lack of human induced disturbance or degradation. 2. An area that either contains rare biogeographic qualities or is representative of a biogeographic "type" or types, or contains unique or unusual biological, chemical, physical, or geological features	**1. Naturalness** **2. Bio-geographic importance**
		An area that is an outstanding and illustrative example of specific biodiversity, ecosystems, ecological or physiographic processes, or community or habitat types or other natural characteristics	**Representiveness**

Table 1.Comparative analysis of EBSA and PSSA criteria

3. SPATIAL ANALYSIS OF EBSA-PSSA OCCURRENCE

3.1. Data Sources

All spatial data for EBSAs were obtained from the Convention on Biological Diversity website (https://www.cbd.int/ebsa) and are as defined November 2015. PSSA boundaries were supplied courtesy of the IMO, via Claymoreclan Design. Finally, shipping density data was obtained via the EC-funded PASTA MARE project (Eiden *et al.*, 2010), and is copyrighted to the European Commission.

3.2. Shipping Density

The PASTA MARE project derived its shipping density data by gridding the globe into smaller cells. Density is defined as the average number of space and terrestrial AIS signals that identify individual vessels within a 1° x 1° cell of ocean space, based on 10 global S-AIS scenes. Each scene retains one position report per vessel within a time frame of 8 days. Thus it is difficult to obtain a true count of vessel activity, therefore the following analysis uses more qualitative terms such as 'low' and 'high' to identify differences in density rather than overall counts.

3.3. The Spatial Distribution of PSSAs

Figure 1 shows the global distribution of ocean and coastal space under the designation of PSSAs (identified in blue). There are currently 13 designations and 2 extensions to the Great Barrier Reef PSSA, to include the Torres Straits and the southwest part of The Coral Sea. Much of the area being encapsulated in three major PSSAs. Three new areas are currently under discussion for designation as PSSAs.

3.4. The Spatial Distribution of EBSAs

Figure 2 shows the global distribution of 204 EBSAs (in red) to date. These areas vary greatly in size from extensive large scale oceanographic areas to small, ecologically specific spaces.

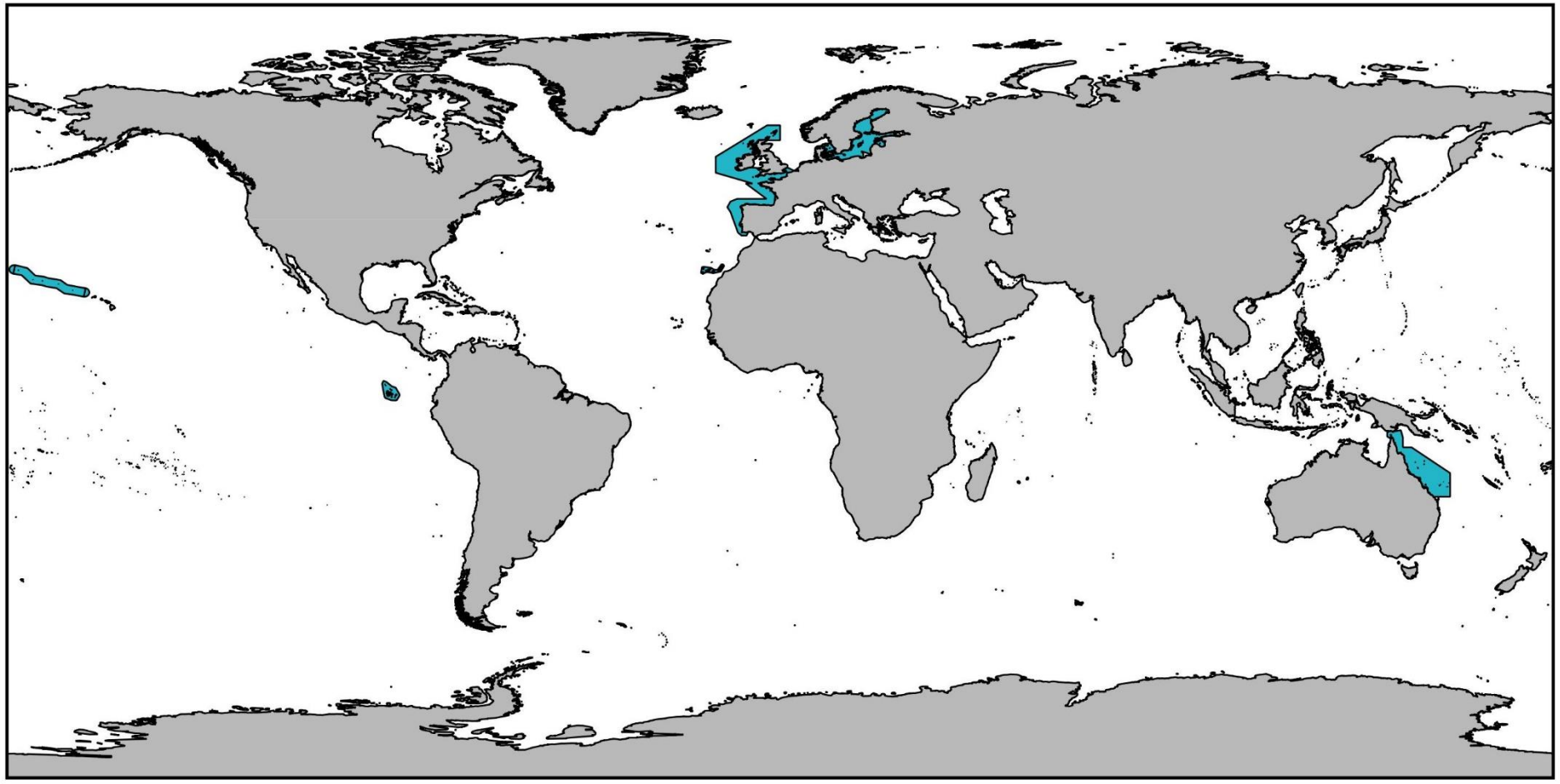

Figure 1. The global distribution of PSSAs

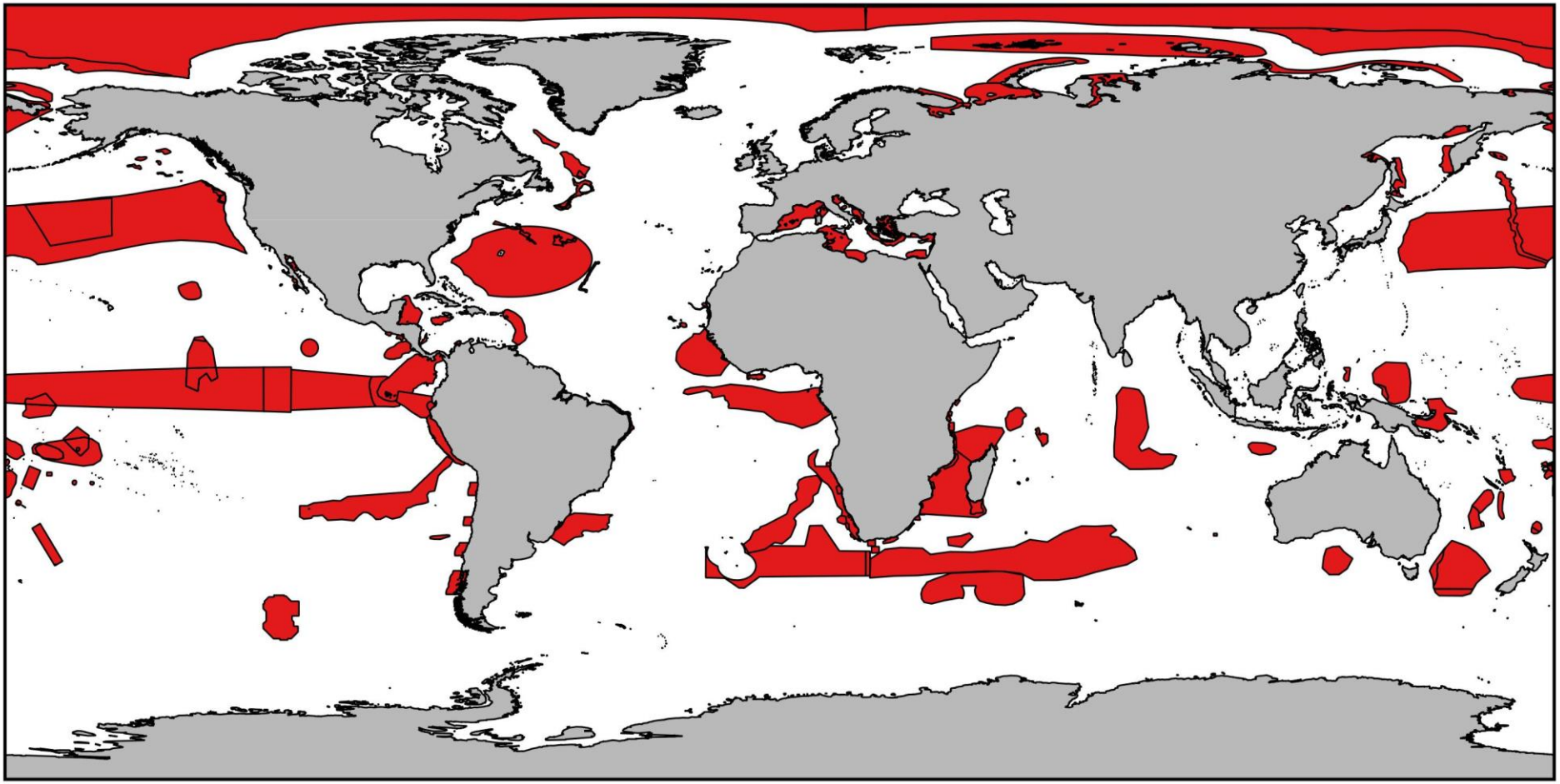

Figure 2. Current global distribution of EBSAs, as of January 2016

3.5. Notable areas of intersection between the two designations

Considering the overlap between the two designations, intersection analysis suggests that there is approximately a 3% area overlap of PSSA designated areas with currently identified EBSAs. These include two areas in the Pacific; the Galapagos Islands and Malpelo Island (Fig 3); the Eastern Caribbean/Saba Bank area (Fig. 3), and one in the Mediterranean; the Straits of Bonifacio (Fig 4.).

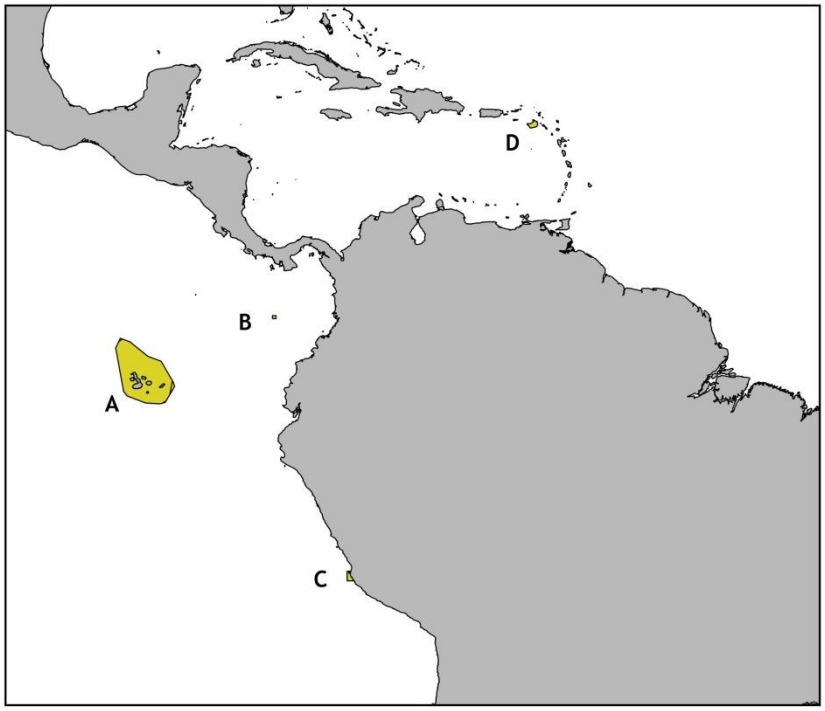

Figure 3. Overlapping PSSA and EBSA regions around the Galapagos Islands (A), Malpelo Island (B), Peruvian Upwelling Core (C) and the Eastern Caribbean (D)

It appears, therefore, that even though the two sets of criteria used for PSSA and EBSA description show convergance around the establishing of areas of ecological sensitivity,there currently is very limited geographical overlap.

The key criteria for establishing PSSAs is the vulnerability of an area to international shipping activity. Spatial analysis of EBSAs, PSSAs, and shipping density data does show that certain areas exist where the co-occurrence of ecologically or biolgically significant systems and high shipping density have been used to instigate the designation of a PSSA; the best example being the Saba Bank (Fig.5). Here the AIS derived data shows a clear

increase in shipping density around the Saba Bank in particular, as well as along the whole of the archipelago to the south, all of which falls within the Eastern Caribbean EBSA.

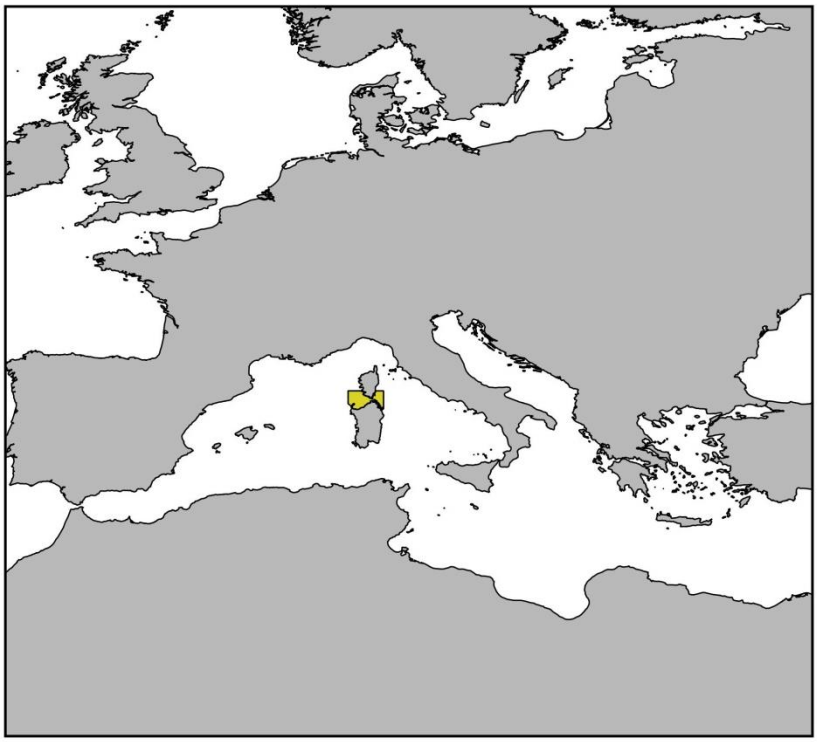

Figure 4. Overlapping PSSA and EBSA regions in the Straits of Bonifacio

One of the potential reasons why more PSSAs and EBSAs do not overlap is because whilst ecological and biological criteria are common to both, only PSSAs consider the shipping signal. In addition, it should be noted that the areas found to meet the EBSA criteria are yet to be assessed with regards to vulnerability to shipping, amongst other potential impacts. It should also be noted that some of the areas may not be subject to high levels of international shipping traffic and other areas described as EBSAs, consist of significant proportions of the High Seas where there are currently no PSSA designations. It is clear from the GIS analysis that the AIS data utilised for this study is not particularly fine grained enough in many areas. Furthermore without far greater levels of background information pertaining to size of vessel, a more frequent interval of data capture and a much finer level of spatial granularity, the judgement of vulnerability due to international shipping is somewhat generic and limited in usefulness. For example, the Straits of Dover, an area of significant maritime traffic, is almost indistinguishable in the data, since the

granularity of the grid used to calculate shipping density is too large to always pick up such small local areas. A similar situation is evident in the Straits of Malacca. Additionally, the Wadden Sea, an established PSSA, is also seen to have low or insignificant traffic density. However, the case for the designation of the Wadden Sea based upon ecological sensitivity and risk from shipping was established in 2002. It appears, then, that the influence and vulnerability from shipping, based upon this global AIS data alone, will only highlight areas where shipping activity is averaged over a specific period of time over a fairly large area (i.e. approximately 60 square miles).

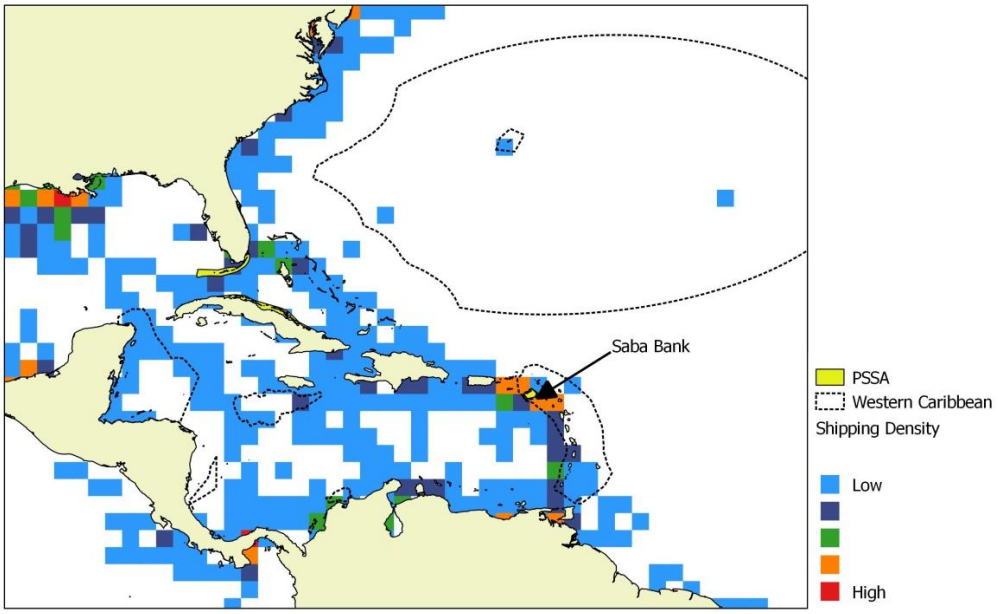

Figure 5. Shipping density, PSSA designation (solid yellow), and EBSA description (area enclosed by dashed lines) in the Caribbean, highlighting the Saba Bank

Another example, where the large scale global AIS data may not give the whole story is in the Tubbataha Reefs area of the Sulu Sea (Fig. 6). In this area, shipping density appears relatively low, yet within this area there may be more hydrographically and oceanographically constrained routes which are not picked up on such a large scale of AIS measurement. Establishing PSSAs in much smaller areas, such as the Banc d'Arguin, might find global AIS data useful but a more localised data set would need to be used in order to yield a more accurate estimate of risk and vulnerability.

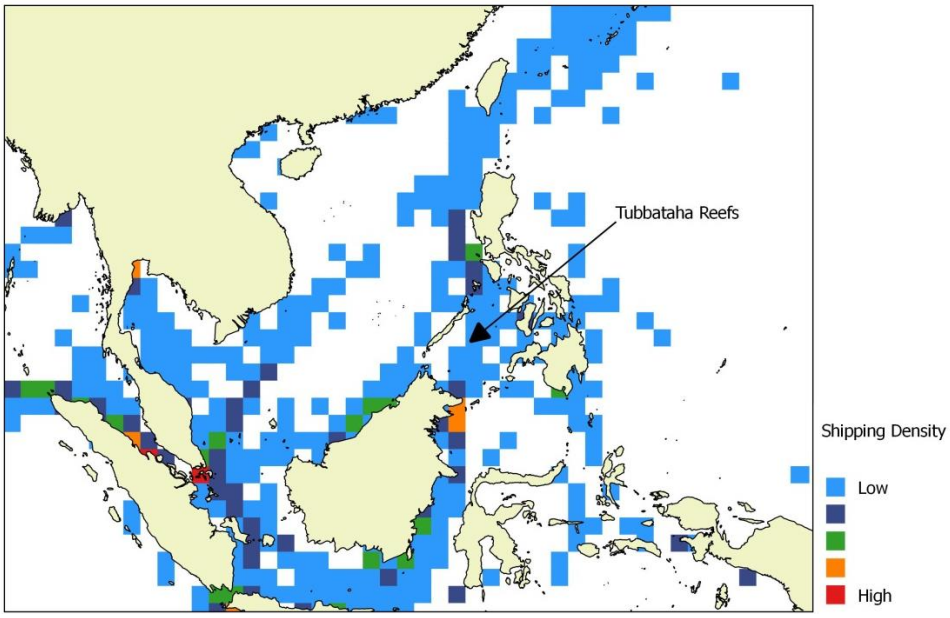

Figure 6. Shipping Density in the Tubbataha Reefs area

3.6. Can shipping density and the description of EBSAs help establish potential PSSAs?

Whilst existing PSSAs and EBSAs currently rarely intersect, and more local data on shipping risk is needed for establishing risk in smaller spatial areas, such as PSSAs, it may still be possible to use global AIS data and the description of EBSAs as a *prima facie* argument for PSSA designation.

Much maritime traffic appears to be congregated outside of many of the 204 EBSAs that have been described so far. This is, in part, since EBSAs extend into areas of High Seas, either into areas where shipping lanes do not tend to occur, or where the relative expanse of space at least lowers density to negligible levels. Similarly, many EBSAs have been defined as falling outside of the coastal routes populated by many ships. Two notable exceptions appear around Southern Africa and within the Mediterranean. Around Southern Africa many small coastal areas have been described as EBSAs, and shipping routes hug relatively close to the coastline (Fig. 7), presumably for safety reasons and access to ports.

In the Mediterranean (Fig. 8), the relatively higher shipping activity in a relatively small marine space increases density. At the same time, much of the coastal water around the countries fringing the Mediterranean has been identified as ecologically significant. A more localised analysis has lead to the Strait of Bonifacio being designated as a PSSA. This

complex interplay between higher density of shipping and a multitude of sensitive areas means that the Mediterranean is of significant importance when considering the risk of shipping to the marine environment.

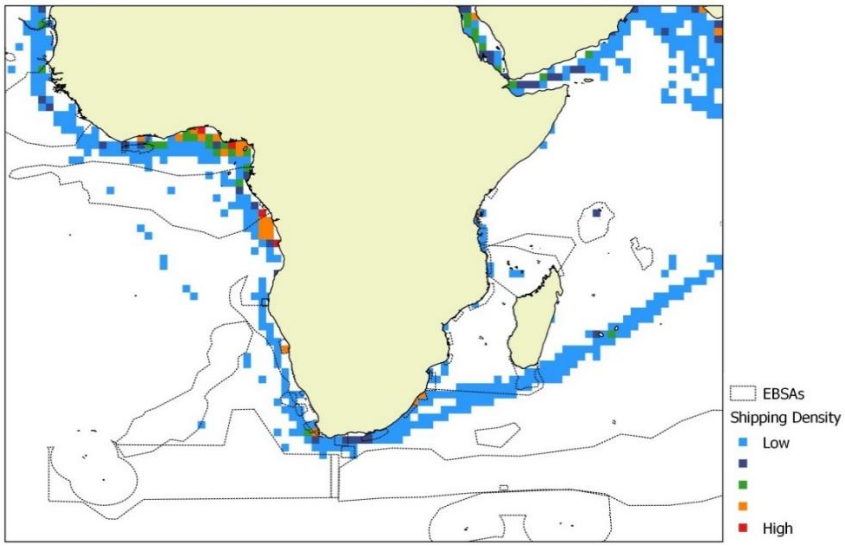

Figure 7 Shipping density and EBSA description around the coast of Southern Africa

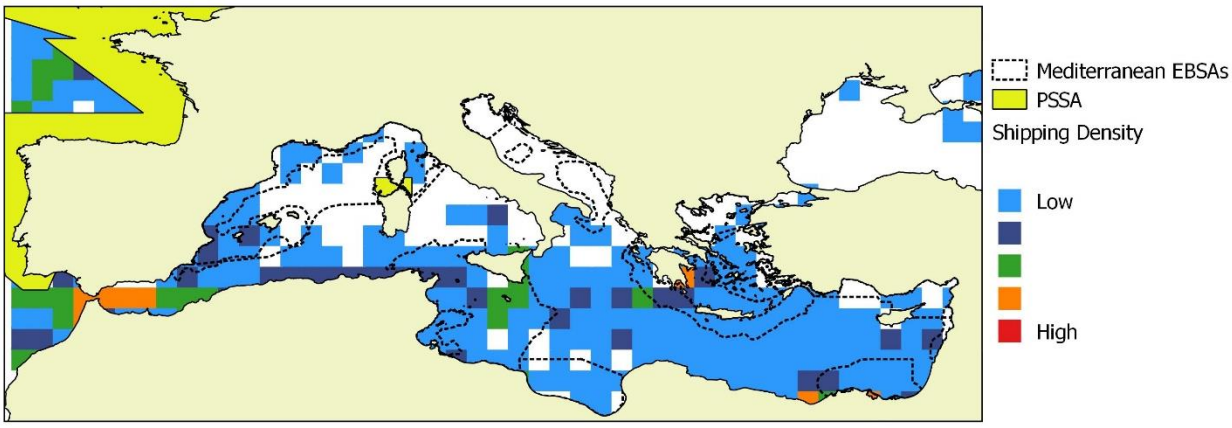

Figure 8. Shipping density and described EBSAs in the Mediterranean

4. ISSUES PERTAINING TO THE REVIEW PROCESS

When considering the correlations and synergies between EBSAs and PSSAs that have the potential for complimentary actions, these are currently limited as the majority of EBSAs identified to date do not have commonality of area with existing PSSAs or potential PSSAs.

Whilst the criteria for designations do have strong similarities there is still a requirement for a PSSA to demonstrate vulnerability to international shipping activity. Additionally, until there is free exchange of pertinent and relevant data there is little opportunity to link the two designations. However should easily accessible exchange of relevant data be available, there is an opportunity for consideration of both commonality of criteria and sensitivity of an area, be it for PSSAs (existing or future) or EBSAs, in order to further the protection of the marine environment.

Roberts *et al.* (2005) argued that some of the PSSA designations were misdirected or their purpose unclear. An example of misdirection being the Western European PSSA which was submitted for designation following a string of accidents involving major oil spills within the proposed area. This PSSA encompasses a vast area with several different ecosystems and includes World Heritage Sites and other protected areas. Currently, this area, along with the Baltic Sea and the Wadden Sea PSSAs have not been the subject of a CBD EBSA regional workshop to describe areas that meet the EBSA criteria. This does not mean that these regions do not exhibit areas that meet the EBSA criteria, but rather that such an exercise could be helpful in describing potential EBSA's in these regions. Due to the extent of the area, actual vulnerability to shipping varies throughout, and, as such, a range of APMs could have been incorporated. However, only one APM exists, this being mandatory reporting. At submission a second APM was proposed, which suggested a ban on single hulled tankers transiting the area. This was not an APM that currently existed within the remit of the IMO and was seen by some as the reason behind the designation, thereby questioning the appropriateness of such a designation. Whilst this measure was disallowed it did however force the issue of phasing out of single hulled tankers by the IMO which has now been accelerated. Such a situation might be indicative of a general tendency towards lack of co-operation, shared information, and 'joined up thinking', which needs to be addressed.

Furthermore, in terms of assessing impacts of shipping (as well as other sectors) on described EBSAs, it would be useful to consider the Convention on Migratory Species (CMS) scientific report (Kot et al, 2014) where the occurrence of CMS listed species in each EBSA was analysed. This study would be particularly relevant for listed cetaceans with respect to risks of ship collision for example, as well as underwater noise, among other threats.

5. CONCLUSION

There is clearly a way in which described EBSAs can be utilised as a decision making tool, where the mapping of ecologically or biologically significant marine areas against specific criteria can help identify potential PSSAs as well as for the development of documentation to support a proposed PSSA designation. The fact that EBSAs are also described in areas which fall under national jurisdiction provides a further tool for the identification of future PSSAs. The fact that an area has been described as an EBSA could strengthen any proposed designation in the same way as an area identified as a World Heritage Site enhances a PSSA designation. However as described EBSAs can only be reviewed with respect to ecological and biological significance to identify potentially vulnerable areas, there is then the need for the collection and application of shipping data which is accurate and at the appropriate level of resolution. Furthermore there is then a need to consider the vulnerability or risk presented in order to identify what, if anything, can be put in place that has a legal standing and which would address and help to reduce the potential impact of the identified vulnerability. If accurate shipping data can be collected, applied and reviewed against the ecologically focused PSSA criteria there may be some potential to create further designations. A further consideration which currently limits the utilisation of EBSAs to identify potential PSSAs is the lack of a central repository for information that can be accessed freely by interested parties. Until such time as this occurs, the value of describing EBSAs identification is currently of somewhat limited use to States who are looking to propose new PSSAs. However it is suggested that when considering potential PSSAs in future that interested parties should be directed to consider the existence of EBSAs and utilise commonality of scientific criteria and data, where available to support the designation. Likewise when considering EBSAs there is the potential for interested parties to consider whether an area is vulnerable from shipping and if so, to highlight this to the IMO, through the appropriate channels, as an area that may be deemed appropriate for designation as a PSSA.

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